POWERCO

GAS ASSET MANAGEMENT PLAN

2020

CONTENTS

1 EXECUTIVE SUMMARY

To be your reliable partner, delivering New Zealand's energy future.

Powerco Corporate Vision

During the past 30 years, Powerco has grown to become one of the largest electricity and gas distributors in New Zealand. Powerco's gas network supplies customers in five regions across the North Island: Wellington, Hutt Valley & Porirua, Taranaki, Manawatū & Horowhenua and Hawke's Bay. We are proud to provide this important service to so many households and businesses across the North Island.

To achieve our vision, Powerco's asset management aims to achieve industry-leading practice. In 2020, we are working towards to ISO 55001 certification, an internationally recognised asset management standard. Powerco's strong Environmental, Social and Governance (ESG) leadership saw it maintain a Global Real Estate Sustainability Benchmark (GRESB)[1] 5-star rating in 2019, and for two of the four years, being ranked first in the peer group.

Powerco's operational context has remained broadly consistent with that of its previous Asset Management Plans. The move towards a net-zero carbon future, along with the as-yet unknown impact of the COVID-19 pandemic, will no doubt present challenges to our business. Nonetheless, we are confident that our specific, forward-facing objectives will continue to enhance our service for customers in both the short and longer term.

1.1 OUR CUSTOMERS AND ASSETS

Powerco's gas distribution network starts from the Transmission System Operator's (TSO) designated gate station handover point. From there, Powerco takes care of the retailer's gas, usually up to the inlet of the Gas Measurement System (GMS), commonly referred to as the 'gas meter', that supplies the end user / customer.

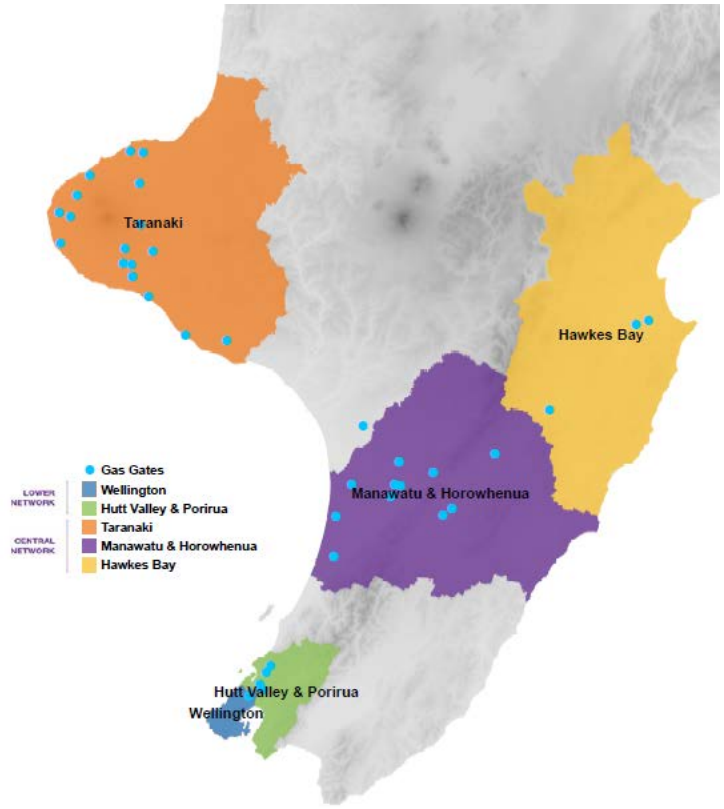
Our assets supply approximately 111,000 customers (or Installation Control Points – ICP), in the North Island (about 39% of the country's total gas connections). The Transmission System Operator (TSO) owns the gate station and assets upstream of the handover point, and Powerco owns the downstream distribution assets. Powerco's assets comprise approximately 6,900km of mains and service pipes (active and inactive). Powerco also operates ~60,000 Gas Measuring Systems (GMS), which are not covered by this AMP. Our network is the second largest in New Zealand in terms of length and number of customers connected.

Our gas network is not a single, interconnected system. Powerco services five separate geographical regions, with a total of 36 gas gate stations that feed 35 sub-networks (one subnetwork has two gas gate stations).

As shown in Figure 1.1, our five regions are:

- Wellington
- Hutt Valley & Porirua
- Taranaki
- Manawatū & Horowhenua
- Hawke's Bay

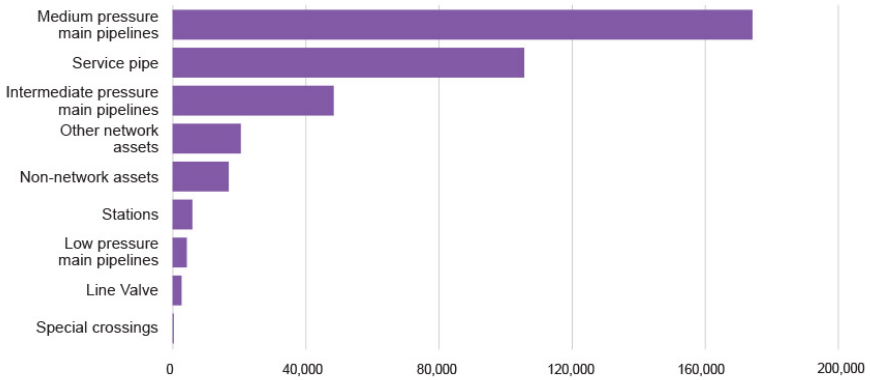
Figure 1.1: Powerco's network shown by region



[1] GRESB is an independent environmental, social and governance benchmark for real assets, defining the global standard for sustainability performance for real estate and infrastructure businesses worldwide.

Powerco's gas network assets have a forecasted regulatory asset base (RAB) value of $383m, as at 30 September 2020. Figure 1.2 shows the RAB value by assets class (based on an extrapolation of a breakdown of net book value). Section 3.4 details the breakdown of our assets per region.

Figure 1.2: RAB value by gas assets type ($000) as of 30/09/2020



Powerco's network assets serve residential, commercial and industrial customers. All our customers receive the same high level of service in terms of reliability, system condition/integrity and gas quality. We prioritise the safety of our network, so we maintain a consistent approach to system condition and reliability. This means we do not offer different levels of gas supply quality to different customers.

We do however classify our customers for capacity and commercial purposes. The majority of Powerco customers, by number of Installation Control Points (ICPs), are residential customers who use gas for cooking, hot water and warming their homes.

While we have comparatively few large industrial customers, they consume the highest volume of gas (see Table 1.1).

Table 1.1: Comparison of network customer numbers with gas consumption (as of 30/09/2020)

CUSTOMER TYPE	GAS CONSUMPTION (%)	NUMBER OF ICPS
Residential/Small Commercial	36	107,844
Commercial	24	2,879
Industrial	40	102
TOTAL	100	110,825

1.2 ORGANISATIONAL FOCUS

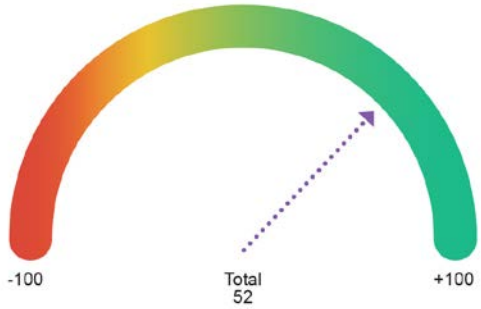
Our operating environment has been stable in recent years as we work within the Commerce Commission's Default Price-Quality Path (DPP) regulatory framework. This has allowed us to focus on increasing our level of customers service, maintaining our operational safety and achieving our Asset Management Objectives.

We have programmes in place to maintain our current high level of customer service and safety performance, and to facilitate the uptake of gas as a desirable energy source across our network. We are also working to drive better operating efficiency and lift our asset management capability.

Current key programme areas include:

- **Customer service:** A Net Promoter Score (NPS) survey is regularly conducted by the Gas Team. The NPS survey is used to help us understand our customers' perception of our service. The latest survey in 2019 achieved an NPS of 52% (on a scale of -100 to +100) as shown Figure 1.3. The survey identified that 58% of our newly connected customers would recommend our services.

Figure 1.3: Net Promoter Score – 2019 survey



While this is a positive result, Powerco is not complacent. We recognise that gas is a discretionary fuel and to continue our success we must maintain high levels of service and reliability to our customers.

- **Managing the safety of our operations:** Maintaining high safety standards across our gas network is paramount and non-negotiable. Powerco's business practices and processes are mature and well-executed, allowing for safety to be built into everything it does. Safety standards and changing legislative requirements significantly influence Powerco's investment decisions and operational expenditure. We have put in place an extensive inspection programme across all parts of our network, which ensures we have effective response times to faults and emergencies.

Safety is the key priority and a non-negotiable for Powerco. We are continually striving to improve and enhance public safety and provide a safe work environment for our team, including our contractors. Network designs that were acceptable when constructed are routinely reviewed against current best practice. We want to ensure we can reduce the risk of harm as far as is reasonably practicable.

- **Zero-carbon policies and sustainability:** Our society's views and expectations around climate change, particularly fossil fuels, are shifting significantly. Our planning takes this into account as part of our focus on improving customer service, operations and asset management maturity.

  Powerco believes that natural gas has an important place in the energy future. Powerco expects that there will be an increasing demand for energy that is affordable, reliable and secure. Natural gas has an ongoing role to meeting this need and can significantly lower greenhouse gas emissions when it displaces coal and other hydrocarbon fuels. Powerco is continually looking at how to best to use its assets to meet these needs.

  The long-term role that natural gas will play will be greatly influenced by the economics of a wide range of developing technologies. Of particular interest, hydrogen and biogas technologies could enable a transition to a zero-carbon gas ecosystem that retains the beneficial characteristics of natural gas. There are already numerous examples of hydrogen and biogas supplementing natural gas around the world and Powerco is assessing the opportunities in New Zealand.

  This AMP planning period is guided by current usage trends, despite the long-term uncertainty. The demand outlook for the AMP planning period is informed by the strong demand for new residential connections, growth in commercial and industrial sectors and positive customer survey feedback. However, with new assets having lives of 50 years or more, Powerco is monitoring developments and indicators very closely to understand and manage the risk of underutilised investments.

  Powerco works hard to protect its positive partnerships and stakeholders' relationships. We know we have a responsibility to manage our networks and engage with our stakeholders in a way that promotes the ongoing economic supply of our natural gas resource to industry and homes. This must also be done without undue impact on New Zealand's environment. Our commitment to this approach is reflected in our alignment with ISO 31000 and our continued work regarding the potential effects and impacts of climate change on our assets and services.

- **Asset management improvement:** Asset management is another focus within Powerco. We want to derive the value from our assets to improve the service we provide for our customers. As such, we are always looking at how we can improve. We use the asset management maturity assessment tool (AMMAT) to measure how we are tracking. This year, Powerco achieved an overall score of 2.8 out of 4, compared with 2.7 in 2018.

  We are also looking to align our asset management with industry-leading practice, which we consider to be ISO 55001. A 2018 independent review of our ISO 55001 alignment recommended enhancing our asset management system process and improving documentation. This alignment is currently underway, and we are aiming to achieve certification in 2020.

- **Embedding our enterprise resource planning system:** Powerco recently commissioned a new enterprise resource planning (ERP) system. This is a key initiative to improve operational processes and transform asset data into insightful information. The Powerco team is now undertaking process improvement activities to ensure the tool is used effectively and efficiently.

- **Information management:** Powerco's data quality has been inconsistent because of our past amalgamation. We want to improve our information management processes for the longer-term to provide more efficient services for our customers. Our new ERP is an opportunity to expose and clean up erroneous or missing asset data. We appreciate that maintaining high quality asset data will be a challenge and many areas of improvement will be identified and progressively implemented during the next few years.

1.3 KEY CHALLENGES

We recognise that gas will be facing challenges in the future. Powerco has a robust strategic management process to help balance competing business priorities, and also look towards our customers for guidance on where we should direct our business. The expect to face the following key challenges during the upcoming AMP planning period:

- **New connections and zero carbon policies:** The introduction of the Climate Change Response (Zero Carbon) Amendment Act 2019 and the banning of new permits for offshore gas exploration mean an uncertain future for the supply of natural gas and therefore the industry. These shifting societal and government views make attracting new customers to gas network more challenging. While there's uncertainty around the supply of natural gas, we have assumed no constraints to supply for the planning duration. Powerco believes that natural gas networks will continue to play an important part in New Zealand's energy future as gas provides a secure, affordable energy. Natural gas also has the potential to lower greenhouse gas emissions when displacing coal and other hydrocarbon fuels.

  Powerco's natural gas brand, The Gas Hub, connects industry players and customers. The Gas Hub encourages potential customers to switch to gas by informing them about the benefits and providing cost calculators to compare gas against other fuel sources, such as electricity. Its success has led Powerco to connect more than 2,500 customers in the past financial year.

  The number of customers connected on our network during the past few years has grown faster than forecasted. This has been off the back of New Zealand's strong economic activity. The impact of COVID-19 is still not clear, however

due to uncertainty surrounding gas supply and the shifting societal and government views, it is difficult to say whether current growth rates will be sustained long-term. However, we expect the connection growth rate during the planning period to remain consistent with the previous few years. Past a five-year period, our forecast is more conservative, assuming a stable number of connections from Regulatory Year (RY) 22 onwards.

- **Innovation and emerging technologies:** Changing customer views on carbon emissions and accessibility of usage data mean the natural gas industry must adapt. With significant shifts happening within the electricity sector also, we are being asked to redefine our operating methodology and be more innovative in our customer service offerings. Increasingly our customers want to have greater real-time visibility of usage (e.g. smart meters). On a broader scale, we recognise the need for Powerco to define its position and ongoing role in the net zero carbon future. It is clear that innovative technologies will provide both opportunities as well as challenges to our normally stable operations.
- **Stable prices and operating efficiency:** Powerco want to deliver consistent prices to customers and has a strong history of achieving this. Our challenge is to maintain stable price outcomes when input costs are generally rising. We aim to continually achieve this through a strong emphasis on support and operational efficiencies. As a business, we constantly test our cost base and operating efficiency.

  Powerco outsources field services work and day-to-day network operations. We periodically retender our five regional field service agreements, which allows us to establish market-tested unit rates for specific work on the network. This includes high-volume work, scheduled maintenance, and emergency and fault response. Our model enables greater operational efficiency and ownership of critical asset management tasks by our team, including work planning, design, scheduling, and stable prices. All of this delivers ongoing value for our customers.
- **Scarcity of field resources:** With Powerco's long-term contract structure, we encourage our service providers to invest in training and equipment to meet our future requirements. We play a big part in promoting gas industry careers through our investment in the Gas Association of New Zealand (GANZ) and the industry training organisation, MITO. Progress is slow, but we are seeing changes to the NZQA qualification structure and training providers that will support an increase in field resources in the next few years.
- **Asset investment drivers:** As at 30 September 2020, Powerco's gas distribution network assets have an average age of 28 years, with a remaining useful average asset life of about 35 years. Generally, this indicates that, based on asset age alone, there is no major reason to change the annual level of maintenance or asset replacement and renewal. However, our team has identified some asset classes that require replacement sooner than the expected regulatory life.

  With most of our asset underground, Powerco has the challenge of checking the condition of underground assets without digging them up. We often must take a predictive approach based on previous failure data, to identify when and where failures may happen. This AMP sets out various initiatives that are being progressed or are at the planning stage.
- **Design and information standardisation:** Powerco's gas network has developed over time through the acquisition of smaller, discrete networks. These individual networks are fully integrated into the Powerco Gas business but geographically they remain as discrete islanded networks. They were built using different design philosophies and operated and maintained using varying standards. This means Powerco owns and maintains a diverse stock of assets. One of our strategic asset management focuses is to standardise these assets when it is cost effective to do so. This will lead to better efficiency and is a key consideration when assessing options to replace or enhance assets.

1.4 FORECAST OF EXPENDITURE

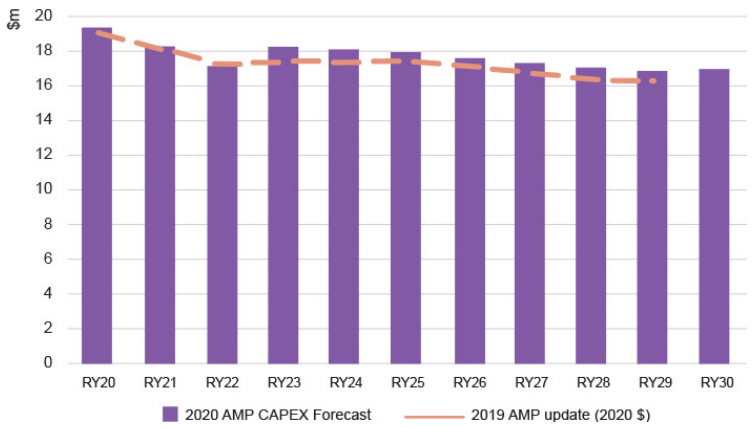
This AMP sets out an investment profile aimed at meeting long-term network requirements (e.g. demand and growth) and reducing asset risks. We discuss the rationale for expenditure in the context of specifically identified asset or network risks and required operational tasks. A detailed breakdown of the expenditure forecasts is in Chapter 9.

1.4.1 CAPITAL EXPENDITURE

Figure 1.4 shows an annual total capital expenditure (in constant terms) over the AMP planning period. The capital investment profile over the next 10 years is based on these main points:

- Maintain growth and connecting new customers.
- Seek to maintain our network capacity while improving our customer service throughout the period.
- Replace or renew our high-risk assets; the expenditure category will change depending on the risk the asset presents.
- Strengthen the resilience of our networks with the implementation of our Network Strategies (see Chapter 7).
- Optimise our support functions through non-network capital expenditure; for example, new IT systems.

Figure 1.4: Capital expenditure forecast (constant $)



1.4.1.1 CUSTOMER CONNECTION

We plan to spend approximately $7.1m on customer connections works in RY20, and 40% of total Capex over the entire AMP planning period.

Our overall customer connection capital expenditure is higher than our previous 2019 forecast. This is because customer connection activity is higher than expected. Not only do we connect more customers every year, we've also seen an increase in large, hard to forecast, one-off customer-initiated work.

We anticipate the impact of the net-zero carbon policies won't have a strong impact on residential connection rates for a few years. However, we are attempting to maintain a positive perception of natural gas to maintain our connection rates over the next few years. Larger customer-initiated jobs are programmed on a reactive basis. Our connection forecasts have been adjusted to reflect these changes and to take into consideration the key challenges in our future.

1.4.1.2 ASSET REPLACEMENT AND RENEWAL

We plan to spend approximately $3.9m on asset replacement and renewal works in RY20, and 23% of total Capex over the entire AMP planning period.

Our asset replacement and renewal expenditure estimates have been developed in response to the current and projected states of our assets. High-risk assets are identified through condition information, age profile and expected life, and against an assessment of current and predicted performance.

Asset replacement and renewal expenditure is relatively stable and predictable. The main reason for expenditure is the replacement of pipelines prone to leakage, including:

- Pre-1985 PE pipe
- Unprotected steel pipe
- Plug valve

1.4.1.3 QUALITY OF SUPPLY

We plan to spend approximately $2.8m on quality of supply works in RY20, and 11% of total Capex over the entire AMP planning period.

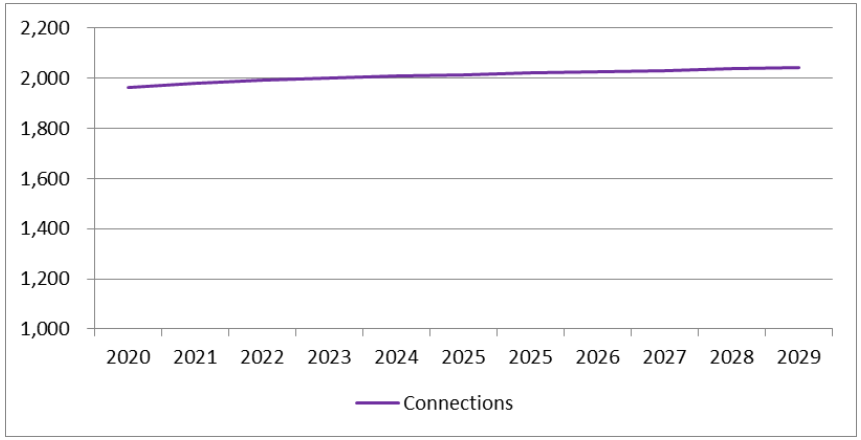
Ensuring quality of supply of our network is of paramount importance to Powerco. We plan to ensure our network will continue to provide sufficient capacity and pressure given forecasted demand growth. Our new Rationalisation Strategy (see Section 7.8) provides another avenue where we can develop a simpler, more efficient networks to provide savings to our customers.

1.4.1.4 SYSTEM GROWTH

We plan to spend approximately $1.5m on system growth works in RY20, and 10% of total Capex over the entire AMP planning period.

The primary driver for system growth expenditure is the need to increase our current network capacity to meet forecast demand and to deliver better security of supply for customers on specific parts of the network. The exact impact of COVID-19 and net-zero carbon policy is difficult to ascertain. However, during the next 10 years, we forecast continued growth in the new connections on our network (as per Figure 1.5).

Figure 1.5: Forecast of total number of new customer connections per annum



1.4.1.5 RELIABILITY, SAFETY AND ENVIRONMENT

We plan to spend approximately $1.1m on reliability, safety and environment works in RY20, and 7% of total Capex over the entire AMP planning period.

We want to limit risks to safety and our environment, as much as is reasonably practicable. We have concerns around exposed District Regulation Stations (DRS) in high-density areas, which can be vulnerable to accidental damage. We address this risk through our DRS Undergrounding Programme as detailed in Section 6.3.5.3.

1.4.1.6 NON-NETWORK IMPROVEMENTS

We plan to spend approximately $2.6m on non-network improvements works in RY20, and 9% of total Capex over the entire AMP planning period.

Our new ERP system and replacement of associated business applications comprises most of our non-network expenditure. Our main initiatives include improvements to:

- Our corporate ERP system
- Quality of information on assets
- IT systems to improve works management efficiencies

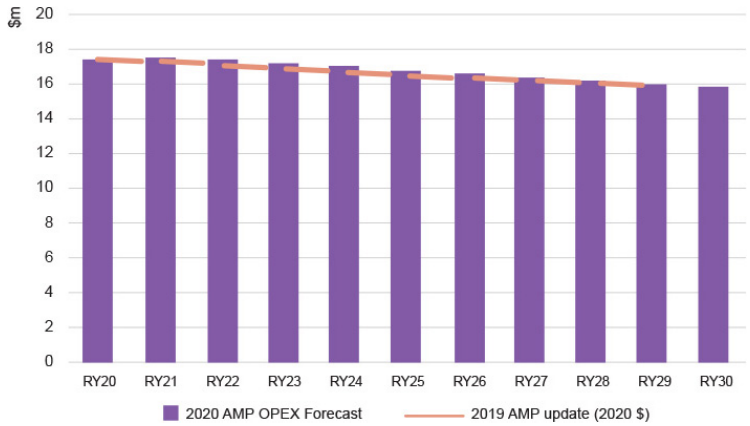
1.4.2 NETWORK OPERATING EXPENDITURE

Figure 1.6 shows an annual breakdown of total operating expenditure (in constant terms) over the AMP planning period. Network operating expenditure is the part of our total expenditure directly associated with running the gas distribution network.

A large proportion of our network expenditure (approximately 50%) is mandatory and is dictated by legislation or industry standards and codes of practice. Our projected forecast shows network operating costs will remain flat throughout the AMP planning period.

Overall, Opex (in constant terms) is forecast to reduce, driven by declining Business Support expenditure due to scale efficiencies and a focus on process efficiencies.

Figure 1.6: Operational expenditure forecast (constant $)



1.5 CONCLUSION

Powerco is committed to providing a safe, high quality gas supply to its customers. We are here to bring the power to your door, and we are proud to deliver gas to households and businesses across the North Island.

Our commitment is reflected in our 2020 AMP, which is the fourth disclosed AMP for our Gas business. This AMP has evolved from previous versions, as we progress on our asset management journey. It is better aligned with ISO 55001 as we work to achieve industry-leading practice. It also describes our vision and plans for the long-term management of our gas assets, to ensure continued improvement in our service delivery for our customers.

As one of the largest electricity and gas distributors in the country, Powerco has a key role to play in New Zealand's energy mix. We know that the move towards a net zero carbon future and the effects of COVID19 will impact on our operating environment and present challenges to our business. However, we have taken these uncertainties into consideration in our planning. The Powerco team is confident that our specific objectives will enable us to continue to enhance our gas supply service to our customers now and in the coming years.

2 INTRODUCTION

2.1 PURPOSE OF THE DOCUMENT

The purpose of this AMP is to set out the long-term plan for the management of Powerco's gas distribution assets. It describes, at a practical level, how we strive to efficiently utilise our resources and achieve the right balance between cost and service quality. The AMP describes how we manage our asset portfolio to achieve our overall vision *to be your reliable partner, delivering New Zealand's energy future*. To achieve this, we ensure we manage our gas network assets, throughout their entire lifecycle to continue growing gas as a leading energy choice for New Zealand, enabling us to provide excellent customer service, and a consistent safe, reliable and cost-effective service.

This AMP is a living document that represents the current status of our asset management plans. This AMP covers the planning period from 1st October 2020 to 30th September 2030, with a focus on work programmes planned for the next three to five years.

As our asset management processes include a continual improvement cycle, we learn more about how to deliver better value to our customers through efficient management of our networks. Therefore, what we describe in this document may change as we strive to improve.

This AMP was approved by the Powerco Board of Directors on the 11th August 2020.

2.2 KEY ASSUMPTIONS OF THE AMP

This AMP is based on some assumptions that underpin our operating environment and therefore our business strategies. These assumptions are:

- There is no major change to the regulatory regime.
- The gas industry structure broadly remains the same and Powerco continues to operate as a non-vertically integrated industry.
- Asset lives remain aligned with the standard lives prescribed in the Input Methodologies.
- Field services continue to be outsourced, and there are no major disruptive changes to the availability of contractors.
- New Zealand will become a low-carbon economy by 2050.

To the extent possible, all the assumptions made in developing this AMP have been quantified and described in the relevant sections. Where an assumption is based on information that is sourced from a third-party, we have clearly set this out.

2.3 STRUCTURE OF THE 2020 AMP

The aim of the AMP is to demonstrate the efficacy of our asset management strategy and practice. This AMP has been structured, as per Figure 2.1, to reflect the elements of our Asset Management System (AMS).

We begin by describing the overall governance and policy, our Asset Management Objectives, and the historical and targeted performance measures (driven by our Business Plan and Asset Management Policy). We then outline the asset strategies developed to achieve our objectives, and the associated asset lifecycle and network growth plans. The AMP culminates in a summary of our 10-year planning period expenditures and confirmed projects. Detailed supporting information, referenced throughout the AMP, is included in an Appendix to the AMP document.

Our AMS describes what we do day-to-day. Each element has a different operational timeframe, ranging from daily operations management to less frequent but regular assessment of the effectiveness and performance of our asset strategies. Our longer-term Asset Management Objectives and goals are reviewed annually but are typically implemented over much longer timeframes.

The AMP lists the scheduled works to be completed during the AMP planning period. These have been prioritised based on our value drivers (see Section 5.2.3). This prioritisation ensures our work both provides value to the business by being directly aligned with our Corporate Mission and decreases the presented safety and network risk of our asset portfolio.

The Asset Management Objectives and strategies align with our corporate objectives, and by extension, corporate policy and strategy. In this way the AMP reflects an overall approach to asset management that provides a direct line-of-sight to our corporate goals.

Figure 2.1: Structure of the AMP

3 POWERCO OVERVIEW

3.1 INTRODUCTION

For more than a century, Powerco (and its predecessors) has distributed electricity and gas to New Zealand homes and businesses. During the past 30 years, Powerco has grown to become one of the largest gas distributors in New Zealand. Our gas network supplies customers in the Wellington, Hutt Valley, Porirua, Taranaki, Manawatū, Horowhenua and Hawke's Bay regions. As long-term stewards of the network assets, our aim is to manage the network to deliver a safe, high-quality and highly efficient gas supply. Simply, we work to ensure we deliver a safe, high-quality and highly efficient gas supply while maintaining exceptional service to our customers.

We have two shareholders, QIC (58%) and AMP Capital (42%). Their focus is to deliver long-term value to both our customers and shareholders; and recognise the role we play in the supply of energy to New Zealanders. Our Vision, Mission And Values are centred on these aspirations.

Asset management is the coordinated activity of an organisation to realise value from its assets. Good asset management is fundamental to business success. The first step of asset management is to understand our assets, our customers' needs, and the current and future operating environment.

Unless specified otherwise, the figures presented in this section represent operational assets commissioned before 30th September 2020.

3.2 POWERCO'S VISION, MISSION AND VALUES

Our **Vision** requires us to effectively manage, maintain and improve our assets and to safely and reliably deliver the energy that our customers expect – today and into the future. The New Zealand electricity and gas distribution sectors are heavily regulated and, as such, our investment and pricing decisions must be made in consultation with our regulator. However, we have an overriding responsibility to our shareholders and customers to make good business decisions that help us achieve the Asset Management Objectives (refer to Chapter 4) that we have set ourselves.

To be your reliable partner,
delivering New Zealand's energy future.

Powerco Corporate Vision

This AMP describes our journey towards achieving this vision over the next 10 years.

Our **Mission** statement seeks to specify how the business will achieve our vision. The Mission statement also highlights the essential requirements of a diligent network distributor to be able to safely, consistently and efficiently manage and operate a gas distribution network.

"In profitable **partnership** with our stakeholders, we are powering the future of New Zealand through the **delivery** of **safe, reliable** and **efficient** energy."

Powerco's Mission Statement

The natural gas we distribute is extracted in the Taranaki region. It is plentiful and one of the cleanest sources of non-renewable energy available, especially when it displaces electricity derived from thermal power plants or coal-fired heat. There is currently no other source of widely available energy that New Zealand businesses and organisations can use to produce industrial-grade heat they need to operate, contributing to New Zealand's economy. Natural gas is an effective and efficient energy source that supports New Zealanders and the New Zealand economy.

New Zealand is transitioning towards a low-carbon economy, and so are our networks. Everything we do as a business aims at meeting customer demand now and in the future. We are working on the improvements that will support the transition to a low-carbon future, by allowing other fuels to be transported through our pipes. We believe gas has a role to play in New Zealand's net-zero carbon future.

These themes are key to our business and are reflected throughout this AMP. Our Asset Management Objectives (described in Chapter 4) and our Asset Management Strategies (Chapter 5) show how we put our Mission into effect and what it means for our plans going forward. Establishing The Gas Hub is also instrumental in building strong partnerships with our customers and stakeholders within the communities in which we operate.

Our **Values** define our identity; who we are, and what we stand for. We developed these Values by describing a set of observable behaviours that would be displayed by the typical Powerco employee. The Values define our culture, define the way we go about our work and maintain our relationships with others. Our AMS, and The Gas Hub brand, have embedded these Values into all aspects of our day to day business, from planning through to delivery to the end customer.

Table 3.1: Powerco's values

VALUE	DESCRIPTION
Safe	We are committed to keeping people safe.
Trustworthy	We act with integrity. We are honest, consistent and ethical. We trust each other and our external partners and work to be trusted in return.
Collaborative	We work together with our partners, contribute our capabilities and provide timely support and consideration to achieve our collective goals.
Conscientious	We are proactive, hardworking, diligent and thoughtful. We are mindful of the needs of others and of the environment. We take ownership for our actions.
Intelligent	We make informed decisions for the best outcome. We continually seek improvement and innovative solutions from our suppliers and ourselves.
Accountable	We lead. We take ownership of our decisions and responsibility for our actions. We are proactive in identifying and resolving problems.

Like our Vision and Mission, you will see our Values reflected throughout this AMP in the approach we take to our business.

3.3 ORGANISATIONAL STRUCTURE

Our organisational structure allows us to assign responsibilities and accountabilities at the appropriate level. Clear understanding and communication of each employee's role within the organisation helps us achieve effective long-term, whole-of-life management of our assets.

Figure 3.1 illustrates how the corporate objectives are disseminated from the Board and the Executive team to the planning and delivery teams.

Figure 3.1: Decision-making and implementation responsibilities

3.3.1 GOVERNANCE

Our Board monitors the performance of the business and by extension the effectiveness and prudence of the asset management decisions being made.

It provides strategic guidance, establishing our corporate Vision, Mission and Objectives.

The principal asset management responsibilities of the Board are:

- Overall accountability for maintaining Powerco as a safe working environment and ensuring public safety is not compromised by our assets and operations. It delegates day-to-day asset management responsibilities to the CEO and Senior Executives.
- Review and approval of our AMP, which includes our medium-term (10-year) investment forecasts, and our shorter-term expenditure plans.
- Sanctioning operational or capital projects involving expenditure greater than $2 million, and the divestment of any assets with a value greater than $250,000.
- Review monthly performance and auditing reports. It uses this information to provide guidance to management on improvements required, or changes in strategic direction.

In order to help it make informed decisions, the Board uses a structure that includes two additional committees:

- The Audit and Risk Committee, which is responsible for overseeing risk management practices. The Committee meets quarterly to review processes and controls and review and discuss issues reported by internal and external auditors. It reports back to the rest of the Board.
- The Regulatory Committee, which is responsible for ensuring that Powerco's AMP is appropriate, regulatory requirements are met, and asset-related risks are appropriately managed.

3.3.2 EXECUTIVE MANAGEMENT TEAM

The structure of Powerco's Executive Management Team is as shown in Figure 3.2.

Our organisational structure is based on two asset management-focused units, the Electricity and Gas divisions, with the support of six functional units. This structure enables the Gas division to focus on core activities and decisions and access specialist skills and advice as required.

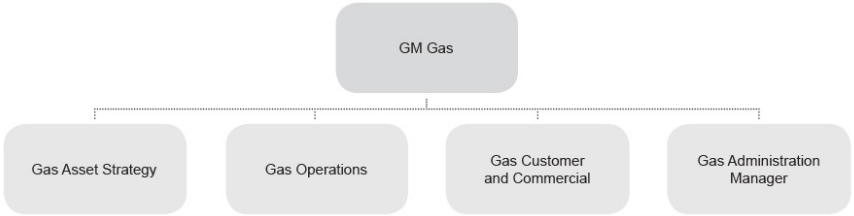
Electricity is a larger component of Powerco, in both budget and resources. Gas leverages its scale and skills on cross-business tactical initiatives when it is efficient to do so.

Figure 3.2: Powerco's Corporate Structure

3.3.3 GAS DIVISION'S RESPONSIBILITIES AND STRUCTURE

The Gas division delivers on the corporate objectives, set by the Board, and reports regularly on progress against them. The Gas division's structure is designed to align it with the main asset management functions, as shown in Figure 3.3.

Figure 3.3: Gas division structure



The gas division's responsibility includes ensuring that the network assets are developed, renewed, maintained, operated and used sustainably and efficiently to meet the needs of all stakeholders.

The following asset-focused groups report to the General Manager:

- **Asset Strategy:** This group is responsible for the asset management function, which involves overseeing long-term activities on the network, sponsoring the asset strategy, and developing, monitoring and analysing asset objectives, performance and reliability. The development of the AMP is part of this group.
- **Operations:** This group is responsible for the preparation and delivery of work on the networks. This includes developing technical standards, design, operation and maintenance, and the management of the contractors working on the network.
- **Customer and Commercial:** This group are responsible for customer relationship management. This includes customer service, customer surveys, and account management of major users on the network. The team helps us maintain a high level of customer service while continuing to grow the network.

3.3.4 OUTSOURCED ACTIVITIES

Core asset management activities and support functions are outsourced to competent service providers. Because of the risks involved with field work, significant controls are in place to ensure the service providers undertake work safely. There are also considerable contractual controls in place to ensure all work is completed to the required level of quality, cost, and timeliness. Our approach to managing external contractors for the delivery of field work is mature and in-line with industry best practice. It is described in more details in Section 3.5.1.1.

3.3.5 INTERNAL SUPPORT FUNCTIONS

The Gas division leverages the corporate support functions to assist with other asset management activities. These support functions include:

- Legal support
- Financial support
- Regulatory support
- Health, safety and environmental advice and support
- Processing of as-builts
- Management of IT services
- Management of facilities

3.4 NETWORK OVERVIEW

Powerco's gas network supplies approximately 111,000 customers in the North Island and comprise approximately 6,900km of pipelines and services. For Information Disclosure (ID) reporting purposes, our gas network is divided into two regions: Central and Lower. Throughout this AMP, we refer to our network having five regions: Wellington, Hutt Valley & Porirua, Taranaki, Manawatū & Horowhenua, and Hawke's Bay. To assist with correlating the ID with this AMP, the regional differentiation is shown in Table 3.2 and Appendix 10.

Table 3.2: Powerco's Regions to ID correlation

REGION	LOWER	CENTRAL	GEOGRAPHIC AREA
Wellington	✓		Urban
Hutt Valley & Porirua	✓		
Taranaki		✓	Rural
Manawatū & Horowhenua		✓	
Hawke's Bay		✓	

Geographic, population and load characteristics differ between Powerco's five regions, necessitating an asset management approach that accounts for the differences while seeking to deliver an equal standard of supply to all customers. Table 3.3 provides the asset breakdown for the five regions.

Table 3.3: Powerco's gas network statistics

ASSET TYPE	HAWKE'S BAY	HUTT VALLEY & PORIRUA	MANAWATŪ & HOROWHENUA	TARANAKI	WELLINGTON	TOTAL
Main pipes	382 km	1,207 km	814 km	916 km	684 km	4,003 km
Service pipes	99 km	484 km	612 km	386 km	470 km	2,051 km
Line valves	281	902	408	381	675	2647
Stations	10	56	62	23	48	199
Special crossings	51	113	66	102	27	359
Cathodic protection systems	1	11	18	17	7	54
SCADA systems	6	19	18	11	23	77

To provide clarity on what assets Powerco operates, this section focuses on:

- Our networks and assets
- Powerco gas customers

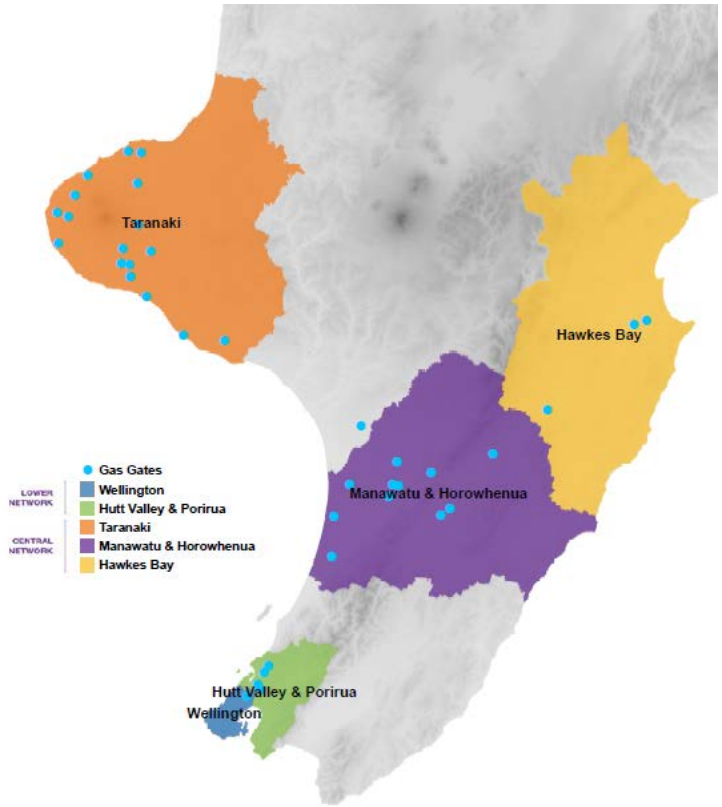
3.4.1 NETWORK AREA DESCRIPTION

Powerco five regions, as shown in Figure 3.4, are:

- Wellington
- Hutt Valley & Porirua
- Taranaki
- Manawatū & Horowhenua
- Hawke's Bay

The geographical and network asset characteristics of each region are described in this section

Figure 3.4: Powerco's network shown by region



3.4.1.1 CRITICAL SUB-NETWORKS

We have identified six sub-networks as being critical as they represent 88 % of the total number of customers connected to our network. Critical sub-networks differ from our regions as they are linked to single supply points, or gas gates; the main difference is that the Hutt Valley & Porirua region has two gas gates. There are numerous smaller gas gates that are not considered critical, but their cumulative impact is shown below, as “Other”, for completeness.

Figure 3.5: Powerco’s critical sub-network characteristics

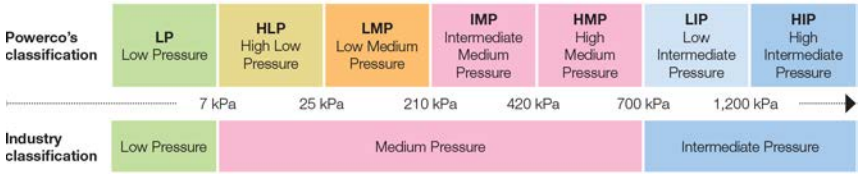
GEOGRAPHIC AREA	GAS GATE	NUMBER OF CUSTOMERS	PERCENTAGE OF ICPS
Wellington	Tawa	31,741	29%
Hutt Valley	Belmont	23,589	22%
Manawatū and Horowhenua	Palmerston North	15,197	14%
Taranaki	New Plymouth	12,189	11%
Porirua	Waitangirua and Pāuatahanui	7,321	7%
Hawke’s Bay	Hastings	5,024	5%
Other	Other	12,620	12%

3.4.1.2 PRESSURE REGIMES

Gas networks can operate at pressures ranging from 7 kPa to 2,000 kPa. Our systems are classified as low, medium or intermediate pressure, per industry standards. These operating pressures are further broken down into seven categories. This split has been chosen to drive efficiency in the supply chain, as they align with equipment characteristics.

Figure 3.6 shows Powerco’s classifications.

Figure 3.6: Powerco’s Pressure Classification



3.4.2 NETWORK CONFIGURATION

The five regions are connected to the gas transmission network by 36 gas gates. The maps in Appendix 11 display the network configuration broken down by gas gate. This includes:

- Main pipes distinguished by operating pressure
- ICPs that have a significant impact on network operations
- Gate stations and pressure regulation stations

3.4.2.1 NETWORK CHANGES

There was one significant change to our network in the period 01 October 2019 to 30 September 2020. This change was the uplift of the majority of the Wellington CBD from LP (7-10 kPa) to HLP (25 kPa).

3.4.2.2 WELLINGTON – AREA DESCRIPTION

The Wellington region is supplied from the gas gate located at Tawa north of the city. Wellington CBD has the largest number of commercial buildings on a single network; it is also the only network that still has a significant quantity of mains operating at low pressure. Over the past three years we can uplifted the entire CBD area to HLP. Three of the four sectors have been completed, with the final sector due for uplift in RY21.

3.4.2.3 HUTT VALLEY AND PORIRUA – AREA DESCRIPTION

Hutt Valley and Porirua region encompasses the three networks located north of Wellington city. They mainly supply residential customers and we observe important subdivision activity in this region.

3.4.2.4 TARANAKI – AREA DESCRIPTION

We operate 17 networks in the Taranaki region. Except for New Plymouth and Hāwera, most networks in the Taranaki area are small, supplying fewer than 1,000 ICPs. They were generally built to supply large industrial customers in their local area, which then allowed the reticulation of adjacent cities or townships. In some networks, the cornerstone industrial customer has shut down, but we still ensure supply to the remaining customers.

3.4.2.5 MANAWATŪ AND HOROWHENUA – AREA DESCRIPTION

Our 13 networks in the Manawatū and Horowhenua regions are small. Only Palmerston North has a dense city network. Some of these networks were constructed to accommodate single large customers (e.g. Kairanga, Kākāriki).

3.4.2.6 HAWKE'S BAY – AREA DESCRIPTION

In the Hawke's Bay region, we operate a single network that covers both Hastings and Napier, supplied by a single gas gate located in Hastings. The defining feature of this network is the relatively large number of major industrial customers and the area is experiencing strong residential growth. This network is the second largest in terms of gas conveyed and has the greatest average volume per ICP.

3.5 OPERATING ENVIRONMENT

The operating environment defines the strategic context in which all decisions within our organisation are made. The operating environment will determine how the corporate objectives are translated into specific, gas-centric, Asset Management Objectives. As such, a clear understanding of the operational environmental factors and how they affect our business are key to making effective decisions. This section will discuss our current understanding of our operating environment, our stakeholders and customers.

Of note, during the past few years, our operating environment has seen growing concerns in environmental sustainability, and the expected ability to be innovative and use emerging technologies to provide energy security while keeping infrastructure costs affordable.

3.5.1 STAKEHOLDERS' INTERESTS

The environment in which we operate is complex and involves many stakeholders, who sometimes have contradictory interests. We endeavour to engage with all stakeholders in a transparent manner to explain our decisions.

To be a "reliable partner", it is our job to assess and balance disparate stakeholder interests in our decisions to make sure we can offer the right service, with the right quality, at the right price. To do this, stakeholders' interests are identified through various mechanisms, for example customer questionnaires and market research. We regularly consult our stakeholders to identify stakeholders' expectations. Clear responsibilities are established inside Powerco to make sure that stakeholder interests are appropriately attended to.

3.5.1.1 STAKEHOLDERS LIST AND MAIN INTERESTS

Our identified stakeholders, their interests and how we identified them, is summarised in Table 3.4.

Table 3.4: Stakeholders and main interests

STAKEHOLDER	MAIN INTERESTS	HOW STAKEHOLDERS' INTERESTS ARE IDENTIFIED
Gas customers	Service quality and reliability Price Safety Information Environmental Seamless experience with their gas installation	Market research studies Engagement and consultation with retailers Dedicated client managers for major customers Gas Hub website analysis Satisfaction surveys after connections through The Gas Hub The Gas Hub presence at home shows
Retailers	Service quality and reliability Price Safety Efficient business-to-business processes	Regular meetings Network Service Agreements Retailer consultations Active participation with Gas Industry Company
Public, landowners, iwi	Public safety Land access and respect for traditional lands Environmental	Consultation and feedback Access and easement negotiations and agreements Acts, regulation and other requirements
Transmission	Technical performance and rules compliance	Involvement in the Gas Association of New Zealand
Other distribution companies	Standards setting Benchmarks	Involvement in industry bodies
Powerco's shareholders	Efficient and effective business management and planning Financial performance Governance Risk management	Corporate governance arrangements Formal reporting KPIs
Commerce commission	Pricing levels Quality standards Effective governance	Meeting with commissioners and staff Quality response to consultations papers, decision paper and regulatory determination
State bodies and regulators	Safety via the Ministry of Business, Innovation and Employment Market operations and access via the Gas Industry Company Environmental performance via the Ministry for the Environment	Published acts, rules and determinations Formal reporting On-going consultation
Employees	Safe, productive working environment Training and development	Regular dialogue, internal communications and employee surveys Employment negotiations

STAKEHOLDER	MAIN INTERESTS	HOW STAKEHOLDERS' INTERESTS ARE IDENTIFIED
	Continuous improvement, adoption of new technologies	
Contractors	Safe, productive working environment Commitment in works volume	Contractor negotiations and dialogue Contract managers present in the regions
Other Powerco divisions	Expertise sharing Standardisation of tools and systems	Regular discussions across the business Tactical initiatives discussed and coordinated

3.5.1.2 ALIGNMENT BETWEEN STAKEHOLDERS AND ASSET MANAGEMENT PRACTICE

Most of our stakeholders have long-term interests that align with the long life of our assets. We reflect these requirements into our governing policies, objectives and processes.

We also work alongside our stakeholders to look past our 10-year planning period, ensuring our assets are designed to serve them now and into the future. In recent years the role of gas in a low-carbon future has been questioned. As a response, we are engaging across the sector to explore what alternative fuels could be distributed through our network. New technology to produce hydrogen, biogas or synthetic natural gas may become viable alternatives to traditional natural gas extraction. We are assessing our business and network strategies in response to these possible scenarios, which may include a network transition plan to transport the low-carbon gas.

3.5.2 POWERCO'S GAS CUSTOMERS

Our customer group is one of our major stakeholders. Powerco supplies a range of gas customers, and the provision of a safe and reliable gas network distribution service is an integral part of Powerco's business.

Powerco targets and achieves a very high level of availability, and to ensure that all customers receive the same level of service, in terms of system reliability, system condition and integrity, and customer service.

3.5.2.1 CUSTOMER OVERVIEW

Powerco maintains three customer type classifications consisting of eight network load groups. The load group names and the criteria for allocating customers to these groups are described in Table 3.5.

Table 3.5: Typical characteristics of different load group customers

LOAD GROUP	TYPICAL CUSTOMERS
Residential (≤10 scm/hr)	
G06	Low volume residential customers.
G11	Standard residential customers. Small commercial customers: Small cafes, fish and chip shops, pizza shops.
Commercial (10-200 scm/hr)	
G12	Restaurants, small apartment / office buildings, small to mid-sized motels
G14	Hotels, large motels, shopping complexes, swimming pools
G16	Large office buildings, apartment blocks, commercial kitchens
G18	Commercial laundries, dry cleaners
Industrial (>200 scm/hr)	
G30	Individually priced customers who do not have a time of use (TOU) meter e.g. large commercial customers, large hotels
G40	Individually priced customers with a TOU meter, with an annual volume generally greater than 10TJ, such as manufacturing and industrial businesses, e.g. dairy, meat or food processing plants.

- Six of the load groups are defined by nominal capacity, in standard cubic meters per hour (scm/hr) and by annual consumption; and they are charged the standard published tariffs. The remaining two (G30 and G40) are considered non-standard customers that fall outside the definitions above and/or because individual pricing arrangements apply to them.
- **Residential/small commercial customers:** Customers in the residential and small commercial category use about 30GJ per year with a maximum load of less than or equal to 10 scm/hr. These customers are generally using individual hot water systems, whether instantaneous or storage cylinders, central heating systems or gas cooking equipment. This drives high demand peaks in the morning and evenings when people use these appliances at home. In comparison, consumption during the rest of the day is low. Our current network performance objectives have been set to accommodate these customers anywhere on our network.
- **Commercial customers**: Commercial customers are diverse in nature and include restaurants, office buildings and small industries where the gas is used to cook, heat spaces or water at a large scale. They have a high load (between 10 and 200 scm/hr), but they mostly use their appliances during daytime. Our current network performance objectives have been set to accommodate these customers with a maximum load of up to 60 scm/hr without having to undertake reinforcement work. If their load is larger, we would work with the customers to find the best way to connect them on the network at a competitive cost, with a balanced customer contribution.

- **Industrial customers**: These customers usually use gas as part of their industrial processes. They are typically dairy, food processing, laundry or sawmill plants. The loads tend to be large (more than 200 scm/hr) but relatively stable throughout the day. The network is generally not designed to cater for these customers without reactive, targeted reinforcement work. We have key account managers who look after these customers to anticipate their future needs, which are then integrated into our long-term plans. We also operate at higher pressure in industrial parks to provide greater capacity, such as Bell Block in New Plymouth or Mihaere Drive in Palmerston North.

3.5.2.2 LARGE CUSTOMERS THAT HAVE A SIGNIFICANT IMPACT ON NETWORK OPERATIONS OR ASSET MANAGEMENT PRIORITIES

We operate all parts of the networks to the same level of availability. However, load group G40 industrial customers have a significant potential to impact network operations as their consumption is high. The impact that each large customer has on our network depends on both the network it is in, and their load profile and operational requirements. For example, the available timeframe for maintenance is dictated by the specific needs of each customer or network development based on demand forecasts. As such, each new G40 customer is assessed on a case by case basis to ensure that both the network can supply the required gas volumes and that the same level of availability of the network is maintained.

Table 3.6 illustrates the correlation between the number of customers in each category and their annual volume.

Table 3.6: Comparison of network customer numbers with gas consumption (as of 30/09/2020)

CUSTOMER TYPE	GAS CONSUMPTION (%)	NUMBER OF ICPS
Residential/Small Commercial	36	107,844
Commercial	24	2,879
Industrial	40	102
TOTAL	100	110,825

Because of their significance on the reliable operation of our networks, specific attention is given to G40 industrial customers. Figure 3.7 and 3.8 illustrate the region and sector of these customers.

Figure 3.7: Breakdown of large customers by region

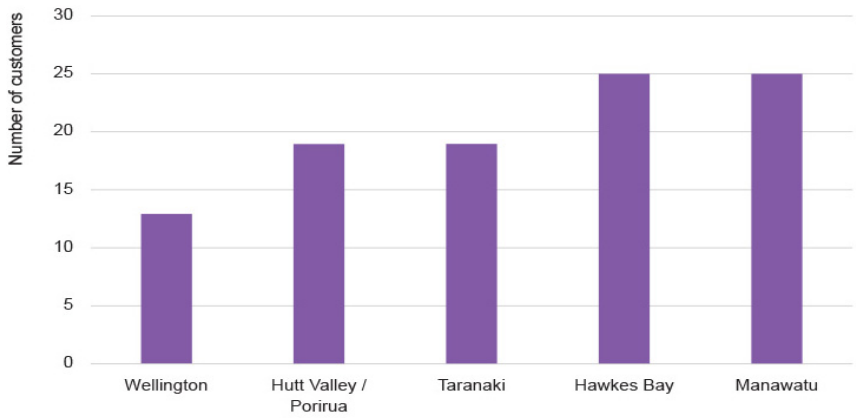
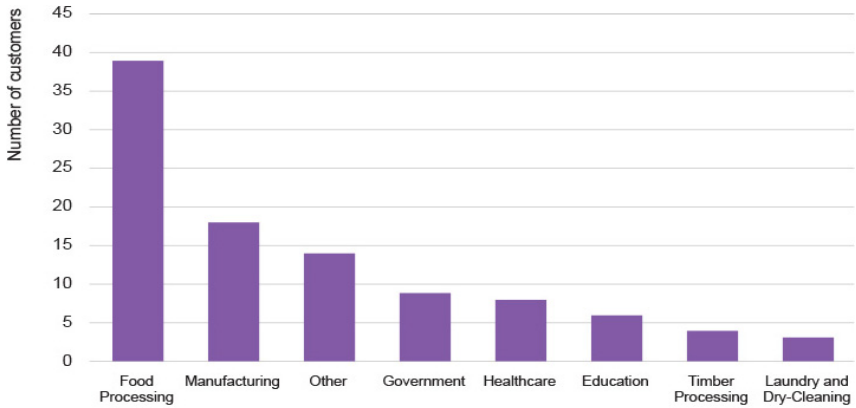


Figure 3.8: Breakdown of large customers by sector



3.5.3 REGULATION

As Powerco does not face direct competition for services, it is regulated under Part 4 of the Commerce Act by the Commerce Commission. This means that our maximum revenue is regulated through a Default Price-Quality Path (DPP) regulation. The Act ensures Powerco is incentivised to invest and innovate in its networks, while ensuring a high level of customer service and a sustainable business model. Powerco has embedded the reporting requirements into its processes and documentation, including this AMP. Appendix 12 lists the Regulatory requirements for this AMP and the AMP clauses demonstrating compliance.

3.5.4 ENVIRONMENTAL SUSTAINABILITY

Powerco is dedicated to ensuring the sustainable use of its network. We support the Climate Change Response Amendment Act 2019 and the current movement towards sustainability.

Evidence of our commitment to sustainable operations is our work regarding Global Real Estate Sustainability Benchmark (GRESB). GRESB is an organisation that assesses the Environmental, Social, and Governance (ESG) performance and sustainability practices of companies worldwide against best practices. GRESB Assessments capture information regarding ESG performance and sustainability best practices for real estate and infrastructure funds, companies and assets worldwide. Results from the latest GRESB survey have placed Powerco sixth out of the 260 global infrastructure asset companies that participated. We aim to continue our high GRESB ranking and continue our focus on having strong ESG factors.

A Climate Change Impact Assessment has been undertaken that assesses the potential impact of climate change upon our asset portfolio. Factors we are considering include sea level rise, increased wind, increased temperature and swollen waterways. We used these factors to identify assets that are at risk, and then assess the impact on customers of losing these assets. The study was aimed at helping the development of strategies to allow us to continue to provide a valuable service our customers into the future.

The results of this assessment confirmed that no specific works plans were required in the AMP planning period. However, facets of our strategies, plans and current works are already aligned with a more sustainable, net-zero carbon future. For example, the replacement of steel with PE pipework which can transport hydrogen. We expect greater clarity regarding how the net-zero carbon future will be evidenced in work programmes in future AMPs.

3.5.5 INNOVATION

Powerco is enthusiastic about ensuring its assets provide a valuable service to our customers in an industry that is facing its largest disruption since the conversion from coal gas. The growing distributed renewable electricity industry, changes in legislation for gas exploration and the changing customer requirements, are driving the need for the natural gas industry to think and operate differently. There are a few innovative initiatives underway that demonstrate our commitment to innovation and customer service.

Smart meters are soon to be employed on residential GMS for the first time. These smart meters are expected to provide gas users greater visibility and control of their gas usage. We are in the initial roll-out phase and expect to convert more than 60,000 smart meters located on our footprint.

Data quality is the focus of improvement efforts. With the recent implementation of an ERP, there is increased ability to identify and rectify data quality issues. Data quality improvements provide an exciting potential to apply smarter analytics and greatly improve the understanding of our asset portfolio. This improved understanding will allow us to develop more mature, efficient and effective strategies.

ISO 55001 accreditation is another area of significant effort we have been focusing on. This will allow us to improve the maturity of our asset management and ensure we are optimising value from our asset portfolio. The new framework will enable us to identify areas of improvement which will allow us to ensure we are able to understand and meet future energy needs.

3.5.6 EMERGING TECHNOLOGIES

The energy sector is encountering some of the largest disruptive innovation it has experienced in a long time. This is unusual for the natural gas sector which hasn't had significant change since the replacement of town gas for natural gas more than half a century ago. This stability has led to strong operational efficiencies. The emergence of new technologies, and the societal shift towards a net-zero carbon future, are challenging this status quo.

The electricity sector is also seeing the advent of new technologies (e.g. EVs, solar panels and batteries) and Powerco expects these technologies to become more widely adopted as capital costs decrease. Powerco is continually assessing how emerging technologies compete with or complement gas use, and how they can benefit its customers.

The natural gas sector is also seeing new technologies being introduced, including;

- Advancements in the possible usage of biogas
- Usage of hydrogen (combined or sole) through our distribution networks
- Development of hydrogen fuel cells
- Improvement of power-to-gas technology (e.g. electrolysers)
- Roll out of smart meters onto our networks

Powerco is actively investigating alternative gas technologies to enhance its future service offering to customers. This AMP will identify objectives (Chapter 4) and strategies (Chapter 5) that Powerco is adopting to understand and proactively respond to the emerging technological changes the sector is experiencing. We expect during the next five years that we will undertake work in alignment with these strategies.

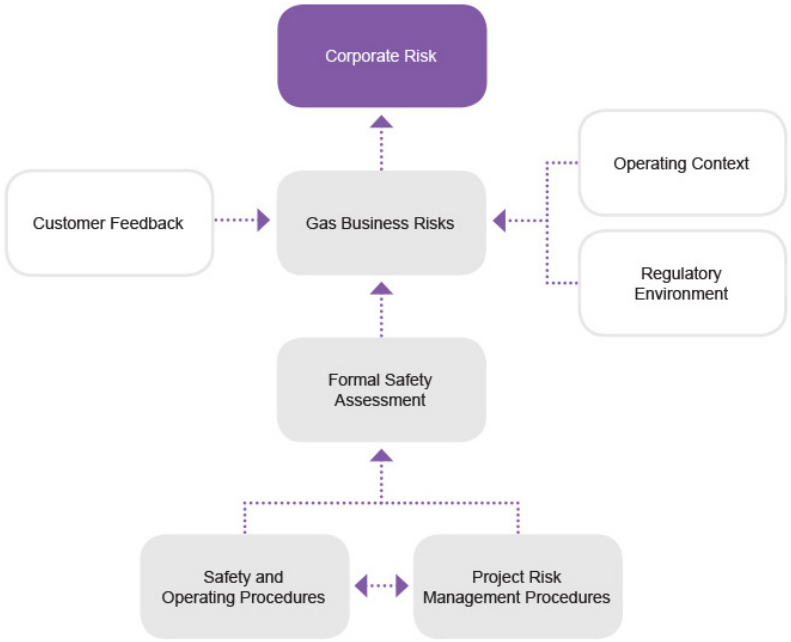
3.6 RISK MANAGEMENT

Risk management is embedded in all business management decision making within Powerco. Decision making occurs at all levels, including setting strategic objectives, project management, business planning and change management. Powerco's Risk Management Framework is based on ISO31000:2019 guidelines. The risk management framework, as shown in Figure 3.9, reflects Powerco's role as the owner of a lifeline utility and operator of a hazardous asset portfolio.

Powerco utilises an enterprise risk management approach. On an annual basis we undertake and assessment of the strategic risks to the Gas business. This assessment considers customer feedback, asset Formal Safety Assessment (FSA) and other factors within our operating context. These risks are collated, assessed

and then ranked. The top risks, with associated controls, are reported to the Board for governance review and oversight.

Figure 3.9: Risk Management Framework

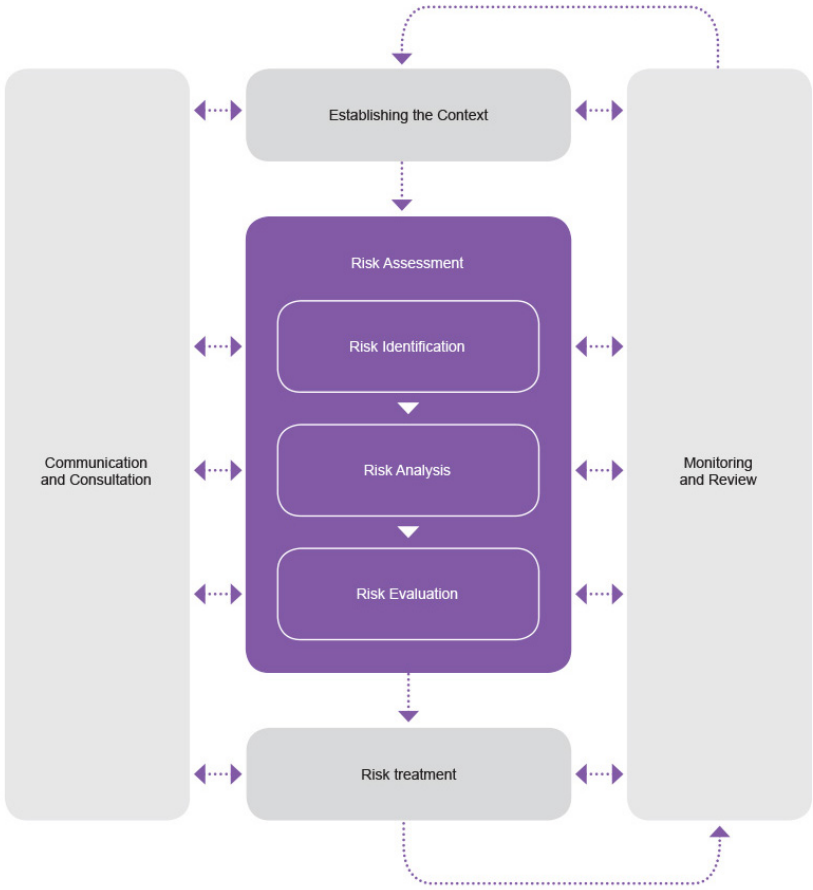


The FSA is conducted every three years and assesses the risks that our assets present to the public, contractors and employees. The FSA complies with the requirements we operate under, NZS 7901:2014 Electricity and gas industries - Safety management system for public safety. The FSA is summarised in Appendix 7.

To inform working level functions of the organisation, the Safety and Operating Plan and Project Risk Management Procedure, for maintenance and project work respectively, are utilised. These procedures ensure that the appropriate level of risk management is provided for our works management. They provide assessment of work risks and identify controls.

A consistent approach (refer to Figure 3.10) is used for assessment and grading of risk. Safety risks that are assessed as medium, or higher, are assessed using ALARP principles to ensure the risk is 'as low as reasonably practicable'. Risks are escalated for acceptance based on their assessed rating. This consistent and coherent approach improves both operational efficiency, communication and accountability or risks within Powerco and with external stakeholders.

Figure 3.10: Powerco risk management process



We are making improvement to the Assurance Framework as part of the ISO55001 project. As such, with time, we expect to see improvements to the risk management framework and effectiveness of our risk controls.

3.6.1 KEY RISK AREAS

We have identified the following key strategic risk areas from the above process.

3.6.1.1 HEALTH AND SAFETY

The health and safety of contractors and the public is recognised as a key risk to Powerco. Powerco is continually working to improve Health and Safety practices and is guided by a number of acts and industry standards, including the Health and Safety in Employment Act, NZS 7901, relative to public safety, and AS/NZS 4645 relative to network management.

The risks of harm to the public and personnel are monitored through regular network inspections. During construction projects, these risks are monitored through a compliance process. Other factors affecting reliability and public safety, such as vehicle collisions, trees, and vandalism are also monitored and controlled.

3.6.1.2 BUSINESS CONTINUITY

With gas being a selective energy source, we need to ensure our customer numbers do not decrease significantly. Reducing customer numbers would result in increasing cost per customer, which would incentivise customers to leave our network, accelerating the entire process and threatening the future of the business. Factors such as net-zero carbon increase the likelihood of this occurring.

The tactical response is to place a strong focus on customer satisfaction. We place customer requirements at the centre of our decision making to ensure that we provide desired value.

Reviews and surveys of our customer satisfaction performance are important to ensure we are progressing.

3.6.1.3 ENVIRONMENT

Natural disasters are considered a major risk given that Powerco serves a wide area of the North Island, including areas that are exposed to seismic and volcanic activity and landslips. The review of pipeline design results from this risk profile.

The tactical response to these risks largely centres on contingency planning, with the Emergency Management Plan being the main guiding document. Powerco also maintains alliances with Civil Defence and regional councils and takes part in Civil Defence exercises.

To better identify and manage environmental risks and associated impacts, Powerco has developed an Environmental Management System and has been accredited to ISO 14001:2004.

3.6.1.4 REGULATORY, LEGAL AND COMPLIANCE

Powerco must comply with a variety of legal and regulatory obligations, as specified in Appendix 5. Risks are identified relating to compliance with local government requirements, legislation, regulatory requirements and contractual obligations with service providers. These risks are managed by embedding compliance requirements into planning and operational processes.

3.6.1.5 ASSET RELIABILITY

Gas is inherently hazardous, as such, measures need to be in place to prevent asset failures from affecting the general public.

Many risk management techniques that help to achieve this goal are ingrained within the industry. Nevertheless, formal steps need to be in place to ensure that these risks are managed. Managing these risks is a central part of the Asset Class Strategies (Chapter 6), which drive the maintenance schedules.

Our technical standards focus on the requirements covering the design/construct, materials purchasing and asset disposal stages of the asset lifecycles.

3.6.1.6 GAS DELIVERY

Controls are needed to mitigate all risks that can cause a disruption of gas supply, including inadequate network capacity.

Adherence to network security criteria is a core part of the asset management process because it affects the network's ability to serve customers without outages. Design philosophies, defined in the Network Strategies (Chapter 7), are applied to help ensure quality of supply criteria are met.

Live gas techniques can often be applied, so that outages are not needed.

3.6.2 HIGH-IMPACT/LOW-PROBABILITY EVENTS

Powerco's networks are designed to be resilient to high-impact/low-probability (HILP) events, such as upstream supply failure, natural disasters and critical equipment failures. The nature of our assets and the way we run our business limits the consequences should these events occur. These HILP events include:

- Loss of supply due to gas transmission pipeline failure
- Undetected gas escape into a building leading to fire or explosion
- Long-term loss of service due to a natural disaster (e.g. earthquake, volcanic activity or landslide).

In order to mitigate the impact of these events, we use the following controls:

- **Geographic diversity:** The geographical diversity of our networks increases the likelihood that natural disasters will affect only part of our networks.
- **Multiple supply points:** Our networks are designed with multiple supply points where practicable, to mitigate the impact of a supply point failure.
- **Standard equipment:** Our networks utilise standard equipment where possible. Consequently, assets can be relocated/rebuilt easily in the event of failure.
- **Earthquake resilient:** Powerco's facilities have been upgraded to ensure resilience to earthquakes and to meet all related statutory requirements.
- **Scalable response:** Powerco's scale and stable long-term capital programmes mean that it can scale and redeploy resources quickly to attend to localised, or regional natural disasters.

- **Response plans:** Powerco has thoroughly tested emergency response plans and demonstrated capability to manage significant natural events and widespread damage to its networks.
- **Business continuity plans:** We have structured business continuity plans in place to ensure that the corporate aspects of our business are resilient and will support on-going operation of our networks.

3.6.3 CONTINGENCY PLANNING

As part of our risk mitigation strategies, we have different contingency plans in place that are regularly tested by exercises. The main strategies relevant to the gas activities are the Gas Event Management Standard, the Emergency Response Plan, the Business Continuity Plan and the Pandemic Contingency Plan.

3.6.3.1 GAS EVENT MANAGEMENT STANDARD

This standard describes the mechanisms, roles and responsibilities relative to fault and incident management. This includes reported smell of gas, supply interruption at a customer, or third-party damage on the network. It also prescribes the escalation criteria to trigger the Emergency Response Plan.

3.6.3.2 EMERGENCY RESPONSE PLAN

Our Emergency Response Plan is regularly reviewed and continues to develop to improve its performance in emergency situations. The plan is designed for emergencies, i.e. events that fall outside the ordinary operation of the network that routinely deals with incidents. The plan is supported by training, tests, equipment and support structures to ensure that the proper response can be delivered.

3.6.3.3 BUSINESS CONTINUITY PLAN

Powerco's Business Continuity Plan (BCP) is designed to manage and support several adverse scenarios. The BCP is supported by a Business Impact Analysis, which is conducted on a regular basis by business units to identify and prioritise critical infrastructure, assets and processes for recovery action. The BCP is rehearsed by the appropriate teams on a regular basis and Powerco's IT infrastructure has been designed with built-in resilience to ensure continuity of operations.

3.6.3.4 PANDEMIC CONTINGENCY PLANS

Powerco has developed a plan to prepare and respond to a pandemic occurring in New Zealand. This plan was utilised, and improved upon, during the COVID lock-down. This plan provides a basis for establishing a common understanding of the specific roles, responsibilities and activities to be undertaken in response to the pandemic. It fully ensures the operational integrity and continuity of the electricity and gas networks, even though this may be at a reduced level, both during and after the pandemic. Because of the unpredictable nature of pandemics, the plan also considers the wider implications for the company beyond "keeping the lights on and gas fires burning". These implications for Powerco therefore go beyond its obligations as a lifeline utility provider.

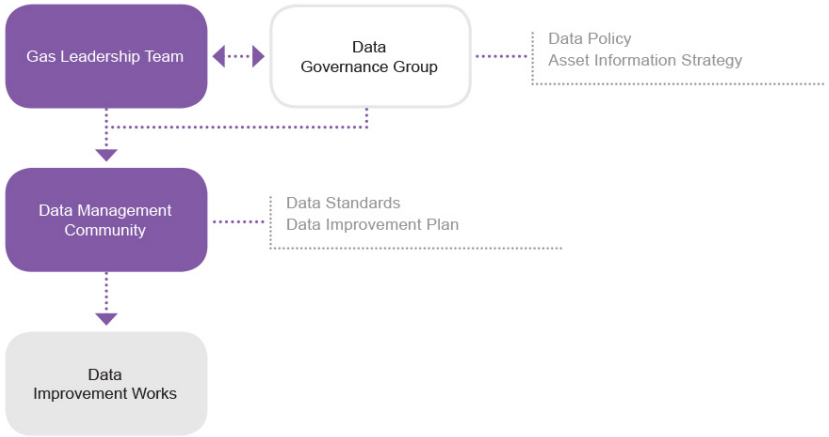
3.7 INFORMATION MANAGEMENT

As part of our Asset Management Maturity Journey, it became apparent that one area that needs specific attention is our information management. Good asset management practices, as described in ISO 55001, highlight the need for all our assets to have a 'digital twin' that represents that asset in digital space. This raw data, itself is not useful, and must be collated and assessed to develop meaningful information that allows confident, asset-based decisions to be made.

Because of the amalgamation of companies that created Powerco, the standards used to capture and collect data varied considerably resulting in unequal quality data. As a result, we are making information management a specific area of attention to ensure our data quality improves to help us make better asset-based decisions.

The introduction of a new ERP has instigated the creation of a new Information Management and Governance structure (refer to Figure 3.11). This new organisational structure is tasked with developing data improvement plans, which are packages of work to improve the quality of our asset data. The governance of the data improvement plans ensures that all efforts are aligned with the corporate objectives. To support this, an Asset Improvement Policy (AIP) and Strategies (AIS) have been created, and new Asset Information Standards are under development. The benefits of the new asst information management and governance structure should enable better data-driven decisions which will result in better outcomes for our stakeholders and customers.

Figure 3.11: Asset information management and governance structure



4 ASSET MANAGEMENT OBJECTIVES AND SERVICE LEVELS

4.1 INTRODUCTION

This section describes how our corporate Vision and Mission (refer to Section 3.2) are translated into our Asset Management Objectives. Measures, or service levels, are established against each objective by which we track our progression and judge our success.

4.2 ASSET MANAGEMENT OBJECTIVES

During the past few years our operating environment has seen growing concerns about environmental sustainability, energy security and infrastructure costs. Given these concerns, the Gas division has reinterpreted the corporate objectives into specific five-year, Asset Management Objectives. These ensure the gas management system, the AMS, focusses work appropriately.

This chapter is split into the desired AMS outcomes, which are then devolved into more detailed Asset Management Objectives. The Asset Management Objectives are the interpretation of the corporate objectives given the current operating environment as detailed in Chapter 3.

The AMS outcomes are:

- Keep the public, our staff and contractors free from harm
- Continuously improve our customer service
- Continuously increase our asset management maturity
- Improve asset performance across all service levels year upon year
- Continually improve our operational efficiency and effectiveness
- Develop a Low Carbon transition plan

The Asset Management Objectives are the more specific, SMART[2] goals that break down the AMS objectives into more easily managed aspects. To ensure this we have considered what is possible and appropriate in our industry and our operating environment. Where practical, we compare our targets with other New Zealand distributors through publicly available information, or through our involvement with the Gas Association of New Zealand. All targets are set and committed to by the Gas Leadership Team and reported monthly to the Board.

The objectives set out in this section are used throughout our whole-of-life asset management practices and are realised through our Asset Management Strategies and plans. Our objectives have been framed to reflect our commitment to further improving service levels to our customers.

Changes can be made at any time to any objective if there are significant changes to decision making factors: customer needs, external operating environment or our internal drivers.

The objectives associated with each measure over the AMP period are summarised in Section 4.10 at the end of this section.

4.2.1 SETTING TARGETS

We set our targets in the context of the following constraints:

- **Rate of change:** As a general principle, we have designed our Asset Management Objectives, to ignore future step changes in the path of future investment. This has been done to help ensure we deliver work efficiently, and our customers do not experience step changes in quality or price of service.
- **Technological disruption:** Powerco realises that the industry is not set up to support high rates of technical change. Consequently, Powerco focuses on well understood, industry proven investments. Where new technology can bring clear economic benefits, our processes require clear customer benefit before proceeding.
- **Field resource availability:** The technical resource we utilise is specialist and finite. Achieving sustained availability of the technical resource requires open discussion with our service providers, appropriate contractual frameworks and support for industry training organisations.

Maintaining flexibility and the ability to work effectively with our services providers to scale and tailor their resources to match our specific requirements has enabled us to achieve reliable delivery of our work programmes in recent years.

Other areas considered when making our objectives:

- Safety of the public, our staff and contractors
- Our customers' expectations of service, quality and price
- Legislative requirements
- Competition from other energy sources (natural gas is a discretionary fuel)
- Risk mitigation costs compared to the cost of tolerating the risk
- Industry standards and best practices
- Powerco's reputation as a professional and responsible organisation

Once set, responsibility of objectives is allocated among the gas management team and progress regularly reviewed.

[2] SMART – Specific, Measurable, Achievable, Realistic, Time-bound

4.3 KEEP THE PUBLIC, OUR STAFF AND CONTRACTORS FREE FROM HARM

Powerco's assets are integrated within its communities and transport a flammable gas. Accordingly, Powerco is committed to preventing harm to the public, its staff, and contractors. We are committed to maintaining and improving the standard of safety management applied to our network.

Our commitment to public safety was demonstrated by certifying our Public Safety Management System (PSMS) in 2013. Our PSMS defines the specific steps we take to ensure our assets are designed to be safe and to remain safe during operation.

Our safety targets focus on the following areas:

- Reduction in the number of Third-Party Damage incidents year-by-year
- Maintaining fast Response Time to Emergency (RTE)
- Maintaining acceptable times to answer emergency phone calls
- Reducing the number of staff and contractor Lost Time Injuries (LTIs) per annum

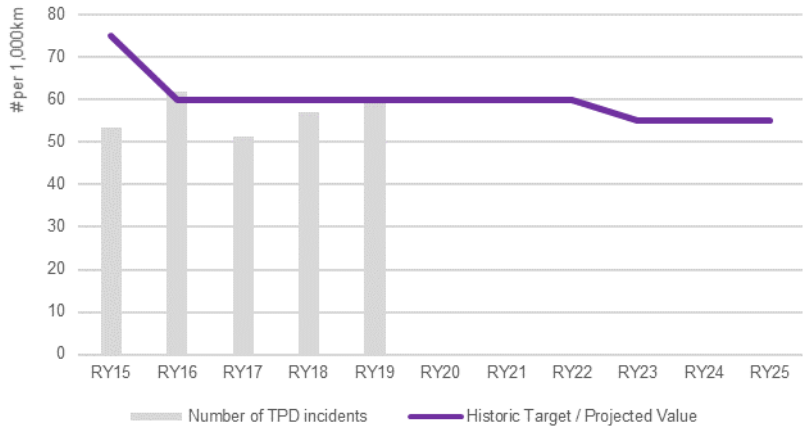
4.3.1 THIRD PARTY DAMAGE

Reduce TPD's to 55 per annum per 1000 km, by 2025

Third-Party Damage (TPD) to our networks represents one of the greatest public safety risks and impacts on supply reliability. While most TPD incidents are relatively benign, they have the potential to cause significant damage and injury, and the number of TPD incidents is an important public safety measure.

Despite increasing levels of activity in road corridors, we have managed to reduce the rate of incidents on the network. This is a continuous effort and we must maintain a strong focus on education and assistance. Relocating assets in high risk areas, and encouraging contractors to use new technology, such as hydro-vac excavation, is an example of what we do to manage this risk. We expect the level of TPD to steadily reduce, as shown on Figure 4.1.

Figure 4.1: Historical and projected Third-Party Damage (TPD)



4.3.2 RESPONSE TIME TO EMERGENCY

Maintain >95% RTE to within one hour

Response Time to Emergency (RTE) is a quality standard set out in the Commerce Commission's Default Price-Quality Path (DPP). It is an important measure of our ability to control incidents and prevent escalating consequences. Our response to emergencies relies on our system for receiving emergency calls from the public. Accordingly, we set targets and measure our time to receive emergency calls.

The requirements in our DPP standard, for response to emergencies, are 80% under 60 minutes, and 100% under 180 minutes. For simplicity, our internal target is responding to 95% of emergencies within one hour as shown on Figure 4.2. This higher target ensures we meet the requirements.

In RY19 we recorded 94.7% compliance. This exceeds the Commerce Commission's requirements but has led to an investigation into improving our performance.

Figure 4.2: Historical and projected Response Time to Emergency (RTE)

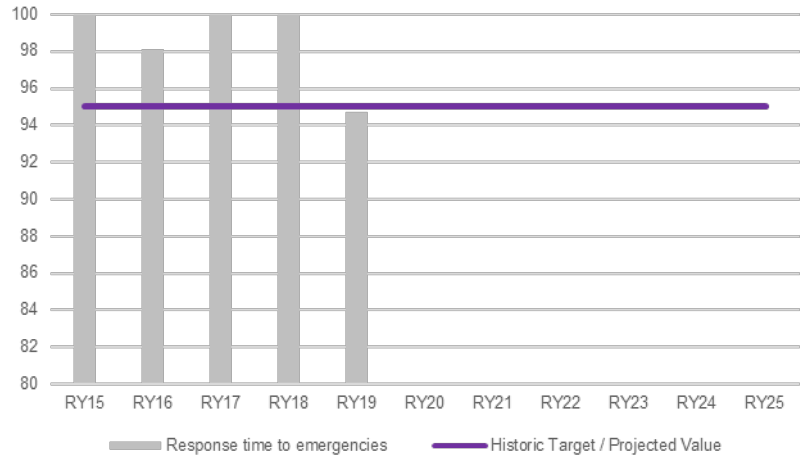
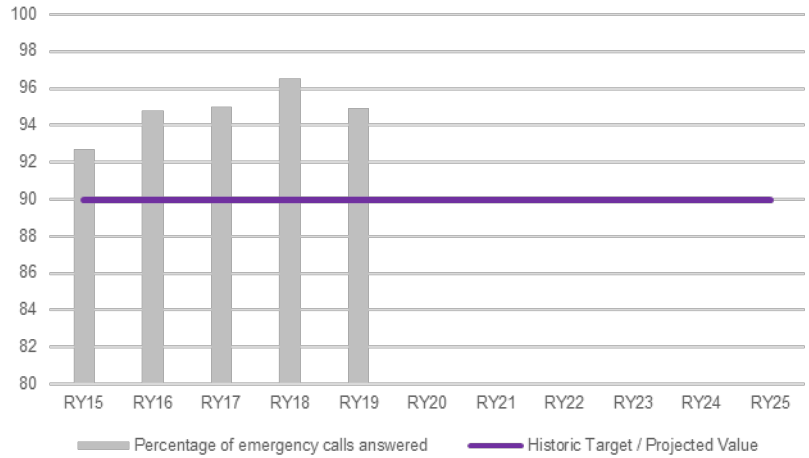


Figure 4.3: Historical and projected emergency calls answered within 30 seconds



4.3.3 EMERGENCY CALLS

Achieve >90% of emergency calls answered within 30 seconds

The first point of contact for the public to report a gas-related incident is Powerco's Network Operating Centre (NOC). To ensure appropriately quick response to a potentially unsafe situation, a time limitation of 30seconds is placed upon NOC to answer the phone to ensure the public is being attended to appropriately. Our response time to emergency calls has constantly been meeting our expectations as shown in Figure 4.3.

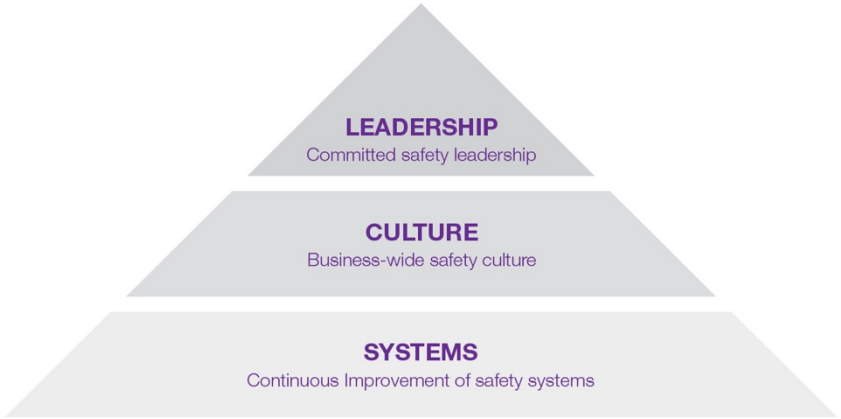
4.3.4 PEOPLE SAFETY

Maintain zero staff and contractor LTIs per annum

Powerco is committed to ensuring the highest levels of safety for its staff and contractors. We strive to continually improve our leadership, systems, and culture in this area.

The core philosophy behind our health and safety approach is to provide committed safety leadership that supports the development of a safety-first culture across our workforce. We continually promote the message that health and safety outcomes are the result of integrating and embedding safety practices into every activity. This approach is illustrated in Figure 4.4.

Figure 4.4: Powerco safety strategy model



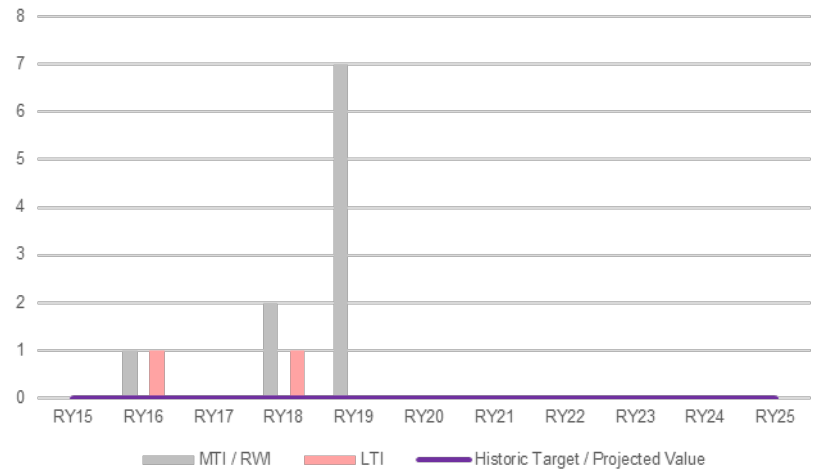
Consistent with our approach to public safety, we have one target to summarise the outcome from all these actions: zero Lost Time Injuries (LTIs). Our objective is to take all practicable steps to prevent harm to those who work on or around our networks, with a focus on events that could cause serious injuries. We strongly believe that we must strive to prevent injuries to our employees and so any other target is unacceptable.

The commitment by our staff and service providers in providing a safe workplace is demonstrated by a consistently low number of medical treatment and LTI rates across our business.

This strong focus on safety has resulted in improvements to our safety reporting from the field. Our reporting has been more repetitive, and has resulted in an increase in understanding, and consequent reporting, from our service providers. It has meant however, that we have seen, and continue to expect to see, increased reporting of less serious injuries, captured as a Medically Treated Injury (MTI) or Restricted Work Injury (RWI). This is represented in Figure 4.5 by the relative increase in MTI/RWI incidents in RY19.

Whilst this increase appears bad from a reporting perspective, Powerco treats this as an opportunity to identify trends that cause lower level injuries. This increased visibility allows us to mitigate these risks to both stop them from causing serious injuries, and to reduce less serious injuries.

Figure 4.5: Medical treatment injuries and lost time injuries



4.4 CONTINUOUSLY IMPROVE OUR CUSTOMER SERVICE

In recent years, we have utilised the strength of The Gas Hub to increase the number of channels customers, public, and stakeholders can use to easily communicate with us. This includes social media, instant chat on our website, or more regular engagement with our stakeholders. To attempt to measure customer satisfaction, we conduct detailed and comprehensive market research customer surveys every year. The results of these surveys feed into our asset management planning. Two Asset Management Objectives have been set:

- Ensure new connection satisfaction is excellent by achieving a Net Promoter Score (NPS) of 60 by 2025
- Ensure customer satisfaction is tolerable by having <50 customer complaints per annum

Furthermore, every second year, we conduct specific asset management-related market research to gauge if our customers are satisfied with the quality of their gas supply and with Powerco's operational performance.

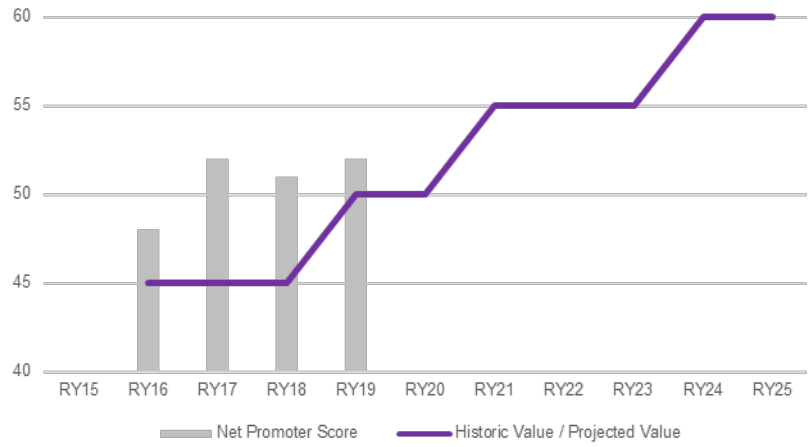
4.4.1 NET PROMOTER SCORE

Achieve an NPS of 60 by 2025

To determine the quality of its customer service and understand its customer experience, Powerco is utilising the Net Promoter Score (NPS) survey system. The NPS is a management tool that provides metrics regarding customer experience and loyalty, and helps provide indications for future customer growth. NPS has been used globally and helps Powerco managers ensure the company is providing the required level of customer service.

Our latest NPS survey, prepared in 2019, showed that the level of satisfaction is very high and growing across all our customer categories: residential, commercial and industrial. Our NPS total score was 52% (on a scale of -100 to +100), with 58% of our newly connected customers saying they would recommend our services. This indicates we have a high satisfaction level with our customer service, which we aim to maintain and improve.

Figure 4.6: Historical and projected Net Promoter Score (NPS)

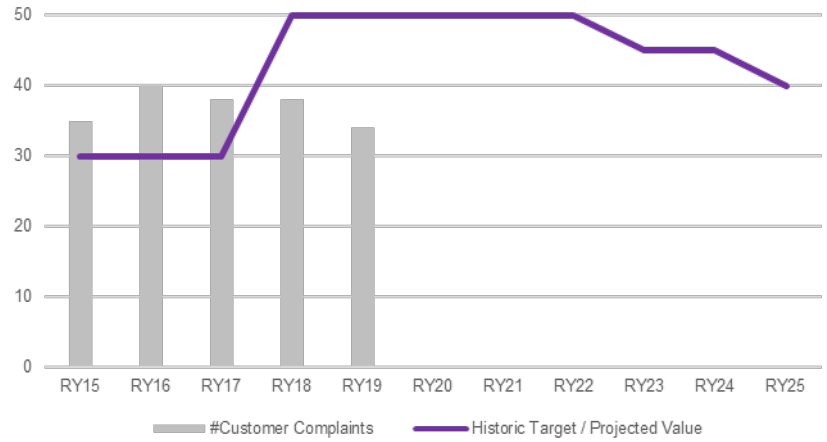


4.4.2 CUSTOMER SATISFACTION

Achieve <50 customer complaints per annum

To ensure we meet our customer's expectations for quality of service, we measure the number of customer complaints per annum. As shown on Figure 4.7, we have seen the number of complaints remain consistent, at fewer than one per week. Given the increasing number of customer connections, this is tolerable, however we will be reducing the allowable limit as we are able to increase our customer service capability. We have revised our target to reflect this increase.

Figure 4.7: Historical and projected number of customer complaints



4.5 CONTINUOUSLY INCREASE OUR ASSET MANAGEMENT MATURITY

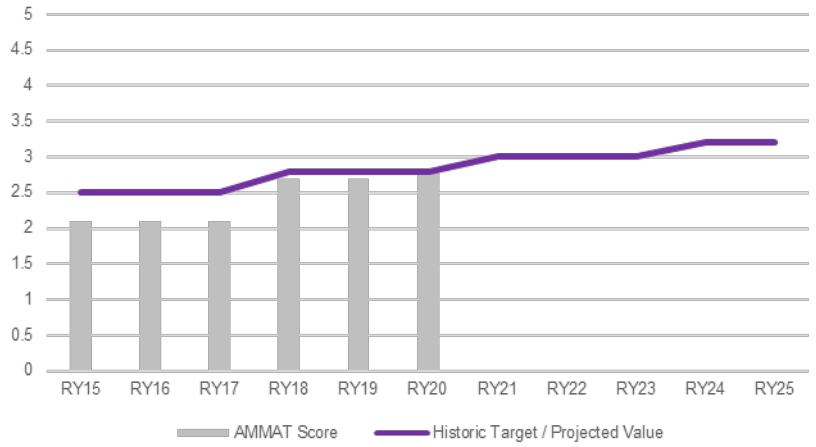
Achieve AMMAT score of 3.2 by 2025

Our asset management maturity journey started in earnest in 2010 with the adoption of the PAS 55 framework and continues today towards alignment with the ISO 55001 standard. Asset management incorporates all management activities that the gas management team undertake. As such, we aim to do this better. The Commerce Commission required AMMAT assessment is a convenient and understood methodology of assessing our asset management maturity. As such, this AMMAT score (between 0 and 5) will be used to measure the value

of improvements, and the motivation to continually improve. The breadth of the AMMAT assessment is broad, so will help achieve improvement across multiple facets of the business.

Historically, Powerco has made significant efforts to improve its asset management maturity; what it deems its “asset management improvement journey”. ISO 55001 accreditation is the next step on this journey.

Figure 4.8: Historical and Projected AMMAT Score



4.6 IMPROVE ASSET PERFORMANCE ACROSS ALL SERVICE LEVELS YEAR UPON YEAR

Asset performance improvement efforts involve optimising network capacity and improving network integrity and operational reliability.

The associated Asset Management Objectives are framed in terms of:

- Network capacity – Poor Pressure Event (PPE) reduction
- Network capacity – network connections and growth provision
- Network integrity – leak reduction
- Operational reliability – component failure resilience
- Operational reliability – gas quality assurance

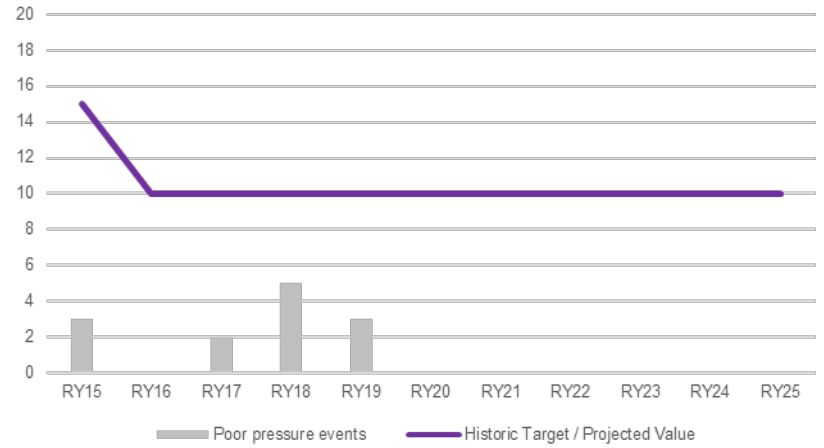
4.6.1 NETWORK CAPACITY – POOR PRESSURE EVENT REDUCTION

Achieve <10 poor pressure events per annum

Network capacity needs to allow for foreseeable demand to be met. The challenge is to allow for uncertainty in forecasted demand growth, while considering the constraints that could impact construction timeframes. By way of example, our new residential customers typically want new gas connections to be available within two weeks of their commitment. To reliably meet this timeframe, the network capacity must have headroom to enable the forecast rates of connection to be accommodated.

A good indicator of whether the current capacity is appropriate for the level of customer demand is the pressure at representative points on the network. Accordingly, to assess our performance against this objective we monitor the pressure and loads at specific locations on our network and regularly validate the capacity performance against the objective criteria. Network systems that are identified as being near capacity will have a capacity management plan developed, which is then progressively implemented. Accordingly, we expect the number of customers being affected by low-pressure to reduce.

Figure 4.9: Historical and Projected Poor Pressure Events



PPEs have reduced since we implemented our pressure monitoring programme across the network. This is shown in Figure 4.9. With the completion of a programme of works across our network, and more particularly within Wellington CBD, we expect the number of PPEs to remain under 10 per annum throughout the

planning period. We are not looking at reducing this target further as this would result in a significant increase in expenditure.

4.6.2 NETWORK CAPACITY – CUSTOMER CONNECTIONS AND GROWTH PROVISION

Achieve zero deferred residential customer applications per annum

If we always have adequate network capacity, customer requests will never be denied. We must proactively understand the growth on our network and the associated demands to achieve this. But customer growth is a difficult variable to accurately forecast. Every customer is different in terms of usage, location on the network and motivation for connecting. Furthermore, there are societal norms that can impact connection rates. For example, the current shift towards net-zero carbon has seen Housing NZ state it will be removing all gas connections from its housing. Notwithstanding the efficacy and impact of such a decision, the impact upon Powerco's network may be significant. As such, significant effort is required to get useful growth forecasts for network modelling.

Since we implemented the metric in 2013, we have not recorded any residential application for a new connection which was deferred due to insufficient capacity.

4.6.3 NETWORK INTEGRITY – LEAK REDUCTION

Achieve <100 pipe leaks per 1,000 km per annum

The term 'integrity' refers to the safe containment of gas and the reliable delivery of gas to our customers. This is expected by our customers, the wider public and is a legislative requirement.

For electricity networks, SAIDI is the generally applied industry measure for delivery reliability. Measuring a gas network's reliability is difficult for several reasons. Gas networks, being underground, are inherently more secure but when outages occur the time it takes to reinstate can be much longer. The process of reinstatement requires the careful purging of the network and the re-commissioning of each customer. This means that a widespread outage can disrupt supply for several weeks. This leads to a SAIDI measure that is very volatile from year to year and makes any short-term trend analysis difficult and potentially misleading.

Therefore, Powerco does not use SAIDI as a short-term measure but the long-run average is useful to demonstrate the overall reliability performance. For Powerco, the historical performance translates to greater than 99.999% availability. This is a high-quality service which most of our customers indicate meets their expectations.

The hazardous nature of natural gas means that gas containment is a critical aspect to maintaining a safe and reliable network and to minimise harm to the environment.

Reliable containment is also necessary to ensure continuous gas delivery as rectifying gas escapes may involve shutting down a section of the network. Our reliability objective therefore requires that the number of uncontrolled gas releases is as low as reasonably practicable.

Uncontrolled gas releases can occur for several reasons including:

- Faulty components or installation
- Gradual penetration of PE pipe by rocks
- Corrosion (steel pipelines and components)
- Operational error while working on the network
- Incorrect pressures (resulting in pressure safety devices venting)
- Damage to the pipeline by third parties

To effectively measure our performance against this objective we need to track the overall number of gas-release incidents we have on the network. Gas releases may be reported by the public or through our inspection regime. Gas releases as a result of TPD (such as a contractor excavating in the road) are excluded from this measure because such incidents do not relate to the condition of the asset and are already accounted for in Section 4.3.1.

The number of public reported escapes (PRE) can vary, and are dependent on public perception. For example, after earthquakes, we encourage the public to report any smell of gas. As a result, we can observe variations year-on-year that are not necessarily a sign of rapid evolution of asset condition.

The number of leaks detected by contractors during system surveys (LDSS) can vary depending upon the amount of leak surveys undertaken that year. Regular surveys of our IP pipelines are undertaken, as they represent a greater safety risk if leaking.

Those two measures (PRE and LDSS) are recorded separately, as they are reported into different sources, but are combined to ensure we manage total leaks on the network. Their targets are shown in Figure 4.10. We are starting to consolidate and review our data and reporting mechanisms to ensure here are no errors, e.g. double counting of leaks, etc. In the meantime, we will maintain our historical targets.

The set target is not a desired leak level, but a maximum allowable level. With an ageing age profile on our mains, we expect leak numbers to increase in the future, so reducing total number of leaks to below the current targets is not seen as economically viable at this stage. However, with improvements in our reporting system, we can sharpen our target sometime in the future. Our goal is to gradually reduce leaks by replacing our assets that at are the most risk of leaking.

Figure 4.10: Historical and projected leaks

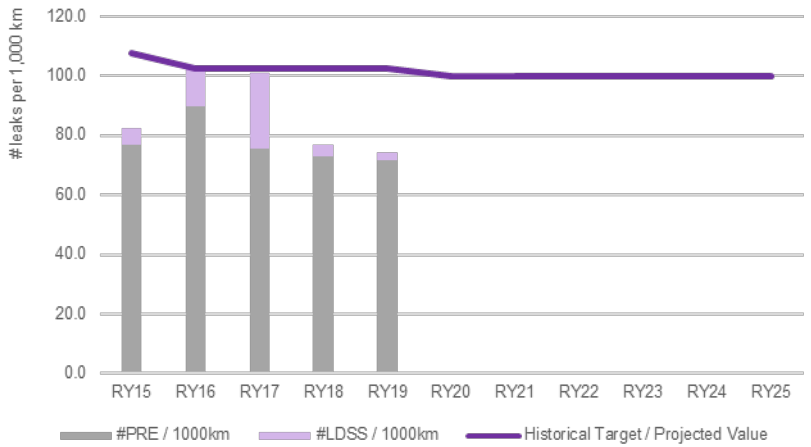
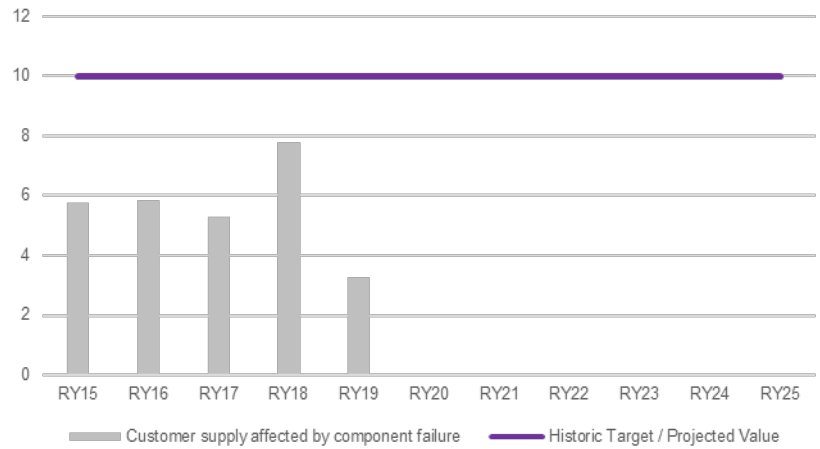


Figure 4.11: Historical and projected customers interruptions due to component failure



4.6.4 OPERATIONAL RELIABILITY – COMPONENT FAILURE RESILIENCE

Achieve <10 customers affected by supply interruptions due to component failure per annum

Powerco strives to optimise supply security through the incorporation of system redundancy where it is economically efficient to do so. An example of system redundancy is the design of network loops that maintain supply to customers if a section of pipe is damaged.

With most of our networks primarily configured as a grid, a simple measure of system redundancy, such as N-1, is not a good measure of reliability. Instead, reliability is modelled taking account of the nature of the network or sub-network, and the likelihood and consequence of a fault condition.

It is difficult to isolate the impact that sub-optimal design may have on reliability (the outcome of the level of reliability we have in our networks is generally covered by other metrics we have established within this AMP). Target measures for reliability are therefore not proposed in this AMP, however we monitor the number of pressure systems compliant with our security of supply strategy and actively plan to rectify the networks that aren't compliant. Overall, reliability remains an important objective as it establishes an important principle for network design and operation.

Figure 4.11 shows how this commitment has resulted in a very low number of customers having their supply interrupted due to a lack of investment on the network.

4.6.5 OPERATIONAL RELIABILITY – GAS QUALITY ASSURANCE

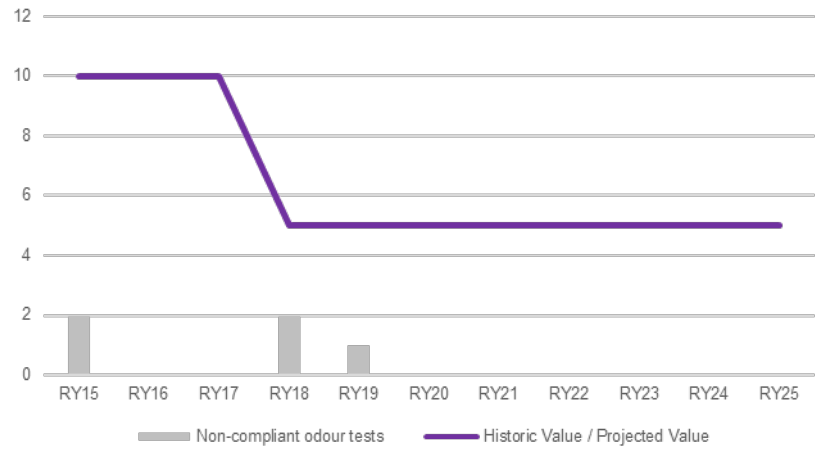
Achieve < 10 non-compliant odour tests reported per annum

In New Zealand, all gas must meet the specification requirements and be odorised as set out in NZS 5442:2008 and NZS 5263:2003 respectively. No single party has full responsibility for gas quality. Gas composition is controlled and monitored by the gas-processing facilities and transmission companies. Gas odorant is added by the transmission companies and monitored by them at gate stations.

Gas network operators, such as Powerco, are responsible for ensuring that the quality of gas delivered to the network is maintained as it travels through the network, with no degradation due to contaminants such as water, dust or oil being added. We are responsible for monitoring gas odorant levels at representative points within the network and to report on non-compliant odour readings. Depending on the actual result of the test, we have an escalation process to communicate with the rest of the gas supply chain.

The strengthening of our processes with the rest of the Gas Industry allowed us to reduce the number of non-compliant reading as shown in Figure 4.12.

Figure 4.12: Historical and projected non-compliant odour test reported



4.7 CONTINUALLY IMPROVE OUR OPERATIONAL EFFICIENCY AND EFFECTIVENESS

Improved efficiency results in better utilisation of our resources through quicker and cheaper delivery of our work programmes. Improved effectiveness results in increased productivity, which will result in better value for money for customers.

Powerco recently implemented the first phase of its new enterprise resource planning (ERP) system. With any large-scale system there is expected to be a learning phase where utilisation is made more efficient and effective. Because of the scale and granular nature of the ERP system, particular focus is being paid towards improving usage of the ERP during the next few years. It is anticipated that with improvements there will be efficiencies gained that will enable improved service for our customers. No objectives have been set for the use of the ERP yet, as metrics are still to be determined. However, it is expected significant effort will go into efficient utilisation of the ERP in the immediate future.

Our objectives in this area focus on two measures:

The following two objectives have been set for our efficiency and effectiveness.

- Cost effective provision of gas
- Service Provider (SP) key performance indicator (KPI) performance

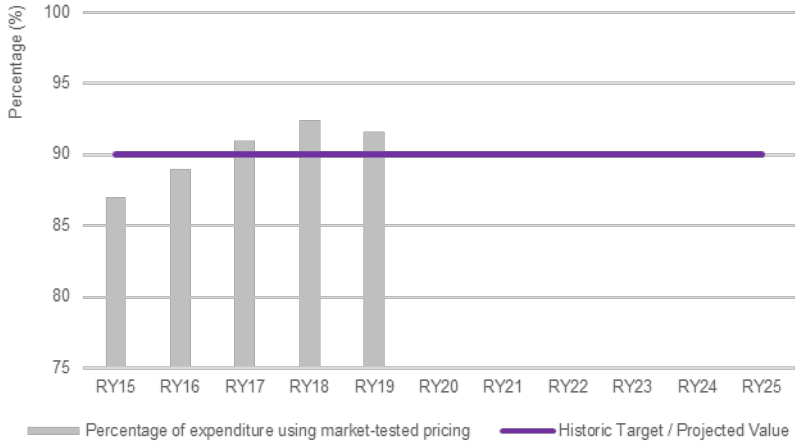
4.7.1 COST-EFFECTIVE PROVISION OF GAS

Achieve >90% of expenditure benchmarked against market-tested pricing

A key means of maintaining delivery efficiency is maintaining market-testing of maintenance and construction costs. Our field service contracts were renewed in 2018 through a formal tendering process. The arrangements we have in place also retain competitive price drivers through the contract period by means of prescribed competitive price adjustments and the provision to tender large or complex works.

By regularly going to market, we can ensure that the rates we obtain from our suppliers represent the current best-value supply. With the new contractual arrangements now in place, we achieved almost 90% of expenditure being market tested. We aim to maintain this level throughout the planning period as shown in Figure 4.13.

Figure 4.13: Historical and projected percentage of market-tested expenditure



4.8 SERVICE PROVIDER KPI PERFORMANCE

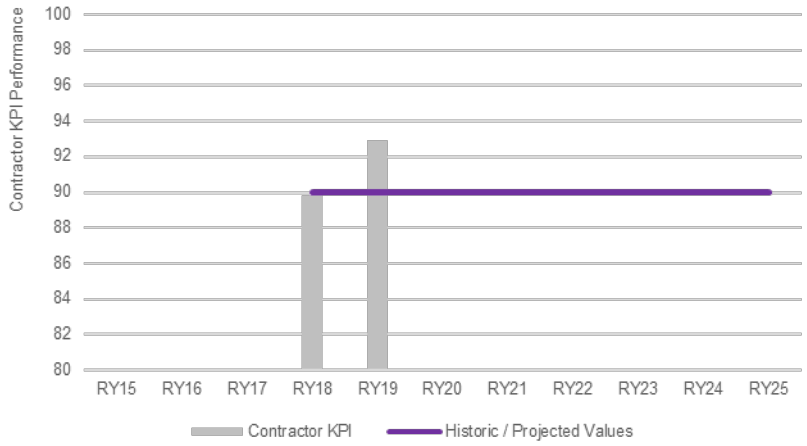
SP performance against KPI's consistently exceed minimum requirements

Our service providers deliver the physical works component of the business. As such, they provide a significant component of the face to face interaction with the end users – our customers.

Powerco maintains KPIs to monitor the quality of our service provider performance. We maintain regular face-to-face communication with our service providers to understand their concerns and issues, and to provide feedback on their performance and provide guidance as needed. We believe our relationships are robust and expect them to continue.

We expect our service providers to maintain a strong work ethic, create safe work environments, maintain high-quality execution and be continually improving. Our KPIs are centred on these factors. Our KPI system became a core metric for us with the new gas field service agreement (GFSA) implemented in 2018. The KPI assesses safety, quality, timelines and customer interaction performance. Figure 4.14 depicts our minimum requirements of our service provider performance. For commercial sensitivity reasons, the value shown is the average KPI across our all our service providers over the entire regulatory year.

Figure 4.14: Historical and projected percentage of contractor KPI performance



4.9 DEVELOP A LOW CARBON TRANSITION PLAN

Develop Low Carbon transition plan by 2025

Powerco supports the current implementation of the Climate Act, 2019. Our customers are also demanding sustainable products or services. This poses a challenge for Powerco. As natural gas is a hydrocarbon, this will impact upon future gas usage. In response to this change in societal values, Powerco aims to continue to provide a valuable service but needs to understand how to transition to this new net-zero carbon future.

A transition plan is of vital importance for the long-term continuation of the business. It involves first gaining a strong understanding of our customers' current and future needs through customer surveys and measurement of customer connection trends over the next few years.

We will also be conducting alternative gas trials in conjunction with other organisations.

The transition plan will take all these into consideration as we plan a course for the future of the business.

4.10 SUMMARY OF OBJECTIVES AND MEASURES

AMS OUTCOME	ASSET MANAGEMENT OBJECTIVE	MEASURE	RY15	RY16	RY17	RY18	RY19	RY20	RY21	RY22	RY23	RY24	RY25
Keep the public, our staff and contractors continuously free from harm.	Keep all network assets safe for the public by having TPD's decreasing to 55 per annum by 2025.	Number of TPD incidents (#p.a./1,000km)	53.3	61.9	51.4	57	59.6	60	60	60	55	55	55
	Keep all network assets safe for the public by having >95% RTE within one hour.	Response time to emergencies (% within one hr)	100	98.1	100	100	94.7	>95	>95	>95	>95	>95	>95
	Keep all network assets safe for the public by having >90% of emergency calls answered within 30 seconds.	Percentage of emergency calls answered (% within 30 secs)	92.7	94.8	95	96.5	94.9	>90	>90	>90	>90	>90	>90
	Maintain zero LTIs per annum to ensure our contractors and staff are safe.	LTI (#p.a.)	1	0	0	0	0	0	0	0	0	0	0
Continuously improve our customer service.	Ensure new connection satisfaction is excellent by achieving an NPS of 60 by 2025.	Net Promoter Score (-100 to 100)	N/A	48	52	51	52	50	55	55	55	60	60
	Ensure customer satisfaction is tolerable by having <50 customer complaints per annum until 2025.	Customer Complaints (#p.a.)	35	40	38	38	34	<50	<50	<50	<45	<45	<40
Continuously increase our asset management maturity.	Achieve AMMAT score of 3.2 by 2025	AMMAT score (# between 0-4)	2.1	2.1	2.1	2.8	2.8	2.8	3.0	3.0	3.0	3.2	3.2
Improve asset performance across all service levels year upon year.	Ensure we have adequate network capacity by having <10 poor pressure events per annum until 2025.	Poor pressure events (#p.a.)	3	0	2	5	3	<10	<10	<10	<10	<10	<10
	Ensure we have adequate network capacity for forecasted growth by having zero deferred residential customer applications per annum until 2025.	Residential applications deferred due to insufficient system capacity (#p.a.)	0	0	0	0	0	0	0	0	0	0	0
	Ensure network integrity is at an adequate level by having <100 pipe leaks per 1,000 km per annum until 2025.	Number network leaks (#)	82.6	103	101	77	74.2	100	100	100	100	100	100
	Ensure operational reliability by having the #customers affected by supply interruptions due to component failure <10 per annum until 2025.	Customers affected by supply interruptions due to component failure (#p.a./1,000 customers)	5.8	5.9	5.3	7.8	3.3	<10	<10	<10	<10	<10	<10
	Ensure gas quality, by having non-compliant odour test reported <10 per annum until 2025.	Non-compliant odour test reported (#p.a.)	2	0	0	2	1	<10	<10	<10	<10	<10	<10
Continually improve our operational efficiency and effectiveness.	Be a cost-effective provider of gas network services by having >90% of expenditure using market-tested pricing.	Percentage of expenditure using market-tested pricing (%)	87	89	91	92.4	91.6	90	90	90	90	90	90
	Improve SP performance continuously by ensuring SP performance KPI's continuously meet minimum requirements.	KPI values/performance (Score 0-10)	N/A	N/A	N/A	89.8	92.9	90	90	90	90	90	90
Develop a Low Carbon transition plan.	Develop Low Carbon transition plan by 2025.	Transition plans %Complete (%)	N/A	N/A	N/A	N/A	N/A	5	20	40	60	80	100

5 ASSET MANAGEMENT SYSTEM

5.1 INTRODUCTION

This chapter describes our approach to asset management. Good asset management requires a clear and structured system that ensures our processes, decision making, and data deliver a safe, reliable and sustainable network. Successful asset management will be evidenced by delighted customers and a thriving business.

In order to improve our asset management practices, the Gas division has recently started aligning our Asset Management System (AMS) with ISO 55001, a set of requirements, principles and terminology defining best practices for the management of physical assets. It is used by a wide range of global infrastructure companies, which will allow us to benchmark Powerco against similar organisations. Attainment of certification to ISO 55001 is a natural progression in maturation of our asset management practice.

This section covers:

- Our Asset Management System (AMS)
- The corporate governance and organisational structure related to asset management
- Our AMS governance
- Our Asset Management Strategies

5.2 ASSET MANAGEMENT FRAMEWORK

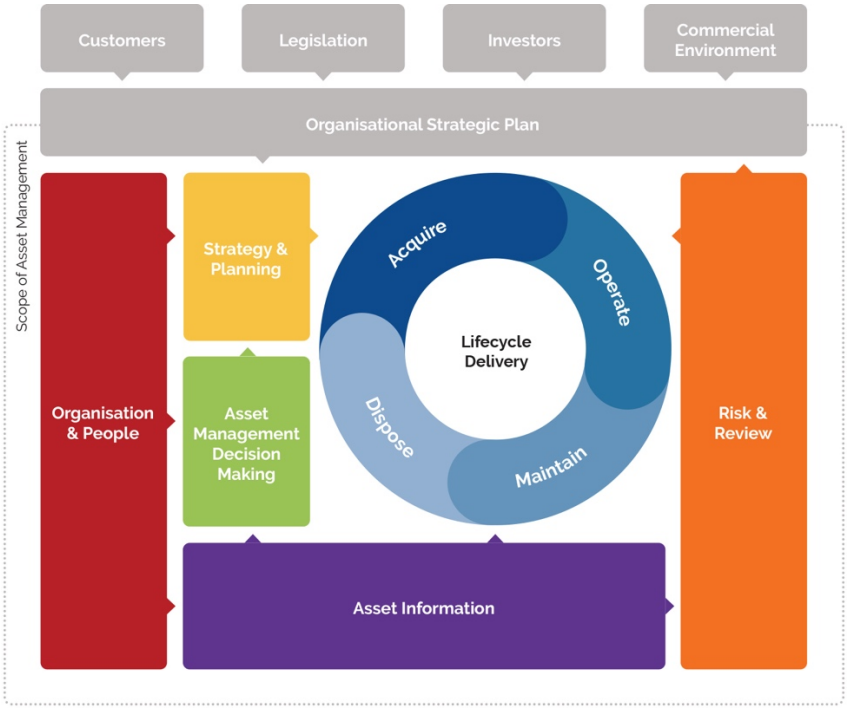
5.2.1 OVERVIEW

Figure 5.1 provides a generic representation of a sound AMS, including the influences, core and supporting elements that contribute to its effectiveness.

Powerco has modelled its AMS on this framework. Our AMS comprises six elements reflecting the core elements within the ISO 55001 framework:

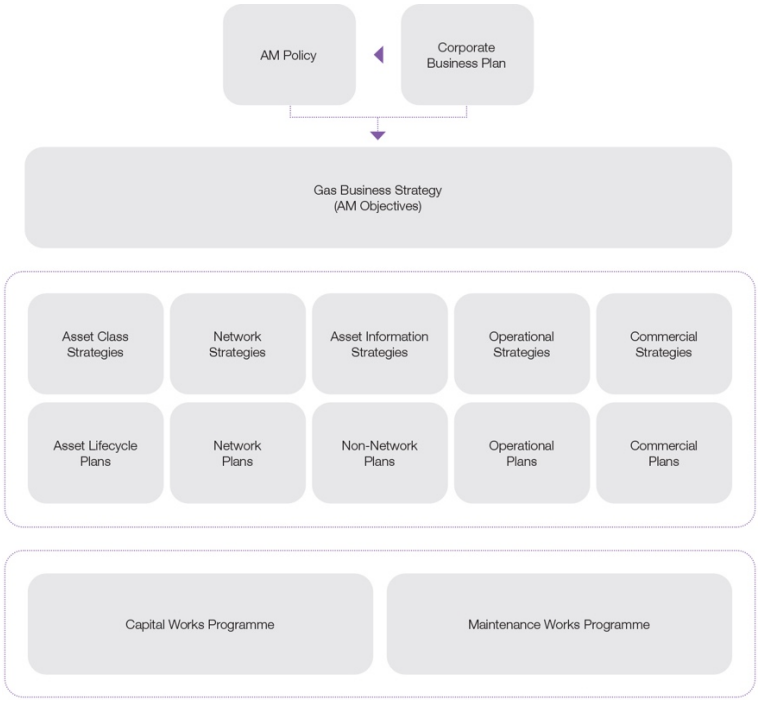
- Strategy and planning
- Asset management decision-making
- Organisation and people
- Lifecycle delivery
- Asset information
- Risk and review

Figure 5.1: Asset Management System model



The concept of “line-of-sight” is a core principle of ISO55001. The principle requires a clear, inter-related connection between all work undertaken within an organisation and the achievement of the corporate objectives. This line of sight is evident in our document hierarchy (refer to Figure 5.2). The document hierarchy depicts how works defined in our plans directly align to our Corporate Objectives detailed in our Corporate Business Plan. The aim of the “line-of-sight” concept, is ensure that all work undertaken is working towards achieving or business objectives, and therefore is of value to the business.

Figure 5.2: Asset management document hierarchy

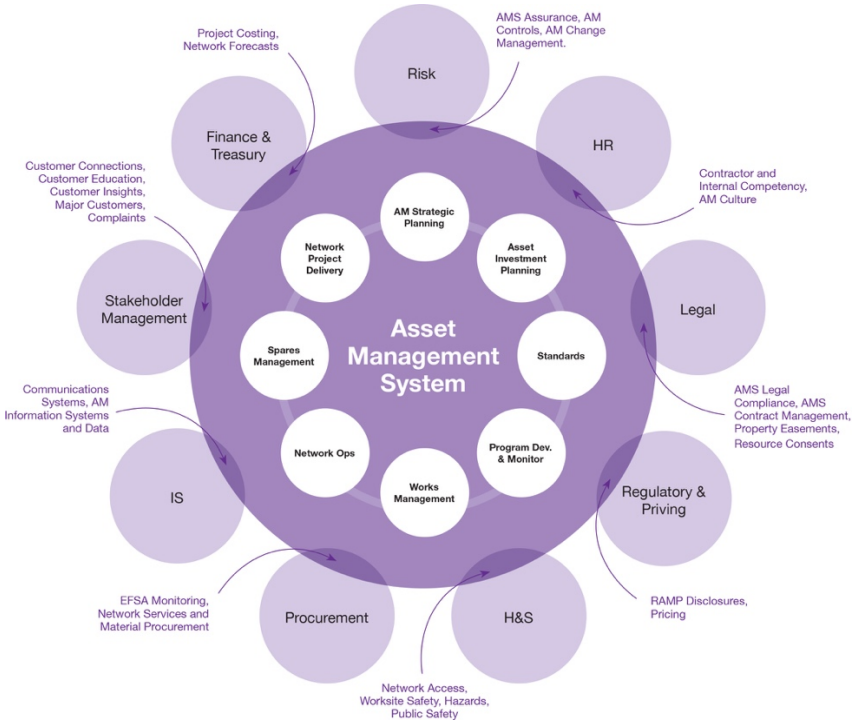


5.2.1.1 GAS AMS SCOPE

As Powerco is primarily a business that manages all its assets, the scope of the Gas AMS incorporates most functions of the business. All support functions to the Gas business assist in the management of our asset portfolios; our asset management. Our asset portfolios include our physical network assets (refer to Section 3.4), as well as our information assets. The focus of this AMP, and our AMS, is on the management of our network assets.

Figure 5.3 demonstrates the functional boundaries and interface of several functions within the overall business with the AMS.

Figure 5.3: Scope of the Gas AMS



5.2.2 STRATEGY AND PLANNING

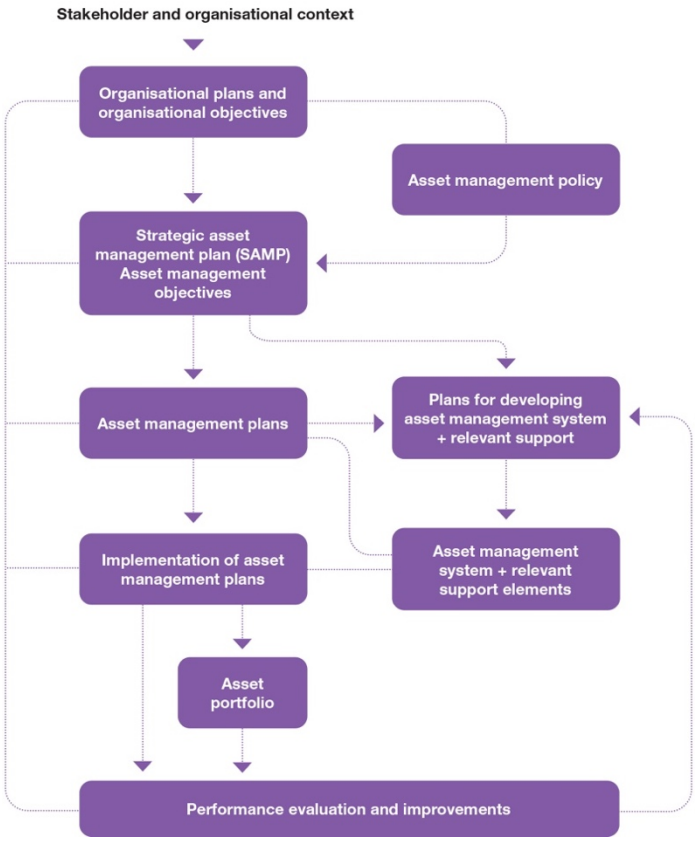
The Strategy and Planning element involves the devising of long-term growth plans, asset renewal plans, budgets and tactical plans to meet Corporate and Asset management objectives.

There is a suite of documents generated:

- Asset Management Objectives
- Asset Management Strategy
- Asset class strategies (including asset information)
- Network strategies
- Operational Strategy
- Commercial and Customer Strategy

These are discussed in more detail in Section 5.2.8.

Figure 5.4: AMS Framework



5.2.2.1 ASSET AND CUSTOMER ANALYSIS

Of significance during the strategy development process is asset performance and customer analysis. We assess feedback for short- (e.g. incident analysis), medium- (e.g. works plan delivery) and long-term (e.g. trends analysis). These are core components to the strategies that we employ to translate our Asset Management Objectives to our asset lifecycle and network plans.

While no formal document comes out from this function, the analysis carried through this function form a key input to the other functions.

5.2.2.2 ASSET INTERVENTION PLANNING

Given our strategy and objectives, the question we ask is “What do we need to do and when do we need to do it in order to optimise the performance and utilisation of our assets to reach our targets and objectives within each network area?” These plans drive the network-related costs that we face as a business.

To create the plans, we use the asset data and performance information collected from the field (including asset condition) and risk management methodologies to optimise our risk profile. We use asset criticality wherever possible to prioritise investments. This Asset Management Plan, and the annual Gas Works Plan are outputs of this function.

This is discussed in more detail in Section 5.4. The detail of our asset planning for each of our network areas is described in Section 8.

There are two types of asset intervention: reactive (i.e. triggered as a result of an inspection or request from a customer) or planned (i.e. scheduled over the long-term). Reactive activities are recorded into a programme of works with a target delivery date that reflects the level of urgency.

5.2.2.3 REACTIVE ACTIVITIES

Reactive activities result from maintenance requirements, faults, customer or customer requirements, third party works, or any unexpected event that requires immediate action on the network. Our responses to these problems usually involve routine, standardised repair methods. By their nature, reactive activities cannot be identified early enough to be individually forecast.

We analyse the need for reactive work using historical data, including:

- Customer connections and customer maintenance
- Corrective maintenance and defects remedied
- Fault responses and emergency activities

As we have improved our asset management maturity, the number of reactive activities has been reducing year-on-year. This allows us to deliver better, safer and more efficient work on our assets, ultimately benefiting our customers.

5.2.2.4 PLANNED ACTIVITIES

Planned activities are driven by our accepted risk levels, the value drivers and the targets established for each objective. If we consider that our current or future risk levels, in terms of our value drivers, are outside acceptable limits, we will include them in a new project with an indicative delivery date in an improvement register.

5.2.3 DECISION MAKING FRAMEWORK

A set of value drivers have been developed to prioritise intervention decisions. The value drivers reflect our corporate Mission. “In profitable **partnership** with our stakeholders we are powering the future of New Zealand through the **delivery** of **safe, reliable** and **efficient** energy.”

The value drivers are critical for all strategic and asset intervention decisions made within the AMS. They are:

- **Safety** – keep the public, our staff and our contractors safe from harm
- **Delivery** – ensure our networks have the capacity and resilience to meet the quality of supply expected by our customers
- **Reliability** – safe containment of gas and operational reliability to deliver gas to our customers at the right quality
- **Efficiency** – continuously seek out and deliver cost efficiencies
- **Partnership** – be a responsible partner for our customers and our other stakeholders

5.2.4 LIFECYCLE DELIVERY

Asset lifecycle planning involves all stages of an asset’s life: acquisition, operations, maintenance and disposal.

Using the processes described in previous sections, we devise technical standards, work instructions and maintenance and inspection plans to be used for acquisition, operation and maintenance of the assets.

Our practices around asset class management and what they mean for each asset class are described in Chapter 6.

5.2.5 ASSET INFORMATION

Comprehensive and consistent asset information enables us to make efficient and cost-effective decisions about how to manage our asset information. Our plans around these are discussed in Chapters 6 and 8.

5.2.6 ORGANISATION AND PEOPLE

Our system can work only if we have the right organisation and the right people with the right skills. It includes human resources management processes and competency frameworks. As noted previously, our governance arrangements and processes are described in Section 3.3.2-3.3.3.

5.2.7 RISK AND REVIEW

There are inherent hazards associated with operating a gas distribution business and in gas delivery. The intent of all asset management decisions is to reduce risks presented to the business; be they business risks or operational risks. A robust risk management framework is required to identify and control risks to acceptable levels. The management of these risks is reflected by the legislative requirements, for example the requirement for demonstrable management of the resultant safety risks.

Our risk management system is described in detail within Section 3.6.

5.2.7.1 MANAGING BUSINESS RISK: STRATEGIC RISK ASSESSMENT

Annually, an assessment of strategic business risks is conducted by the Gas Leadership Team. An assessment of the operating environment is conducted, to determine if there have been any changes. These changes are captured, and a formal risk assessment is conducted to ensure the top risks, and any new risks, are appropriately controlled. This risk assessment is then sent to the Board for review and approval.

5.2.7.2 MANAGING SAFETY RISKS: FORMAL SAFETY ASSESSMENT

In 2018, we conducted our five-yearly network Formal Safety Assessment, as required by AS/NZS 4645:2018 (Gas Distribution Networks) and NZS 7901:2014 (Safety Management System for Public Safety). This is a living document where we record and assess every hazard, threat and mode of failure that we have identified on our networks with our current controls.

If the risk is above an “Intermediate” level, we modify the controls to reduce it to a lower level. If the risk is “Intermediate” we conduct an ALARP (“as low as reasonably practical”) assessment. If the risk is lower than “Intermediate”, we accept the current controls.

We have identified 10 hazards that directly relate to safety, divided into 65 generic assessed risks. These hazards are detailed below.

Table 5.1: Identified safety hazards

HAZARDS	DETAILS
Gas release	Gas is released into the atmosphere (this is associated with the loss of structural integrity)
Gas release in an insufficient ventilated location	Gas is released and reaches a critical concentration that can cause asphyxiation or have the potential to be ignited if an energy source is present
Fire and explosion	Gas is released, reaches a critical concentration and an additional energy source is present (i.e. ignition source)
Electricity	People are harmed due to the usage of electrical equipment (e.g. SCADA cabinet) or the presence of stray currents on metallic pipes
Pneumatic energy	The gas conveyed through the network is pressurised

HAZARDS	DETAILS
Third party interference	Assets are damaged or operated by an unauthorised person, including vandalism
Environmental conditions and natural disasters	Assets are damaged during earthquakes, volcanic eruptions, lahars, thunderstorms, flooding, tsunami or landslides
Heights	People are harmed by falling, slipping or tripping on the asset
Hazardous material	Assets are made of hazardous material
Confined spaces	Assets are located in a confined space

We have conducted a detailed SFAIRP assessment of all the risks identified "Medium" or above and conducted bow-tie risk assessments on the top risks. The assessment did not identify the requirement for additional controls. We are, however, building a programme of works to review the controls that we deemed as critical.

A process map describing this process is available in Appendix 7.

The various mitigation activities identified are then added to the relevant programme of work (operational or capital).

5.2.7.3 MANAGING DELIVERY RISKS: CAPACITY AND GROWTH ASSESSMENT, SECURITY OF SUPPLY ASSESSMENT

In order to determine whether or not we need to expand the network we first carry out a capacity assessment that examines the pattern of peak demands on each pressure system, the ability of the District Regulation Stations (DRS – supply points on the network) to meet those peak demands, and the ability of the pipework to convey sufficient gas to meet the peaks. Throughout the network, we are finding that the increasing use of gas-fired hot water installations is tending to drive peak demands higher. Our analysis of the demand profiles gives us a first indication of the degree of risk we face on each network should we experience peak demands that exceed our forecasts or, alternatively, if we should experience reduced supply (for example, due to a DRS component failure.)

In addition to peak demand growth, we analyse areas where general volume growth is occurring, as follows:

- Infill growth in areas where our mains already front the customer
- Customer-specific volume growth, where customers are using more gas (e.g. due to, the installation of additional appliances)
- External growth, where new customers are driving the need to extend our network and build new mains (e.g. new subdivisions)

In the long-term, a certain degree of uncertainty applies to residential growth forecasts. We work with councils, developers and our account managers to identify areas of growth on our footprint.

We are improving our forecasts for commercial and industrial demand by working more closely with these customers, but we generally do not have more than one year's visibility of their future activities and needs. To provide additional headroom for unexpected growth, we generally build our networks in industrial and commercial parks with higher pressure and capacity specifications on a case-by-case basis. A process map describing the network capacity assessment process is in Appendix 8.

Infill and volume growth are provided for by setting a minimum network pressure that would maintain enough headroom to accommodate the identified growth at times of peak demand. To help ensure we achieve this goal we have stress-tested our growth assumptions using scenarios from our growth review and have evenly spread the expected volume increase across the relevant parts of the network.

Footprint growth is mainly driven by new subdivision activity. We have had strong demand for new builds on our footprint as the concept of gas as a fuel has become better received. Our relationship with developers, reinforced by local councils' plans, has helped us to understand where new subdivision activity is likely to occur on our footprint during the next three to five years. For more information about our growth forecasts, refer to Chapter 7.

In 2020, we have been implementing several new network strategies across our networks. These strategies aim to practically reduce the risk presented by the network and reduce the likelihood of any large-scale outages. Specifically, it mentions the requirement for monitoring on critical stations, the establishment of trunk mains linking stations together, and the use of by-pass when the number of customers likely to be affected by an outage is greater than five. We have identified the projects required to align our current network configuration with the policy and we are assessing the impact.

5.2.7.4 MANAGING RELIABILITY RISK: RELIABILITY ASSESSMENT

We aim to operate a sound network. The reliability assessment is a process that helps us understand the risk of our assets failing. We use the data collected through our electronic field data system (SPA) and our Failure Mode and Effect Analysis (FMEA) for each of our asset classes. This helps us evaluate the risk that an asset will fail in the future. A process map is in Appendix 9.

This risk-based approach helped us identify one specific reliability issue with polyethylene networks constructed before 1985 that have previously been squeezed-off and installed in specific years. We have started a replacement programme on those assets that have experienced higher leakage rates than others, and we continue to gather more data on pipe and soil condition as we go.

We have not identified any other significant asset class with a specific reliability issue, apart from obsolescence.

5.2.8 ASSET MANAGEMENT DOCUMENT HEIRARCHY

A core component underpinning our AMS framework is the documentation hierarchy (refer to Figure 5.2). Powerco's document hierarchy provides a framework that allows us to manage our performance, risks and costs in a consistent, transparent manner.

5.2.8.1 ASSET MANAGEMENT POLICY

Our Asset Management Policy guides all our asset management activities. The policy provides alignment and linkages between the asset management activities, our corporate Mission, Vision And Values. It represents our commitment to manage our assets in an efficient and structured way, so we can deliver optimal outcomes for all stakeholders.

The Powerco Asset Management Policy, which applies across both Electricity and Gas networks, was newly updated in 2019. changes are minor in respects to our previous policy, although it introduces achieving the accreditation for ISO 55001, integrating our AMS with all other management systems and reaffirms the importance of asset-related data management. Chapter 6 of this AMP gives more details on how we consider data as an asset.

The Asset Management Policy states that we will pursue the following outcomes:

- Positioning the safety of the public, our staff and contractors as paramount
- Developing our networks in a way that delivers the evolving needs of our customers
- Supporting environmentally sustainable and ethical practice, through the selection and life-cycle management of our assets
- Delivering a cost-effective service by optimising asset cost, risk and performance
- Be proactive, transparent, and authentic in our interactions with our stakeholders
- Meeting all statutory and regulatory obligations

We believe these elements are critical in being a valuable partner in delivering on New Zealand's future energy needs. A full version of the policy can be found in Appendix 4.

The AMS we employ is designed to deliver the requirements set out in the asset Management Policy and the corporate objectives in our Business Plan.

5.2.8.2 CORPORATE BUSINESS PLAN

The development of our Corporate Business Plan[3] is an annual process led by the Executive Management Team and agreed to by the Board of Directors. It describes our long-term corporate objectives and strategies to deliver the Vision and Mission. This is the starting point for our asset management system within the framework set by our Asset Management Policy.

Fundamental to our AMS is the translation of the organisational strategy into specific AM objectives. These Asset Management objectives (detailed in Chapter 4) establish a set of quantified measures by which we can assess our business performance.

5.2.8.3 GAS BUSINESS STRATEGY

The Gas Business Strategy is the document that captures the Gas Asset Management Objectives and Gas Asst Management Strategies. The Gas leadership Team (GLT) is responsible for interpreting the intent of the corporate objectives and Asset Management Policy, through the lens of the operating environment (Chapter 3) and developing gas-specific, Asset Management Objectives and Strategies. The Gas business strategies are developed every five years and are reviewed annually.

Gas Tactical Plans are developed annually which translate the strategies into actionable work plans. The management and delivery of these plans becomes the daily activity of the Gas division employees.

5.2.9 CONTINUOUS IMPROVEMENT OF OUR ASSET MANAGEMENT SYSTEM

Each year, we step back and look at our performance and strive to improve our asset management capabilities. This started in 2010 when we went through a formal PAS 55 audit, continued in 2018 when we had a gap analysis conducted for achieving ISO55001 and continues today with a sustained focus on improving our processes and systems, in alignment with our Asset Management Objective in Section 4.5.

A useful tool to establish a measure of our maturity in the asset management journey is the AMMAT self-assessment established by the Commerce Commission in their Information Disclosure requirements for Gas Distribution Businesses (GDBs). In the past two iterations of our AMP, we have completed this in-house and have had it peer-reviewed.

We also take the opportunity to improve our AMS by leveraging the different audits we have. This includes the compliance audit with NZS 7901 regarding public safety management systems and peer review with the Electricity business.

[3] This is formally documented in our annual Business Plan but details our long-term strategy as an organisation.

Figure 5.5: Asset management improvement journey

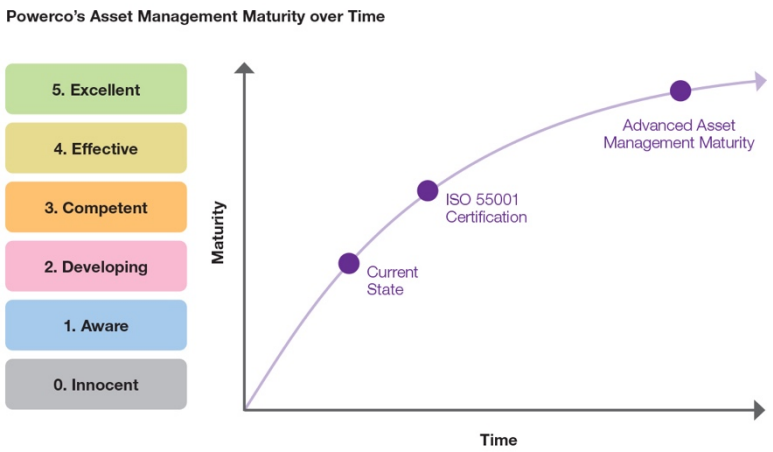
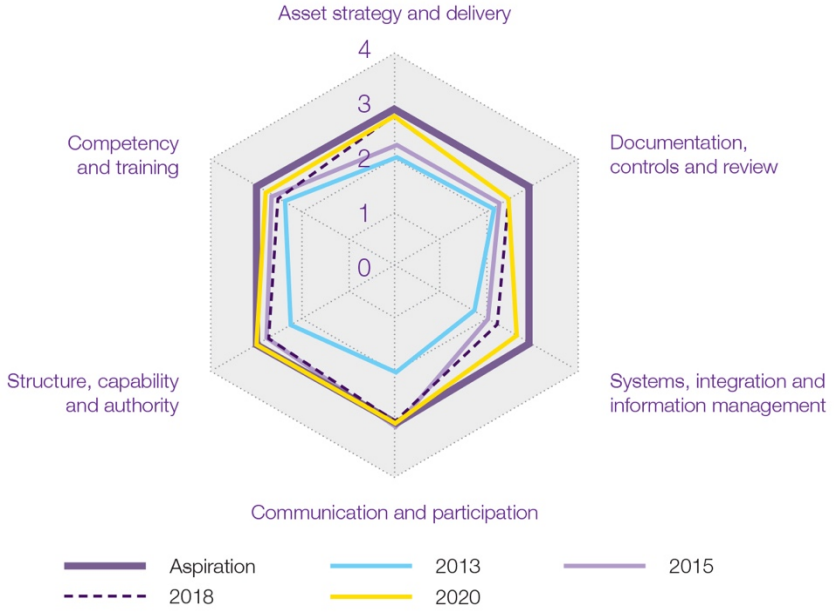


Figure 5.6: AMMAT self-assessment score



Finally, as part of the ISO55001 certification process, we are formalising our feedback process. The new process will allow a robust method for capturing opportunities for improvement for our AMS, asset management process and all associated artefacts. Feedback can be sourced internally or externally, with all opportunities to be prioritised and actioned as appropriate.

5.2.10 COMPLIANCE WITH NEW ZEALAND LEGISLATION AND STANDARDS

Powerco is accountable for complying with all the relevant Acts that will impact on our asset management approach; including the Gas Act 1992, the Gas Safety and Measurements Regulations 1992 and the Gas DPP established under Part 4 of the Commerce Act.

Our Asset Management Framework and practices use these requirements as a foundation. Our Asset Management Policy, described in Section 2.3.3, clearly states our objective to meet all statutory and regulatory obligations. We have integrated standards and industry Codes of Practice to our objectives, processes and procedures; including AS/NZS 4645 for Gas distribution networks, and NZS 7901 Safety Management System for Public Safety. The Executive Management Team (comprising the Chief Executive and his direct reports), is accountable for the organisation to fulfil compliance and issue an annual compliance statement. A full list of these legislative requirements can be found in Appendix 5.

5.3 ASSET MANAGEMENT SYSTEM GOVERNANCE

A robust framework of governance controls and managerial responsibilities is in place to ensure all asset management decisions align with our corporate Values, Mission, Vision and Asset Management Policy. Powerco's corporate governance and organisational structure is detailed in Section 3.3.2-3.3.3. This section will discuss the governance controls related to the oversight of our AMS.

5.3.1 GAS ASSET MANAGEMENT SYSTEM STEERING COMMITTEE

The Gas AMS Steering Committee is made up of senior managers form the Gas Division and, provides governance of the Gas AMS management. The aim of the Gas AMS Committee is to ensure that the AMS generates value through appropriate asset management.

Each year the focus of our asset management expenditure and associated budget is considered and approved by our Board. Works plans are ratified by the committee and approved by the Gas Asset Strategy Manager under delegation.

Once work plans are approved, the listed projects are subject to further individual approval based on our Delegated Financial Authority (DFA) policy. Any additional expenditure exceeding financial authority limits triggers further review. This ensures our objectives are met and we have prudent oversight of expenditure decision making.

5.3.2 ASSET MANAGEMENT PLANNING RESPONSIBILITIES

Powerco plans expenditure at different levels, as shown in Table 5.2. At each level, the amount of detail and expenditure certainty increases. Each level is designed to provide clear 'line-of-sight' between our corporate objectives and asset management activities. This structure allows us to have clear accountability at each stage of the planning process.

Table 5.2: Asset management planning

LEVEL	HORIZON	PURPOSE	REVIEW FREQUENCY	RESPONSIBLE	RELATED DOCUMENTATION
Business Plan	Up to 10 years	Setting corporate objectives, strategies and targets for the company	Yearly	CEO, Executive, with Board endorsement	Vision, Mission, Values, corporate objectives, Asset Management Policy
Gas Business Strategy	5 years	Sets out the Gas objectives, strategies and tactical initiatives	Yearly	GM Gas	Business Units Strategies and Tactical plans
Asset Management Plan	10 years	Describes our planned projects and expenditure forecasts	Yearly (full review every 2 to 3 years, yearly update in between)	Gas Asset Strategy Manager, with Executives and Board endorsement	Asset Management Strategy, Asset Management Plan
Gas Works Plan	1 year	Details the yearly work programme	Quarterly	Gas Operations Manager	Gas Works Plan, Maintenance plan, Non-network plan(s)
Works Delivery	As required	Detailed planning of project or activity delivery	As required	Project/Works Manager with DFA holder	Gas project brief, Scope of Works

5.3.3 DELEGATED FINANCIAL AUTHORITY

The Delegated Financial Authority (DFA) policy aligns with our corporate governance charter and group delegations of authority. It sets out expenditure limits that each manager is authorised to approve, the process for approving payments, and the cross-checks built into this. Application of the DFA policy is externally audited on an annual basis.

Expenditure limits apply to capital and operational expenditure, network or non-network, and budgeted or reactive. The typical DFAs for our Gas division are listed in Table 5.3 and Table 5.4. The limits are set out within our sub delegation standard which is a controlled document approved by the CEO.

Table 5.3: Delegated Financial Authority (Capex)

LEVEL	SCHEDULED		REACTIVE	
	Network	Non-network	Network	Non-network
Board	>$2M	>$1M	>$1M	>$1M
CEO	$2M	$1M	$1M	$1M
General Manager Gas	$500k	$100k	$50k	$5k
Senior Managers	$150k	$25k	$30k	$1k
Managers	$80k	$10k	$10k	$1k

Table 5.4: Delegated Financial Authority (Opex)

LEVEL	SCHEDULED		REACTIVE	
	Network	Non-network	Network	Non-network
Board	>$2m	>$1M	>$1M	>$1M
CEO	$2m	$1M	$1M	$1M
General Manager Gas	$500k	$50k	$50k	$5k
Senior Managers	$50k	$25k	$10k	$1k
Managers	$25k	$10k	$5k	$1k

5.4 ASSET MANAGEMENT STRATEGIES

the means by which the gas division aims to achieve our Asset Management Objectives, is through our Gas Business Strategies. This section will provide an overview of each strategy.

5.4.1 ASSET CLASS STRATEGIES

Powerco manages many different asset types each with different risks, operating procedures, expected lifespans and failure modes. The Asset Class Strategy will influence how often the asset is operated, inspected and maintained. Powerco has asset class strategies for all our major asset types, including:

- Mains and service pipes
- Regulator stations
- Line and service valves
- Special crossings
- Monitoring and control systems
- Cathodic protection systems

Each asset class strategy identifies the asset class objectives (refer to Chapter 6). To assist in the development of the objectives, failure mode and effect assessment (FMEA) is conducted for each asset class. The FMEA collates the risks of each asset type and informs the Asset Class Strategy.

The current status of the asset class is used to define the lifecycle management. The asset class status is developed by analysing the:

- Asset class quantities and age profile
- Asset class life expectancy
- Asset class condition

Lifecycle management of each asset class determines how we intervene with the asset. Powerco utilises a Reliability Centred Maintenance (RCM) strategy for its maintenance scheduling. Our RCM strategy requires us to understand our asset class risks, in conjunction with current asset class performance, to develop our asset intervention plan(s) for each asset class. Asset intervention includes when and how we:

- Operate the asset
- Maintain the asset
- Renew or replace the asset
- Dispose of the asset

Each Asset Class Strategy will identify the asset class maintenance schedules and asset class renewal programmes, or tranches of work. These programmes are broken into specific projects in the Asset Lifecycle Plans which are then scheduled in for delivery over the AMP planning period.

The Asset Class Strategies ensures that the works identified in the lifecycle plans are aligned with the Asset Management Objectives.

5.4.2 NETWORK STRATEGIES

Powerco operates networks in five regions, each with different operating characteristics, customers and therefore operating risks. The network strategies developed, previously referred to as the Security of Supply Policy, include:

- Pressure droop
- Elevated pressure
- Resilience and redundancy
- Odorant
- Network isolation
- Rationalisation

Assessments of the networks are conducted under the limitations dictated within these strategies. These assessments identify areas of the networks to be worked on to mitigate the identified risks. These areas are broken into specific projects in the Network Plans (refer to Chapter 7).

5.4.2.1 PRESSURE DROOP STRATEGY

Poor pressure events on the network will see customers potentially lose supply of gas. As such, it is important to be able to detect and prevent any poor pressure event, under typical network operating conditions. Droop characteristics for each network are recorded and captured as part of normal operating procedures, and these values are utilised to determine how the network is operating. Limits on acceptable droops have been set and are maintained to ensure customer interruptions are limited in normal operation.

5.4.2.2 ELEVATED PRESSURE STRATEGY

Elevated pressures on the network may cause damage to, or failure of, Powerco or customer assets. This is a potentially dangerous situation and strict limits are placed on the maximum allowable operating pressure to ensure this situation doesn't occur. The performance of the network is reviewed regularly and assurance that safety systems are in place and operational safety measures are undertaken. Elevated pressures are normally due to upstream issues, so most measures undertaken will see valves automatically close and an alarm raised.

5.4.2.3 RESILIENCE AND REDUNDANCY STRATEGY

Failure of assets is inevitable, but to ensure that customers do not lose gas supply, some redundancy must be designed into the network. Minimum requirements for network design help to ensure that a single asset failure will not affect an unduly large number of customers.

5.4.2.4 ODORANT STRATEGY

We ensure odorant is present to enable natural gas leaks to be detected. We assess the growth of our network and location of our test points, on a regular basis, to ensure our testing regime is effective.

5.4.2.5 NETWORK ISOLATION STRATEGY

In the event of a large asset failure, Powerco must have the ability to isolate the flow of gas to the damaged area. As such, a strategy has been developed to ensure that neither the public nor Powerco is exposed to undue risk in the event of an asset failure; and, where appropriate, isolation ability is designed into the network.

5.4.2.6 RATIONALISATION STRATEGY

Powerco has accumulated networks throughout its corporate history. Accordingly, we have inherited different design philosophies and practices. These are sometimes

at odds with current thinking, or Powerco's desired network state. To ensure network designs are efficient and consistent, rationalisation strategies are being developed for each region.

5.4.3 OPERATIONAL STRATEGY

Operation of the assets and networks is arguably the most important facet of Powerco's business. Operational strategies ensure works are delivered and are conducted safely. There are two main operational strategies that are developed to ensure we meet our objectives through effective delivery of our works programme in a safe and reliable manner. They are:

- Works mastery
- Safety leadership

5.4.3.1 WORKS MASTERY

Delivery of our physical works is the purpose of our asset planning. Complete delivery of our works programmes is faced with numerous challenges. Balancing cost, scheduling and quality is the essence of successful project and works delivery. The Works Mastery Strategy is developed to identify how the business will navigate the challenges and successfully deliver the works plans.

5.4.3.2 SAFETY LEADERSHIP

Safety is a core component of our works delivery and is engrained into our design and works methodologies. We wish to ensure continued focus, and improvement, on the safety performance of all aspects of our business. The Safety Leadership Strategy details the areas the business is focussing on to become a leader in safety within the industry.

5.4.4 COMMERCIAL AND CUSTOMER STRATEGY

We employ outwards facing processes to provide both an avenue for connecting new customers as well as to capture customer feedback to inform intervention decisions.

The other important commercial strategy being implemented is to ready the network for a net-zero carbon future.

- Customer service and growth
- Net-zero carbon

5.4.4.1 CUSTOMER SERVICE AND GROWTH

For Powerco, customer satisfaction is paramount. As natural gas is a selective energy source, we place strong focus on ensuring we understand what our customers want and how we can satisfy them. A secondary effect of good customer service is strong growth in new connections, and a low level of disconnections. The current strategies are focused on strong and clear customer communication to gain an understanding of what our customers want and ensuring that we are capable of capitalising on growth opportunities on our network. The customer feedback is internalised and used to drive business process improvement to improve our customer service capability. The growth component of this strategy is captured in Section 7.2.

5.4.4.2 NET ZERO CARBON

The role natural gas plays in the net-zero carbon future is a new factor impacting the industry. There are many aspects to a trend of this nature, so this strategy is expected to mature and develop as the social operating environment evolves.

5.4.5 NON-NETWORK STRATEGIES

Non-network strategies include the lines of effort that are aimed at improving support aspects of the Gas business (refer to Chapter 8). As a large percentage of our effort in the business goes towards providing support to our network-focussed activities, improvements to these aspects can result in significant efficiency gains. There are three main strategies that are being implemented:

- Asset Management Improvement Strategy
- Asset Information Strategy

5.4.5.1 ASSET MANAGEMENT IMPROVEMENT STRATEGY

As asset management is effectively most of what the business does day to day, it behoves us to continuously improve our business practices. As such, we have undertaken a strategy to guide us on our Asset Management Maturity Journey, which aims to continuously improve our asset management understanding and capability to ensure we are providing the best service and value for money for our customers. We are committed to becoming certified against international asset management standard ISO 55001.

5.4.5.2 ASSET INFORMATION STRATEGY

Underlying all asset decisions is a dependency on high-quality information to support operational deployment and long-term investment. The Asset Information Strategy (AIS) sets out the strategic direction we are taking in managing our asset information. Our goal with asset information is based on the following objectives:

- To provide a good understanding of our assets - their condition, location and technical attributes
- To ensure that the right information is available to Powerco's staff and contractors

- To focus on how we will successfully achieve our core function of delivering energy safely, reliably and economically using quality asset information;
- To support the delivery of best value to our customers, while sustaining an appropriate commercial return for our shareholders based on decisions dependent on reliable, well managed asset information
- To use asset information to drive our continuous improvement programme, to maintain our position as one of New Zealand's most respected, forward-thinking distribution network managers

5.5 ASSET MANAGEMENT PLANS

In the previous section, we described how activities are identified and delivery dates determined. This is how we begin building our Gas Works Plan and our maintenance programme, including justifying each project to be executed.

5.5.1.1 GAS WORKS PLAN

As part of our annual planning process a Gas Works Plan (GWP) is created which details all scheduled capital projects to be undertaken the next financial year. The GWP captures all projects for the proceeding three years. Significant works are managed as discrete projects. Tranches of asset-related work identified in the asset class and network strategies are quantised into projects and scheduled into an upcoming GWP. The projects in the GWP are optimised to ensure greatest benefit to our customers and greatest reduction in network risk.

For each project, we review the impact of the status quo on our short-term network KPIs and our long-term expenditure profiles. We endeavour to deliver a smooth work programme, without step changes in activity, provided we have the resources available to achieve this and our ability to efficiently deliver is maintained.

We also review the best way to deliver each project in terms of internal and external resourcing and cost efficiency in order to complete any investigations, project justifications or designs. Our contract structure allows us to use alternative contractors or seek competitive tenders for work if a project requires specialist work or the cost is expected to be more than $150,000.

Finally, we look at the delivery timeframe to plan the works during the year and revise our cost estimates.

5.5.1.2 OPTIMISATION AND PRIORITISATION

Only top priority projects are entered into the GWP. To populate the GWP, the Improvement Register is reviewed, and investment opportunities are prioritised against the value drivers. The projects are given weightings against each value driver, and the top priority opportunities are then incorporated into the GWP.

5.5.1.3 PROJECTS APPROVAL

Before a project can be authorised for expenditure, we produce a Gas Project Brief. The project brief is the gate before expenditure is incurred. It describes how the project is aligned with our strategy and objectives, the scope of works and the option analysis and recommendations. The following are involved in the approval process:

- The asset strategy team, or commercial team as project sponsors
- The project delivery team to consider the option analysis and that the deliverability of the works has been properly considered
- The Asset Strategy Manager (for critical projects) to ensure alignment with our asset management governance and structure
- The relevant holder of the financial authority needed for this project

If a project deviates from a standard design or practice, justification is needed at this step, before approval, in order to achieve process efficiency and maximise cost efficiency.

5.5.1.4 MAINTENANCE PROGRAMME

Our routine maintenance and inspection programmes are planned at asset class and regional levels. Normal operational condition and maintenance activities are specified in the standards prepared by the operations team.

5.5.1.5 CUSTOMER-INITIATED WORKS

Residential requests come directly to the customer team from individuals or through their retailers. Most customer-initiated works have standard designs and procedures applied. Our customer contribution policy is used to identify the costs to be passed on to the customer. Other customer-initiated works (commercial, subdivision reticulation, etc.) go through the same process as capital works, with commercial oversight and justification provide by the Pricing and Revenue Manager.

5.5.1.6 THIRD PARTY REQUESTS

Pipe relocations or alterations are reactive activities driven by third-party requests (e.g. Kenepuru subdivision development) and therefore cannot have plans created for them. However, the programme budget is managed accordingly, and prioritisation
of projects is utilised if scheduled projects need to be halted. They come directly to, and are dealt with, by the project delivery team. Most of these activities can have their costs recovered, as provided for by the Gas Act.

These actions will be funded from our existing forecasts, as part of our business-as-usual continuous improvement activities.

6 ASSET CLASS STRATEGIES AND LIFECYCLE PLANS

6.1 INTRODUCTION

This section describes our asset classes and how we manage our assets throughout their lifecycles. In doing so, we describe our current understanding of their systemic issues, the condition of our assets, our approach to operations and maintenance, refurbishment and renewal programmes, and information quality. The asset classes covered in this section are detailed in Table 6.1.

Table 6.1: Asset class definition

ASSET CLASS	DEFINITION
Main and service pipes (M&S)	**Main** – Pipeline that transports gas from the bulk supply transmission system to each service main. **Service** – Pipeline that transports gas from the main to the customer, ending at the meter control valve.
Regulator Stations (DRS)	An installation designed to reduce the pressure of gas.
Line and services valves (VAL)	A fitting installed in a pipeline designed to control the flow of gas.
Special Crossings (SPX)	An installation designed to provide above or below ground passage for a pipeline across a river, road (national significance) or railway.
Monitoring and control systems (MCS)	A monitoring and control system architecture that incorporates sensors, remote terminal units, networked data communications and computers for high-level process supervisory management.
Cathodic protection systems (CPS)	A corrosion inhibiting system that ensures buried metallic pipelines are permanently cathodic, i.e. electrically negative to the surrounding soil.

6.1.1 ASSET RISKS

To achieve our goal of delivering a safe, reliable and efficient supply of gas to our customers, we strive to limit risk, while allowing for continued growth of our network.

Asset risks are identified and controlled to reduce safety concerns and reliably deliver gas to our customers. Powerco's approach to asset risk, is achieved by undertaking a full risk assessment over the asset's lifecycle. A Failure Mode and Effects Analysis (FMEA) assessment is conducted on each of our asset classes. The outputs of these assessments are refined and included into Asset Class Strategies, which serve as the leading documents for our Asset Standards and Lifecycle Plans.

For each asset class we will cover the highest criticality risks identified in the FMEAs. Risk criticality is achieved using the Risk Priority Number (RPN), which assesses each risks severity and likelihood, taking methods of control and detection into account.

General network risks are covered in Appendix 6.

6.1.2 CONDITION GRADING

To indicate the condition of our assets, we utilise a standardised grading system devised by the Commerce Commission. These grades give an overall indication of the condition of our assets or groups of assets. Powerco's application of the grades is provided below:

Table 6.2: Condition grading definition and application

GRADE	DEFINITION
Grade 1	End of serviceable life, immediate intervention required. Intervention planned in next planning cycle or completed through reactive project.
Grade 2	Material deterioration but asset condition still within serviceable life parameters. Intervention likely to be required within three years.
Grade 3	Normal deterioration requiring regular monitoring.
Grade 4	Good or as new condition.
Grade unknown	Condition unknown or not yet assessed.

With most of our assets being underground, we use several parameters, assumptions and mechanisms in our annual assessment of asset condition:

- Asset age
- Number of defects identified per asset class
- Polyethylene (PE) renewal models
- Number of leaks identified
- Direct current voltage gradient (DCVG) surveys

6.1.3 COST ESTIMATION

Costs are estimated using historical data from previously completed projects, and from the experience of our project engineers, contractors and field staff. Accurate cost estimation can be difficult given our assets are predominantly underground. Construction can often be impacted by unknown existing third-party assets and ground conditions. Location also impacts costing, e.g. building within high density community usage areas tends to cost more than suburban/rural areas and building within road corridors tends to cost more due to traffic management.

Where a project has a high complexity, we split the project over multiple stages. By including a detailed design and costing phase we can improve the accuracy of the project cost estimate, which decreases the risk of over/under spend of our budget.

6.1.4 PERFORMANCE MONITORING

Asset performance plays a critical role within Reliability Centred Maintenance (RCM) and asset renewal planning. Table 6.3 and Table 6.4 describe our standard performance assessment types and how they are applied to the respective asset classes.

Asset performance is monitored through defects. Results are analysed in our asset performance models and cause adjustments to standards through our Asset Class Strategies and maintenance programme, and/or create renewal projects.

Table 6.3: Performance assessment types

ASSESSMENT TYPE	DESCRIPTION
Material Testing	Laboratory testing of material performance and failure.
Leakage Surveys	Detection of leaks in the near vicinity to the asset.
Safety Assessments	Analysis of asset safety risks, including formal safety assessments.
Condition Assessments	Visual inspection of asset condition.
Monitoring Alarms	Fault and warning alarms from monitoring systems.

Table 6.4: Performance measures

ASSESSMENT TYPE	M&S	DRS	VAL	SPX	MCS	CPS
Leakage surveys	X	X	X	X		
Material testing	X	X				
Safety assessments		X		X		
Condition assessments		X	X	X	X	
Monitoring alarms		X			X	X

6.1.5 OPERATION AND MAINTENANCE

Our maintenance activities are driven by standards, which are in alignment with industry standards. They often prescribe minimum inspection frequencies and ensure the safe operation of the network, but also offer the possibility to use a risk-based approach. In recent years, our internal standards have evolved towards a risk-based approach.

They follow the principles of Reliability Centred Maintenance aimed at further improving the efficiency and optimisation of our asset lifecycle management. This may lead to a change in the frequency of leakage surveys and inspections, or type of operation/maintenance activity preformed.

6.1.6 ASSET INFORMATION

The data shown in this chapter is sourced from our AMS and is based on the best information we have available to date. While we are confident with the accuracy of most data available in our AMS, one of our primary asset management improvement initiatives is targeted at enhancing our core asset information and dataset. This enhances our RCM, renewal planning and knowledge of asset risk.

The amalgamation of multiple companies, networks and asset management systems over the years has led to information and data quality issues. In order to improve this data, we are implementing an asset information strategy and supporting standards.

To better understand our key improvement areas for asset information, we are creating a confidence scoring framework that can be applied across all our information systems. The framework takes the criticality, completeness and accuracy of information to provide confidence scoring of assets and their individual characteristics. In the following sections we will highlight the key areas of improvement for each asset class.

6.2 MAIN AND SERVICE PIPES

Mains and services act as the backbone of our distribution network. They are our largest asset class, accounting for approximately 87% of our total RAB value. The type of pipes used on our network are found in Table 6.5.

Table 6.5: Description of Powerco's mains and services types

PIPE TYPE	DESCRIPTION
Steel pipe	Steel pipes (Yellow Jacket) are mainly used on IP systems as their mechanical characteristics allow the transport of higher-pressure gas. They are protected against corrosion using cathodic protection systems, wrapping and in specific cases painting (above ground).
PE	PE is our preferred material for pipes as they are easier to assemble using electrofusion technics. PE pipes are pinchable, allowing quick isolation by squeezing off the pipe.
Galvanised steel	Galvanised steel was used in a specific timeframe in the past when it was considered cheap to install. It is adequate for its purpose, but as it is a weak steel, we do not install galvanised steel unless working on the current galvanised steel networks. We have a few instances of galvanised steel on our network. It is not a standard solution and only used on a case-by-case basis.
Cast iron	Cast iron is an old technology and represents a risk in our asset portfolio as it is more brittle compared with modern steel pipes. Most of our cast iron has been replaced. We are investigating the remaining small quantity recorded in our GIS to check and validate the information.

6.2.1 OBJECTIVES

The primary objective of mains and services is the safe and reliable distribution of gas within our network. In order to efficiently minimise their overall risks, Powerco is focused on reducing the total number of leakage and unplanned outage events that occur due to asset failure. Through analysis of these events we have determined that the leading causes of risk are:

- Third-Party Damage (TPD),
- Non-standard construction/maintenance,
- Accelerated deterioration of pipeline assets.

Section 6.2.5.1 highlights the highest specific risks identified against mains and services. Through the application of asset class lifecycle management and plans, we are continuously minimising and eliminating these risks.

Currently, we are focusing on incorrect location information, pre 1985 PE (Pre85) and unprotected steel pipelines.

6.2.2 QUANTITY BY TYPE AND AGE

Table 6.6 shows a breakdown of the types of main and service pipes we operate and the associated lengths by material and service status.

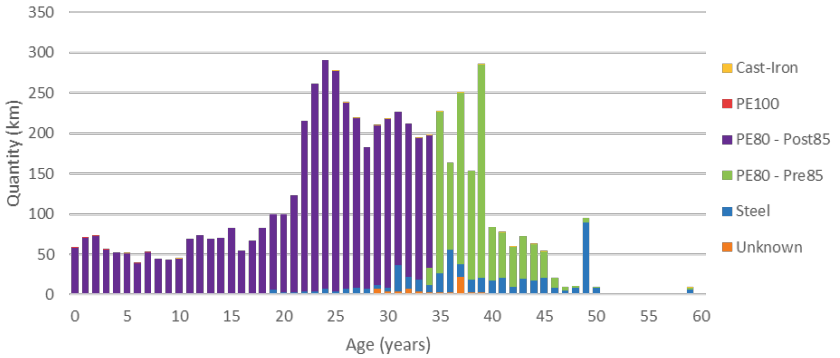
The average age is included to indicate the overall health of the assets. Powerco was formed through the amalgamation of multiple companies and networks over time, this is particularly noticeable within our mains and services asset class. This asset class is also impacted by Pre85 PE (see Section 6.2.3) and unprotected steel, due to increased asset risk. In order to effectively demonstrate these impacts, we report quantity by type and age per region, highlighting regions that have large quantities present and reporting Pre85 separately from the rest of our PE.

Figure 6.1 shows that between 1980 and 1997 our networks underwent major growth, accounting for 67% (2,714km) of our total network length. Due to the adjusted life expectancy of Pre85 PE, we have 996km in the final third of its life.

Table 6.6: Total length by material and status

MATERIAL	SUB MATERIAL	TOTAL (KM)	IN SERVICE (KM)	AVERAGE AGE (YEARS)[4]
Cast Iron	All	153	0	36
PE	All	5,708	5,506	27
	PE80 – Post 85	4,338	4,224	23
	PE80 – Pre 85	1,367	1,278	39
	PE100	4	4	4
Steel	All	882	477	37
	Yellow/Grey Jacket	287	257	38
	Galvanised	10	2	27
	Other[5]	584	218	37
Unknown[6]	All	151	83	34

Figure 6.1: Main pipes age profile for all regions



[4] In service pipes only
[5] Includes, painted, wrapped and unknown
[6] We assume this is made up primarily of PE and steel

6.2.2.1 WELLINGTON

Our subnetwork in Wellington is primarily made of PE. The cast iron pipes present in the CBD were progressively replaced by modern PE. This was done after 1985 meaning the amount of Pre85 is relatively low (55km) compared with other regions. The Wellington IP line is made of steel and protected by an impressed current cathodic protection system, which is currently undergoing reconfiguration and renewal. On the age profile, the IP line being built first 40 years ago can be seen.

Figure 6.2: Main pipes age profile for wellington region

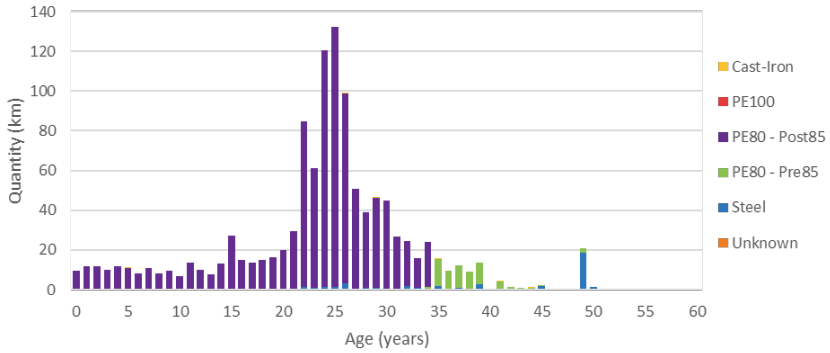


Table 6.7: Asset Quantities and Average Age in Wellington Region

MATERIAL	SUB MATERIAL	TOTAL (KM)	IN SERVICE (KM)	AVERAGE AGE (YEARS)
Cast iron	All	67	0	40
PE	All	1,144	1,110	24
	PE80 – Post 85	1,067	1,041	23
	PE80 – Pre 85	77	69	40
	PE100	0	0	5
Steel	All	303	44	26
	Yellow/Grey Jacket	13	12	26
	Galvanised	0	0	11
	Other	290	32	27
Unknown	All	10	2	19

6.2.2.2 HUTT VALLEY AND PORIRUA

The Hutt Valley and Porirua region is primarily constructed from PE, accounting for 89% (1,076km) of its total length. HVP has our highest volume of Pre85 PE (355km) and is one of our worst performing subnetworks in terms of leakage. The remainder of the network is steel pipes protected by impressed current cathodic protection systems, which is having its performance investigated.

Figure 6.3: Main pipes age profile for Hutt Valley and Porirua region

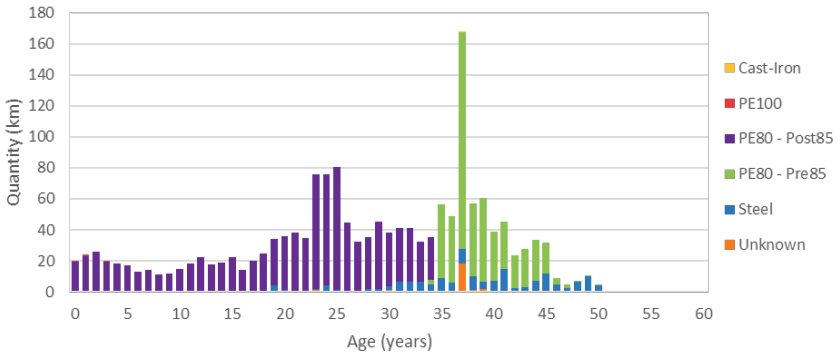


Table 6.8: Asset Quantities and Average Age in Hutt Valley and Porirua Region

MATERIAL	SUB MATERIAL	TOTAL (KM)	IN SERVICE (KM)	AVERAGE AGE (YEARS)
Cast iron	All	8	0	37
PE	All	1,557	1,511	28
	PE80 – Post 85	1,032	1,015	21
	PE80 – Pre 85	523	495	38
	PE100	1	1	1
Steel	All	173	147	36
	Yellow/Grey Jacket	154	140	37
	Galvanised	3	0	32
	Other	15	6	30
Unknown	All	42	36	34

6.2.2.3 TARANAKI

Most of the network in the Taranaki region is made of PE pipes, with 261km of Pre85 PE. The data shows many unspecified material service pipes, analysis of the installation date indicates that the majority of these are likely PE. Pockets of galvanically protected MP steel exist within the region, where the condition of the protection system is unknown, meaning the steel is potentially unprotected. A renewal programme is currently underway.

Figure 6.4: Main pipes age profile for Taranaki region

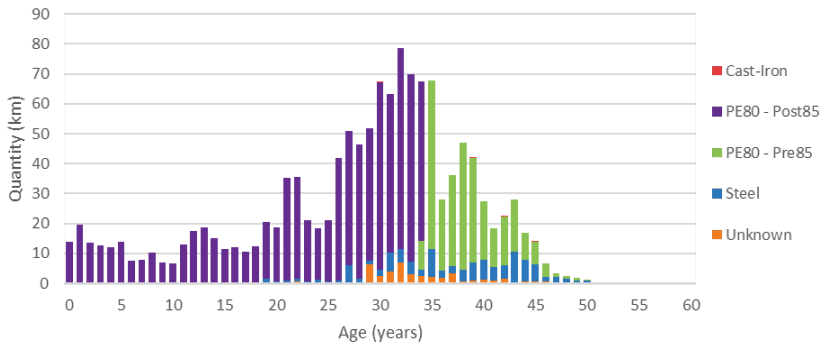


Table 6.9: Asset Quantities and Average Age in Taranaki Region

MATERIAL	SUB MATERIAL	TOTAL (KM)	IN SERVICE (KM)	AVERAGE AGE (YEARS)
Cast iron	All	33	0	39
PE	All	1,209	1,160	29
	PE80 – Post 85	890	871	24
	PE80 – Pre 85	319	289	39
	PE100	0	0	0
Steel	All	166	103	38
	Yellow/Grey Jacket	86	72	39
	Galvanised	6	0	38
	Other	74	31	34
Unknown	All	83	44	34

6.2.2.4 MANAWATŪ AND HOROWHENUA

The majority of the Manawatū and Horowhenua region is constructed of PE, with 261km of Pre85 PE. Pockets of galvanically protected MP steel exist, where the condition of the cathodic protection system is unknown. It is assumed there is poor data in this region, as there are two large installation date spikes, where the work was likely completed over multiple years but recorded at a single point in time.

Figure 6.5: Main pipes age profile for **Manawatū** and Horowhenua region

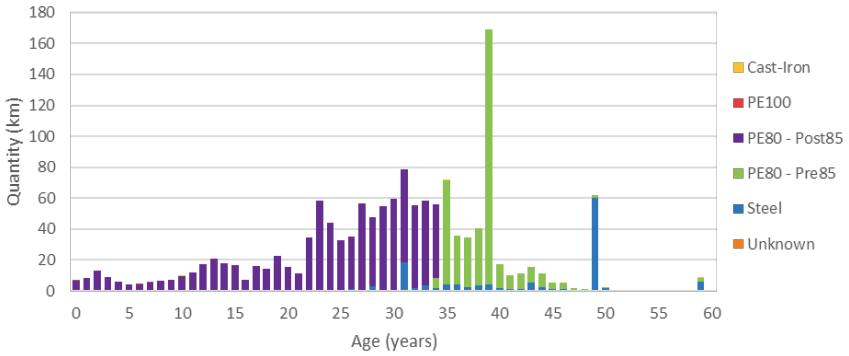


Table 6.10: Asset Quantities and Average Age in **Manawatū** and Horowhenua Region

MATERIAL	SUB MATERIAL	TOTAL (KM)	IN SERVICE (KM)	AVERAGE AGE (YEARS)
Cast iron	All	28	0	38
PE	All	1,346	1,290	30
	PE80 – Post 85	918	881	24
	PE80 – Pre 85	428	408	39
	PE100	1	1	6
Steel	All	165	136	44
	Yellow/Grey Jacket	13	12	35
	Galvanised	1	1	51
	Other	152	123	44
Unknown	All	14	1	29

6.2.2.5 HAWKE'S BAY

Hawke's Bay is Powerco's youngest network, with almost all the pipe assets being less than 35 years old. A long IP steel main was installed from Hastings to Napier 35 years ago, this is reflected by the large spike seen in Figure 6.6.

Figure 6.6: Main pipes age profile for Hawke's Bay region

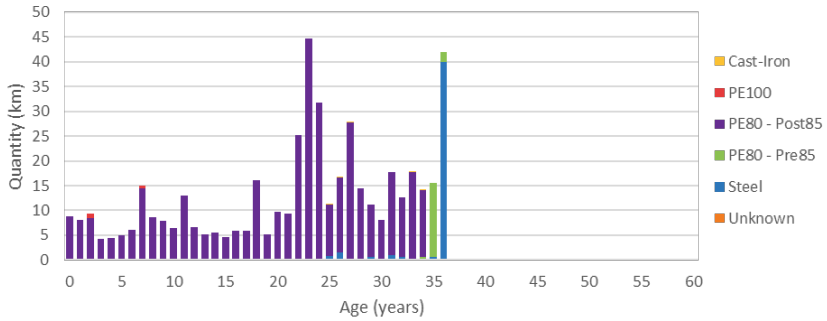


Table 6.11: Asset quantities and average age in Hawke's Bay region

MATERIAL	SUB MATERIAL	TOTAL (KM)	IN SERVICE (KM)	AVERAGE AGE (YEARS)
Cast Iron	All	17	0	28
PE	All	453	436	22
	PE80 – Post 85	431	416	22
	PE80 – Pre 85	20	18	37
	PE100	1	1	5
Steel	All	75	46	30
	Yellow/Grey Jacket	22	20	31
	Galvanised	0	0	19
	Other	53	26	30
Unknown	All	2	0	45

6.2.3 LIFE EXPECTANCY

Distribution pipe expected lives are set by the Commerce Commission and are shown in Table 6.12. The Commerce Commission defines that mains and services life is based upon nominal operating pressure. This is due to steel and PE being traditionally used for IP and MP, respectively. This is not always accurate, with MP steel and IP PE pipework existing. Because of this, MP steel and IP PE (PE100) have adjusted expected lives in our AMS. PE pipes installed before 1985 (Pre85) are a known problem in the industry. Because of brittleness, wall thickness and inadequate construction methodologies they have a shorter life expectancy.

Table 6.12: Life expectancy of mains and services

MATERIAL	SUB MATERIAL / PRESSURE	EXPECTED LIFE (YEARS)
Steel pipe	All IP	60 to 70
	All MP and below	50 to 60
PE	PE80 – Post 85	50 to 60
	PE80 – Pre 85	40 to 50
	PE100 (IP)	60 to 70
Cast iron	All	20 to 30

6.2.4 ASSET CONDITION

Table 6.13 below summarises the condition of mains and services, classified by pressure regime. Section 6.1.2 explains how quantities are allocated to each of the grades. A detailed table with the condition of all our assets is in Appendix 3 as part of Schedule 12a.

Table 6.13: Mains and services asset condition

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
Steel main (IP networks)	3	0%	0%	0%	99%	1%	3
Steel services (IP networks)	0	0%	0%	66%	31%	3%	3
PE main (MP networks)	263	0%	0%	80%	0%	20%	3
PE services (MP networks)	11	0%	0%	23%	1%	76%	3
Steel main (MP networks)	3551	0%	0%	91%	8%	1%	3
Steel services (MP networks)	1930	0%	0%	84%	13%	3%	3

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
PE main (LP networks)	152	1%	0%	79%	0%	20%	3
PE services (LP networks)	51	0%	0%	24%	0%	76%	3
Steel main (LP networks)	16	0%	0%	86%	14%	1%	3
Steel services (LP networks)	7	0%	1%	84%	12%	3%	3

6.2.5 LIFECYCLE MANAGEMENT

6.2.5.1 ASSET RISKS

Through the application of FMEA covered in Section 6.1.1 we have identified the major risks for mains and services, shown in Table 6.14. Each of these risks contribute to a higher likelihood of TPD, failure due to non-standard construction/maintenance and accelerated deterioration of pipeline assets. Our asset class strategies are driving changes within our standards, and identifying projects, to minimise or eliminate these risks from occurring, and instructing process adjustments for when they are identified in the field.

Table 6.14: Key Mains and Services Risks

MAJOR THREAT	SPECIFIC THREATS	CONSEQUENCE
Legacy construction and design	Mechanical joints	Mechanical joints are prone to full-bore failure
	Backfill damage	Poor backfill material causing damage to buried asset, leading to leakage
	Threaded joints	Higher likelihood of leakage through threading.
	Connection welding	Poor quality welding failure, leading to leakage
Material failure	Pre85 PE	Higher likelihood of material failure, leading to leakage
	Thin walled pipes	Higher likelihood of asset failure from interaction with asset e.g. squeeze offs or new service tees
Incorrect maintenance	Inadequate CP protection	Higher likelihood of accelerated material degradation, due to underperforming protection
	Improper pipe squeezing	Higher likelihood leakage as non-standard procedure damages asset
Third-party damage	Working without notification	Higher likelihood of third-party damaging asset, leading to leakage or failure
	Directional drilling	Higher likelihood of third-party accidentally damaging the asset, leading to leakage or failure
Poor asset information	Incorrect location	Higher likelihood of people working in proximity damaging asset, leading to leakage or failure
	Incorrect material	Unplanned outage cause by interference, due to asset not being correctly identified

6.2.5.2 ASSET PERFORMANCE

The distinguishing feature of mains and services is that they primarily exist underground, meaning condition assessment and inspection is difficult and requires more innovative approaches than digging them up.

In the past, we have run an extensive programme to replace all cast iron pipes on our network. This programme has come to an end and the remainder of the pipes labelled as cast iron in our systems are being investigated to check the data is accurate, therefore we will not discuss the performance of cast iron.

The condition of steel pipes is determined using DCVG (Direct Current Voltage Gradient) surveys, and readings from the CP systems on steel pipes to inspect pipe coating condition. Within the past few years, we have determined that some of our CP areas are underperforming. We are running a renewal programme across our main IP systems, reconfiguring or renewing our CP systems, see Section 6.7.6.1. We also have a dedicated programme of work to replace, or provide protection for, unprotected steel pipes, as we are unable to monitor the performance of these assets through the same methods as protected pipelines.

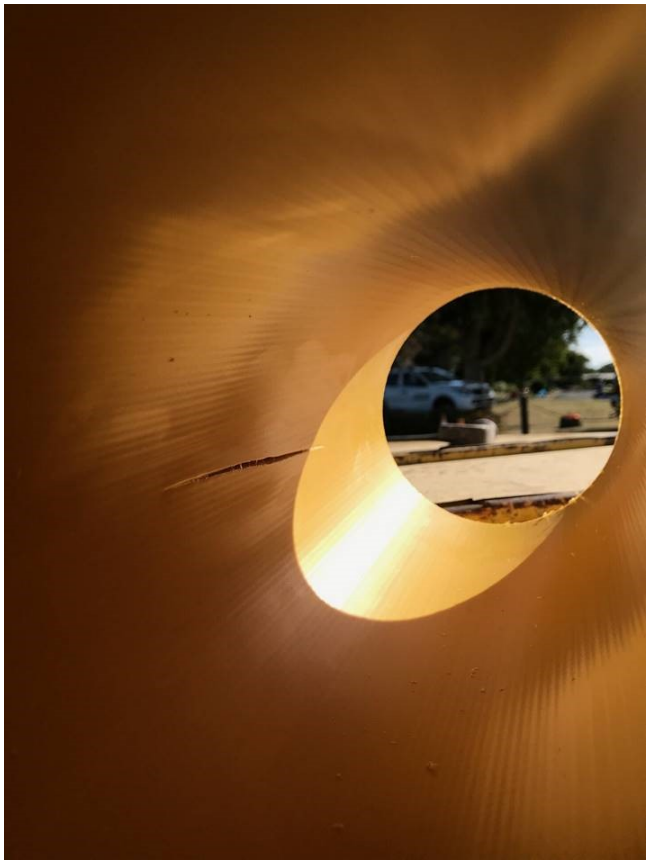
For PE pipes, the mode of failure is largely dependent on material type and the quality of the workmanship when the pipe was constructed. The best way we have found to assess the condition of the asset is to compare current leakage against historical rates.

Since 2014, we have been analysing failure and material testing data on PE pipelines installed before 1985. There is industry-wide evidence that pipes that have been squeezed off tend to have a higher leakage rate. As a result of the mechanical deformation, the pipe material becomes brittle and cracks can appear along the body of the pipe. Because of this, pipes that have been repaired are likely to start leaking in the vicinity of the original leak repair. Historically squeeze off points were rarely recorded, but because of the impact of Pre85 PE, we have put a dedicated programme of work to replace Pre85 pipes and a renewed focus on the collection of this data.

The testing and analysis undertaken has also provided some new insights into potential leakage sources on pipes installed before 1985. During testing we have found higher volumes of thin walled pipes than expected (Hutt Valley and Porirua in particular). We have very little data on historical wall thickness and are currently investigating identification methods. Secondly, service fittings and plastic welding

methods used on mains and services installed before 1985 tend to have a higher likelihood of leakage than our current methods. This has been included in our Pre85 renewal programme.

Figure 6.7: Photo of longitudinal cracking on Pre85 sample



6.2.5.3 RENEWAL PLANNING

Except for unprotected steel and Pre85 PE, most of our main and service pipes are in good condition, due to much of the network being relatively young. This means our renewal plans for pipes are targeted primarily at these key areas.

Historical PE renewals have resulted in lengths of steel pipe having their length interrupted with PE. This has introduced sections of potentially unprotected steel across our network. We are investigating these sections and planning to renew them with PE.

Section 6.2.5.2 highlighted the issue of Pre85 PE on our network. Due to the large volume of required renewals, a model has been developed to assist with the prioritisation. This model incorporates leaks, squeeze offs, wall thickness and number of weak points (i.e. pre 1985 service connections, tee joints and joints) to score pipes according to their likelihood of leaking. The model highlights sections of PE that have been most commonly reported by field staff. The model is now being used to provide the projects for the Pre85 renewal budget.

While doing our regular network inspections, we can encounter some instances where the customer installations, or the environment where the pipe is laid, has changed. This could happen, for example, when a homeowner decides to extend their house over our pipes, install a new appliance close to the meter's exclusion zone without notifying us, or if the pipe was historically installed in a location that does not suit our current safety standards. We have a reactive approach to each of these instances and assess each instance on a case-by-case basis.

The remainder of pipe works are dealt with as individual projects, where renewal or replacement represents a valuable risk reduction. This includes modification to the pipework due to its environment or location.

6.2.5.4 OPERATIONS AND MAINTENANCE

Once constructed, PE pipelines do not require any direct maintenance. Steel pipelines require corrosion protection systems (cathodic protection) using impressed current or sacrificial anodes. Refer to Section 6.7.5.4 for more information on the operation and maintenance of these systems.

TPD is one of the greatest risks to mains and services. In order to minimise the likelihood and severity, we require notification when third parties are working in proximity to our assets. Pipes that are deemed to have high delivery impacts or are in areas of high consequence are marked as strategic and require stand over from our regional contractors. To help identification, ongoing maintenance is required on pipeline warning signage.

The largest operational costs with main and service pipes are associated with our regular leakage management and inspections, and fault response during an event (as described within our Public Safety, and Network Integrity related strategies in Chapter 7). The leakage inspection cycles for pipes by type are shown in Table 6.15.

Table 6.15: Mains and services leakage survey frequency

ASSET TYPE	FREQUENCY
Mains and services in high density community usage area	Annually
Steel pipeline when CP system is faulty	Annually
Other pipes not covered above	5 Yearly

6.2.5.5 DISPOSAL

Disposal of main and service pipes occurs infrequently on our network, because of the expensive nature of removals. When a pipe is no longer required, we prefer to decommission the asset and leave it in the ground, recording it as out of service in our records. In certain situations when required, such as a pipe being in the way of another asset, we will remove this section leaving the rest of the pipe in the ground as described above and record the section in question as removed. Physical disposal of this asset is conducted by our service provider in compliance with all environmental requirements.

6.2.5.6 ASSET INFORMATION

Our goal with mains and services asset information is to increase our data confidence on attributes and characteristics relating to location, physical properties, criticality and condition of our assets. These improvements relate directly to our key asset risks and network operation requirements, shown in Table 6.16.

Table 6.16: Asset Information Improvements

IMPROVEMENT	ISSUE	REASON
Location	Accuracy	Improved location information will assist with the prevention of third-party damage.
Wall thickness	Completeness	Thin walled pipes have increased leakage rates, understanding where these are located will assist with renewal planning.
Strategic pipes	Accuracy	Redeveloping strategic pipe models will prevent unnecessary operational spend and assist with the prevention of third-party damage on strategic mains.
Asset age	Accuracy	The reduction in number of mains with an assumed installation date will assist with renewal planning, particularly around pre 1985 mains.

6.2.6 LIFECYCLE PLANS

We commenced the Pre85 replacement programme in RY15 and have forecast up to $1.2m per year during the planning period, with annual checkpoints as we develop our annual works programme, to maintain cost efficiency and validation of performance improvement. Over the next three years we have the following projects planned:

- Onepoto Pre85 replacement
- Henry Street Pre85 replacement
- Copeland/Pilmuir Pre85 replacement
- Truro/Bodmin Pre85 replacement
- Stokes Valley Road Pre85 replacement
- Waddington Drive Pre85 replacement
- Knights/Wilford Pre85 replacement
- Ulric Street Pre85 replacement
- Jamaica Drive Pre85 replacement
- Roband/Shanly Pre85 replacement

A replacement programme for unprotected steel mains is under way. We plan to spend a minimum of $900k per year going forward. Over the next three years we have the following projects planned:

- PN MP steel replacement - Waldegrave Street
- NP MP steel replacement - Spotswood
- PN MP steel replacement - Havelock Avenue
- NP MP steel replacement - Birdwood Avenue
- NP MP steel replacement - Devon Street East
- NP MP steel replacement - Gover Street

6.3 DISTRICT REGULATION STATIONS

District Regulation Stations (DRS) represent our second largest network asset class by value after mains and services. They are responsible for pressure reduction on our network and are one of our more technically complex asset classes, owing to their construction, maintenance and componentry. Historically, all our stations were above ground assets. In 2013, modular under ground stations were added to our standards. Table 6.17 summarises the types of stations we use on our network. To assist with RCM, stations are classified into two categories based on delivery criticality, shown in Table 6.18.

Table 6.17: Description of Powerco's DRS types

STATION TYPE	DESCRIPTION
Above ground stations	Above ground stations. These include regulators, filters, valves and facilities (building or enclosure).
Below ground stations	Under ground station units called "Cocons." They are not prone to vehicle collision and limit the visual nuisance, especially in the urban environment.

Table 6.18: Description of Powerco's DRS classification

CLASSIFICATION	DESCRIPTION
District Regulation Station	Either ≥500 customers[7] or ≥100 customers including at least one critical customer
Pressure Regulation Station	5-500 customers

6.3.1 OBJECTIVES

For regulator stations our primary objectives are:

- Efficiently reducing the total number of unplanned gas releases and outages due to asset failure.
- Reduction in public safety risk.
- Maintaining a high standard of visual appearance.

Through analysis of these objectives we have determined that the leading causes of risk are third party interference legacy design and non-standard operation/maintenance. Through the application of asset class lifecycle management and plans we are continuously minimising and eliminating these risks.

Currently, we are focusing on stations without fire valves and the protection of stations within high density community usage (HDCU) areas. Section 6.3.5.1 highlights the highest specific risks identified against regulator stations.

6.3.2 QUANTITY BY TYPE AND AGE

We currently have 197 regulator stations installed across our regions. Regulator stations account for approximately 2% (RAB value) of the gas assets on our network. Since we began undergrounding stations in 2005, 28 Cocons have been installed across our network. Table 6.19 shows a breakdown of types and operating pressures of these stations. The average age is included to indicate the overall health of the assets.

Table 6.19: Total regulation stations by region, type and pressure

REGION	TYPE	TOTAL STATIONS	IP STATIONS	MP STATIONS	AVERAGE AGE (YEARS)
Wellington	Total	48	30	18	16
	Above ground	34	17	17	21
	Below ground	14	13	1	6
Hutt Valley and Porirua	Total	56	48	8	31
	Above ground	50	42	8	34
	Below ground	6	6	0	3
Taranaki	Total	23	17	6	23
	Above ground	17	11	6	26
	Below ground	6	6	0	16
Manawatū and Horowhenua	Total	62	25	37	30
	Above ground	62	25	37	30
	Below ground	0	0	0	
Hawke's Bay	Total	10	10	0	28
	Above ground	10	10	0	28
	Below ground	0	0	0	

[7] Commercial customers calculated in residential customer equivalents

6.3.3 LIFE EXPECTANCY

Historically due to the complexity of regulator stations we have bundled all the componentry into a single equipment record in our AMS, apart from our major stations (e.g. Tawa Gas Gate). Because of this, we have set the expected life of regulator stations as 35 years, in alignment with most of the components making up a station. This simplification causes difficulties with renewal planning, so is currently under review because of the increased capability of our new AMS.

6.3.4 ASSET CONDITION

Due to our preventative maintenance programme, Powerco's regulator stations are in good condition. Section 6.1.2 explains how quantities are allocated to each of the grades. The table below summarises the condition of regulator stations, classified by pressure regime. A detailed table with the condition of all our assets is in Appendix 3 as part of Schedule 12a.

Table 6.20: Regulator station asset condition

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
IP stations	130	1%	4%	76%	19%	0%	3
MP stations	70	2%	9%	82%	6%	2%	3

6.3.5 LIFECYCLE MANAGEMENT

6.3.5.1 ASSET RISKS

Through the application of FMEA, covered in Section 6.1.1 we have identified the major risks for regulator stations, shown in Table 6.21.

Each of these risks contributes to a higher likelihood of public safety risk, component failure and failure due to non-standard design, construction, and maintenance. Our asset class strategies are driving changes within our standards, and identifying projects, to minimise or eliminate these risks from occurring, and instructing process adjustments for when they are identified in the field.

Table 6.21: Key Regulator Station Risks

MAJOR THREAT	SPECIFIC THREATS	CONSEQUENCE
Legacy construction and design	No fire valves	Inability to shut down station in emergency.
	Threaded joints	Higher likelihood of leakage through threading.
Component failure	OPSO/Relief failure to activate	Overpressure in downstream network resulting in violation of MAOP.
	Premature OPSO activation	Early activation of the OPSO valve due to vibration, leading to loss of customers.
Incorrect maintenance	Incorrect OPSO/ relief set pressure	Overpressure of downstream network resulting in violation of MAOP or early activation leading to loss of customers.
	Inoperable or buried fire valve	Inability to shut down station in emergency.
Third-party interference	Vandalism or interference	Third party interference on asset leading to leakage or unplanned outages.
	Vehicle impact	Vehicle impact, leading to gas exposure, fire or loss of customers.

6.3.5.2 ASSET PERFORMANCE

Unlike mains and services, we can perform asset condition assessments and inspections on the most critical components of regulator stations. This includes below ground stations, which are accessible from a hatch at ground level.

DRSs are often above ground, making them the most visible parts of our network. Being above ground also makes them more vulnerable to external damages, such as impact by vehicles or vandalism. In high density community usage areas, such as Wellington CBD, we have been carrying out an undergrounding programme of works since 2012 (see the following section).

6.3.5.3 RENEWAL PLANNING

Regulator station renewals are driven by safety improvements and the removal of obsolete components. Due to a low life expectancy and high criticality of stations, they tend to feature heavily in our renewal plans. We are improving efficiency of the network and maintenance by rationalising the number of stations we operate and standardising the types of stations on our network.

In 2012 we undertook formal safety assessments on all above ground regulator stations, focusing on the risk of damage due to vehicle impact and vandalism. The review of risk mitigation options led us to consider three options:

- Upgrading the stations by installing physical protection (e.g. bollards to protect from a vehicle collision), if allowed by the local governing body
- Replacing the above ground assets with underground units (Cocons)
- Removing the station through a rationalisation project

These safety improvements currently make up most regulator station renewals.

Fire valves installed upstream and/or downstream of stations allow us to quickly isolate during a fault or emergency. In 2019 Powerco undertook an assessment to identify stations without the appropriate fire valves. We are building a programme for the installation or renewal of these valves.

The components of DRSs (regulators, transducers, etc.) are prone to wear and obsolescence, but by modifying our maintenance programme and activities we have managed to extend the useful life of these stations. There are a few instances where we have had to replace these components because of ageing. However, our standard design uses common componentry that limits this risk.

All stations that are identified for renewal must first be considered for rationalisation, covered in Section 7.8, and where possible replaced by regulator stations.

6.3.5.4 OPERATION AND MAINTENANCE

DRSs are inspected for maintenance every six months and PRSs annually. We use this opportunity to carry out the following standard operations:

- Pressure recording, and adjustment if necessary
- Every year, changing the regulators' settings to swap the "working" and "stand-by" streams

In addition to the activities described above, we undertake the following every six months (or every year for the last item):

- Check for leaks
- Inspect for corrosion
- Check flange insulation kits on stations within a cathodic protection system, ensuring they are isolated from the system
- Undertake valve half operation and lubrication
- Check filters and clean if required
- Every year, test the over-pressure protection

To extend the lives of the stations, we have a 10-year inspection programme. The weak points of most of our stations are corrosion and regulators. Where required, we sandblast and repaint the stations, inspect the regulators and change their soft parts.

Figure 6.8: Artwork on Tory Street DRS in Wellington to deter vandalism

6.3.5.5 DISPOSAL

When disposing of a regulator station, Powerco's preference is the full removal of the station including related equipment and the restoration of the site to pre-installation condition. This is due to both above and below ground stations presenting a public safety risk if not removed, requiring ongoing maintenance and monitoring which carries operational spending. Physical disposal of this asset is conducted by our service provider in compliance with all environmental requirements.

6.3.5.6 ASSET INFORMATION

Our goal with regulator station asset information is to increase our data confidence on the components within stations and their associated characteristics, providing us with higher fidelity asset information for renewal and maintenance planning. Historically this was only done for our critical stations. In 2019 we implemented a new asset hierarchy that allows for individual components to be explicitly and more easily recorded on all stations. Table 6.22 shows the key characteristics we are planning to collect.

Table 6.22: Asset information improvements

IMPROVEMENT	ISSUE	REASON
Regulator type	Completeness	Improved accuracy with maintenance planning, ensuring we have the correct equipment and soft parts if maintenance is required.
Regulator protection type	Completeness	Required for network safety assessments.
Regulator model	Completeness	Required for accurate station capacity assessments.
Regulator orifice diameter	Completeness	Required for accurate station capacity assessments.

6.3.6 LIFECYCLE PLAN

Over the next three years we have the following DRS projects planned:

- **Middleton DRS renewal:** Missing fire valve, unable to isolate station in emergency or fault event, upstream isolation required leading to unplanned outages on a larger number of customers.
- **Tory Street DRS Renewal:** Aboveground pipework is leaking within the station. Controls are currently in place to reduce risk while renewal is planned.
- **Linden Ave DRS Renewal:** Missing fire valve, unable to isolate in emergency or fault event, upstream isolation required leading to unplanned outages on a larger number of customers.

6.4 LINE AND SERVICE VALVES

Line and service valves are constructed out of steel and PE and represent 1% (RAB value) of our asset base. The type of valves used on our network are found in the Table 6.23.

Table 6.23: Description of Powerco's valve types

TYPE	DESCRIPTION
Main (Line)	Installed inline on mains, used for isolating sections on the network.
Service (Line)	Installed inline on services, used for isolating customers.
Station	Installed within regulator stations and are not covered in this section, see section 6.3 for more information.

6.4.1 OBJECTIVES

Main and service valves exist in a fixed configuration (i.e. open or closed), only requiring operation when dealing with faults and emergencies. To ensure we can quickly isolate sections of the network, valves must be operable, identifiable and locatable. We are also focused on reducing public safety risk and the total number of leakage events. Analysis has determined that the leading causes of risk are third party interference and non-standard construction or maintenance. Through the application of asset class lifecycle management and plans we are continuously minimising and eliminating these risks.

6.4.2 QUANTITY BY TYPE AND AGE

Main and service valves represent 1% of our asset base. Table 6.24 shows a breakdown of the types of main and service valves we operate and the associated pressure and service status. The average age is included to indicate the overall health of the assets.

Table 6.24: Total number by type, pressure and status

TYPE	PRESSURE	TOTAL (NO.)	IN SERVICE (NO.)	AVERAGE AGE (YEARS)[8]
Main	IP	862	550	27
	MP	1786	1125	22
	LP	131	82	15
Service	IP	527	286	29
	MP	880	466	21
	LP	162	89	19

6.4.3 LIFE EXPECTANCY

Valves expected lives are set by the Commerce Commission and shown in Table 6.25.

Table 6.25: Life expectancy of main and service valves

MATERIAL	SUB MATERIAL / PRESSURE	EXPECTED LIFE (YEARS)
Steel Valve	All IP	60 to 70
	All MP and below	50 to 60
PE Valve	All IP	60 to 70
	All MP and below	50 to 60

[8] In service valves only

6.4.4 ASSET CONDITION

Table 6.26 below summarises the condition of main and service valves, classified by pressure regime. Section 6.1.2 explains how quantities are allocated to each of the grades. A detailed table with the condition of all our assets is in Appendix 3 as part of Schedule 12a.

Table 6.26: Line valves asset condition

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
IP valves	1389	0.15%	0.30%	40.69%	12.13%	46.73%	3
MP valves	2666	0.00%	0.45%	34.69%	18.01%	46.84%	3
LP valves	293	0.00%	0.25%	36.20%	15.26%	48.28%	3

6.4.5 LIFECYCLE MANAGEMENT

6.4.5.1 ASSET RISKS

Through the application of FMEA, covered in Section 6.1.1, we have identified the major risks for line and service valves, shown in Table 6.27. Our asset class strategies are driving changes within our standards, and identifying projects to minimise or eliminate these risks from occurring and instructing process adjustments for when they are identified in the field.

Table 6.27: Key valve risks

MAJOR THREAT	SPECIFIC THREATS	CONSEQUENCE
Legacy construction and DESIGN	Valve lid not flush with ground level	Public safety risk due to tripping hazard
Material/Component failure	Corrosion (steel valves)	Increased likelihood of leakage
	Valve spindle failure	Valve spindle breaks when being operated, inability to isolate network or customers
Incorrect maintenance	Valve inoperable	Inability to isolate network or customers
	Identification label missing or unreadable	Inability to isolate network or customers in emergency or accidental isolation of incorrect sector or customers
	Valve unlocatable	Unlocatable valve, unable to isolate network or customers
	Missing or broken valve lid	Public safety risk due to tripping hazard
Third party interference	Valve buried or sealed over	Unlocatable valve, unable to isolate network or customers
	Valve sleeve filled with spoil or collapsed	Unlocatable valve, unable to isolate network or customers

6.4.5.2 ASSET PERFORMANCE

Most of the valves we operate on the network are located underground, with only the lid, spindle and sleeve being accessible from above ground. In order to assess asset performance, we undertake condition assessments and analysis on defect rates, primarily leakage and inoperability. When reviewing defects, we have not encountered any instances where the valve was in such a poor condition (i.e. Grade 1) that replacement was necessary.

6.4.5.3 RENEWAL PLANNING

Main and service valve renewal is based on asset performance. We plan to proactively renew valves that are critical for the isolation of the network (see Network Isolation in Section 7.7) if a major event were to occur. For the remaining valves, renewals are undertaken on failure or in tandem with planned renewals on their associated pipeline.

6.4.5.4 OPERATION AND MAINTENANCE

In 2017 we undertook a valve labelling project, where a new naming convention was applied across all valves. The purpose of this project was to ensure that all valves would be easily identifiable for the purposes of maintenance and emergency/fault response. All new valves installed on the network must be labelled according to the new convention.

All valves are inspected on a yearly basis. As part of this inspection we make sure that:

- No gas leaks from the valves or their surroundings
- The valve lids are sound and do not present a risk to the public
- The valves are accessible and clearly located
- Valve identification labels are present and readable.
- The valves can operate halfway
- The sleeve is free of spoil
- Corrosion levels are acceptable

If a valve poses a public safety risk, maintenance is scheduled. With all other defects, we assess whether we should replace, refurbish or permanently decommission it on a case-by-case basis.

6.4.5.5 DISPOSAL

Disposal of main and service valves occurs infrequently on our network, due to the expensive nature of removal. When a valve is no longer required, we prefer to decommission the asset by wrapping and burying and recording it as out of service in our records. In certain situations when required, i.e. a valve has an unrepairable leak, we will remove the valve and replace it with a section of pipe, then remove the valve from our asset records. Physical disposal of this asset is conducted by our service provider in compliance with all environmental requirements.

6.4.5.6 ASSET INFORMATION

Our goal with valve asset information is to increase our data confidence on valves and their associated characteristics, providing us with higher fidelity asset information for renewal and maintenance planning. Table 6.28 shows the key characteristics we are looking to improve.

Table 6.28: Asset information improvements

IMPROVEMENT	ISSUE	REASON
Category (main or service)	Accuracy	Required to ensure correct network and customer isolations.
Valve material	Completeness	Required for maintenance and renewal planning.
Direction to close	Completeness and accuracy	Required for safe operation during emergency and fault response.
Turns to close	Completeness and accuracy	Required for safe operation during emergency and fault response.

6.4.6 LIFECYCLE PLANS

The following are projects that have been identified in the Line and Service Valves Lifecycle Plan for construction:

- **Belmont IP Corroded Isolation Valves:** During routine inspections corrosion damage was found on valves within the Belmont HIP pressure system. A renewal project is planned to commence FY22.

Based on the asset condition and very low defect rates, we have no other planned replacement projects.

6.5 SPECIAL CROSSINGS

Special crossings are used to enable pipelines to cross rivers, railways and roads (of national significance). Crossings are constructed aboveground attached to support structures (e.g. bridge or culvert), or belowground as a buried cased pipeline or inside a utility corridor. Table 6.29 summarises the types of special crossings we use on our network.

Table 6.29: Description of special crossing types

TYPE	DESCRIPTION
Attached	Fixed to a support structure using brackets, can be cased or uncased.
Below ground	A cased pipeline buried beneath a crossed feature.
Utility corridor	A passage within a support structure, specifically designed for carrying uncased pipelines.

Figure 6.9: Bridge crossing in Hawke's Bay

6.5.1 OBJECTIVES

As secondary systems, special crossings ensure their protected asset/s continue to meet their primary objective (e.g. safe and reliable delivery of gas). Special crossings achieve this by protecting mains and services against material deterioration when crossing a river, railway or road. Analysis of asset risk has determined that the leading causes of special crossing failure are:

- Third party damage/interference
- Component failure
- Asset failure due to incorrect maintenance and operation

Through the application of asset class lifecycle management and plans we are continuously minimising and eliminating these risks.

6.5.2 QUANTITY BY TYPE AND AGE

Table 6.30 shows a breakdown of the types of special crossings we operate and the associated pressure and service status. The average age is included to indicate the overall health of the assets.

Table 6.30: Total number by pressure, type and status

PRESSURE	TYPE	TOTAL (NO.)	IN SERVICE (NO.)	AVERAGE AGE (YEARS)[9]
IP	Total	99	98	35
	Above ground	30	30	36
	Below ground	57	57	35
MP	Total	259	259	32
	Above ground	134	134	29
	Below ground	77	77	34

6.5.3 LIFE EXPECTANCY

The Commerce Commission sets special crossing expected lives based upon the pipeline contained within, shown in Table 6.31.

Table 6.31: Life expectancy of special crossings

MATERIAL	EXPECTED LIFE (YEARS)
IP crossings	60 to 70
MP crossings	50 to 60
LP crossings	50 to 60

6.5.4 ASSET CONDITION

Table 6.32 below summarises the condition of special crossings, classified by pressure regime. Section 6.1.2 explains how quantities are allocated to each of the grades. A detailed table with the condition of all our assets is in Appendix 3 as part of Schedule 12a.

Table 6.32: Special crossings asset condition

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
IP Crossings	99	0.00%	0.15%	98.83%	1.02%	0.00%	3
MP Crossings	259	0.00%	0.29%	98.17%	1.54%	0.00%	3
LP Crossings	0	0.00%	0.00%	0.00%	0.00%	0.00%	3

6.5.5 LIFECYCLE MANAGEMENT

6.5.5.1 ASSET RISKS

Through the application of FMEA, covered in Section 6.1.1, we have identified the major risks for special crossings, shown in Table 6.33. Each of these risks contributes to a higher likelihood of public safety risk, and failure due to non-standard design, construction and maintenance. Our asset class strategies are driving changes within our standards, and identifying projects, to minimise or eliminate these risks from occurring and instructing process adjustments for when they are identified in the field.

[9] In-service crossings only

Table 6.33: Key special crossing risks

MAJOR THREAT	SPECIFIC THREATS	CONSEQUENCE
Legacy construction and design	Crossing depth too shallow	Scouring or erosion of the riverbed exposing crossing to water.
Supporting structure defects/failure	Bridge movement	Increased stress or fatigue applied to crossing, leading to leakage or failure.
	Vibration	Bracket fixings become loose increasing stress or fatigue applied to crossing, leading to leakage or failure.
Material/component failure	Flexible joint	Bridge movement causing flexible joints to fail, leading to leakage or failure.
	Seal failure	Water or material ingress causing corrosion, leading to leakage or failure.
Third-party damage	Vehicle impact (Above ground)	Third-party damaging asset or protective coating, leading to leakage or failure.
	Vandalism (above ground)	Third-party damaging asset or protective coating, leading to leakage or failure.
	Working without notification	Third-party damaging asset or protective coating, leading to leakage or failure.

6.5.5.2 ASSET PERFORMANCE

Asset performance is monitored through leakage surveys, maintenance inspections and safety assessments on a case-by-case basis.

6.5.5.3 RENEWAL PLANNING

Renewal planning is undertaken proactively on special crossings, driven by:

- Maintenance and inspection results
- Safety assessments
- Bridge renewals (aboveground only)
- Erosion or riverbed exposing crossing
- End of asset life

When defects can no longer be remedied through corrective maintenance or the stations presents a public safety risk, renewal projects are planned.

6.5.5.4 OPERATION AND MAINTENANCE

Special crossings are inspected on a quarterly and annual basis. Table 6.34 shows the type and frequency of inspections for the different types of crossing, with Table 6.35 describing the types of inspections. Standard inspections are covered in Section 6.1.4.

Table 6.34: Operation and maintenance schedule for special crossings

CROSSING TYPE	QUARTERLY	ANNUALLY	5 YEARS	15 YEARS
Above ground	Leakage survey Signage Visual integrity	Movement and stability		Comprehensive integrity
Below ground		Leakage survey Signage Visual integrity	Comprehensive integrity	

Table 6.35: Special crossing specific inspection types

TYPE	DESCRIPTION
Leakage survey	Gas detection over the crossing span plus 20 meters either side.
Signage	Crossing identified through clearly visible and accurate signage.
Movement and stability	Assessment of abutment movement, bank stability and expansion joint integrity.
Visual integrity	Visual assessment of the coating, support and surrounding environment integrity.
Comprehensive integrity	Above ground - Full inspection of crossing, coating, brackets and fixings Below ground - Inspection of vent pipework and pressure test of casing (if required).

If we observe corrosion on pipe supports (for bridge crossings) or carrier pipe, this is dealt with within a year of its discovery through our defect process.

6.5.5.5 DISPOSAL

With special crossings we consider above and below ground disposals separately.

For above ground crossings as with regulator stations, our preference is the full removal of the crossing including related equipment (e.g. brackets), and the restoration of the site to pre-installation condition. This is due to above ground stations presenting a public safety risk if not removed, requiring ongoing maintenance and monitoring, which carries operational spending.

For below ground crossings, we treat them the same as mains and services, preferring to decommission the asset and leave it in the ground, recording it as out of service in our records. Physical disposal of this asset is conducted by our service provider in compliance with all environmental requirements.

6.5.5.6 ASSET INFORMATION

Our asset information for special crossings is of a high standard, owing to the criticality of these assets. Through ongoing maintenance and inspections, we can collect all required information.

6.5.6 LIFECYCLE PLANS

We have three reliability-based renewal projects planned for special crossings, described below:

- **Meeanee Quay Bridge bracket replacement:** Current brackets are allowing ingress of water leading to corrosion on the carrier pipe.
- **Ngaruroro Bridge bracket replacement:** Existing brackets are not adequately allowing movement of the carrier pipe due to thermal expansion, causing damage to the protective coating. Designs for new brackets are being investigated for renewal.
- **Sanson Stub renewal:** Transition flanges on the bridge are leaking due to deterioration. The bridge crossing is going to be replaced with an underground crossing.

6.6 MONITORING AND CONTROL SYSTEMS

Monitoring and Control Systems (MCS) are a key part of our network infrastructure. We are not currently using any control functions meaning our system is used for real-time monitoring only. Information provided is a fundamental part of our network improvement initiatives and operation. The type of monitoring and control systems used on our network are found in the Table 6.36.

Table 6.36: Description of Powerco's Monitoring and Control System types

TYPE	DESCRIPTION
SCADA	Permanent sites, providing live data and alarms primarily used for monitoring regulator stations.
Data loggers	Self-contained units, recording and providing delayed data and live alarms, used on regulator stations and network monitoring points.

6.6.1 OBJECTIVES

As secondary systems, MCS ensure their monitored asset/s keep meeting their primary objective (e.g. safe and reliable delivery of gas). MCS achieve this by alerting Powerco of potential failures. Through the analysis of asset risk, we have determined that the leading causes of MCS failures are third party damage/ interference, failure of supporting systems, and poor response times because of incorrect maintenance and operation. By applying asset class lifecycle management and plans we are continuously minimising and eliminating these risks.

The current focus for this asset class is the correct configuration of systems (see Section 7.5) and investigations into a replacement monitoring and control system.

6.6.2 QUANTITY BY TYPE AND AGE

Table 6.37:shows a breakdown of the types of monitoring and control systems we operate by quantity, service status, and average age, which we have included to indicate the overall health of the assets.

Table 6.37: Monitoring and Control Systems by pressure, type and status

TYPE	TOTAL (NO.)	IN SERVICE (NO.)	AVERAGE AGE (YEARS)[10]
Total	154	152	8
SCADA	79	77	7
Data loggers	75	75	8

6.6.3 LIFE EXPECTANCY

The Commerce Commission sets an expected life of 20 years for MCS.

6.6.4 ASSET CONDITION

Table 6.38 below summarises the condition of MCS. Section 6.1.2 explains how quantities are allocated to each of the grades. A detailed table with the condition of all our assets is in Appendix 3 as part of Schedule 12a.

Table 6.38: Monitoring and Control Systems asset condition

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
Monitoring and Control Systems	154	0.00%	42.66%	44.76%	12.59%	0.00%	4

[10] In service systems only

6.6.5 LIFECYCLE MANAGEMENT

6.6.5.1 ASSET RISKS

Through the application of FMEA covered in Section 6.1.1 we have identified the major risks for MCS shown in Table 6.39. Our asset class strategies are driving changes within our standards, and identifying projects, to minimise or eliminate these risks from occurring and instructing process adjustments for when they are identified in the field.

Table 6.39: Key Monitoring and Control Systems risks

MAJOR THREAT	SPECIFIC THREATS	CONSEQUENCE
Alarm configuration	Incorrect alarm levels	Alarms set at wrong level, increasing likelihood of over/under pressure being missed.
	Spurious alarms	Decreased likelihood of responding to correct alarm.
Insufficient response time	Missed alarms	Duty operator misses alarm, increased likelihood of unplanned outage of gas exposure event.
Component failure	Battery failure	Battery fails, MCS not operating when alarm required.
	RTU or datalogger failure	Primary unit fails, MCS not operating when alarm required.
Supporting systems	IT server failure	Server hosting MCS software fails, increased likelihood of missing alarms.
	Telecommunication system failure	Telecommunications network fails, increased likelihood of missing alarms.
	Electrical system failure	Electrical system fails, MCS not operating when alarm required.
Third-Party Damage	Vehicle impact	Third-party damage on asset, MCS not operating when alarm required.
	Vandalism	Third-party interference on asset, MCS not operating when alarm required.

6.6.5.2 ASSET PERFORMANCE

Our MCS are in good condition, due to most of the systems being relatively young. Performance is monitored through routine inspections and analysis of alarms and pressure readings.

6.6.5.3 RENEWAL PLANNING

Network Strategies (Chapter 7) inform the requirements for MCS. The Network Resilience and Redundancy Strategy is the primary driver for the installation and renewal of SCADA systems on regulator stations, and the Pressure Droop Strategy informs the locations for the installation of dataloggers on network extremities. The Pressure Droop and Elevated Pressure strategies define the alarm limit setpoints for SCADA and dataloggers.

Powerco's preference is to run MCS assets to failure. Asset obsolescence will drive large work programmes, with the criticality of the asset driving renewal prioritisation.

6.6.5.4 OPERATION AND MAINTENANCE

MCS operation is totally autonomous and data transfer is done via the national telecommunications network. Operation and maintenance activities are driven by alarms and routine inspections.

6.6.5.5 DISPOSAL

When disposing of a MCS Powerco's preference is the full removal and restoration of the site to pre-installation condition. The system presents a public safety risk if not removed, requiring ongoing maintenance and monitoring, carrying operational costs. MCS exist in a supervisory role for regulator stations, meaning disposal is often driven by station removals. Physical disposal of this asset is conducted by our service provider in compliance with all environmental requirements.

6.6.5.6 ASSET INFORMATION

Our asset information for MCS is of a high standard, due to the accessibility, live data/alarms and age of our assets. Through ongoing maintenance and inspections, we can collect all required information.

6.6.6 LIFECYCLE PLANS

Based on the asset condition and very low defect rates, we currently have no planned replacement projects.

We are investigating a replacement for our MCS IT architecture. This will drive changes to our overall asset management strategy, potentially requiring the installation of new MCS architecture. We intend to identify the best option to upgrade the system.

6.7 CATHODIC PROTECTION SYSTEMS

Cathodic Protection (CP) systems are applied to buried metallic assets on our network and assist with maintaining and monitoring the assets' condition. Cathodic protection serves as a secondary protection system when the protective coating on an asset fails. Table 6.40 describes the types of cathodic protection systems on our network.

Table 6.40: Description of Powerco's Cathodic Protection system types

TYPE	DESCRIPTION
Galvanic system	Asset is protected by being cathodically charged through the passive electronegativity difference between the sacrificial anode and the asset.
Impressed current system	A galvanic system with additional negative charge impressed onto the protected asset. This charge increases cathodic protection by opposing corrosion charge pathways.

6.7.1 OBJECTIVES

As a secondary system, cathodic protection is applied to ensure its protected asset/s keep meeting their primary objective (e.g. safe and reliable delivery of gas). Cathodic protection achieves this by protecting assets against material deterioration. Asset risk analysis has determined that the leading causes of cathodic protection failure are:

- Third-party damage/interference.
- External interference.
- Asset failure due to incorrect maintenance and operation.

Through the application of asset class lifecycle management and plans we are continuously minimising and eliminating these risks.

The current focus for this asset class is the improvement of cathodic protection system performance, specifically on our IP pressure systems.

6.7.2 QUANTITY BY TYPE AND AGE

Table 6.41 shows a breakdown of the types of cathodic protection systems we operate by quantity, service status and average age, which we have included to indicate the overall health of the assets

Table 6.41: Cathodic Protection Systems by Type and Status

TYPE	TOTAL (NO.)	IN SERVICE (NO.)	AVERAGE AGE (YEARS)[11]
Total	62	54	28
Impressed Current	11	11	32
Galvanic	51	43	27

6.7.3 LIFE EXPECTANCY

The Commerce Commission sets an expected life of 35 years for cathodic protection systems, irrespective of system type and its associated equipment.

6.7.4 ASSET CONDITION

Table 6.42 summarises the condition of cathodic protection systems. Section 6.1.2 explains how quantities are allocated to each of the grades. A detailed table with the condition of all our assets is in Appendix 3 as part of Schedule 12a.

Table 6.42: Cathodic Protection systems asset condition

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
Cathodic Protection	62	0.00%	6.10%	56.61%	6.10%	31.19%	3

6.7.5 LIFECYCLE MANAGEMENT

6.7.5.1 ASSET RISKS

Through the application of FMEA, covered in Section 6.1.1 we have identified the major risks for cathodic protection systems, shown in Table 6.43. Our asset class strategies are driving changes within our standards, and identifying projects, to minimise or eliminate these risks from occurring and instructing process adjustments for when they are identified in the field.

[11] In service systems only

Table 6.43: Key Cathodic Protection System Risks

MAJOR THREAT	SPECIFIC THREATS	CONSEQUENCE
Incorrect design or construction	Incorrect asset protected	Unintentional protection of another asset, creating an unplanned draw on the system. Failure or reduction in cathodic protection.
	System not extended for network growth	Steel assets installed without extending coverage of system. Assets unprotected.
Incorrect maintenance and operation	Anode fully degrades	Failure or reduction in cathodic protection.
	Live cable exposed	Increased risk to public safety.
Material/component failure	Isolation joint or surge diverter failure	Unintentional protection of asset/s, creating an unplanned draw on the system. Reduction or failure of cathodic protection.
	Cable failure	Asset no longer receiving impressed current. Failure or reduction in cathodic protection.
External interference	External CP system	Disruption caused by external CP system. Failure or reduction in cathodic protection.
	Induced or stray current	Disruption caused by external CP system. Failure or reduction in cathodic protection.
Third-party damage or interference	Vehicle impact	Above ground assets damaged. Failure or reduction in cathodic protection.
	Test point buried or sealed over	Unable to test performance of cathodic protection. Failure or reduction of system not identified.
	Working without notification	Third-party damaging component assets. Failure or reduction in cathodic protection.

6.7.5.2 ASSET PERFORMANCE

CP is a secondary system for the protection of critical steel assets, so we prefer to analyse the performance of systems before leakage and defects start to occur on the protected asset. Performance is monitored on an ongoing basis. The overall performance can be impacted by, but not limited to:

- Damage or failure of the protected asset's intrinsic protection (e.g. coating or wrapping)
- Unintentional protection of assets external to the system, through design failure or failure of an insulation joint
- Degradation of the protection anode
- Damage to the rectifier
- Stray or induced current on protected asset

6.7.5.3 RENEWAL PLANNING

For individual assets with a CP system, Powerco's preference is run to failure. For the system, renewal is planned when we are no longer able to keep it preforming within its operating parameters through operation and maintenance.

In addition to performance, other network projects are another major driver for the construction or augmentation of our CP systems, with IP mains extensions requiring the installation of additional CP assets.

6.7.5.4 OPERATION AND MAINTENANCE

Cathodic protection systems typically require little maintenance, but this is dependent on specific locational ground conditions. Typical operation and maintenance activities include setting operating parameters, checking joints and replacing anodes.

Only systems with impressed current require operating parameters to be set. These parameters are set to ensure that the ground's electric potential is above the pipe's electric potential. Changes to the settings are made throughout the lifecycle of the assets based on defects and inspection results.

We check and record the electric potentials, current, and electrical bonds at joints during inspections.

CP systems are maintained on a run-to-failure basis for rectifiers and bonds. Anodes are maintained based on condition, we analyse the inspection results and decide on a case-by-case basis what interventions are required.

6.7.5.5 DISPOSAL

When disposing of above ground CP system assets (i.e. rectifiers, PCRs, test points, etc.), Powerco's preference is the full removal and restoration of the site to pre-installation condition. Systems that are not removed, present public safety risks, requiring ongoing maintenance and monitoring, carrying operational costs.

For below ground assets (i.e. anodes, cables, isolation joints, etc.), we prefer to decommission the asset and leave it in the ground, recording it as out of service in our records. Physical disposal of this asset is conducted by our service provider in compliance with all environmental requirements.

6.7.5.6 ASSET INFORMATION

As an output from the capital project, covered in Section 6.7.6.1, we are currently rebuilding and reconfiguring our asset information on cathodic protection systems. Based on our current information, Table 6.44 shows the key characteristics we are looking to improve.

Table 6.44: Asset information improvements

ASSET	IMPROVEMENT	ISSUE	REASON
All assets	Location	Accuracy	Improved location information will assist with maintenance, inspections, and prevention of third-party damage.
CP system	Area name	Accuracy	Required for identification of CP systems.
CP anode	Type (galvanic or impressed)	Completeness	Required for defining the area of a CP system.
CP test point	Type	Completeness	Required for identification, improving maintenance and inspections.
CP bond wire	Bonded to	Accuracy	Required for defining the area of a CP system.
CP test lead	Wire ID	Completeness	Required for identification, improving maintenance and inspections.

6.7.6 LIFECYCLE PLANS

We have an ongoing renewal programme across our main IP pressure systems, as well as our only predominantly steel MP subnetwork. These systems are in overall good condition but require renewal of individual components and augmentations to improve performance. We will spend a minimum of $180,000 per year over the next five years to complete this programme. With the Wellington IP pipeline completed this year, we currently have projects planned for the following areas:

- Porirua IP pipeline
- Upper Hutt IP pipeline
- Lower Hutt IP pipeline
- New Plymouth IP pipeline
- Hāwera MP pipeline

7 NETWORK STRATEGIES AND DEVELOPMENT PLANS

7.1 INTRODUCTION

This section describes our network strategies, the decisions they inform and the projects/plans they produce for each region covered by our network. For each network strategy, we will describe the major programme of works that we have forecasted. We have a strong focus on the safety and delivery drivers. You will see the options we have considered so far and those we prefer based on cost, performance, efficiency, and ability to deliver. The list of projects in this section provides greater levels of detail on a three to five-year horizon. When possible, we extend this vision to 10 years.

Our network strategies, summarised in Section 5.4.2, are defined in more detail in this section. The focus in this chapter is network-related projects rather than projects based on individual assets as seen in Chapter 6. Network strategies provide direction for strategic investment and network performance requirements.

Table 7.1: Network strategy purpose

ASSET	REASON
Growth	Allow anyone within our network areas to be able to connect into our gas network
Pressure droop	Ensure sufficient capacity to obviate low pressure in any part of the network
Elevated pressure	Preserve personnel and public safety
Resilience and redundancy	Maintain supply availability
Odorant	Ensure adequate odorant within our network
Network isolation	Increase the disaster resilience of our network against high-impact, low-probability events
Network rationalisation	improve supply and delivery efficiency

7.1.1 NETWORK RISKS

Powerco assesses general network risks through a regular (i.e. five-yearly) Formal Safety Assessment (FSA), as outlined in Appendix 6. Our network strategies include controls to mitigate the strategic risks identified in the FSA. The identified controls are developed in alignment with the value drivers and aim to ensure reduced safety concerns and reliable delivery of gas to our customers.

Table 7.2: Key Network Risks

RISK	FSA[12]	CONSEQUENCE	STRATEGY	CONTROL
Gas outage	A5.1	Loss and re-gain of supply where flame failure device is not present.	Pressure droop	Droop limits
Equipment venting	A5.1: #1, #4	Overpressure on the inlet that causes physical damage to the equipment (GMS/DRS).	Elevated pressure	Network pressure design Pressure protection alignment
Faulty DRS equipment	A5.1: #5	Due to a fault, DRS equipment fails resulting in gas outage.	Resilience & redundancy	Twin-stream
Third-party interference	A5.6	Assets are damaged or operated by an unauthorised person, including vandalism.	Resilience & redundancy	Undergrounding stations
Gas Release (undetected)	A5.2 A5.3	An equipment vents gas that is not detected until it reaches high concentration in air.	Odorant	Gas odorisation management
Gas Release (uncontrolled)	A5.1	Major gas leak, fire, explosion.	Network isolation	Emergency isolation valves, isolation plans

7.2 GROWTH

We have three strategies to accommodate growth on the network:

- Reticulate new development areas (subdivisions) linked to our existing network
- Connect infill new builds or infill subdivisions (existing parcels subdivided into two to 10 dwellings)
- Connect customers directly fronting our mains (within 40 metres) or re-connect previous customers now disconnected

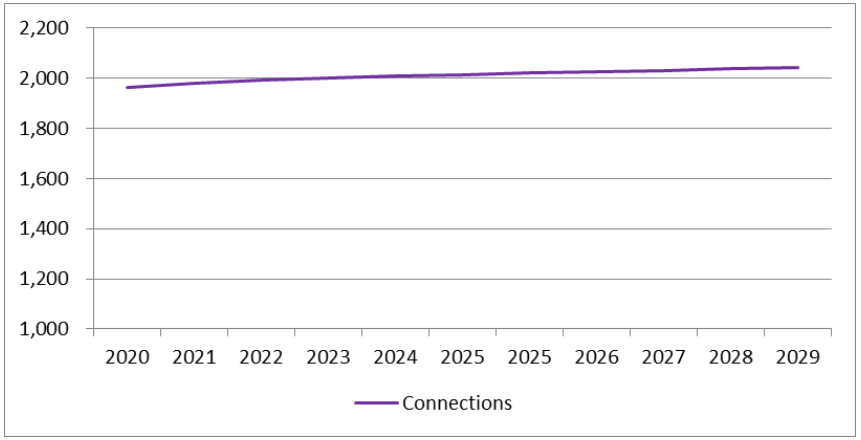
Network growth results in increased utilisation of the existing assets, which leads in the long term, to more competitive and efficient customer pricing.

Budgets for new developments are derived from a detailed system growth budget forecast and historical trends. Budgets for infill and reconnection growth are

[12] Appendix 7 - Formal Safety Assessment (FSA) reference

forecasted based on expected connection numbers, marketing efforts and historical values. The forecasted growth for the upcoming ten years is shown in Figure 7.2.

Figure 7.1: Forecast of Total Number of New Customer Connections per annum



The remainder of growth expenditure is spent on major projects scheduled throughout the planning period. The majority of these are network reinforcements to increase capacity of the network to cater for projected growth. As most new subdivision growth occurs at the extremities of our networks, the capacity is impacted not only by a rise in gas volumes, but also by a larger pressure drop resulting from longer distances of gas conveyance.

Growth is occurring in all regions of our network, with the highest growth, and subsequent reinforcement works, required in Hawke's Bay. This section summarises the growth in each region.

7.2.1 WELLINGTON

Most of the growth in this region is happening on the northern part of the sub-network. The Wellington Urban Growth Plan shows the potential extension of the city along the state highway to Porirua. This will occur both on the west of the state highway, from Churton Park to Tawa, via Stebbings Valley, and on the east, from Grenada Village and Woodridge to Grenada North, via Lincolnshire Farms. This aligns with the plans we have discussed with potential developers.

Growth in the area is set to occur around:

- Churton Park
- Grenada Village
- Woodridge
- Newlands
- Crofton Downs
- Island Bay

7.2.2 HUTT VALLEY AND PORIRUA

In Hutt Valley, large subdivisions in Wallaceville and Wainuiomata have introduced constraint on the LIP pressure system jointly supplying both areas. In Lower Hutt, only small subdivisions are being developed, which should not impact that part of our network. However, there are major plans to increase the city's footprint, so we will continue to actively monitor these areas.

Subdivision growth rates in Porirua are high and will require some significant network expansion and reinforcements during the planning period.

The primary areas of expected growth, for which we are planning additional supply capacity to, are:

Hutt Valley

- Wallaceville (Upper Hutt)
- Kelson (Lower Hutt)
- Arakura (Wainuiomata)
- Moohan Street (Wainuiomata)

Porirua

- Aotea
- Kenepuru
- Whitby
- Plimmerton
- Judgeford Hill

7.2.3 TARANAKI

In the next five years, we expect to reticulate several subdivisions in New Plymouth in a staged manner to align with the developments. In the longer term, we will also support the council's plans to expand the city along Smart Road. The primary areas of growth in the region are:

- Fernbrook
- Bell Block – Airport Drive and Wills Road
- Mangorei Road
- Smart Road

7.2.4 MANAWATŪ AND HOROWHENUA

We continue to see sustained growth in the region. In Feilding and Levin, new subdivisions are being connected to our network as they grow. We anticipate the need to reinforce the southeast of Levin as growth occurs.

Palmerston North, our third largest subnetwork in terms of customers, is expected to grow significantly during the planning period. As well as subdivisions expanding the city in the south (Summerhill), the city council is planning a major expansion on the eastern side of the city. This is accompanied by significant industrial and commercial activity. In Palmerston North, we continue to see growth in the following areas:

- Freedom Drive / Whakarongo
- Awapuni
- Summerhill

7.2.5 HAWKE'S BAY

Growth in the region is occurring in Napier, Hastings, and Havelock North. Subdivision growth, as well as large rates of infill growth, have occurred in Havelock North in recent years. Additionally, there are several large subdivisions in all three areas with potential for large increases in size during the planning period. The main developments are:

- Te Awa (Napier)
- Parklands (Napier)
- Guppy Road (Napier)
- Frimley / Lyndhurst (Hastings)
- Iona (Havelock North)
- Brookvale (Havelock North)
- Arataki Road (Havelock North)

7.3 PRESSURE DROOP

The objective of the Network Pressure Droop Strategy is to build sufficient network capacity to ensure that no customers are impacted by poor network pressures, and to allow for all residential/small commercial gas connection applications to be accepted.

This strategy provides guidance on growth forecasting, criteria for minimum allowable pressures (pressure droop with regards to network capacity, and lowest functional operating pressure with regards to equipment specification, i.e. GMS inlet pressure requirements), as well as pipe sizing and gas velocity limits. These, along with our network modelling and pressure monitoring programme, allow us to identify when and what reinforcement projects are required. The strategy aims to strike a balance between cost and delivery risk.

Projects identified through this strategy aim to reinforce the network to improve constraints that arise from either:

- Network growth – constraints are expected to occur due to increased customer demand as described in Section 7.2, or
- Capacity constraints – if constraints on the amount of gas we can provide currently exist.

Table 7.3: summarises the network performance status keys we utilise to grade the performance of our networks. Each section (7.3.6–7.3.10) summarises the major network development plans for each region that are required. They also give the current and expected performance levels, comparing status quo (no projects are carried out) versus planned works (projects are completed). These projects are also summarised, including timeline and expenditure, in Chapter 9.

The projects included in the tables do not consider post-2025. This is reflective of our current knowledge and understanding of the network performance and our planning being less accurate after a five-year horizon.

Table 7.3: Network status key

STATUS	NETWORK PERFORMANCE AND MAXIMUM PRESSURE DROOP
●	Satisfactory (<40%)
●	Low-pressure (>40%)
●	Very low-pressure (>60%)
●	Loss of supply (>80%)

Any pressure systems not mentioned in this section are performing at a satisfactory level and are expected to remain that way across the planning period. No reinforcement projects are required, and we will continue to monitor those systems.

7.3.1 NETWORK GROWTH

Growth rates are modelled with consideration of:

- Historical infill rates and council planned growth rates
- Greenfields growth through direct relationships with developers and councils
- Diversity factors for both residential subdivisions and large commercial/industrial customers

Our approach to growth with residential customers is to have a network that can accommodate new connections without any work other than installing a service pipe. Customers that need a new energy source are generally time-constrained and we want to offer them a competitive and timely proposition.

For large commercial and industrial customers, we adopt a reactive approach. Even by collecting intelligence from council zoning (e.g. location of industrial parks), it is difficult to design a network that will match what the customers want without knowing what type of activities are exactly expected in the region, and, therefore the requirements for specific loads and usages.

As the bulk of the growth occurs on the extremities of our networks, it has a much greater impact on capacity and thus requirements for reinforcement. Modelling growth rates allows us to determine the extent and timeline of reinforcements.

7.3.2 NETWORK CAPACITY

Pressure droop is a measure of the pressure drop from the Normal Operating Pressure (NOP) and allows us to measure residual capacity in our networks.

We have increased our maximum allowable pressure droop to 50% (up from 40%). This increase in allowable droop has been made because we have more confidence in our network modelling, better coverage of pressure monitoring data loggers across our networks, and more consideration of the rate of growth and its impact on capacity, allowing us to be more precise with project timing. Additionally, several of our networks have operated in the 50% droop range for some time with no ill effects, and with little to no growth expected, they remain stable with sufficient buffer for unexpected demand. A 50% droop level represents about 80% capacity being utilised, leaving additional capacity for unexpected demand such as abnormally cold weather, existing customer-specific volume growth (e.g. installation of additional appliances), and infill, subdivision and commercial growth beyond what is known in our growth forecasts. If the trigger of 50% droop is reached, we undertake a detailed analysis that potentially leads to reinforcement works on the network. Part of the analysis is a reassessment of the risk that customers lose supply through a poor pressure event, considering our growth projections. With all the above considerations, there is no increased risk to our network delivery.

The main approaches to increase capacity of the network are:

- Construct high-capacity mains (replacing older, smaller diameter mains) to minimise pressure losses along a defined route
- Add more points of supply on the network, for example:
    - A new regulator station supply from a higher-pressure network, which allows more gas to be injected into the system
    - A mains interconnection with a less constrained part of the network
- Increase the NOP within permitted limits

The choice of the approach is dependent on the specific characteristics encountered in each network, the type of end-customers and the circumstances that lead to the pressure droop.

In addition to reinforcing networks with poor network capacity, we occasionally need to replace regulator stations that have reached their delivery capacity, as identified in Section 6.3. All our stations are running at satisfactory utilisation and we have no current plans to upgrade any stations due to capacity constraints.

7.3.3 PIPE SIZING

Mains pipes are sized to ensure that we have adequate capacity now and into the future so that further reinforcement is not required during the lifecycle of the mains.

Service pipe sizes are designed to ensure required customer GMS inlet pressure can be met at peak customer load during minimum operating levels on the network.

Gas velocity in pipes is also considered in sizing of mains to ensure velocities remain within allowable limits, as higher velocities result in significantly higher rates of pressure drop (as well as potentially high noise levels). We periodically investigate all pipes in our network modelling to identify high velocity mains and add them to our issues register.

7.3.4 PRESSURE MONITORING

We use pressure data logging devices to measure the pressure of our network. All our pressure loggers are installed directly onto our network and have remote capabilities that provide daily pressure data and alarm capabilities. We run a pressure monitoring programme to:

- Regularly monitor non-constrained networks every three years, or reactively (whichever comes first), informed by our modelling tool or reported network issues
- Maintain permanent active pressure monitoring on our highly utilised pressure systems with >40% droop (physically recorded on the network or modelled under simulated peak conditions)

Collecting network pressure data allows us to improve accuracy of our network models and detect any changes in network performance between model builds.

7.3.5 NETWORK MODELLING

We use network modelling to simulate network operating conditions allowing us to perform capacity assessments and make decisions on network investment. We utilise one of the most advanced pipeline simulation software tools that is commercially available. Our network modelling is relatively mature and allows us to:

- Simulate network performance under a one-in-20-year peak load
- Forecast accurate network capacity
- Gauge pressure performance of our future networks

This allows us to identify options for reinforcement required to bring our networks to acceptable levels.

We also use network modelling to aid in responding to faults/emergencies such as leaks, to allow us to identify whether we can isolate the network (and perform bypass sizing if required), and the resulting network performance and consequences.

7.3.6 WELLINGTON

The Wellington region consists of a single subnetwork fed from Tawa Gas Gate and supplying seven MP systems and two LP systems through the Wellington IP.

Table 7.4 details our current reinforcement plans for pressure systems on the Wellington region.

Table 7.4: Wellington capacity reinforcement plans

PRESSURE SYSTEM	CURRENT PRESSURE PERFORMANCE	PRESSURE PERFORMANCE (IF STATUS QUO)	PRESSURE PERFORMANCE (IF PROJECTS COMPLETED)	PROPOSED PROJECTS
Wellington IP	🟠	🟠	🟡	Tawa Gate upgrade
Wellington CBD	🟡	🟠	🟢	Wellington CBD pressure upgrade
Wellington 25kPa	🟡	🟡	🟡	None – active monitoring
Wellington North	🟠	🔴	🟢	Butavas Street DRS inlet reinforcement Westchester Drive overlay Mark Ave overlay
Karori	🟡	🟡	🟡	None – active monitoring
Chartwell	🟢	🟡	🟢	Chartwell Drive pressure uplift

7.3.6.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Wellington CBD remains constrained in some parts of the network. The pressure elevation programme we started in 2013 has allowed us to increase pressure (from 10kPa to 25kPa) in areas where demand was the highest. Works are ongoing, and the entirety of the CBD pressure system will be operating at a new operating pressure in RY21. This is discussed in Section 7.3.6.2.

Wellington's 25kPa pressure system has seen improvements since being interconnected with the completed sectors of the Wellington CBD upgrade. Once the CBD pressure upgrade is complete, both pressure systems will be merged, and we expect pressure to increase in the Mt Cook area. Enhancements to the Dover Street station in the southern end of the city (Island Bay) will increase capacity and support growth. We may see localised pressure droops in Island Bay, and we plan to actively monitor the area.

In the northern suburbs, the city is expanding with new buildings and subdivisions and it is expected that the city will eventually form one continuous urban area all the way to Tawa. Some low-pressure points have been identified on this part of the network and will be remedied during the planning period.

The Wellington IP system remains under scrutiny as we monitor the impact of the Wellington CBD network reconfiguration. Performance issues on the Karori lateral will be remedied as part of the Karori rationalisation project mentioned in Section 7.8.1.

The remainder of Wellington's pressure systems have been upgraded in the last 10 years from low- to medium-pressure and are performing well.

7.3.6.2 NETWORK DEVELOPMENT PROJECTS

Tawa A Gate Station regulator upgrade

The gas transmission network supplying Wellington cannot maintain the required inlet pressure to Tawa A Gas Gate under peak flows. Under these conditions, the current regulator composite manifold cannot maintain its delivery pressure. We plan to change out the regulators to a different type that will allow the delivery pressure to be met, improving the supply and resulting pressure droops at the Karori and Newtown extremities of the IP.

Wellington CBD pressure upgrade

In our previous AMPs, we described our strategy to upgrade pressure in part of the CBD to 25kPa. The first part of this project started in 2013 and was completed in 2016, with the second part (four stages) starting in 2016. Three out of four stages have been completed at the time of writing this document. Works for the fourth and final sector are underway, with an anticipated completion date of RY21. Expenditure for RY20 and RY21 totals $2.6m, bringing the total projected expenditure for this four-staged phase of the project to $9.0m.

Wellington North Reinforcement (3 projects)

We anticipate that the demand growth resulting from subdivision activity around Grenada Village and Churton Park will warrant overlays in each area to ensure pressure droop remains within the security of supply requirements. Additionally, there is constraint on the small diameter main along Rama Crescent that supplies a PRS feeding into the Wellington 25kPa pressure system at Butavas Street.

We plan to upgrade the following areas to bring the pressure system to an adequate level as well as support forecast growth:

Butavas Street DRS inlet reinforcement

The lowest pressure point on the pressure system is at a small regulating station (Butavas Street DRS) feeding into the eastern part of the Wellington 25kPa pressure system. This is not likely to be impacted by growth, however it does breach our pressure droop requirements and could result in poor delivery pressures at the station outlet. We plan to upgrade a portion of the small diameter mains feeding the station.

Westchester Drive overlay

With large growth at the extremities of Churton Park, smaller diameter mains will not have sufficient capacity to supply gas to new customers. We will overlay Westchester Drive in RY23 with larger diameter mains to cater to medium-term growth. In addition to this, we also anticipate a longer-term requirement to isolate the area as its own pressure system and will increase the operating pressure to 350kPa. We currently plan to do this in RY29.

Mark Avenue overlay

Growth in Grenada Village will see network pressures breach security of supply levels in RY24. We will increase capacity to the area by replacing smaller diameter mains with larger ones along Mark Avenue.

Chartwell Drive pressure uplift

The new Crofton Downs subdivision will constrain the Chartwell Drive pressure system, and we expect that our pressure threshold will be reached in RY22. We will monitor the pressure and demand on the system and increase the NOP from 70kPa to 100kPa in RY23 if needed.

7.3.7 HUTT VALLEY AND PORIRUA

The Hutt Valley and Porirua region consists of three sub-networks. The first feed the Hutt Valley from Belmont Gas Gate, supplying 10 main medium-pressure systems through the Belmont HIP and LIP pressure systems. The second feeding Porirua from two gas gates, with Waitangirua and Pauatahanui #1 jointly supplying the Mana MP system, with Waitangirua solely feeding another six MP systems. Finally, Pauatahanui #2 is the third subnetwork which feeds a small area with a handful of rural customers.

Hutt Valley and Porirua subnetworks are mainly operating in the MP range, supplying residential customers. The subnetwork in Hutt Valley runs over a large geographical area, from the gas gate in Belmont, as far as Upper Hutt in the northeast, Eastbourne and Wainuiomata in the south, and Ngauranga Gorge in the west. In Porirua, the subnetwork supplies an area going from Plimmerton in the north, to Tawa in the south, and includes Titahi Bay to the west. We plan to expand the network to supply the Judgeford Hills development east of Transmission Gully.

Table 7.5 details our current reinforcement plans for pressure systems in the Hutt Valley & Porirua region.

Table 7.5: Hutt Valley and Porirua capacity reinforcement plans

PRESSURE SYSTEM	CURRENT PRESSURE PERFORMANCE	PRESSURE PERFORMANCE (IF STATUS QUO)	PRESSURE PERFORMANCE (IF PROJECTS COMPLETED)	PROPOSED PROJECTS
Belmont LIP	🟡	🔴	🟢	Wainuiomata IP Reinforcement
Kelson	🟢	🟡	🟡	None – Active monitoring
Lower Hutt LMP	🟡	🟡	🟡	None – Active monitoring
Wainuiomata	🟢	🟢	🟡	None – Active monitoring
Pauatahanui IP	🟡	🔴	🟢	Pauatahanui IP Upgrade

7.3.7.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Lower Hutt LMP pressure system remains constrained, however, the pressure constraint on this system is limited to a single branch. We maintain active monitoring at this point, and we consider this situation acceptable as planned growth will not impact this system.

Belmont LIP system remains constrained and will require reinforcement to cater to subdivision growth in both Upper Hutt and Wainuiomata. The Upper Hutt constrained segment will be remedied as an indirect result of both the Upper Hutt and Wallaceville rationalisation projects (see Section 7.8.2), while the Wainuiomata segment will be remedied through the Wainuiomata IP reinforcement project.

With large subdivision growth happening in the Plimmerton area, reinforcement work will need to be carried out on the Pāuatahanui IP system in RY23. This reinforcement will only cater to half of the projected growth, and further reinforcement may be required beyond five years. These future works are dependent on the future uptake rate in the new development.

7.3.7.2 NETWORK DEVELOPMENT PROJECTS

Wainuiomata IP reinforcement

As mentioned in the 2019 AMP Update, constraint on the Belmont LIP pipeline is being observed on the main feeding part of the Upper Hutt pressure system as well as the Wallaceville pressure system (including the new Alexander Road subdivision). This is being remedied as part of the Upper Hutt and Wallaceville rationalisation projects.

Additionally, growth in demand in Wainuiomata will also create constraint on the southern part of the Belmont LIP system. High rates of infill coupled with subdivision growth indicate an additional 600 lots over the next 20 years. This growth is putting constraint on the small diameter mains supplying the Norfolk DRS at the extremity of the LIP system. The Wainuiomata Rationalisation project (see Section 7.8.2) will provide a secondary benefit to improve pressures on the system, however, will not be enough to keep up with the growth. We plan to reinforce the LIP system supplying the Norfolk Street DRS in RY25 by laying new mains interconnecting the LIP along Parkway and Nelson Crescent.

Pāuatahanui IP Upgrade

Plimmerton Farm in Porirua is expected to see the development of up to 2,000 lots over 20 years, beginning in RY22. We intend to support this growth by reticulating the suburb. The existing supply point is expected to become constrained within the first year of this development. Therefore, we will need to upgrade the Pāuatahanui IP system supplying the Plimmerton regulator station to ensure delivery needs are met for the growing number of customers. We forecast the uprating of the Pāuatahanui IP (from 1,050kPa to 1,500kPa) in RY23.

7.3.8 TARANAKI

The Taranaki region consists of 17 subnetworks supplying mostly small towns and a major subnetwork in New Plymouth which feed four main medium-pressure systems through its IP system. Table 7.6 details our current reinforcement plans for pressure systems in the Taranaki region.

Table 7.6: Taranaki Capacity Reinforcement Plans

PRESSURE SYSTEM	CURRENT PRESSURE PERFORMANCE	PRESSURE PERFORMANCE (IF STATUS QUO)	PRESSURE PERFORMANCE (IF PROJECTS COMPLETED)	PROPOSED PROJECTS
New Plymouth IP	🟡	🟡	🟡	None – active monitoring
New Plymouth MP	🟡	🟠	🟢	Hutchen Place reinforcement
Bell Block North	🟢	🟡	🟡	None – active monitoring
Pātea	🟡	🟡	🟡	None – active monitoring
Lepperton	🟡	🟡	🟡	None – active monitoring
Waitara MP	🟡	🟡	🟡	None – active monitoring

7.3.8.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Our subnetworks in the Taranaki region are of various sizes and performance. The latest results of our pressure monitoring programme show that most of the pressure systems are within the droop limit, therefore do not require any major investment in the short-term.

There are four pressure systems that exceed 50% droop in Taranaki, three in New Plymouth, and one in Pātea. Considering the decrease in customers in Pātea, we have decided to hold reinforcement until any significant development is flagged.

In New Plymouth, previous years' projects have increased the performance of all the pressure systems. On the New Plymouth MP pressure system, only localised issues at Port Taranaki have been identified. This will be remedied through the Hutchen Place reinforcement project, discussed below. Bell Block North and the New Plymouth IP systems are under active monitoring.

In Waitara, seasonal pressure drops have occurred on the 50NB main supplying a chicken farm on Waitara Road. However, these do not pose a problem at this time. If increased consumption occurs in the area, we will transfer this main over to the Lepperton pressure system that was isolated from Waitara in RY19 and now operates at a higher pressure.

7.3.8.2 NETWORK DEVELOPMENT PROJECTS

Hutchen Place reinforcement

A single branch of relatively long, small diameter main supplying industrial customers at Port Taranaki is resulting in localised constraint in the area. Low pressures have been confirmed through pressure monitoring. We plan to reinforce the area and are considering four options:

- Overlay the entire 1.1km length of 50NB main along Bayly Road / Ocean View Parade / Hutchen Place in 100NB

- Connect Hutchen Place to the 100NB main on Breakwater Road through a 160m interconnection via Pioneer Road
- Connect Hutchen Place to the 80NB main at the northern end of Breakwater Road through either:
    - a 160m interconnection under the railway, or
    - a 200m interconnection along Wharf Street north of the railway
- Add a new point of supply from the New Plymouth IP at Peace Avenue and isolate and run the constrained area at a higher pressure

7.3.9 MANAWATŪ AND HOROWHENUA

The Manawatū and Horowhenua region consist of 13 subnetworks supplying mostly rural areas. The major subnetwork in Palmerston North feeding six main medium-pressure systems through its IP system.

Table 7.7 details our current reinforcement plans for pressure systems in the Manawatū & Horowhenua region.

Table 7.7: Manawatū and Horowhenua capacity reinforcement plans

PRESSURE SYSTEM	CURRENT PRESSURE PERFORMANCE	PRESSURE PERFORMANCE (IF STATUS QUO)	PRESSURE PERFORMANCE (IF PROJECTS COMPLETED)	PROPOSED PROJECTS
Palmerston North LMP	🟡	🟡	🟡	None – active monitoring
Summerhill	🟢	🔴	🟢	Summerhill reinforcement
Feilding	🟢	🟡	🟡	None – active monitoring
Levin	🟢	🔴	🟢	Queen Street East overlay

7.3.9.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Our network in the Manawatū and Horowhenua region mainly comprises small-town subnetworks, usually supplying a few large commercial or industrial customers. Feilding and Levin have significant residential growth occurring and are actively monitored for growth. We expect the need to reinforce Levin in the southeast due to new subdivisions. Other subnetworks currently operate at a satisfactory level.

In Palmerston North, we are expecting strong residential growth in the south, and expect strain on the Summerhill pressure system. We will actively monitor demand and pressure levels and plan to reinforce the system if growth occurs as modelled.

With the Palmerston North Eastern Reinforcement completed, we are prepared for the city council's plans for a major expansion on the eastern side of the city.

The Hokowhitu suburb relies on small-diameter pipes. The Palmerston North Rationalisation project (see Section 7.8.3) will remedy any capacity issues.

7.3.9.2 NETWORK DEVELOPMENT PROJECTS

Summerhill Reinforcement

The growth occurring in the southern part of Summerhill will put strain on the extremities of the pressure system. We expect that by RY24, the pressures will breach our droop requirements, and we plan to reinforce the system in RY23 by increasing the NOP to 150kPa.

Queen Street East Overlay

The growth occurring in the southeast of Levin is expected to put strain on the 50NB mains supplying the area. We expect that by RY24, the pressure will reach very low levels. We will need to reinforce the system through an overlay of the 50NB mains with larger 100NB mains.

7.3.10 HAWKE'S BAY

The Hawke's Bay region consists of a single subnetwork fed from Hastings Gas Gate that supply four main medium-pressure systems and one low-pressure system through the Hastings IP.

Table 7.8 details our current reinforcement plans for pressure systems in the Hawke's Bay region.

Table 7.8: Hawke's Bay capacity reinforcement plans

PRESSURE SYSTEM	CURRENT PRESSURE PERFORMANCE	PRESSURE PERFORMANCE (IF STATUS QUO)	PRESSURE PERFORMANCE (IF PROJECTS COMPLETED)	PROPOSED PROJECTS
Napier	🟢	🔴	🟢	Te Awa Ave Cocon
Taradale	🟢	🟠	🟢	Taradale supply upgrade
Hastings LMP	🟡	🔴	🟡	Havelock North reinforcement

7.3.10.1 CURRENT PERFORMANCE AND FUTURE DEMAND

The IP subnetwork supplying Napier and Hastings conveys the highest volume per customer of all our network because of the presence of large industrial customers.

Growth in the region is the highest on our network and is supported by large subdivision activity in both Napier and Hastings. We are monitoring those developments and require reinforcement work to be carried out in Te Awa, Taradale, and Havelock North.

7.3.10.2 NETWORK DEVELOPMENT PROJECTS

Te Awa Avenue Cocon installation

Te Awa is fed by a long stretch of small diameter main. In order to adequately supply subdivision growth, an additional supply point has been installed.

A total of $180,000 was spent on this project and completed in RY20.

Taradale supply upgrade

The Parklands subdivision mentioned in the 2015 AMP is still underway, with a slower than expected growth and uptake rate occurring. This is evident through connection rates and pressure trends. This reduced rate of uptake provides more time until capacity upgrades are required.

There is also subdivision growth in Guppy Road increasing the demand on the pressure system. Droop is expected to reach approximately 50% by RY24. We plan to raise the network operating pressure from 150kPa to 210kPa, which will allow for the possibility of a merge with the adjacent Napier LMP pressure system, providing added security of supply to both areas.

We will continue to monitor the performance of the pressure system as growth occurs, with design planned for RY24, and surveying, equipment upgrades, and the pressure uplift occurring in RY25.

Havelock North reinforcement

Havelock North is seeing growth in gas customers, from both existing homes connecting to gas as well as new subdivision growth. This growth has put constraint on the southern end of Hastings LMP pressure system. A feasibility study has started, with three possible reinforcement options identified being:

- Outlay a second MP trunk main supplying Havelock North from Hastings
- Outlay a new high pressure main from the Hastings Gas Gate with a new supply point into Havelock North
- Increase the network operating pressure of the entire Hastings LMP pressure system including Havelock North

The best solution will be determined RY20, with construction in RY21 and RY22.

7.4 ELEVATED PRESSURE

The purpose of the Network Elevated Pressure Strategy is to reduce safety and delivery risk associated with elevated pressure, and to ensure that supply stations and customer equipment can operate adequately under a high-pressure incident.

The main objectives are as follows:

- Define maximum allowable operating pressures (MAOP) for safety, monitoring, and control purposes
- Ensure that no existing equipment is exposed to pressures above the equipment's manufacturer pressure rating, increasing likelihood of failure.
- Ensure that customer safety is maintained by not exposing installations downstream of GMSs to a pressure greater than the installation's design.
- Minimise reliefs activating on regulating stations
- Prevent over pressure shut off (OPSO) valves from shutting supply to large numbers of customers following a single over-pressure event
- Standardise MAOPs for all newly constructed pressure systems
- Manage SCADA alarm setpoints
- Provide guidance on raising/lowering MAOP of pressure systems

We are reviewing our current regulator station setpoints and plan to standardise DRS relief and OPSO setpoints where practical. The intent being that, in the event any pressure system is exposed to elevated pressures, the reliefs will operate before OPSOs are shut, reducing the risk of supply loss. This will be delivered through our Opex maintenance programme.

There are currently no identified network elevated pressure issues that require Capex investment.

7.5 RESILIENCE AND REDUNDANCY

The purpose of the Network Resilience and Redundancy Strategy is to ensure we have the appropriate level of built-in redundancies to maintain supply to our customers in the event of the failure of network equipment. This strategy is applied proactively to all stations identified for replacement due to asset-driven risks as identified in Section 6.3, as well as retroactively to increase redundancy of existing stations.

Network resilience, as part of operational reliability, is measured against the quantity, type and gas volume of customers that could potentially lose supply due to a single reasonably foreseeable failure event. This is managed through the following regulator station requirements:

- Single vs twin stream
- Single station vs multiple stations
- Above ground vs underground
- Monitoring requirements

We plan to assess 22 above ground stations for risk of being damaged through impact by a car and will underground any stations determined to have a higher than

acceptable risk. During the planning period, we have allocated $450,000 per year for these undergrounding projects. Stations deemed for renewal are also assessed through the Rationalisation Strategy to capitalise on network improvement efficiencies and improve overall network performance.

Lastly, to detect potential failures, we use a SCADA system with real-time monitoring and alarm capabilities on our high criticality stations, as well as pressure logging devices on our medium criticality stations. We have identified seven stations that will benefit from being connected to our SCADA system and will aim to install these systems on a priority basis.

Table 7.9: SCADA system installations

STATION NAME	PRESSURE SYSTEM	SUBNETWORK
Kings Wharf Cocon	Kings Wharf	Wellington
Taylor Preston PRS	Taylor Preston	Wellington
Maungaraki DRS	Lower Hutt LMP	Belmont
Sunrise Boulevard DRS	Tawa LMP	Porirua
Cameron Street Cocon	Waitara MP	Waitara
Mangati Road DRS	Bell Block North	New Plymouth
Feilding Gate Station DRS	Feilding HMP	Feilding

7.6 ODORANT

Odorisation of natural gas is a key safety requirement in its distribution and use. Odorant serves as a detection method for loss of containment. It alerts the public of its presence at home and in the general community. It also provides an early warning to third parties working in close proximity to mains and services should there be an existing leak, or an accidental strike on a main or service.

This strategy ensures our network odorant levels are managed properly and that odorant test point locations are determined adequately and reviewed at required intervals. Additionally, it ensures the prevention and mitigation of odorant fade, specifically resulting from large lengths of pipe with minimal to no gas conveyance (i.e. “dead-legs”).

This strategy informs maintenance plans (driving Opex costs rather than Capex projects). Works include odorant point installation/relocation, monitoring, and flaring where required. In the event a “dead-leg” is found to be at risk of odorant fade, we will seek to remedy this through one of the following options:

- Sponsorship of a customer at the end of the “dead-leg” to allow odorised gas to flow through the pipe
- Routine flaring at defined intervals to ensure odorant remains within adequate levels
- Decommissioning the “dead-leg” from the network

In the event of any odorant failures, we will evaluate and control any associated risk (e.g. checking that the nearest upstream customer still has adequate odorant, checking if the problem can be economically controlled with regular flaring). These events are dealt with reactively when they are detected and are managed on a case-by-case basis.

7.7 NETWORK ISOLATION

The purpose of the Network Isolation Strategy is to improve our emergency response preparedness as we increase the disaster resilience of our network against high-impact, low-probability events (e.g. major earthquakes, third-party damage to IP main). Network isolation requirements are checked retrospectively as well as when the network is extended. All valves replaced through asset-driven means, as described in Section 6.4.5, are cross-checked against this strategy.

We are improving isolation capacity on a risk-based metric by installing new isolation valves throughout our six critical subnetworks. This enables us to isolate our network simply and quickly in case of a major event. We have identified where we need to install valves on our network (refer to Table 7.10 and Table 7.11). To complete these works, we expect to spend $4m over the next five years for this initial alignment with our Network Isolation Strategy.

The future phase of our isolation strategy aims to ensure that our major and critical customers are given priority when isolation is required. In the event of a required shutdown of a large part of our network, we will look to maintain supply to these customers through a series of strategically located valves, or alternatively by connecting these customers directly onto the high-pressure backbone pipelines. Additionally, in the event of an entire network shutdown, this configuration would allow a quick reinstatement of supply to these customers. We expect to spend $1m total over three years from RY25 to RY27 for this next phase.

Overall, we foresee spending $5m over the next eight years to ensure all our network has the necessary isolation valves required to be prepared for any emergencies and comply with our isolation strategy requirements.

7.7.1 IP ISOLATION

Risk is determined on a probability and consequence basis. Probability is based on the length of main isolatable by a specific valve, and consequence is based on the “cost” of losing supply (based on the marginal number of customers that would lose supply) if the valve was not present. In order to ensure efficiency in design, minimum isolatable lengths and number of customers are set.

IP isolation valves ensure quick isolation of pipelines conveying gas at high pressures, while minimising outages to customers. We plan to install IP isolation valves on our six critical subnetworks as per Table 7.10.

Table 7.10: IP Isolation valve installations

SUBNETWORK	# OF VALVES REQUIRED	START DATE	END DATE
Wellington	2	RY19	RY21
New Plymouth	2	RY21	RY22
Belmont	8	RY21	RY23
Porirua	6	RY22	RY24
Palmerston North	2	RY23	RY25
Hawke's Bay	2	RY23	RY25

This programme of works is being carried out across a 7-year period and will total approximately $3.4m to bring our critical subnetworks up to meeting our IP isolation strategy requirements.

7.7.2 SECTORISATION

Our sectorisation plans create isolatable sectors that minimise the impact of disruption in the event that a large isolation is required. The strategy aims to make all sub-networks isolatable into sectors with a maximum of 5,000 customers, while reducing that number to 500 customers for CBDs and steel networks.

There are two scenarios this strategy is attempting to mitigate:

- A large incident occurs within an area allowing us to isolate the sector without impacting supply to all other parts of the network
- A large incident occurs on one of our high-pressure pipelines, allowing us to load shed an entire sector to reduce the load and maintain positive pressure to the remainder of the network

We aim for all LP/MP/CBD/steel sectors to have a maximum of five isolation valves in order to minimise the response time in an emergency.

7.7.2.1 LP/MP SECTORISATION

Only six of our subnetworks have greater than 5000 customers. These are the only subnetworks on which this strategy has an impact. Porirua and Hawke's Bay subnetworks are already compliant with this strategy, and the remaining four require capital works as per Table 7.11.

This programme of works is being carried out across a seven-year period and will total approximately $650,000 to bring the remaining critical subnetworks up to meeting our sectorisation requirements.

Table 7.11: Sector valve installations

SUBNETWORK	# OF VALVES REQUIRED	START DATE	END DATE
Wellington	26	RY19	RY21
New Plymouth	10	RY21	RY23
Belmont	7	RY21	RY23
Palmerston North	10	RY23	RY25

7.7.2.2 CBD SECTORISATION

For CBDs in larger towns/cities, we will aim to maximise the number of customers per sector to 500 customers. These areas are often too meshed/interconnected to make a sectorisation practical without many valves. This would be both costly to install and difficult to respond timely to in an emergency. Therefore, installation of these valves is only done where practical. The installation of these valves will allow us to maintain parts of the CBD in operation rather than shutting down an entire CBD (providing benefit to the entire community).

Currently the only CBD that can be made to meet this requirement in a cost-effective manner is the Wellington CBD. The sectorisation of this CBD has come as an indirect result of the broader Wellington CBD pressure upgrade project (see Section 7.3.6.2) which uplifted the pressure in the Wellington CBD in smaller, manageable sectors, one at a time, with the valves installed now usable as emergency isolation valves. No further capital works are planned for CBD sectorisations.

7.7.3 STEEL NETWORKS

Steel networks should also be made isolatable in sectors of 500 customers due to the difficulty in responding to leakage on steel pipelines. For steel pipes, we cannot squeeze off and bypass easily like with PE pipe networks. Therefore, any problems can result in the shutdown supply to an entire subnetwork. The only identified steel network requiring valves is the Hāwera MP pressure system.

Hāwera sectorisation

Hāwera MP requires some work to ensure we have isolatable sectors of approximately 500 customers. The Hāwera network is a predominantly steel network, with many old construction valves that have corroded. This project is currently in the options analysis stage and we expect to repair/install 23 valves through to RY22.

7.8 RATIONALISATION

This strategy aims to find and optimise efficiencies in our network. When an asset renewal or network project is identified, we undertake a network rationalisation assessment to see if there are other assets/issues on the network in need of remediation, and whether the network can be made more efficient, resulting in an overall optimised network. The result is a reduction in average annual costs over the lifespan of the assets compared with a do-nothing / like-for-like asset replacement option. Additionally, project delivery efficiencies are gained with all the required works for a pressure system designed, constructed, and delivered at the same time.

Some benefits from a network rationalisation include:

- Reduction/replacement of assets that have high operational expenditure (resulting in cost savings)
- Improvement in network capacity
- Reduction of defects on the network
- Reduction of safety risks on the network
- Removal of high velocity and “dead-leg” pipes
- Enhancement to isolation capabilities

Several combinations of options are compared with one another as well as against a “do nothing” option, resulting in a solution that provides the greatest benefit across the five drivers.

We have several rationalisation projects underway and planned throughout the Wellington, Hutt Valley & Porirua, and Manawatū & Horowhenua regions. These projects are also summarised, including timeline and expenditure, in Chapter 9.

7.8.1 WELLINGTON

Karori rationalisation

One of the two stations supplying Karori (Karori Rd DRS) is high risk due to a lack of fire valves and will reach the end of its economic life in RY25. It is also experiencing low inlet pressures on the IP feed to the station. As we replace the station, we will take the opportunity to rationalise the pressure system by removing this station, downrating the IP supply to medium pressure and installing three points of interconnection throughout the pressure system. The rationalisation will result in improved pressures across the system, while resulting in reduced maintenance costs with the removal of the station. We will also look to replace the small diameter IP main supplying the remaining Karori supply station (Chaytor Street DRS) to eliminate high velocities through the pipe.

7.8.2 HUTT VALLEY AND PORIRUA

Porirua CBD DRS rationalisation

Porirua CBD was fed by seven small, distinct pressure systems, each of them fed by an above ground station. The large number of stations posed a risk of third-party damage. Five years since the beginning of the feasibility studies, this project has been successfully completed in RY20 with seven systems linked, and five stations reduced to a single station. The reduction in the number of stations also reduces the amount of maintenance required on the network.

Avalon/Belmont DRS rationalisation

The Avalon station is in a Powerco-owned building containing a DRS servicing Lower and Upper Hutt through the Belmont LIP pressure system. It is in a zone prone to flooding (south of the river), on the border of a public park. The station is at the end of its serviceable life and the flood risk drove the decision to relocate this station.

After an options analysis, it was deemed that the best location for the new station was in Belmont, on the north side of the river, where another station (Kelson DRS) already feeds from the HIP pipeline. As part of the project, we are taking the opportunity to rationalise the supply into adjacent suburbs, including the removal of an above ground station located close to a school. The result will be the three suburbs of Kelson, Belmont and Belmont Domain being fed from a single supply point.

This multi-year project began in RY18 and will be completed in RY21. We will have spent a total of $1.6m to procure and install new Cocon units and decommission and reinstate the old sites.

Upper Hutt service regulator rationalisation

Many of the Upper Hutt service regulators (SR) supplying small lots of customers are in poor condition, at risk of vehicle impact, lack proper isolation, and feed inactive or disconnected ICPs. This project is to replace Gibbons Street SR and Montgomery Crescent SR by extending the Upper Hutt LMP pressure system to supply these customers.

Upper Hutt rationalisation

This project was first identified through the need to replace several at-risk and end-of-life assets in the Upper Hutt LMP pressure system.

Additionally, constraint on the Belmont LIP is being observed on a small diameter lateral feeding the Upper Hutt system at Miro Street, as well as the Wallaceville pressure system (including a new subdivision).

We have taken the opportunity to rationalise this system, replacing six above ground stations with four underground stations reducing safety risk and maintenance costs. Relocation of the stations will improve pressures on the pressure system itself, as well as significantly improve network pressure constraints

from the small diameter IP lateral down Whakatiki Street / Ward Street, by moving the Miro Street DRS supply point further upstream.

Two sites have already been replaced in previous years as the Rimutaka DRS and Upper Hutt North DRS undergrounding projects.

The final phase of this multi-year project is in the design phase and we will procure and install two new Cocon units as well as decommission and reinstate four old sites.

Wallaceville rationalisation

High growth rates in the Alexander Road subdivision have put constraint on the Wallaceville pressure system requiring us to add a new point of supply from the west to meet our delivery needs. This new supply point is fed from the existing Dante Road PRS at the end of the Belmont LIP lateral, to the new residential subdivision via a mains interconnection along Alexander Road.

Additionally, we will replace the small single-stream PRS with a twin-stream Cocon, providing the required capacity and redundancy for the system, which will allow us to remove the remaining two stations supplying Wallaceville at Lane Street and Ward Street. The shift of load from Ward Street to Dante Road will result in the removal of the pressure constraint on the small diameter Belmont IP lateral down Whakatiki Street / Ward Street.

We forecast that the capacity threshold of the system will be exceeded in RY22. We anticipate the link to the new subdivision with Dante Road to occur in late RY20 or early RY21, and plan to design and renew the station over the next two years.

Wainuiomata rationalisation

The Wainuiomata pressure system has been identified for rationalisation to reduce the number of non-compliant and end-of-life stations supplying the pressure system. We plan to reduce the number of stations from four to two. This will transfer some load (from the two stations being removed) on the small diameter Belmont LIP lateral feeding the Norfolk Street DRS upstream to the Parkway DRS, relieving some constraint on the Belmont LIP in the short-term. The Wainuiomata IP reinforcement project (see Section 7.3.7.2) will relieve the constraint in the medium-term.

This multi-year project is in the design phase and we will procure and install a new Cocon unit as well as an above ground station (including SCADA on both) and decommission and reinstate the old sites.

7.8.3 MANAWATŪ AND HOROWHENUA

Milson Line rationalisation

The Milson Line rationalisation project aimed at increasing the security of supply to the Milson and Cloverlea areas of Palmerston North. This project was completed in the first half of RY20. A combination of joining pressure systems, station renewals, and mains interconnections has allowed us to meet the minimum redundancy and capacity requirements for these pressure systems, now operating as one. Additional benefits have included a reduction in the number of stations from six to three, and the removal of three stations that were deemed to be in high consequence areas and at end-of-life.

Palmerston North rationalisation

The south-eastern part of Palmerston North city (Hokowhitu) is constructed in small diameter mains resulting in low extremity pressures. Additionally, Palmerston North's network architecture is characterised by numerous small advanced age regulator stations spread out across the city. We plan to reconfigure the Palmerston North LMP pressure system to significantly reduce the number of stations, while increasing capacity with some mains interconnections. We plan to complete the project in two stages, with the east and west (of State Highway 3) planned for completion in RY23 and RY25, respectively.

7.8.4 TARANAKI

There are no Rationalisation projects currently planned within the Taranaki region.

7.8.5 HAWKE'S BAY

There are no Rationalisation projects currently planned within the Hawke's Bay region.

8 NON-NETWORK STRATEGIES AND PLANS

8.1 SUMMARY

Non-network assets are those that are not part of the network asset portfolio that is directly utilised to deliver gas to our customers. These assets support the operation of our business and are critical for effective and efficient operation. Non-network assets include information systems and other non-network assets, such as motor vehicles, tools, plant and machinery.

As detailed in Section 5.4.5, our non-network strategies are the key improvement initiatives for support aspects to network related works. Improvement of non-network systems contributes to achieving our Asset Management Objectives. The three main strategies being implemented are:

- Asset Information Strategy
- Asset Management Improvement Strategy
- Information System Strategic Plan

8.2 NON-NETWORK ASSETS

8.2.1 INFORMATION SYSTEMS

In this section, we describe the current information systems environment. Powerco uses the following non-network information systems:

- Enterprise Resource Planning (ERP) System
- Geographical Information System (GIS)
- Service Provider Application (SPA)
- Connections Works Management System (CWMS)
- Engineering Drawing Management System (EDMS)
- Outage Management System (OMS)
- Customer Complaints Management System
- Safety Manager
- Contractor Safety Management Platform
- Ancillary databases

8.2.1.1 ENTERPRISE RESOURCE PLANNING SYSTEM

Powerco has recently implemented a new ERP: Systems, Applications and Products in Data Processing (SAP). Powerco operates SAP to provide a single, integrated software system that connects its financial and works management (projects, maintenance, etc.) systems, and is the master of non-spatial asset and financial data. SAP provides a single, integrated system, able to provide financial tracking, works and maintenance programming, works and maintenance management, procurement, asset information database, asset condition database, and, defect and rotable asset management. We have also integrated a field mobility solution (MyPM) to provide field staff with real-time access to SAP. All these capabilities are interconnected which will lead to operational efficiency gains, the primary benefit of an ERP.

8.2.1.2 GEOGRAPHICAL INFORMATION SYSTEM

Powerco uses a combination of GIS and SAP systems to capture, store, manage and visualise its network assets. GIS is the master system for the geographical representation of our network's assets. The GIS is built on top of a set of ESRI and Schneider Electric applications (ArcGIS, ArcFM) that deliver data in web, desktop and service-based solutions. This system acts as the master of spatial data, be that location as well as attributes dependent on where the asset is installed. GIS works in conjunction with SAP with the data displayed in both GIS and SAP, being passed back and forth using a Geo-Enablement Framework (GEF).

8.2.1.3 SERVICE PROVIDER APPLICATION

Powerco has a mobile platform that delivers applications to field services laptops and mobile devices. This application enables field capture of asset condition, maintenance activity results, and defects. Reporting on the data generated by the SPA application is delivered via a suite of reports out of both SAP and MyPM. The defect and condition data can also be viewed spatially from the GIS.

8.2.1.4 CONNECTIONS WORKS MANAGEMENT SYSTEM

Our CWMS is an online workflow management system that facilitates/tracks the processes associated with connection applications, approvals, and works completion. Application, review, and input work steps are available to Powerco-approved contractors via the internet. The primary function of the system is to manage the flow of customer-initiated work requests through Powerco's formal process, from initial request through to establishment of the Installation Control Point (ICP) in billing and reference systems.

The workflow ensures efficient workflow and oversight, as well as ensuring the latest business rules are applied to all categories of connection work.

Requests for new or existing customers to carry out work on Powerco's network are covered by Powerco's Customer-Initiated Works (CIW) process. This process places importance on providing new and existing customers a direct service from Powerco, undertaken by our contractors at their connection point(s). The business rules of the process ensure that the capacity of the overall local network and the quality of supply to adjacent customers is retained.

8.2.1.5 ELECTRONIC DRAWING MANAGEMENT SYSTEM

Powerco's EDMS, BC-Meridien, is where electronic copies of formal drawings of our assets are managed. Formal control ensures appropriate configuration management to enhances asset intervention decisions. The BC-Meridian application works in conjunction with AutoCAD. BC-Meridian is a database of all engineering drawings, including regulator stations, special crossings and gas measurement stations. In addition, there is a separate vault that contains legal documents relating primarily to easements.

8.2.1.6 SCADA AND OUTAGE MANAGEMENT SYSTEM

Our OMS is a core tool used in managing the NOC workload. OMS is used to manage calls and outage restoration efforts, track interruptions to customers, and provide relevant information to customers through retailers, our website, or an interactive voice recording system. Operators enter public reported jobs and record important information such as who was dispatched, site arrival time, when the job was completed, site findings/observations, and gas outage data.

Programmes of work are in progress within our Electricity business to replace the SCADA and OMS with best practice and modern technology. These projects will deliver a platform that we will utilise to foster closer interaction with our customers, enable greater real-time reporting and better analysis of asset information. Automation of maintenance management practices also continues to improve asset information and data on asset condition. We can use this information to drive an optimised renewal planning and condition-based maintenance programme.

Business improvement programmes include:

- Automated maintenance management to simplify and automate business processes to permit the delivery of consistent, timely and accurate maintenance plans and work schedules
- Enhance network improvement to provide easily accessible, timely and accurate information on network assets
- Information management to realise the capability to manage information effectively within Powerco, including the provision of end-to-end knowledge management systems and processes
- Continuous improvement to release incremental improvements to systems and processes and to embed a continuous improvement culture at Powerco

8.2.1.7 CUSTOMER COMPLAINTS MANAGEMENT SYSTEM

Our Customer Complaints Management System maintains an auditable record through the lifecycle of a customer complaint. The application is designed to work within the Electricity and Gas Complaints Commission rules regarding complaints, and automatically generates the key reports required.

Another feature of the application is the integration with the GIS and ICP data sources, to provide spatial representation of complaints and gas quality issues. This provides valuable information to the planning teams.

8.2.1.8 SAFETY MANAGER

Safety Manager is one of the systems that supports Powerco's operational risk model and incident management workflow. As the central repository for incidents, hazards and identified risks, and safety interactions and actions, it acts as a platform to manage these across internal and external stakeholders at both an operational and strategic level. In addition, it supports the Health, Safety, Environment and Quality (HSEQ) Team for the management of Personal Protective Equipment (PPE) and minimum H&S competencies for all Powerco employees.

Powerco recently upgraded its Safety Manager software suite. The new suite includes improved incident management, reporting, and investigation recording. Included within Safety Manager is the Gas Network Hazard Register, which identifies the hazards applicable to Powerco employees, its contractors, and the public. A copy of the register is provided to Powerco employees and contractors. The register is reviewed and updated on a regular basis, or as a result of an incident or investigation recommendations.

8.2.1.9 CONTRACTOR SAFETY MANAGEMENT PLATFORM

To assist its Contractor Safety Management, Powerco uses IS Network (ISN) platform. ISN enables Powerco to ensure its contractors have appropriate health and safety maturity before they are allowed to work on the network. Contractors and suppliers are required to submit health, safety, quality, risk and regulatory information. This information is then assessed by the ISN experts to assess the accuracy, relevance and timeliness of the data. Using this information, we can ensure that all our contractors meet our qualification requirements.

8.2.1.10 COPPERLEAF

Copperleaf, or C55, is a software package that allows businesses to optimise investment for their portfolios. Copperleaf is used globally by utility companies to identify annual programmes of works, based on asset condition information. The aim of utilising Copperleaf is to use our understanding of our asset risk position, to efficiently identify and validate investment solutions. The program allows us to quickly explore multiple varied scenarios to make optimal use of our limited resources.

The need for an improved investment optimisation tool was identified during the ISO55001 gap analysis in 2018. Copperleaf is expected to be delivered in 2020 and is to be used for the generation of the FY21 programme of works.

8.2.2 OTHER NON-NETWORK ASSETS

8.2.2.1 SPECIALIST TOOLS AND CRITICAL SPARE PARTS

Powerco owns an inventory of specialist tooling, associated consumable items, and critical network spares that are essential for the resilient operation of the network. These are generally high-value assets that are not used frequently on the network but are required to complete reactive repairs/replacements of network assets. They are made available to our service providers and specialist contractors. We retain the responsibility to maintain these assets.

8.2.2.2 OFFICE BUILDINGS, DEPOTS AND WORKSHOP

Powerco operates from facilities located throughout its network footprint. This has many advantages, including employees with local knowledge being situated close to customers and service providers. Our facilities include an office in central Wellington, three offices in New Plymouth, a large, leased stores facility in Lower Hutt, and small offices located in our service providers' depots in Napier, Palmerston North and Lower Hutt. We also have a backup control centre facility in New Plymouth as part of our business resilience plan.

Our Junction Street campus now includes a new purpose-built Network Control Operation Centre that was completed in December 2018. This state-of-the-art facility provides a modern and resilient platform to operate from and creates additional space for the business to grow and manage the increase in activity on our electricity networks, and associated support staff.

8.2.2.3 MOTOR VEHICLES

Powerco has a fully maintained fleet of 10 vehicles and one trailer dedicated to the Gas business. A 2018 review of our fleet resulted in the selection of new electric vehicles (EV) that fit defined criteria, including that vehicles must have a five-star ANCAP rating, low emissions and be fit for purpose. Powerco undertakes to have regular vehicle inspections to ensure vehicles are well maintained and serviced as per the manufacturers' recommendations.

8.3 ASSET MANAGEMENT IMPROVEMENT STRATEGY

We are continually striving to improve our asset management capability and have developed a clear Asset Management Objective (refer to Section 4.5) to focus efforts to achieve this. Specifically, Powerco is undergoing work to align its AMS with ISO 55001.

8.3.1 ISO 55001

The ISO 55001 accreditation programme is the largest works programme that is derived from the Asset Management Improvement Strategy. As mentioned throughout this AMP, the purpose of Powerco implementing ISO55001 is to engender a more mature and effective AMS and processes.

A gap analysis was conducted in 2018 to determine areas of improvement to achieve accreditation. The ISO 55001 programme of work started in 2019 and includes documentation of several frameworks and processes. Powerco is currently scheduled to have their ISO 55001 accreditation assessment conducted in FY21.

8.4 ASSET INFORMATION STRATEGY

The AIS ensures that our asset data is correctly utilised to inform effective asset management decisions. Upon writing of this AMP, the AIS is still under development.

A summary of the strategy is:

- ERP system – support to capitalise on the benefits of a centralised source of asset information and ensure there is a single source of truth
- Location quality – simplifying input of data to enhance and efficiently improve asset data (e.g. GPS location) during construction or when opportunities arise
- Standardising input fields – to limit data entry errors
- Data criticality to prioritise correction – to allow prioritised, incremental correction of errors
- Data transparency – open access to necessary data to retailers and contractors to accelerate work processes (e.g. customer works management system and ERP data)
- Data consolidation – utilising our data warehouse to consolidate different data sources to allow analysis and better asset management decisions

8.4.1 ENTERPRISE RESOURCE PLANNING SYSTEM

SAP has provided us a fully integrated ERP system that comprises a new field mobility solution with better access to asset and financial data. We have successfully integrated core SAP functionality within the organisation and are embedding operational processes in RY20. Building on this new core, SAP is expected to be expanded upon over the next few years.

More information on our IS strategy can be found in Section 22 of our Electricity business' Asset Management Plan, available in the Electricity Disclosures section of our website (https://www.powerco.co.nz/publications/disclosures/electricity/).

9 EXPENDITURE FORECASTS

9.1 OVERVIEW

This chapter sets out forecast expenditure we anticipate will be required to operate, develop and maintain our networks to support our Asset Management Objectives.

The information provided in this section summarises the more detailed discussions provided in Chapters 6 and 7. We have provided high-level commentary and context for the estimates and their assumptions. Where possible, we have provided applicable cross-references for readers who require more detailed information.

Delivering to our forecasts is a constant challenge. The size of the contracting market is limited, and material suppliers are scarce. The small market means that the programme can be, and often is, dictated by availability of contractors and resources. To mitigate this risk and to help us achieve our forecasts, we work closely with the parties in the supply chain and manage a portfolio of projects across multiple years that allows us to reschedule projects if one is delayed.

A summary of forecasted capital expenditure (Capex) and operational expenditure (Opex) over the planning period is provided in the Figures 9.1 and 9.2. The following sections describe forecast expenditures through to Regulatory Year 2030 (RY30), in constant dollar terms as of 2020.

Figure 9.1: Capex forecast (constant $)

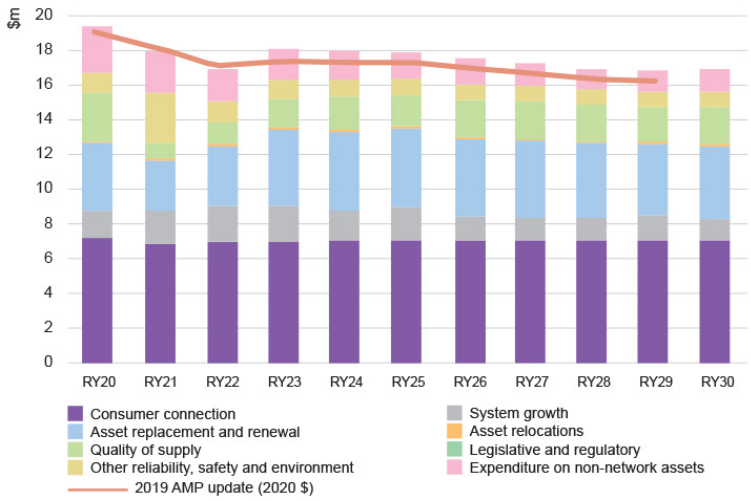
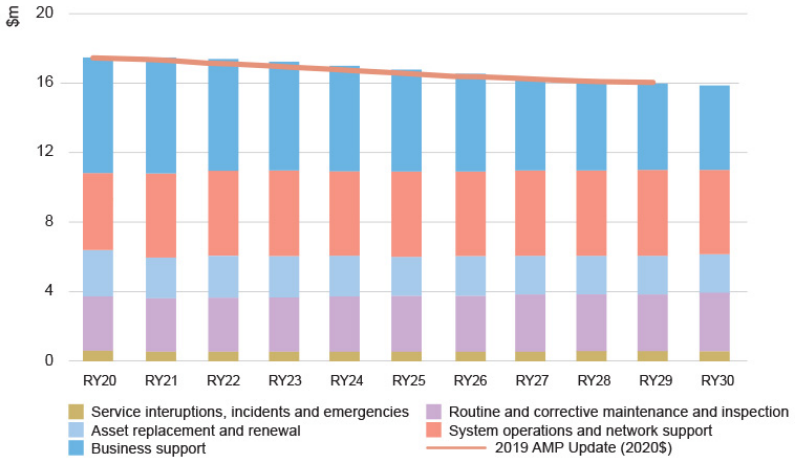


Figure 9.2: Opex forecast (constant $)



9.1.1 EXPENDITURE SUMMARIES

The graphs that follow in this section show forecast expenditures from RY20 to RY30. All financial forecasts included in this section represent our most current expected estimates of the costs associated with operating and developing our networks. The expenditure forecasts are denominated in constant value terms based on 1 October 2020 dollar values.

To simplify overall presentation, full details, including tabular costs summaries for all operational and Capex cost categories, are provided in Appendix 3, Schedules 11a and 11b.

9.2 BACKGROUND

In general, the expenditure forecasts in this section have been developed using a base-step-trend methodology. The specific work to be completed, detailed in Chapters 6 and 7 is used to define the ‘base’, with the operating context (Chapter 3) used to assess if a ‘step’ is needed. Predictive forecasting techniques are used to estimate the ‘trend’ work volumes that are applied to associated unit rates. The following general principles have been applied:

- In the case of maintenance and renewal-based expenditure, our estimates have been developed in response to the current and projected states of our assets as indicated by condition information, age profile and expected life, and the performance of our assets. The expenditure forecasts have been tailored to maintain asset condition and reliability performance.

- In the case of growth-related expenditure, we have undertaken a comprehensive analysis of current asset utilisation and simulated the effect of anticipated load growth on our networks to identify capacity and security-related issues that will require resolution during the planning period. Based on this analysis we have completed a regional assessment of the investments we believe will be required during the period.
- Individual replacement costs are estimated using a combination of our understanding of current market conditions and any relevant historical costs. Historical costs are useful to understand specific issues related to an asset (e.g. hard to access, difficult ground conditions, etc.). We adapt our contractual agreements with our service providers based on the anticipated work risks and ensure appropriate risk-sharing.

9.2.1 KEY ASSUMPTIONS

Our networks are geographically diverse and the number of asset classes we operate is extensive. These factors, and the inherent uncertainty involved in making forecasts over an extended period, create significant complexity and increasing scope for variance as the planning period progresses. The key assumptions made, and the associated bases for the assumptions, are summarised below:

Table 9.1: General assumptions

ASSUMPTION	BASIS FOR THE ASSUMPTION
Customers are generally satisfied with the level of service they receive.	Our estimates are based on maintaining our current levels of service over the planning period. This assumption is based on discussions, survey work and market studies we have completed in preparation for this AMP.
Asset lives remain aligned with the standard lives prescribed in the Input Methodologies.	We use standard asset lives described in the Input Methodologies to depreciate our assets. Government climate change policy may, however, reduce the economic life of our assets and we will consider if an adjustment is warranted during the planning period.
NZIER forecasts are appropriate for inflation.	We have assumed that the published NZIER inflation forecast (noted below) provides an appropriate basis for adjusting our forecasts into nominal dollars.

Table 9.2: CPI forecasts used to produce the expenditure forecasts

YEAR TO	2021	2022	2023	2024	2025
End September	1.1%	2.0%	2.0%	2.0%	2.0%

Table 9.3: Renewal assumptions

ASSUMPTION	BASIS FOR THE ASSUMPTION
Asset age provides a reasonable proxy for asset deterioration and resulting expected life for forecasting purposes.	Except where specific performance issues or accelerated deterioration have been identified (e.g. pre-85 pipes, as discussed in Chapter 6), it has been assumed that assets will generally reach the end of their expected lives. This assumption is considered appropriate for forecasting work on large asset populations, given that actual works will be triggered by other factors, including asset condition and safety.
Optimisation of maintenance and renewal expenditure will continue to provide acceptable risk outcomes.	Powerco tests the effectiveness of its long-term investment decisions by considering the resulting residual risk. Our analysis suggests that the investments we propose will enable us to manage risk within an acceptable range.

Specific details regarding our approach to asset renewal forecasting, and our specific assumptions in this area are provided in Chapter 6.

Table 9.4: Growth assumptions

ASSUMPTION	BASIS FOR THE ASSUMPTION
Historical correlations between planning inputs (GDP, housing statistics, etc.) and load growth will continue over the planning period.	Powerco has developed techniques to estimate ICP and volume growth, based on a combination of high-level trends, such as economic growth, as well as local trends, such as housing statistics. Although we recognise that the net-zero carbon future will impact our load growth, our estimates assume that historical correlations will hold into the near future.
The Gas Hub brand will remain an enabler for growth	The presence of The Gas Hub brand in the market has already proved that better customer service, better customer relationship, targeted marketing and sales efforts influence the number of connections.
The ban on new offshore exploration permits will have no impact on customer connection rates in the short term	In April 2018, the New Zealand government announced a ban on new offshore exploration and drilling permits. As a result, there is a risk that consumer behaviour towards natural gas will change. However, at the time of writing, we have seen no evidence of this behaviour, but we will continue to evaluate the impact. We have not taken this change into consideration for this AMP.

Specific details regarding our approach to growth forecasting are provided in Chapter 7.

Table 9.5: Non-network assets assumption

ASSUMPTION	BASIS FOR THE ASSUMPTION
We will leverage from the investment planned by Electricity, while the company invests in core asset management, operational control systems and facilities to bring value to customers and deliver cost efficiencies	Our forecasts assume investment in core asset management systems, discussed in the Electricity AMP, will benefit Gas in the longer term by bringing tools, systems and facilities that would be too onerous for Gas only. This includes the deployment of a new Enterprise Resource Planning system, and the building of a new Network Operations Centre. These improvements, in turn, should ultimately translate to improved cost outcomes for Gas customers. We will continue to refine the scope and costs of these works to ensure targeted benefits can be delivered.

Specific details regarding our approach to non-network projects and our specific assumptions in this area are provided in Chapter 8.

9.2.2 ENSURING RELIABLE LONG-TERM FORECASTS

Much of the work Powerco does is routine and repeatable. The resources we use are stable and their costs are well understood. The assets we build are standardised and their construction costs are expected to be stable in the longer term.

The key aspects that underpin our ability to provide reliable long-term financial estimates are noted in the Table 9.6.

Table 9.6: Powerco approach to effective forecasting by area

FORECAST AREA	POWERCO APPROACH
Global impacts	During the past few years, a few factors have affected our costs. Increases in commodity prices due to international demand, increases in labour prices due to strong offshore demand, and enhancements to the way we manage the safety and quality of our works have lifted overall construction costs. Our current view is that these upward pressures on prices have stabilised. Consequently, we have restricted forecast price adjustments to the CPI. However, given trends in offshore markets and the potential for the NZ dollar to devalue, this is an area we are maintaining a watching brief.
Major works	The scale of Powerco's operations is such that we routinely complete major projects, such as major main extensions or DRS installation. These works are tendered, and the associated processes provide real-time insights into the cost of typical works. Further, our project delivery and contract management teams have the capability to tailor estimates on a consistent basis to reflect local conditions. These factors give us the expertise needed to forecast the cost of the larger projects within our works portfolios.
Minor works	We use a unit rates structure across all minor works elements. The rates have been market tested by going to tender. This process has given us confidence these rates provide a strong basis for reliable forecasting.
Maintenance	Powerco has unit rates in place for each maintenance task and incentivises its contractors to continually enhance their cost performance in this area. As our works managers are actively involved with works delivery, we are confident that the rates we pay are well managed and provide a strong basis for reliable forecasting.
Programme methodologies	The scale and large number of projects we complete each year provide us with significant advantages with respect to forecasting. While the cost of individual projects can be subject to significant uncertainty, the average cost of projects within a programme (many projects of a similar type) is significantly more stable and will tend to balance intrinsic historical risks to provide an improved basis for forecasting.

9.2.3 ENSURING EFFICIENT COST OUTCOMES

Improving cost efficiency is an area of critical importance for Powerco, and it is an area that forms a central pillar of our Asset Management Objectives framework. We have a range of key existing processes that are designed to improve future cost efficiency, and these are noted in the table below.

Table 9.7: Powerco approach to contracting to ensure efficient cost outcomes

ASSUMPTION	BASIS FOR THE ASSUMPTION
Minor works	Powerco utilises tailored contracts to maximise the benefits of scale and minimise transaction costs for the large volume of minor works we complete each year. The contracts are incentivised to provide benefits to Powerco for smooth and effective work release, and benefits to its service providers for reducing the per unit rate of work overtime. The contract negotiation periods are of three to five years' duration to ensure the costs we are paying are reflective of the market.
Major works	Powerco competitively tenders its larger project works to enable the benefits of a competitive market to be realised. Our larger projects have scopes that are well understood, and a range of contractors who have capability in the areas we require. Strong competition and controlled pricing give us confidence that good results are being achieved.
Specialist services	Powerco utilises a range of specialist services, such as project management, steel pipe constructions and specialist engineering services. In most cases, the costs of such services are well understood by the market. Consequently, Powerco's focus is on ensuring enduring partnerships where our specialist providers know our business and can provide maximum value while engaged. Powerco has found that this approach has provided good value in recent years.
Incentives	Powerco believes that appropriate incentives are a key supporting element to help achieve effective cost outcomes. The contractor Key Performance Indicators are a critical element of the Asset Management Objectives and align with this belief. We also employ liquidated damages in contracts for large tendered projects where timing is a critical area.

Table 9.8: Powerco Approach to Project Delivery to Ensure Efficient Cost Outcomes

ASSUMPTION	BASIS FOR THE ASSUMPTION
Design	Powerco utilises standard designs, standard equipment specifications, and standard layouts wherever possible. We are continually seeking to standardise our approach in ways that minimise complexity. The approach is designed to simplify construction (and therefore minimise costs) and optimise the long-term cost of ownership.
Tender	Powerco tenders all works of significant scale (typically > $150,000) and can do the same for specialist works. Our ability to benchmark tender outcomes provides strong confidence in the costs achieved.
Materials procurement	Powerco procures larger items (DRSs, specialist material, large quantity of pipes, etc.) directly for larger projects. Powerco also directly tenders civil works where it makes sense to do so. Procurement of minor items is left to the contractor to ensure a smooth workflow.
Risk	Powerco takes a pragmatic approach to risk allocation. We employ contract formats that seek to achieve a balanced allocation of risk, and, by doing so, avoid paying inflated risk premiums. We utilise a range of formal risk-sharing arrangements. For larger, well-defined works, we typically seek lump-sum pricing. For smaller jobs, we utilise unit rates and/or a time and material structure.
Foreign exchange/ commodity exposure	Powerco seeks to lock in project value at the point of project award. Typically, we seek binding fixed costs denominated in NZD. In cases where we procure large items directly from overseas, we hedge the currency exposure at the point of placing the order. This approach is embedded within Powerco's treasury polices.

9.2.4 EXPENDITURE CATEGORIES

The financial summaries that follow provide a summary of forecast expenditure over the planning period in our key expenditure areas. For simplicity, we have split expenditure into Opex and Capex and provided specific projections for each subcategory. The categories and subcategories are consistent with information disclosure requirements.

The Capex categories are:

- Customer connection
- System growth
- Asset replacement and renewal
- Asset relocations
- Reliability, safety and environment
- Non-network assets

The Opex categories are:

- Service interruptions and emergencies
- Routine and corrective maintenance and inspection
- Asset replacement and renewal
- System operations and network support
- Business support

9.2.5 ESTIMATING UNCERTAINTY

To the extent possible, we have considered the effects of the assumptions we have made when developing our estimates and developed a view that represents the most reasonable outcome in cost terms.

Powerco's philosophy is to derive a P50 estimate for the estimates we produce. A P50 has a 50% likelihood that actual costs will fall at or below the estimate level. P50s are generally considered appropriate for use in a regulated utility environment, particularly for programme-based works such as asset renewal.

As part of our asset management journey, we are continuously seeking ways to enhance our forecasting systems to provide more detail on the nature and quantum of variance, which could be reasonably expected from our forecasting process.

9.3 CAPITAL EXPENDITURE

9.3.1 CAPITAL EXPENDITURE SUMMARY

Capex is used to create new assets or to increase the performance or useful life of an existing asset. Capex increases the value of the Regulated Asset Base (RAB) and is capitalised in accordance with generally accepted accounting practice (GAAP).

Figure 9.3: Total Capex

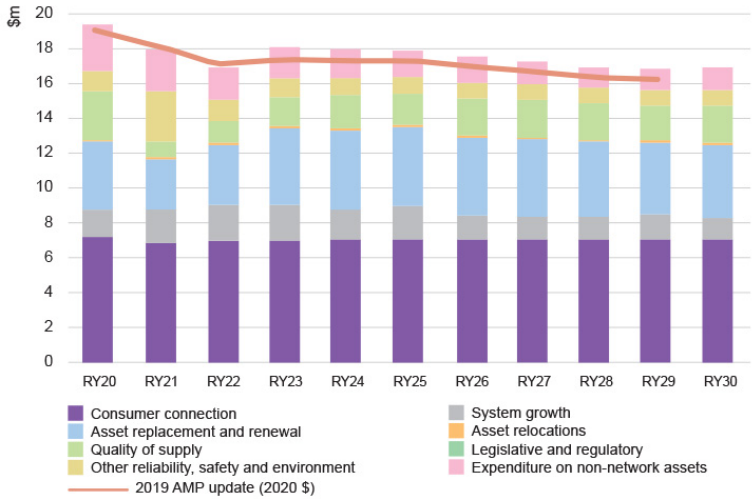
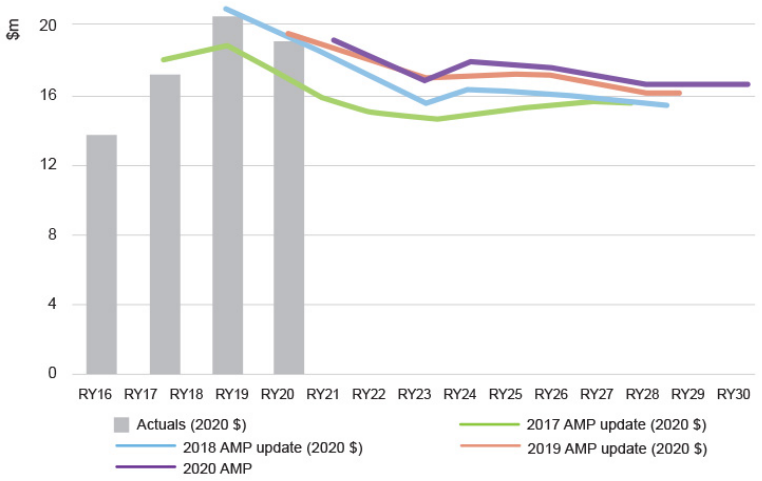


Figure 9.3 compares the current forecasts against previously disclosed forecasts (RY17, RY18 and RY19), and the actuals since RY16 (converted into 2020 constant $). As can be seen, the forecast is broadly aligned with previous AMP disclosures.

Capex forecasts can be challenging due to inherent uncertainties and specialised resource availability. We constantly review and adapt our forecasts against our actual expenditure. Delays in project execution, stronger than forecast customer-initiated works, and implementation of the ERP system remain the main reasons for the variance.

Figure 9.4: Comparison of Capex



Reasons for the forecast trend in expenditure are:

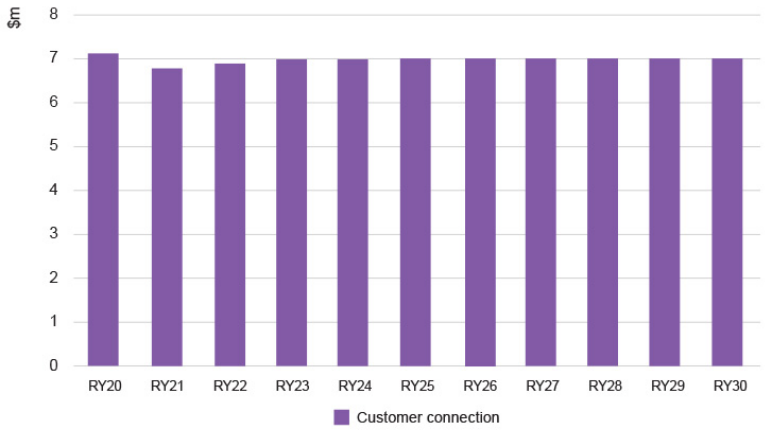
- An increase in volumes and value of customer connections. Due to the uncertainty of customer sentiment towards natural gas, the net customer connection forecast has been flattened, compared to historically which had an increasing forecast.
- We have rebalanced our expenditure between the Asset Replacement and Renewal and Quality of Supply categories as we focus more on renewing and rationalising our Pre-85 PE pipe, unprotected steel pipe and our regulator stations to address both age, and on-going cost efficiencies.
- Non-network Capex decrease as we reduce the non-network cost allocation as the electricity RAB increases due to their Customer Price-Quality Path (CPP) work, and we realise ICT support cost efficiencies.

9.3.2 CUSTOMER CONNECTION

Customer Connection is Capex primarily associated with the connection of new customers to the network, or alterations to the connections of existing customers, where main extension is generally not required. Customer Connection Capex is shown in Figure 9.5.

The efforts put in The Gas Hub have driven growth in our connection numbers. Historically, we have expected this to continue, however, because of changing social sentiment we have a more conservative forecast. Our forecast is aligned to a more consistent net connection value. This is indicated by an approximately flat forecasted expenditure.

Figure 9.5: Customer Connection Capex



ASSUMPTIONS & UNCERTAINTIES

Basis	Volumes are based on anticipated projects, the mix and number of which reflect our current view of the level of economic and residential activity on our footprint.
Supporting information	Our systems utilise a range of information about future growth assumptions. Economic forecasts, council forecasts, and detailed local development knowledge from our engineers and customer teams support appropriate forecasting in this area.

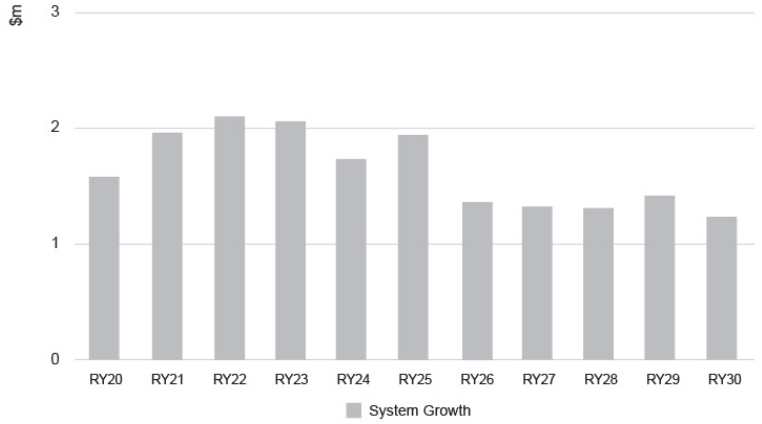
9.3.3 SYSTEM GROWTH

System Growth Capex relates to the development or enhancement of the network. This category is for work driven by:

- Growth in network load, which requires an increase in network capacity
- Mains extension or network upgrade to connect new customers

Our forecasts for system growth Capex have been developed on a bottom up basis through the network plans (Chapter 7). By considering growth rates in all areas, and long-term security outcomes we can estimate, with appropriate confidence, the quantum of future expenditure for this category of Capex.

Figure 9.6: System Growth Capex



ASSUMPTIONS & UNCERTAINTIES

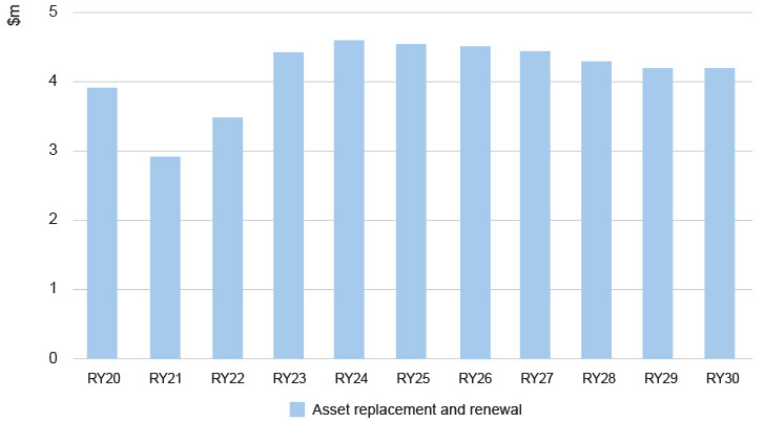
Basis	Specific volumes of projects, and the mix of projects required to deliver our Asset Management Objectives are determined via our area planning framework. The costs of the projects identified are based on our current cost base, escalated for inflation.
Supporting information	Powerco has progressively enhanced levels of growth and security-related investment during the past decade. As a result, we have developed strong capability in delivery, and good cost benchmarks for work in this category. This information provides a good basis for forward estimating.

9.3.4 ASSET REPLACEMENT AND RENEWAL

Asset Replacement and Renewal costs relate to addressing the progressive deterioration of the condition of network assets or the obsolescence of network assets. This may include replacement of existing assets where these assets have been identified as reaching their assessed criteria or trigger for replacement. These include reactive replacements following technical failure or risks associated with age, condition or obsolescence.

We have forecasted an increase to the asset replacement and renewal programmes. The specific tranches of work are discussed in Chapter 6, but include: the replacement of pre-85 pipes, unprotected steel, plug valves, ageing regulator stations and the renewal of CP systems. Increases are due to improving understanding of asset condition and performance allowing for greater certainty of when investment is needed. At this stage, there is no safety or investment risk to be specifically managed.

Figure 9.7: Asset Replacement and Renewal Capex



ASSUMPTIONS & UNCERTAINTIES

Basis	The cost of replacement reflects our current unit rates escalated for inflation and reflects localised impacts for some of our more remote areas.
Supporting Information	Powerco's planning defect identification and analysis processes and data provide a good basis for future volumes.

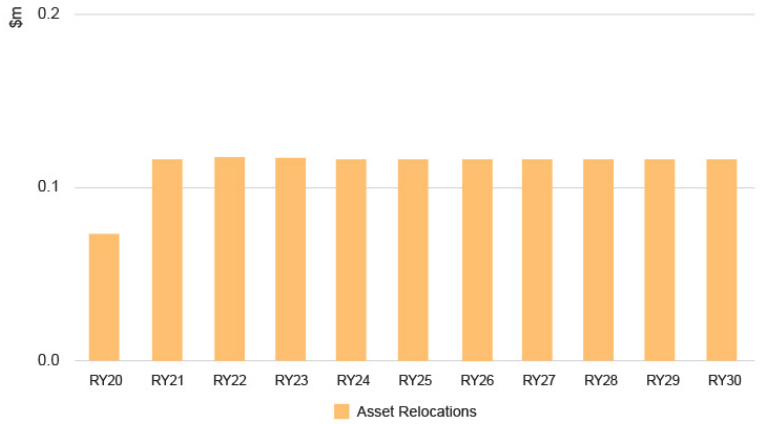
9.3.5 ASSET RELOCATION

Asset Relocation is Capex associated with the need to move assets as a result of third-party requests. As it is a capital expense, the expectation is that new assets would be created as a result of the relocation: a simple relocation of an existing asset is an activity that should be accounted as Opex.

Asset relocation mainly includes new pipe constructed as part of route realignment due to a third-party request (such as road widening).

While we have seen high volatility in the level of relocation required over time, we forecast a level of asset replocation approximately $100,000 per annum (excluding customer contribution).

Figure 9.8: Asset Relocations Capex



ASSUMPTIONS & UNCERTAINTIES

Basis	Volumes have been based on historical levels of relocation. The cost of relocation represents our current cost base, escalated for inflation.
Supporting information	Our engineers and customer teams maintain a watching brief regarding emerging relocation requirements. Where major works in excess of our forecasts are known, these are factored into our forecasts.

9.3.6 QUALITY OF SUPPLY

Quality of Supply Capex is focused on ensuring we provide sufficient capacity and pressure given forecasted demand growth. These projects look at current network pressure performance, future modelled network performance, and network configuration, to ensure that our networks are both capable of delivering required demand at acceptable pressures and constructed in the most efficient manner possible. In this way, we ensure that our networks are providing a minimum quality for the service of natural gas, and that we are not being inefficient in our network design and maintenance.

We have some current large projects identified primarily under the Rationalisation Strategy (see Section 7.8) and Pressure Droop Strategy (see Section 7.3). There are some large current projects under way, and then a drop to cater for the RY21 Reliability, Safety and Environment (see 9.3.7) forecast. Longer-term, we forecast this work type to increase as we look to make our network more efficient.

Figure 9.9: Quality of Supply Capex

ASSUMPTIONS AND UNCERTAINTIES

Basis	This category of investment relates to portfolios of projects covering specific, targeted enhancement areas. The costs of specific projects and programmes are based on our recent experience in managing similar types of initiatives escalated for inflation.
Supporting information	Powerco's scale has enabled it to develop a strong information and business projects capability. This capability provides us with confidence in both forecasting delivery risk and our ability to manage that risk.

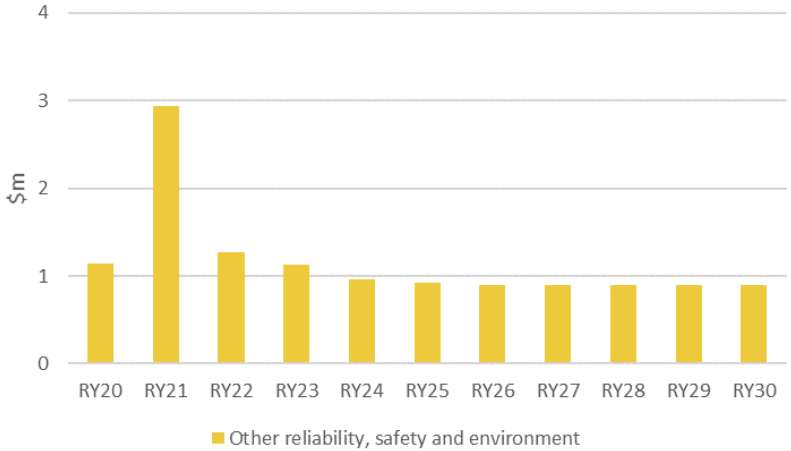
9.3.7 RELIABILITY, SAFETY AND ENVIRONMENT

Reliability, Safety and Environment Capex:

- Maintains or improves the safety of the network for the public, employees and contractors
- Improves reliability, security of supply or service standards and/or
- Is needed to meet environmental standards

We have incorporated expenditure to enable us to deliver targeted asset specific investment programmes focused on reliability, and improved public safety. Our recent focus in this area has resulted in progressive identification of valuable enhancement initiatives, and we have set overall future expenditure to reflect this trend.

Figure 9.10: Reliability, Safety and Environment Capex



ASSUMPTIONS & UNCERTAINTIES

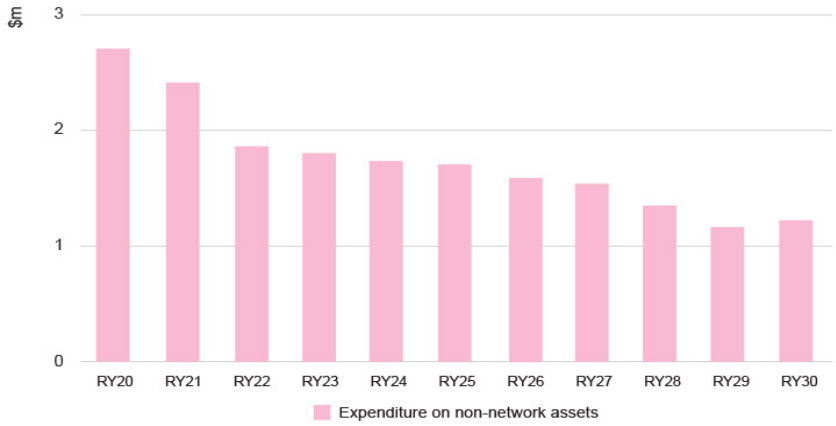
Basis	This category of investment relates to portfolios of projects covering specific, targeted enhancement areas. The costs of specific projects and programmes are based on our recent experience in managing similar types of initiatives escalated for inflation.
Supporting information	Powerco's scale has enabled it to develop a strong information and business projects capability. This capability provides us with confidence in both forecasting delivery risk and our ability to manage that risk.

9.3.8 NON-NETWORK

Non-Network Capex costs are all costs associated with ICT and facilities that support the operation of the Gas business. Two areas of relatively significant cost in the recent past include the implementation of our new Enterprise Resource Planning system and building of the new Network Operations Centre.

With the significant increase in investment in the Powerco Electricity network, their RAB is expected to grow relatively rapidly in the near-term. As ICT costs will not increase at the same rate, the allocated costs to the Gas business will correspondingly decrease. This reducing allocation, as well as expected efficiency gains in ICT support costs (e.g. software licences, etc.), see a decrease in forecasted Capex (refer to Figure 9.11).

Figure 9.11: Non-Network Capex



ASSUMPTIONS & UNCERTAINTIES

Electricity CPP delivery	The delivery of the Electricity CPP is a large and difficult undertaking. This allocation assumes that the CPP will be delivered as planned.

9.4 OPERATIONAL EXPENDITURE

9.4.1 OPERATING EXPENDITURE SUMMARY

Opex is directly associated with maintenance and inspection costs required to ensure safe operation of the Gas distribution network. Opex includes all work to survey and maintain the assets to achieve their original design lives and service potentials. Analysis of costs has shown most of the operational works expenditure remains effectively constant throughout the period, and that it is mandatory, dictated by legislation or accepted code of practice across the industry for prudent operation. In alignment with our objectives, we are aiming for reductions in overall Opex, which is to be found within our support business functions.

Figure 9.12: Total Opex

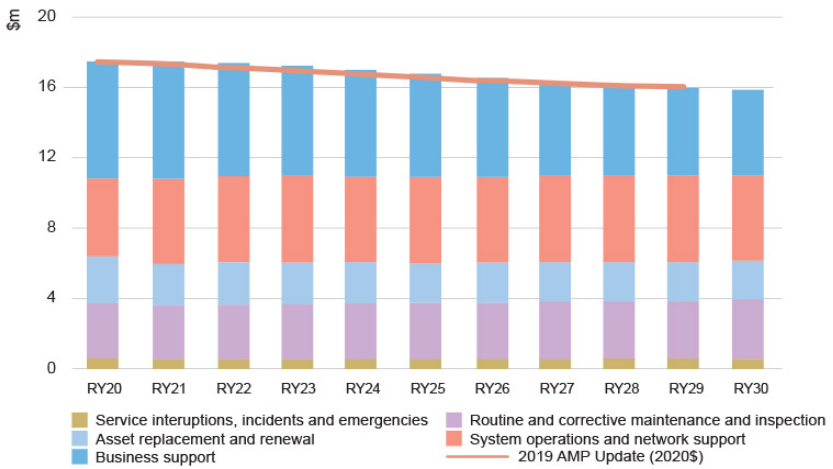


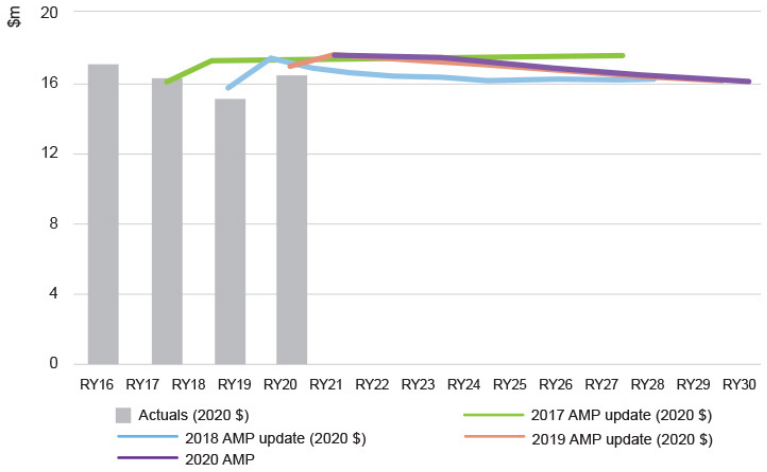
Figure 9.13 compares the current forecasts against previously disclosed forecasts (RY17, RY18 and RY19), and the actuals since RY16 (converted into 2020 constant $).

Operational expenditure remains broadly flat throughout the period. Non-Network expenditure, formed by the Business Support and System Operations and Network Support categories, varies from one year to another based on business requirements at the time.

The key areas for operational works expenditure are:

- Service interruptions, incident and emergencies (see Section 9.4.2). This category contains the expenses related to our Third-Party Damage (TPD) prevention programme.
- Routine and corrective maintenance and inspection (see Section 9.4.3): Most of these “minor work” type activities are based on the maintenance schedule and unit rates.
- Asset replacement and renewal (see Section 9.4.4): This category contains all the replacement and renewal jobs that can’t be capitalised. The cost for each individual activity is generally low (under $500).
- Business Support costs (see Section 9.4.6) are the allocation of Powerco’s corporate support activities relating to its centralised corporate functions.

Figure 9.13: Comparison of Opex



9.4.2 SERVICE INTERRUPTIONS AND EMERGENCY MAINTENANCE

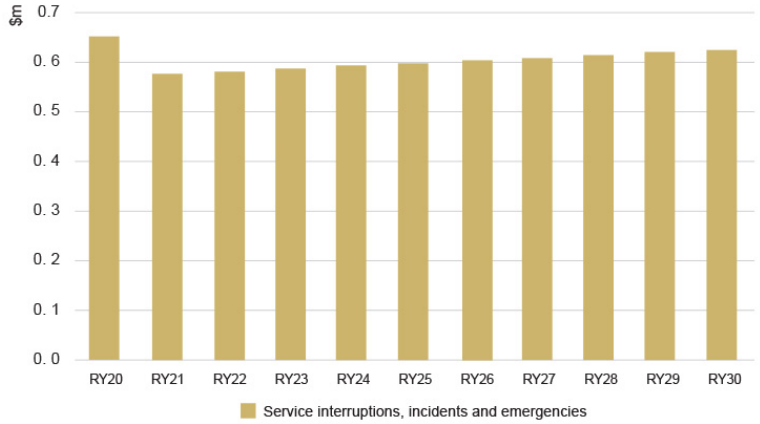
Service Interruption (faults) and Emergency Maintenance work is completed as needed in response to supply interruptions, major leakage or public reported escapes, and generally comprises callouts to restore supply or to make the network safe.

Work comprises activities undertaken by field personnel responding to a reported failure of the network, including any back-up assistance needed at the time to restore supply or make the network safe. The work can be either temporary or permanent in nature. Where follow-up work is needed, that is deemed to be corrective in nature.

Our fault response capability is measured by the response to emergency time and is closely monitored.

We have more work to do to analyse the effects of network condition and link these to our fault and emergency response volumes. However, we don’t foresee any immediate need to increase the expenditure in this domain.

Figure 9.14: Service Interruptions and Emergencies



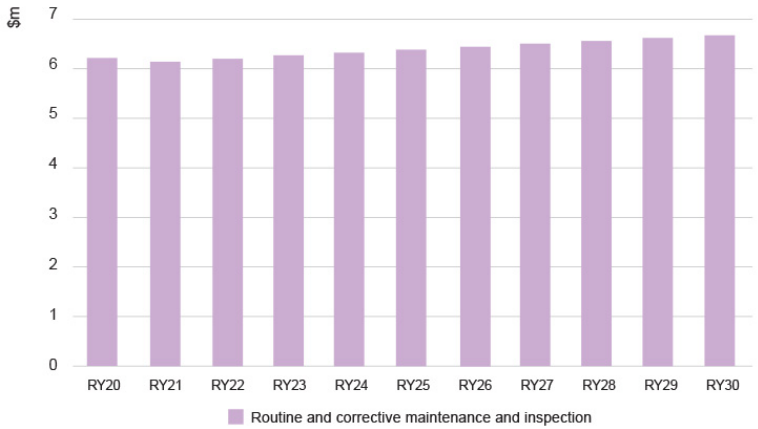
ASSUMPTIONS & UNCERTAINTIES

Basis	Volumes of faults are determined based on historical trends. Unit rate forecasts are our current cost basis, escalated for inflation, and include consideration of local conditions.
Supporting information	Powerco has a well-developed understanding of the requirements to respond to emergencies and ensure safety of the public and customers around our network.

9.4.3 ROUTINE AND CORRECTIVE MAINTENANCE AND INSPECTION

Routine and Corrective Maintenance Opex is driven by pre-planned work schedules. It comprises network inspections and routine servicing of equipment, as well as repair of defective equipment in accordance with the annual maintenance plan. This expenditure category also includes maintenance of a non-routine nature, such as relocations of rotatable assets. Most of our routine and inspection maintenance programme is driven by legislation and industry standards.

Figure 9.15: Routine and Corrective Maintenance



ASSUMPTIONS & UNCERTAINTIES

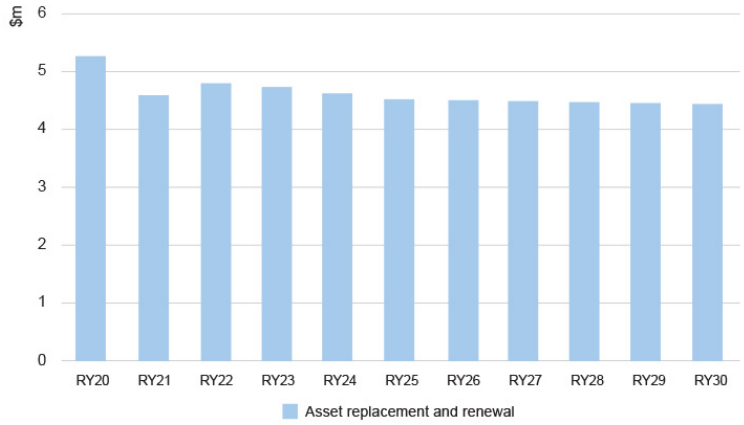
Basis	Unit rate forecasts represent our current cost base, escalated for inflation and network growth, and include consideration of local cost influences.
Supporting information	During 2012, Powerco implemented enhancements to its defect management systems that provide improved oversight of work completed in this category. This has provided a strong basis for establishing future requirements for this investment category.
Third-party requests	The quantity of plan, location and stand overs is driven by third party requests that we can't control or influence.

9.4.4 ASSET REPLACEMENT AND RENEWAL

Replacement and Renewal Maintenance Opex is driven by the maintenance of asset integrity to address the progressive deterioration or obsolescence of assets, or the need to maintain physical security.

Because there is a potential cross-over between this expenditure and corrective maintenance expenditure, Powerco interprets Asset Replacement and Renewal Maintenance to include defect remedy of a non-routine nature, which requires the replacement of a capitalised asset or subcomponent. Conversely, corrective maintenance includes renewal of subcomponents or parts, that are not part of our capitalisation policy and the value of which is inferior to a certain threshold.

Figure 9.16: Asset Replacement and Renewal



ASSUMPTIONS & UNCERTAINTIES

Basis	Volumes have been determined based on network age and condition. Unit rate forecasts are based on historical works escalated for inflation.
Supporting information	Powerco's planning defect identification and analysis processes and data provide a good basis for future volumes.

9.4.5 SYSTEM OPERATIONS AND NETWORK SUPPORT

System Operations and Network Support expenditure includes the direct costs associated with managing the network. These include network planning process expenses, the non-capitalisable portion of the service provider relationship management process (contract and project management), information system management (GIS) costs and network operations expenses.

The operating and maintenance expenditure also includes management costs not directly associated with creating network assets, such as the costs of customer management, network planning, network operating and managing service provider relationships. These costs include site leases, site service charges, network insurance premiums and charter payments, and may include the costs of decommissioning existing assets (where a new asset has not been created).

Figure 9.17: System Operations and Network Support expenditure

ASSUMPTIONS & UNCERTAINTIES

Basis	Costs have been developed based on a review of historical work volumes and the staff structures and costs required to support these work volumes. The application of technology (to minimise additional staff requirements) has been considered when developing these forecasts.
Supporting information	Powerco has a well-developed understanding of organisational requirements to support work delivery, and corporate systems and benchmarking processes, which provide us with confidence regarding the anticipated financial costs of these structures.

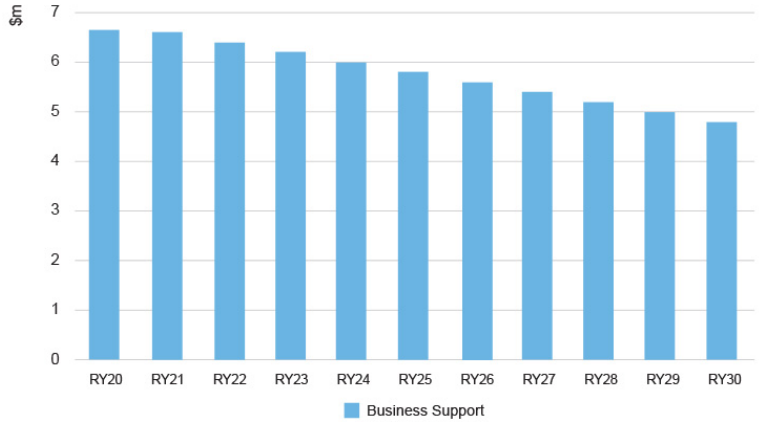
9.4.6 BUSINESS SUPPORT

Business Support expenditure represents the allocation of Powerco's corporate support activities relating to its centralised corporate functions. Key functions provided for include finance, legal, audit and compliance, pricing, human resources, health and safety, corporate communications, information services, business projects, and general administration.

Powerco has well-established functions in these areas, which it considers to be appropriately sized to provide effective corporate oversight and management.

Business Support expenditure is overall lower than previous forecasts as we adjust the cost allocation, with our Electricity business growing in scale quicker than the Gas business. Combined with this, we are forecasting a decrease in support costs due to support process improvements from the new ERP and other process improvement activities. As a result, costs in this area are forecast to decline over the planning period.

Figure 9.18: Business Support

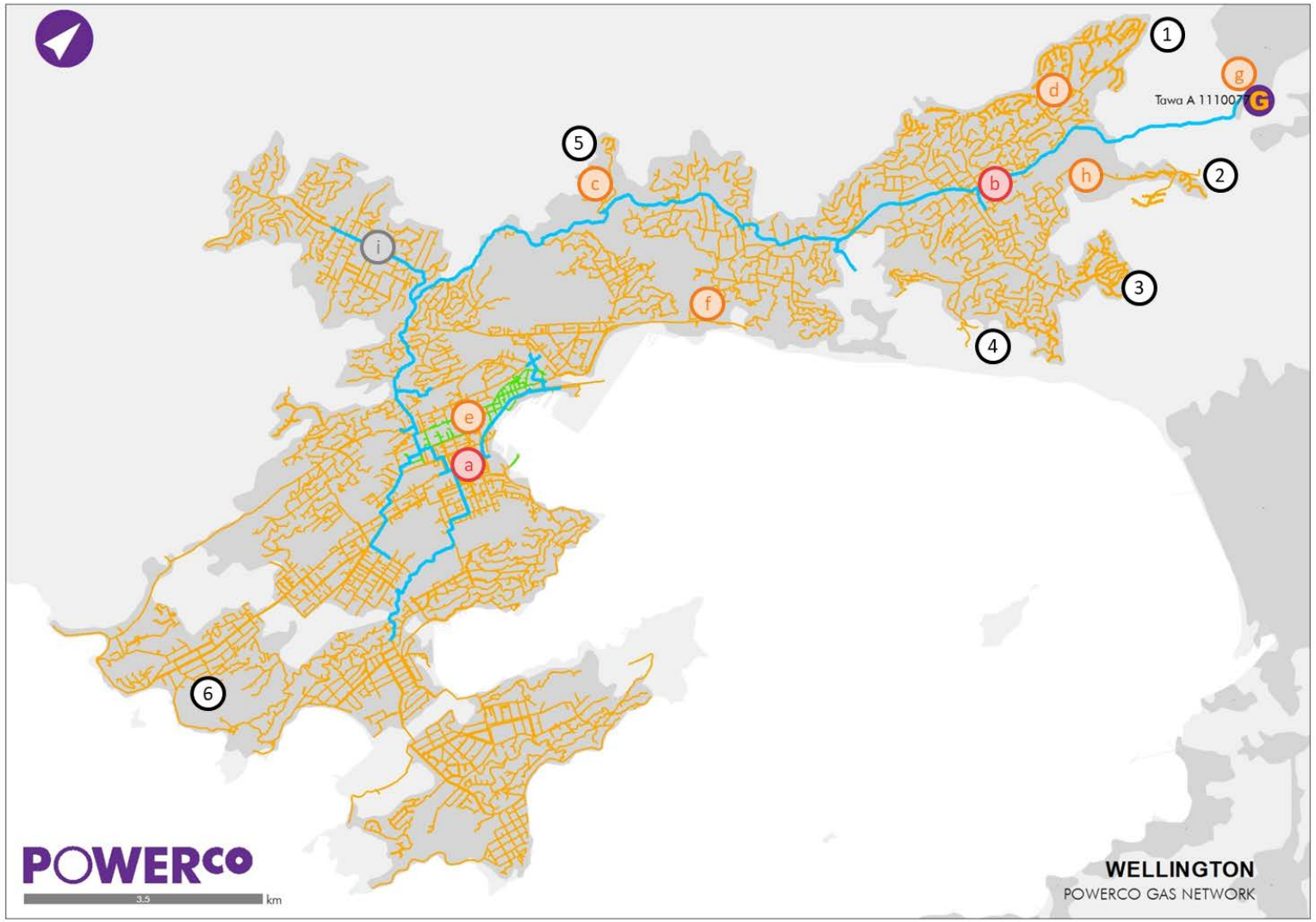


ASSUMPTIONS & UNCERTAINTIES

Basis	Costs have been developed based on a review of historical and forecasted work volumes and the required support systems and structures. The application of technology (to minimise additional staff requirements) has been considered when developing these forecasts.
Supporting information	Powerco has a well-developed understanding of organisational requirements to support work delivery, and corporate systems and benchmarking processes, which provide us with confidence about the anticipated financial costs of these structures.

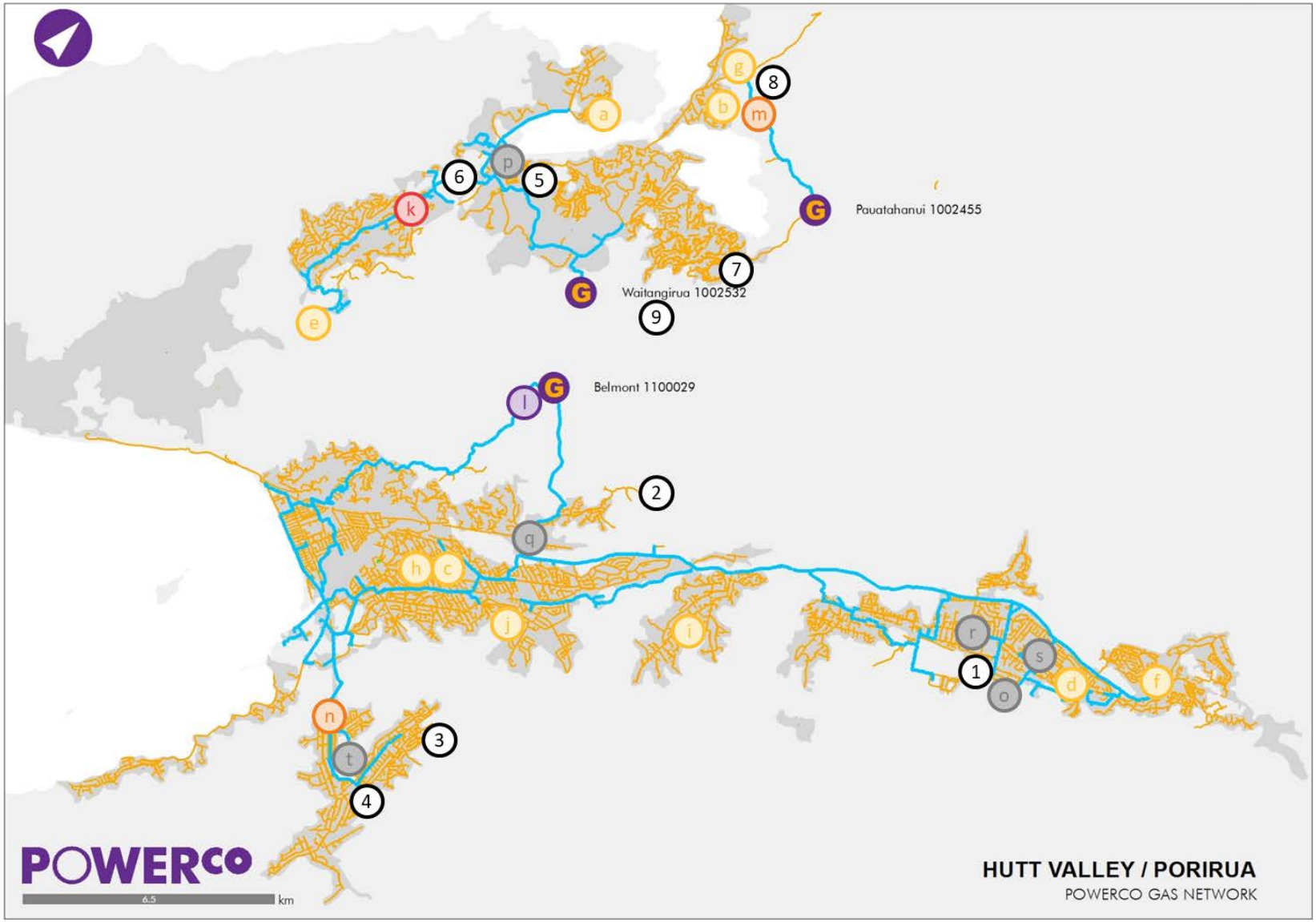
9.5 EXPENDITURE PLAN SUMMARY

9.5.1 WELLINGTON



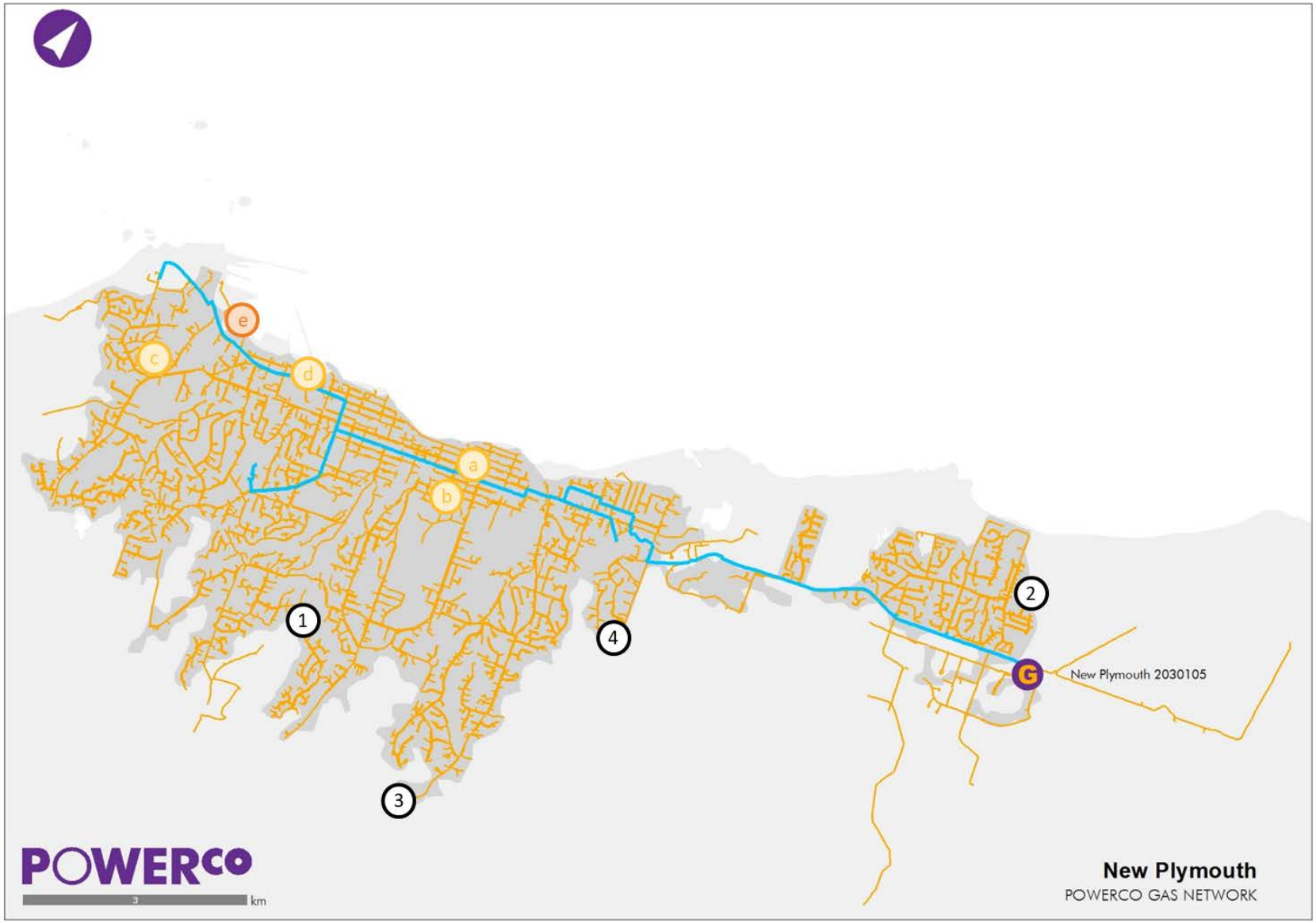
ITEM	WORK TYPE	DRIVER	ASSET MANAGEMENT STRATEGY	PROJECT	DELIVERY TARGET	DELIVERY BUDGET
a	ARR	Reliability	District Regulation Stations	Tory Street DRS Replacement	2022	$750k
b	ARR	Safety	District Regulation Stations	Middleton DRS Renewal	2021	$200k
Whole area	ARR	Reliability	CP Systems	CP Renewal - Wellington IP	2020	$450k
c	GRO	Delivery	Pressure Droop	Chartwell Drive Pressure Uplift	2023	$50k
d	GRO	Delivery	Pressure Droop	Westchester Drive Overlay	2023	$400k
e	QOS	Delivery	Pressure Droop	Wellington CBD Pressure Upgrade	2021	$9.0m
f	QOS	Delivery	Pressure Droop	Butavas Street DRS Inlet Reinforcement	2022	$125k
g	QOS	Delivery	Pressure Droop	Tawa Gate Station Regulator Upgrade	2022	$40k
h	QOS	Delivery	Pressure Droop	Mark Avenue Overlay	2024	$390k
Whole area	ORS	Safety	Network Isolation	Wellington IP Isolation Plans	2021	$760k
Whole area	ORS	Safety	Network Isolation	Wellington MP Sector Plans	2021	$390k
i	QOS	Safety	Rationalisation	Karori Rationalisation	2023	$520k
1	GRO	Partnership	Network Growth	Churton Park	TBC	TBC
2	GRO	Partnership	Network Growth	Grenada	TBC	TBC
3	GRO	Partnership	Network Growth	Woodridge	TBC	TBC
4	GRO	Partnership	Network Growth	Newlands	TBC	TBC
5	GRO	Partnership	Network Growth	Crofton Downs	TBC	TBC
6	GRO	Partnership	Network Growth	Island Bay	TBC	TBC

9.5.2 HUTT VALLEY / PORIRUA



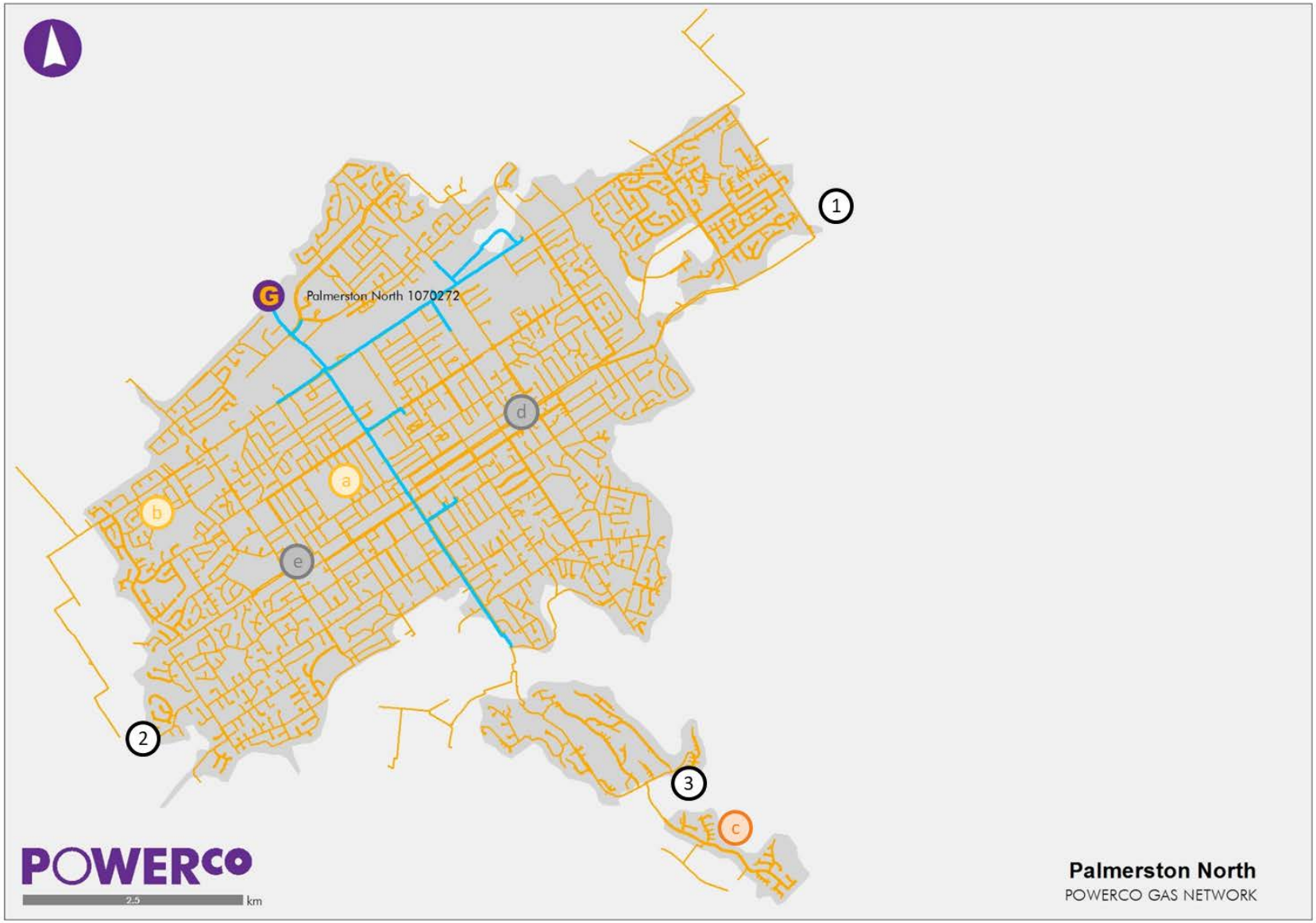
ITEM	WORK TYPE	DRIVER	ASSET MANAGEMENT STRATEGY	PROJECT	DELIVERY TARGET	DELIVERY BUDGET
a	ARR	Reliability	Mains and Services	Onepoto Pre85 Replacement	2022	$1.25m
b	ARR	Reliability	Mains and Services	Truro/Bodmin Pre85 Replacement	2022	$575k
c	ARR	Reliability	Mains and Services	Copeland/Pilmuir Pre85 Replacement	2023	$500k
d	ARR	Reliability	Mains and Services	Henry Street Pre85 Replacement	2023	$150k
e	ARR	Reliability	Mains and Services	Jamaica Drive Pre85 Replacement	2023	$650k
f	ARR	Reliability	Mains and Services	Roband/Shanly Pre85 Replacement	2023	$500k
g	ARR	Reliability	Mains and Services	Ulric Street Pre85 Replacement	2023	$125k
h	ARR	Reliability	Mains and Services	Knights/Wilford Pre85 Replacement	2024	$360k
i	ARR	Reliability	Mains and Services	Stokes Valley Road Pre85 Replacement	2024	$145k
j	ARR	Reliability	Mains and Services	Waddington Drive Pre85 Replacement	2024	$340k
k	ARR	Reliability	District Regulation Stations	Linden Ave DRS renewal	2023	$200k
l	ARR	Reliability	Line and Service Valves	Belmont HIP Corroded Isolation Valves	2022	$350k
Whole area	ARR	Reliability	Cathodic Protection Systems	CP Renewal - Porirua IP	2021	$75k
Whole area	ARR	Reliability	Cathodic Protection Systems	CP Renewal - Upper Hutt IP	2021	$250k
Whole area	ARR	Reliability	Cathodic Protection Systems	CP Renewal - Lower Hutt IP	2023	$230k
m	GRO	Delivery	Pressure Droop	Pāuatahanui IP Upgrade	2023	$50k
n	GRO	Delivery	Pressure Droop	Wainuiomata IP Reinforcement	2025	$450k
Whole area	ORS	Safety	Network Isolation	Belmont IP Isolation Plans	2023	$960k
Whole area	ORS	Safety	Network Isolation	Belmont MP Sector Plans	2023	$100k
Whole area	ORS	Safety	Network Isolation	Porirua IP Isolation Plans	2024	$640k
o	GRO	Delivery	Rationalisation	Wallaceville Rationalisation	2022	$220k
p	ORS	Safety	Rationalisation	Porirua CBD Rationalisation	2020	???
q	ORS	Safety	Rationalisation	Avalon/Belmont DRS Rationalisation	2021	$1.6m
r	ORS	Safety	Rationalisation	Upper Hutt Rationalisation	2022	$900k
s	ORS	Safety	Rationalisation	Upper Hutt SR Rationalisation	2022	$70k
t	ORS	Safety	Rationalisation	Wainuiomata Rationalisation	RY22	$580k
1	GRO	Partnership	Network Growth	Wallaceville (Hutt Valley)	TBC	TBC
2	GRO	Partnership	Network Growth	Kelson (Lower Hutt)	TBC	TBC
3	GRO	Partnership	Network Growth	Arakura (Wainuiomata)	TBC	TBC
4	GRO	Partnership	Network Growth	Moohan Street (Wainuiomata)	TBC	TBC
5	GRO	Partnership	Network Growth	Aotea (Porirua)	TBC	TBC
6	GRO	Partnership	Network Growth	Kenepuru (Porirua)	TBC	TBC
7	GRO	Partnership	Network Growth	Whitby (Porirua)	TBC	TBC
8	GRO	Partnership	Network Growth	Plimmerton (Porirua)	TBC	TBC
9	GRO	Partnership	Network Growth	Judgeford Hill (Porirua)	TBC	TBC
1	GRO	Partnership	Network Growth	Wallaceville (Hutt Valley)	TBC	TBC
2	GRO	Partnership	Network Growth	Kelson (Lower Hutt)	TBC	TBC
3	GRO	Partnership	Network Growth	Arakura (Wainuiomata)	TBC	TBC
4	GRO	Partnership	Network Growth	Moohan Street (Wainuiomata)	TBC	TBC

9.5.3 NEW PLYMOUTH



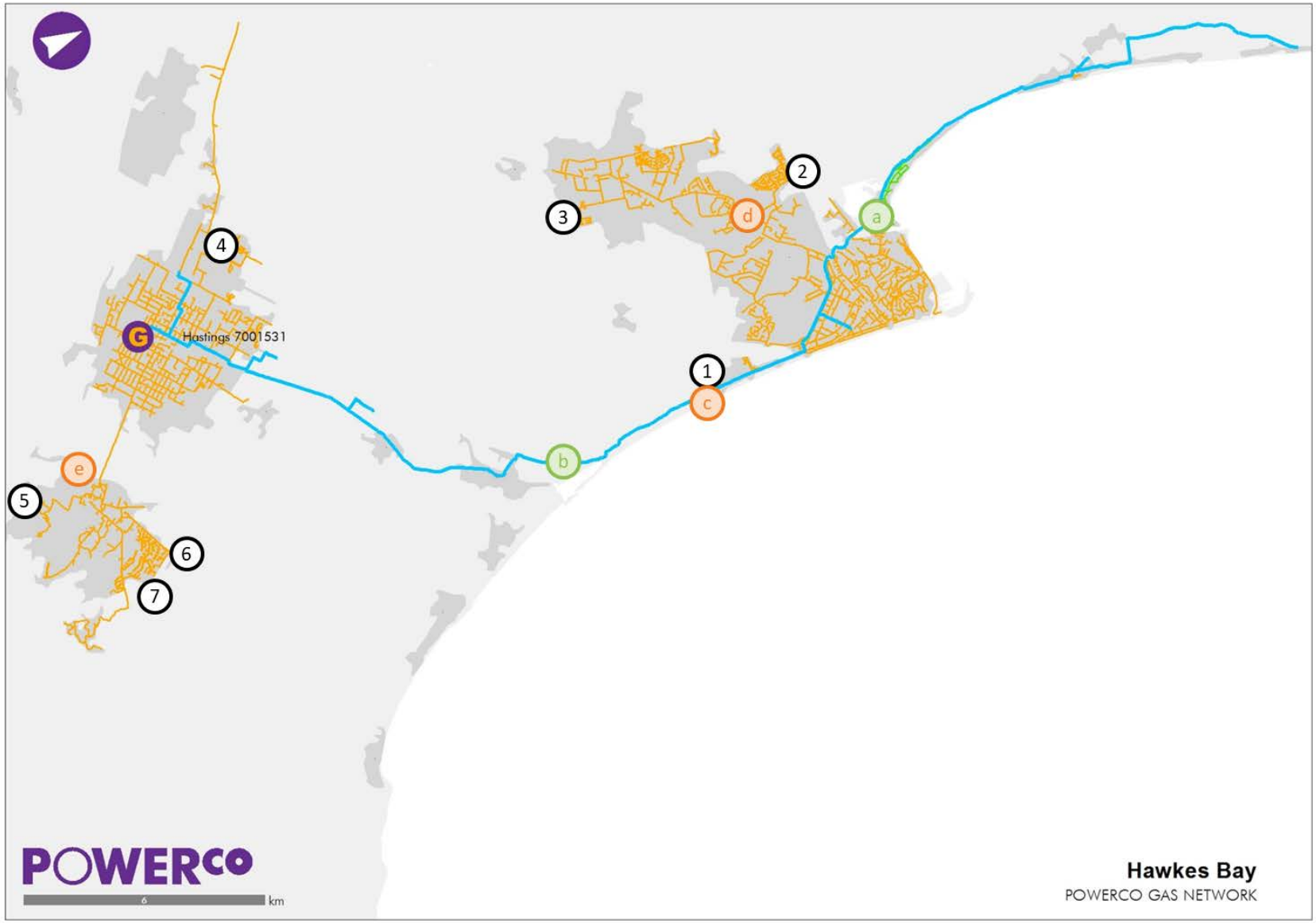
ITEM	WORK TYPE	DRIVER	ASSET MANAGEMENT STRATEGY	PROJECT	DELIVERY TARGET	DELIVERY BUDGET
a	ARR	Reliability	Mains and Services	NP MP Steel Replacement - Devon St East	2020	$280k
b	ARR	Reliability	Mains and Services	NP MP Steel Replacement - Gover St	2020	$120k
c	ARR	Reliability	Mains and Services	NP MP Steel Replacement - Spotswood	2020	$440k
d	ARR	Reliability	Mains and Services	NP MP Steel Replacement - Birdwood Ave	2022	$60k
Whole Area	ARR	Reliability	Cathodic Protection Systems	CP Renewal - New Plymouth IP	2024	$180k
Whole Area	ARR	Reliability	Cathodic Protection Systems	CP Renewal - Hāwera MP	2025	$180k
e	GRO	Delivery	Pressure Droop	Hutchen Place Reinforcement	2022	$200k
Whole Area	ORS	Safety	Network Isolation	New Plymouth IP Isolation Plans	2022	$400k
Whole Area	ORS	Safety	Network Isolation	New Plymouth MP Sector Plans	2023	$88k
1	GRO	Partnership	Network Growth	Fernbrook Drive	TBC	TBC
2	GRO	Partnership	Network Growth	Bell Block – Airport Drive and Wills Road	TBC	TBC
3	GRO	Partnership	Network Growth	Mangorei Road	TBC	TBC
4	GRO	Partnership	Network Growth	Smart Road	TBC	TBC

9.5.4 PALMERSTON NORTH



ITEM	WORK TYPE	DRIVER	ASSET MANAGEMENT STRATEGY	PROJECT	DELIVERY TARGET	DELIVERY BUDGET
a	ARR	Reliability	Mains and Services	PN MP Steel Replacement - Waldegrave St	2020	$150k
b	ARR	Reliability	Mains and Services	PN MP Steel Replacement - Havelock Ave	2022	$900k
Off map	ARR	Reliability	Special Crossings	Sanson Stub Renewal	2022	$80k
c	GRO	Delivery	Pressure Droop	Summerhill Reinforcement	2023	$150k
Whole Area	ORS	Safety	Network Isolation	Palmerston North IP Isolation Plans	2025	$200k
Whole Area	ORS	Safety	Network Isolation	Palmerston North MP Sector Plans	RY25	$75k
d	QOS	Efficiency	Rationalisation	Palmerston North East Rationalisation	2023	$500k
e	QOS	Efficiency	Rationalisation	Palmerston North West Rationalisation	2025	$1.1m
f	QOS	Delivery	Rationalisation	Milson Line Rationalisation	2020	$750k
1	GRO	Partnership	Network Growth	Freedom Drive/Whakarongo	TBC	TBC
2	GRO	Partnership	Network Growth	Awapuni	TBC	TBC
3	GRO	Partnership	Network Growth	Summerhill	TBC	TBC

9.5.5 HAWKE'S BAY



ITEM	WORK TYPE	DRIVER	ASSET MANAGEMENT STRATEGY	PROJECT	DELIVERY TARGET	DELIVERY BUDGET
a	ARR	Reliability	Special Crossings	Meeanee Quay Bridge Bracket Replacement	2022	$250k
b	ARR	Reliability	Special Crossings	Ngaruroro Bridge Bracket Replacement	2023	$190k
Whole Area	ARR	Reliability	Cathodic Protection Systems	CP Renewal - Hastings IP	2025	$210k
c	GRO	Delivery	Pressure Droop	Te Awa Avenue Cocon Installation	2020	$180k
d	GRO	Delivery	Pressure Droop	Taradale Supply Upgrade	2025	$185k
e	QOS	Delivery	Pressure Droop	Havelock North Reinforcement	2022	$700k
Whole Area	ORS	Safety	Network Isolation	Hawke's Bay IP Isolation Plans	2025	$200k
1	GRO	Partnership	Network Growth	Te Awa Estate (Napier)	TBC	TBC
2	GRO	Partnership	Network Growth	Parklands (Napier)	TBC	TBC
3	GRO	Partnership	Network Growth	Guppy Road (Napier)	TBC	TBC
4	GRO	Partnership	Network Growth	Frimley/Lyndhurst (Hastings)	TBC	TBC
5	GRO	Partnership	Network Growth	Iona (Havelock North)	TBC	TBC
6	GRO	Partnership	Network Growth	Brookvale (Havelock North)	TBC	TBC
7	GRO	Partnership	Network Growth	Aratiki Road (Havelock North)	TBC	TBC

APPENDIX 1 KEY ASSUMPTIONS OF THE AMP

This AMP is based on some fundamental assumptions that underpin our long-term strategic direction and operating environment. These key assumptions are:

- The present gas structure broadly remains the same and Powerco continues to operate as a non-vertically integrated gas business.
- The gas transmission system continues to operate and develop in generally the same direction as currently, and is maintained to an adequate level.
- Field services continue to be outsourced, and there are no major disruptive changes to the availability of contractors.
- Design services are provided in-house.
- Customer demand and expectations regarding reliability of their energy supply continue to follow long-term trends.
- New Zealand will become a low-carbon economy by 2050. Powerco will continue to distribute energy through its network, moving from extracted natural gas to a renewable, similar gaseous fuel such as hydrogen or synthetic natural gas.
- Asset lives remain aligned with the standard lives prescribed in the Input Methodologies.
- There is no major change to the regulatory regime – for example, structural changes to the regulatory institutions or mechanisms currently in place.
- To the extent possible, all the assumptions made in developing this AMP have been quantified and described in the relevant Chapters. Where an assumption is based on information that is sourced from a third party, we have clearly set this out.

APPENDIX 2 GLOSSARY OF KEY TERMS

AMMAT means Asset Management Maturity Assessment Tool.

AMP means Asset Management Plan.

AMS means Asset Management System.

BCP means Business Continuity Plan.

Capex means Capital Expenditure, which is the expenditure used to create new assets or increase the service performance or service potential of existing assets beyond the original design service performance or service potential. Capex increases the value of the asset stock and is capitalised in accounting terms.

CBD means Central Business District.

CP means Cathodic Protection.

CPP means Customised Price-Quality Path.

CWMS means Customer Workplace Management System, otherwise known as "Green".

DPP means Default Price-Quality Path.

DRS means District Regulation Station.

EMT means Powerco's Executive Management team.

ERP means the Enterprise Resource Planning software.

FMEA means Failure Mode and Effects Analysis.

FSA means Formal Safety Assessment.

FSC means Field Service Co-ordinator. It is a role introduced in the Gas Contracts Management team to ensure the operational link between Powerco and the service providers (see Chapter 3.1.3).

FY means Financial Year ending 31 March of the year in question.

GDB means Gas Distribution Business.

GIC means the Gas Industry Company.

GIS means Geographical Information System.

GMS means Gas Measuring System.

HDCU means High Density Community Usage.

HIP means High Intermediate Pressure (1200 - 2000 kPa).

HSEQ means Powerco's Health, Safety, Environment and Quality team.

ICP means Installation Control Point, which is the point of connection of a customer to the Powerco network.

IP means Intermediate Pressure (700-2000 kPa).

ISO 55001 refers to the International Standard Organization publication 55 000.

IT means Information Technology (in terms of infrastructure).

JDE means J.D. Edwards, Powerco's historic enterprise resource planning application.

KPI means Key Performance Indicator.

LIP means Low Intermediate Pressure (700 - 1200 kPa).

LP means Low Pressure (0-7 kPa).

MAOP means Maximum Allowable Operating Pressure.

MCS means Monitoring and Control System.

MP means Medium Pressure (7-700 kPa).

NOC means Network Operations Centre.

NOP means Normal Operating Pressure.

Opex means Operating Expenditure, which is the expenditure directly associated with running the gas distribution network, and ensures it is operating safely at any time. Operating expenditures include maintenance and inspection expenditures required to survey and maintain the assets to achieve their original design lives and service potentials. It also includes the expenses related to our third-party prevention programme.

OPSO means Over-Pressure Shut-Off valve.

PAS55 refers to the Publicly Available Specification 55.

PE means Polyethylene, which is the material plastic gas pipes are made from.

Pre85 means installed prior to 1985.

PRS means Pressure Regulator Station.

RAB means Regulatory Asset Base.

RCM means Reliability Centred Maintenance.

RY means Regulatory Year ending 30 September of the year in question.

SCADA means Supervisory Control and Data Acquisition.

SPA means Service Provider Application.

TPD means Third Party Damage.

UFB means Ultra-Fast Broadband, which is being rolled out around New Zealand

A3.1 SCHEDULE 11A: REPORT ON FORECAST CAPITAL EXPENDITURE

Company Name	Powerco Limited
AMP Planning Period	1 October 2020 – 30 September 2030

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)

GDBs 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	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30
	11a(i): Expenditure on Assets Forecast		**$000 (nominal dollars)**										
	Consumer connection		7,095	7,144	7,331	7,453	7,600	7,781	7,948	8,116	8,287	8,460	8,631
	System growth		1,569	1,996	2,163	2,239	2,215	2,110	1,526	1,501	1,527	1,678	1,496
	Asset replacement and renewal		3,901	2,936	3,560	4,615	4,891	4,946	5,003	5,034	4,984	4,956	5,057
	Asset relocations		73	118	121	122	124	127	129	132	135	138	140
	Reliability, safety and environment:												
	Quality of supply		2,870	922	1,318	1,674	1,740	1,996	2,411	2,462	2,462	2,355	2,619
	Legislative and regulatory		0	0	0	0	0	0	0	0	0	0	0
	Other reliability, safety and environment		1,136	2,974	1,303	1,172	1,027	1,007	994	1,015	1,037	1,058	1,080
	Total reliability, safety and environment		4,007	3,896	2,621	2,846	2,767	3,002	3,406	3,478	3,499	3,414	3,699
	Expenditure on network assets		16,645	16,090	15,796	17,275	17,598	17,967	18,012	18,261	18,433	18,645	19,023
	Expenditure on non-network assets		2,679	2,369	1,816	1,743	1,640	1,516	1,465	1,291	1,104	1,156	1,269
	Expenditure on assets		19,323	18,459	17,612	19,018	19,239	19,483	19,477	19,552	19,537	19,801	20,292
plus	Cost of financing		58	65	64	55	40	41	41	42	57	73	75
less	Value of capital contributions		831	896	925	942	956	971	959	977	997	1,024	1,033
plus	Value of vested assets		0	0	0	0	0	0	0	0	0	0	0
	Capital expenditure forecast		18,550	17,628	16,751	18,132	18,322	18,553	18,559	18,617	18,597	18,851	19,333
	Assets commissioned		18,627	17,767	16,883	17,925	18,294	18,518	18,558	18,609	18,600	18,813	19,261
			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	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30
			$000 (in constant prices)										
	Consumer connection		7,095	7,066	7,136	7,151	7,149	7,176	7,186	7,194	7,202	7,208	7,210
	System growth		1,569	1,975	2,106	2,148	2,084	1,946	1,380	1,331	1,327	1,429	1,249
	Asset replacement and renewal		3,901	2,904	3,464	4,428	4,601	4,562	4,524	4,462	4,332	4,223	4,224
	Asset relocations		73	117	117	117	117	117	117	117	117	117	117
	Reliability, safety and environment:												
	Quality of supply		2,870	912	1,283	1,606	1,636	1,841	2,180	2,183	2,140	2,006	2,187
	Legislative and regulatory		0	0	0	0	0	0	0	0	0	0	0
	Other reliability, safety and environment		1,136	2,941	1,268	1,124	966	928	899	900	901	902	902
	Total reliability, safety and environment		4,007	3,853	2,551	2,730	2,603	2,769	3,079	3,083	3,041	2,908	3,089
	Expenditure on network assets		16,645	15,914	15,374	16,575	16,554	16,569	16,285	16,187	16,018	15,885	15,889
	Expenditure on non-network assets		2,679	2,343	1,767	1,673	1,543	1,398	1,325	1,144	960	985	1,060
	Expenditure on assets		19,323	18,257	17,141	18,248	18,097	17,967	17,610	17,331	16,978	16,870	16,949

Company Name: **Powerco Limited**

AMP Planning Period: **1 October 2020 – 30 September 2030**

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)

GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

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sch ref												
45	**Subcomponents of expenditure on assets (where known)**											
46	Research and development	0	0	0	0	0	0	0	0	0	0	0
47												
48		*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
49	for year ended	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30
50	**Difference between nominal and constant price forecasts**	**$000**										
51	Consumer connection	0	78	196	302	451	605	762	922	1,085	1,252	1,422
52	System growth	0	22	58	91	131	164	146	171	200	248	246
53	Asset replacement and renewal	0	32	95	187	290	385	480	572	653	734	833
54	Asset relocations	0	1	3	5	7	10	12	15	18	20	23
55	Reliability, safety and environment:											
56	Quality of supply	0	10	35	68	103	155	231	280	323	349	431
57	Legislative and regulatory	0	0	0	0	0	0	0	0	0	0	0
58	Other reliability, safety and environment	0	33	35	47	61	78	95	115	136	157	178
59	**Total reliability, safety and environment**	0	43	70	115	164	234	327	395	458	505	609
60	**Expenditure on network assets**	0	176	422	700	1,044	1,398	1,727	2,074	2,414	2,760	3,134
61	Expenditure on non-network assets	0	26	49	71	97	118	140	147	145	171	209
62	**Expenditure on assets**	0	202	471	771	1,142	1,516	1,867	2,221	2,559	2,931	3,343
63												
64												
65		*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*					
66	**11a(ii): Consumer Connection** for year ended	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23	30 Sep 24	30 Sep 25					
67	*Consumer types defined by GDB**	**$000 (in constant prices)**										
68	Residential / Small Commercial	6,641	6,773	6,831	6,844	6,843	6,869					
69	Commercial / Industrial	454	292	305	307	306	306					
70												
71												
72												
73	** include additional rows if needed*											
74	**Consumer connection expenditure**	7,095	7,066	7,136	7,151	7,149	7,176					
75	*less* Capital contributions funding consumer connection	688	685	692	694	693	696					
76	**Consumer connection less capital contributions**	6,407	6,380	6,443	6,457	6,456	6,480					
77	**11a(iii): System Growth**											
78	**Intermediate pressure**											
79	Main pipe	0	0	0	0	100	399					
80	Service pipe	0	0	0	0	0	0					
81	Stations	127	99	99	0	0	0					
82	Line valve	0	0	0	0	0	0					
83	Special crossings	0	0	0	0	0	0					
84	**Intermediate Pressure total**	127	99	99	0	100	399					

Company Name: **Powerco Limited**

AMP Planning Period: **1 October 2020 – 30 September 2030**

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)

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sch ref								
85		**Medium pressure**						
86		Main pipe	1,324	1,647	1,786	1,922	1,739	1,307
87		Service pipe	110	216	208	213	232	226
88		Stations	0	0	0	0	0	0
89		Line valve	4	7	7	7	8	8
90		Special crossings	1	2	2	2	2	2
91		**Medium Pressure total**	1,439	1,872	2,003	2,145	1,980	1,543
92		**Low Pressure**						
93		Main pipe	1	2	2	2	3	3
94		Service pipe	1	1	1	1	1	1
95		Line valve	0	0	0	0	0	0
96		Special crossings	0	0	0	0	0	0
97		**Low Pressure total**	2	4	3	4	4	4
98		**Other network assets**						
99		Monitoring and control systems	0	0	0	0	0	0
100		Cathodic protection systems	0	0	0	0	0	0
101		Other assets (other than above)	0	0	0	0	0	0
102		**Other network assets total**	0	0	0	0	0	0
103								
104		**System growth expenditure**	1,569	1,975	2,106	2,148	2,084	1,946
105	*less*	Capital contributions funding system growth	80	101	108	110	107	100
106		**System growth less capital contributions**	1,488	1,873	1,998	2,038	1,977	1,846
107								
108								
109			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended						
110		**11a(iv): Asset Replacement and Renewal**	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23	30 Sep 24	30 Sep 25
111		**Intermediate pressure**	**$000 (in constant prices)**					
112		Main pipe	9	9	1	16	26	25
113		Service pipe	4	4	0	8	12	11
114		Stations	693	599	472	691	1,009	1,010
115		Line valve	0	236	158	0	0	0
116		Special crossings	0	165	234	97	0	0
117		**Intermediate Pressure total**	706	1,014	865	811	1,047	1,046
118		**Medium pressure**						
119		Main pipe	1,875	832	1,391	2,250	2,145	2,119
120		Service pipe	867	385	643	1,152	1,216	1,204
121		Station	0	3	17	14	0	0
122		Line valve	3	172	169	5	8	8
123		Special crossings	1	45	44	1	2	2
124		**Medium Pressure total**	2,745	1,436	2,264	3,423	3,372	3,333

Company Name: **Powerco Limited**

AMP Planning Period: **1 October 2020 – 30 September 2030**

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)

GDBs 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								
125		**Low Pressure**						
126		Main pipe	1	1	0	2	3	3
127		Service pipe	0	0	0	1	1	1
128		Line valve	0	0	0	0	0	0
129		Special crossings	0	0	0	0	0	0
130		**Low Pressure total**	1	1	0	3	4	4
131		**Other network assets**						
132		Monitoring and control systems	0	0	0	0	0	0
133		Cathodic protection systems	448	351	234	192	178	178
134		Other assets (other than above)	0	101	101	0	0	0
135		**Other network assets total**	448	453	335	192	178	178
136								
137		**Asset replacement and renewal expenditure**	3,901	2,904	3,464	4,428	4,601	4,562
138	*less*	Capital contributions funding asset replacement and renewal	0	0	0	0	0	0
139		**Asset replacement and renewal less capital contributions**	3,901	2,904	3,464	4,428	4,601	4,562
140								

11a(v): Asset Relocations

141									
142		*Project or programme**							
143		None							
144									
145									
146									
147									
148		** include additional rows if needed*							
149		All other projects or programmes - asset relocations	73	117	117	117	117	117	
150		**Asset relocations expenditure**	73	117	117	117	117	117	
151	*less*	Capital contributions funding asset relocations	62	99	100	99	99	99	
152		**Asset relocations less capital contributions**	11	17	18	18	17	18	
153									

11a(vi): Quality of Supply

154			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
155		for year ended	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23	30 Sep 24	30 Sep 25
156								
157		*Project or programme**	**$000 (in constant prices)**					
158		Wellington CBD Pressure Upgrade	2,505	475	0	0	0	0
159		Havelock North Reinforcement	223	282	282	0	0	0
160		Butavas Street DRS Inlet Reinforcement	0	25	100	0	0	0
161		Palmerston North Rationalisation	0	90	531	626	370	185
162		Karori Rationalisation	0	34	291	258	0	0
163		Mark Avenue Overlay (Wellington)	0	0	40	196	157	0
164		** include additional rows if needed*						
165		All other projects or programmes - quality of supply	143	6	40	527	1,110	1,655
166		**Quality of supply expenditure**	2,870	912	1,283	1,606	1,636	1,841
167	*less*	Capital contributions funding quality of supply	0	0	0	0	0	0
168		**Quality of supply less capital contributions**	2,870	912	1,283	1,606	1,636	1,841
169								

Company Name: **Powerco Limited**

AMP Planning Period: **1 October 2020 – 30 September 2030**

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)

GDBs 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								
170	**11a(vii): Legislative and Regulatory**							
171		*Project or programme*						
172		None						
173								
174								
175								
176								
177		** include additional rows if needed*						
178		All other projects or programmes - legislative and regulatory	0	0	0	0	0	0
179		**Legislative and regulatory expenditure**	0	0	0	0	0	0
180	*less*	Capital contributions funding legislative and regulatory	0	0	0	0	0	0
181		**Legislative and regulatory less capital contributions**	0	0	0	0	0	0
182	**11a(viii): Other Reliability, Safety and Environment**							
183		*Project or programme**						
184		Isolation Plans and Resilience	157	819	977	1,113	966	704
185		Hawkes Bay IP Safety Valve Improvements	305	22	0	0	0	0
186		Upper Hutt Rationalisation	340	426	147	0	0	0
187		Avalon/Belmont Rationalisation	7	1,114	0	0	0	0
188		Wainuiomata Rationalisation	0	539	113	0	0	0
189		** include additional rows if needed*						
190		All other projects or programmes - other reliability, safety and environment	328	20	31	11	0	225
191		**Other reliability, safety and environment expenditure**	1,136	2,941	1,268	1,124	966	928
192	*less*	Capital contributions funding other reliability, safety and environment	0	0	0	0	0	0
193		**Other Reliability, safety and environment less capital contributions**	1,136	2,941	1,268	1,124	966	928
194								
195	**11a(ix): Non-Network Assets**							
196	**Routine expenditure**							
197		*Project or programme**						
198		ICT capex	2,137	1,747	1,164	1,215	1,196	1,065
199		Facilities capex	236	230	221	213	205	197
200								
201								
202								
203		** include additional rows if needed*						
204		All other projects or programmes - routine expenditure	0	0	0	0	0	0
205		**Routine expenditure**	2,373	1,977	1,385	1,427	1,401	1,261
206	**Atypical expenditure**							
207		*Project or programme**						
208		Facilities capex	306	367	382	245	142	137
209								
210								
211								
212								
213		** include additional rows if needed*						
214		All other projects or programmes - atypical expenditure	0	0	0	0	0	0
215		**Atypical expenditure**	306	367	382	245	142	137
216								
217		**Expenditure on non-network assets**	2,679	2,343	1,767	1,673	1,543	1,398

A3.2 SCHEDULE 11B: REPORT ON FORECAST OPERATIONAL EXPENDITURE

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2020 – 30 September 2030**

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.
GDBs 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

	for year ended	Current year CY 30 Sep 20	CY+1 30 Sep 21	CY+2 30 Sep 22	CY+3 30 Sep 23	CY+4 30 Sep 24	CY+5 30 Sep 25	CY+6 30 Sep 26	CY+7 30 Sep 27	CY+8 30 Sep 28	CY+9 30 Sep 29	CY+10 30 Sep 30
Operational Expenditure Forecast		**$000 (in nominal dollars)**										
Service interruptions, incidents and emergencies		662	615	631	646	665	685	705	725	746	768	791
Routine and corrective maintenance and inspection		3,031	3,106	3,188	3,266	3,363	3,461	3,561	3,665	3,772	3,882	3,995
Asset replacement and renewal		2,638	2,304	2,492	2,486	2,474	2,460	2,496	2,531	2,568	2,604	2,642
Network opex		6,331	6,024	6,311	6,399	6,502	6,606	6,762	6,922	7,086	7,254	7,427
System operations and network support		4,937	5,943	6,039	6,123	6,245	6,369	6,497	6,627	6,759	6,895	7,032
Business support		6,797	6,941	6,838	6,720	6,632	6,538	6,437	6,329	6,215	6,093	5,964
Non-network opex		11,734	12,884	12,876	12,843	12,877	12,907	12,934	12,956	12,974	12,987	12,996
Operational expenditure		18,065	18,908	19,187	19,242	19,380	19,513	19,696	19,878	20,060	20,242	20,423

	for year ended	Current year CY 30 Sep 20	CY+1 30 Sep 21	CY+2 30 Sep 22	CY+3 30 Sep 23	CY+4 30 Sep 24	CY+5 30 Sep 25	CY+6 30 Sep 26	CY+7 30 Sep 27	CY+8 30 Sep 28	CY+9 30 Sep 29	CY+10 30 Sep 30
		$000 (in constant prices)										
Service interruptions, incidents and emergencies		662	608	614	620	626	632	637	643	649	654	660
Routine and corrective maintenance and inspection		3,031	3,072	3,103	3,134	3,163	3,191	3,220	3,249	3,278	3,307	3,337
Asset replacement and renewal		2,638	2,278	2,426	2,385	2,328	2,269	2,256	2,244	2,231	2,219	2,206
Network opex		6,331	5,958	6,142	6,139	6,117	6,092	6,114	6,135	6,158	6,180	6,204
System operations and network support		4,937	5,878	5,877	5,875	5,874	5,874	5,874	5,874	5,874	5,874	5,874
Business support		6,797	6,865	6,655	6,448	6,239	6,029	5,820	5,610	5,401	5,191	4,981
Non-network opex		11,734	12,743	12,532	12,323	12,113	11,903	11,694	11,484	11,275	11,065	10,855
Operational expenditure		18,065	18,702	18,674	18,462	18,230	17,995	17,807	17,620	17,432	17,245	17,059
Subcomponents of operational expenditure (where known)												
Research and development		0	0	0	0	0	0	0	0	0	0	0
Insurance		101	103	105	107	110	112	114	116	119	121	123

	for year ended	Current year CY 30 Sep 20	CY+1 30 Sep 21	CY+2 30 Sep 22	CY+3 30 Sep 23	CY+4 30 Sep 24	CY+5 30 Sep 25	CY+6 30 Sep 26	CY+7 30 Sep 27	CY+8 30 Sep 28	CY+9 30 Sep 29	CY+10 30 Sep 30
Difference between nominal and real forecasts		**$000**										
Service interruptions, incidents and emergencies		0	7	17	26	39	53	68	82	98	114	130
Routine and corrective maintenance and inspection		0	34	85	132	200	269	341	416	494	575	658
Asset replacement and renewal		0	25	67	101	147	191	239	288	336	385	435
Network opex		0	66	169	259	386	514	648	786	928	1,074	1,223
System operations and network support		0	65	161	248	371	495	623	753	885	1,021	1,158
Business support		0	76	183	272	394	509	617	719	814	902	982
Non-network opex		0	141	344	521	764	1,004	1,240	1,472	1,699	1,922	2,141
Operational expenditure		0	207	513	780	1,150	1,518	1,888	2,258	2,627	2,996	3,364

A3.3 SCHEDULE 12A: REPORT ON ASSET CONDITION

Company Name	Powerco Ltd
AMP Planning Period	1 October 2020 – 30 September 2030

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

sch ref					Asset condition at start of planning period (percentage of units by grade)						
8	Operating Pressure	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
9	Intermediate Pressure	Main pipe	IP PE main pipe	km	-	-	0.00%	99.25%	0.75%	3	-
10	Intermediate Pressure	Main pipe	IP steel main pipe	km	-	-	79.73%	0.31%	19.96%	3	-
11	Intermediate Pressure	Main pipe	IP other main pipe	km	-	-	20.93%	-	79.07%	3	-
12	Intermediate Pressure	Service pipe	IP PE service pipe	km	-	-	66.10%	31.20%	2.70%	3	-
13	Intermediate Pressure	Service pipe	IP steel service pipe	km	-	0.02%	23.16%	0.62%	76.19%	3	0.02%
14	Intermediate Pressure	Service pipe	IP other service pipe	km	-	-	95.27%	-	4.73%	3	-
15	Intermediate Pressure	Stations	Intermediate pressure DRS	No.	1.34%	4.03%	75.84%	18.79%	-	3	5.37%
16	Intermediate Pressure	Line valve	IP line valves	No.	0.15%	0.30%	40.69%	12.13%	46.73%	3	0.29%
17	Intermediate Pressure	Special crossings	IP crossings	No.	-	0.15%	98.83%	1.02%	-	3	0.08%
18	Medium Pressure	Main pipe	MP PE main pipe	km	0.27%	0.02%	91.24%	7.71%	0.75%	3	0.29%
19	Medium Pressure	Main pipe	MP steel main pipe	km	1.43%	0.01%	78.54%	0.05%	19.96%	3	1.45%
20	Medium Pressure	Main pipe	MP other main pipe	km	-	-	20.93%	0.00%	79.07%	3	-
21	Medium Pressure	Service pipe	MP PE service pipe	km	-	0.06%	84.45%	12.79%	2.70%	3	0.06%
22	Medium Pressure	Service pipe	MP steel service pipe	km	0.01%	0.04%	23.69%	0.07%	76.19%	3	0.05%
23	Medium Pressure	Service pipe	MP other service pipe	km	-	0.02%	95.18%	0.07%	4.73%	3	0.02%
24	Medium Pressure	Stations	Medium pressure DRS	No.	1.54%	9.23%	81.54%	6.15%	1.54%	3	10.77%
25	Medium Pressure	Line valve	MP line valves	No.	-	0.45%	34.69%	18.01%	46.84%	3	0.23%
26	Medium Pressure	Special crossings	MP special crossings	No.	-	0.29%	98.17%	1.54%	-	3	0.14%
27	Low Pressure	Main pipe	LP PE main pipe	km	-	0.02%	85.65%	13.57%	0.75%	3	0.02%
28	Low Pressure	Main pipe	LP steel main pipe	km	-	-	79.35%	0.69%	19.96%	3	-
29	Low Pressure	Main pipe	LP other main pipe	km	-	-	6.32%	14.61%	79.07%	3	-
30	Low Pressure	Service pipe	LP PE service pipe	km	-	0.91%	84.37%	12.02%	2.70%	3	0.91%
31	Low Pressure	Service pipe	LP steel service pipe	km	-	-	23.18%	0.63%	76.19%	3	-
32	Low Pressure	Service pipe	LP other service pipe	km	-	-	78.32%	16.95%	4.73%	3	-
33	Low Pressure	Line valve	LP line valves	No.	-	0.25%	36.20%	15.26%	48.28%	3	0.13%
34	Low Pressure	Special crossings	LP special crossings	No.	-	-	-	-	-	3	-
35	All	Monitoring & control systems	Remote terminal units	No.	-	42.66%	44.76%	12.59%	-	4	-
36	All	Cathodic protection systems	Cathodic protection	No.	-	32.26%	37.10%	19.35%	11.29%	3	8.06%

A3.4 SCHEDULE 12B: REPORT ON FORECAST UTILISATION

Company Name	Powerco Limited
AMP Planning Period	1 October 2020 – 30 September 2030

SCHEDULE 12b: REPORT ON FORECAST UTILISATION

This Schedule requires a breakdown of current and forecast utilisation (for heavily utilised pipelines) consistent with the information provided in the AMP and the demand forecast in schedule S12c.

sch ref

Forecast Utilisation of Heavily Utilised Pipelines

Region	Network	Pressure system	Nominal operating pressure (NOP) (kPa)	Minimum operating pressure (MinOP) (kPa)	Total capacity at MinOP (scmh)	Remaining capacity at MinOP (scmh)	Unit	Utilisation: *Current Year CY* y/e 30 Sep 20	*CY+1* y/e 30 Sep 21	*CY+2* y/e 30 Sep 22	*CY+3* y/e 30 Sep 23	*CY+4* y/e 30 Sep 24	*CY+5* y/e 30 Sep 25	Comment
Hawkes Bay	Hastings	Hastings LMP	150	75	1,456	26	scmh	1453	1514	1572	1572	1695	1758	This subsystem currently experiences droop higher than 45%, with strong growth projected in the form of additional subdivisions. Droop is forecast to reach approximately 50% in Winter 2020. Concept design for the upgrade is underway. In RY22 the upgrade is nominally modelled as an additional MP main to improve supply into Havelock North, but the concept design has not yet settled on a preferred solution. If strong growth continues a second phase of upgrade to extend the MP addition further into Havelock North may be required past 2025.
							kPa	77	68	104	97	89	81	
Hawkes Bay	Hastings	Taradale	150	75	769	37	scmh	718	748	777	808	838	868	Growth is progressing, but at a slower rate than previously forecast, this is evident in connection rates and pressure trends. The reduced growth speed is attributed to delays in Greenfields development completions. This reduced speed provides more time until capacity upgrades are required. Droop is expected to reach approximately 50% by RY24. A pressure uplift is scheduled for RYE25. The desired NOP after uplift is at least 210kPa potentially allowing a merge with the adjacent Napier LMP subsystem.
							kPa	95	91	87	83	77	154	
Hutt Valley/Porirua	Belmont	Belmont LIP	860	430	15,108	158	scmh	15121	15915	16021	16126	15900	15997	MINOP pressures were observed for the first time at the inlet to Miro St DRS in Winter 2019. Rapid residential development and high gas uptake in Upper Hutt near the end of this IP branch have necessitated a transfer of load to a less constrained branch of the LIP. Works to transfer some of this load were delayed and are expected to be completed by RY21. In RY21 the first phase of the Upper Hutt DRS rationalisation will be delivered. This will improve the LIP constraint in Upper Hutt such that it is no longer the lowest LIP pressure after RY21. Onwards, the lowest LIP pressure will be at the inlet to Norfolk St DRS in Wainuiomata. Droop of 60% is forecast in RY25 at the inlet to Norfolks DRS without upgrades in Wainui. The Wainuomata IP reinforcement (Parkway interconnection) will remediate the remaining constraint from this system.
							kPa	414	561	428	393	351	573	
Hutt Valley/Porirua	Belmont	Lower Hutt LMP	125	63	7,153	45	scmh	7157	7165	7165	7165	7165	7165	The low pressure constraint on this subsystem is limited to a single branch of the Lower Hutt LMP subsystem. We permanently monitor the lowest point on the constrained branch. Strong infill residential growth in Lower Hutt central may cause a decline in pressure at this extremity. In the event of a decline in pressures a new cocon in Lower Hutt Central will improve pressures.
							kPa	62	61	61	61	61	61	
Hutt Valley/Porirua	Waitangirua/ Pauatahanui	Pauatahanui IP	1,050	525	1,162	95	scmh	1067	1116	1122	1271	1368	1466	Expected residential growth around Plimmerton will necessitate a reduction in the Plimmerton DRS setpoint pressure around RY21 to shift load to other stations. In the following year, RY23, a gas gate pressure uplift to 1,500kPa will improve the pressures further as the large subdivision progresses.
							kPa	701	678	773	1224	1116	979	
Manawatu	Palmerston North	Palmerston North LMP	100	50	5,795	6	scmh	5795	5849	5888	6216	6273	6319	To address a number of issues such as low extremity pressures, advanced age regulator stations and large numbers of small stations, a 2-phase, east and west (of State Highway 3) rationalisation have been scoped for RY23 and RY25, respectively.
							kPa	50	50	49	45	44	68	
Manawatu	Palmerston North	Summerhill	100	50	501	15	scmh	403	461	517	572	634	664	As the biggest identified area for growth in Palmerston North, we will actively monitor demand and pressure levels. Droop of 60% and pressures approaching the capacity limit are forecast in RY24 if no action is taken and growth continues as projected. To prevent capacity limits being exceeded it is proposed to raise the NOP to approximately 150kPa in RY24.
							kPa	72	65	59	50	108	104	

Company Name	Powerco Limited
AMP Planning Period	1 October 2020 – 30 September 2030

SCHEDULE 12b: REPORT ON FORECAST UTILISATION

This Schedule requires a breakdown of current and forecast utilisation (for heavily utilised pipelines) consistent with the information provided in the AMP and the demand forecast in schedule S12c.

sch ref

7 **Forecast Utilisation of Heavily Utilised Pipelines**

8 **Utilisation**

9															
10	Region	Network	Pressure system	Nominal operating pressure (NOP) (kPa)	Minimum operating pressure (MinOP) (kPa)	Total capacity at MinOP (scmh)	Remaining capacity at MinOP (scmh)	Unit	*Current Year CY* y/e 30 Sep 20	*CY+1* y/e 30 Sep 21	*CY+2* y/e 30 Sep 22	*CY+3* y/e 30 Sep 23	*CY+4* y/e 30 Sep 24	*CY+5* y/e 30 Sep 25	Comment
25	Taranaki	New Plymouth	New Plymouth IP	1,250	625	7,597	427	scmh	7559	7650	7701	7752	7802	7854	Pressures at the inlet to Tukapa St station are observed near 50% droop on occasion. This is not forecast to have any quality of supply impact in the forseeable future as the regualtor station is adequately sized to perform under low inlet pressures. The station is permanently monitored via SCADA.
26								kPa	645	630	633	628	623	617	
27	Taranaki	New Plymouth	New Plymouth MP	250	125	5,429	53	scmh	5445	5499	5520	5541	5562	5583	There is a single branch of this network where low pressures have been detected. The localised constraint is due to a relatively long run of low diameter main supplying industrial customers near Breakwater Road. This is scheduled for upgrade in RY22 to meet commercial growth and quality of supply needs. The remainder of the network has pressures within specifications, even considering reasonable residential demand growth.
28								kPa	108	108	160	159	158	157	
29	Taranaki	Patea	Patea	350	175	357	56	scmh	355	355	355	355	355	355	Gas gate volumes through Patea have been slowly trending down for the the last 5 years, hence the improvement compared to historical AMP figures. Montoring is ongoing. Note: new records of the service size of the large commercial customer with the lowest pressure have been located. The service is larger than previously recorded hence the modelled pressure improvement.
30								kPa	178	178	178	178	178	178	
31	Taranaki	Waitara	Lepperton MP	350	175	364	48	scmh	401	401	401	401	401	401	This is a new pressure system that was created when Lepperton was uplifted and separated from Waitara. It is being reported on now for the first time because this is the first year for which a full winters' monitornig is available on the performance of the system.
32								kPa	85	85	85	85	85	85	
33	Taranaki	Waitara	Waitara MP	250	125	775	57	scmh	751	751	765	778	791	804	The supplies to Lepperton and Waitara have been separated. The supply pressure in Lepperton was increased to ease supply constraints in that network. The current Waitara network extremity has droop of approximately 40%. Monitoring is ongoing. The droop is not projected to worsen significantly.
34								kPa	138	138	135	133	130	126	
35	Wellington	Tawa A	Chartwell	70	45	233	0	scmh	205	223	238	238	238	238	The new Crofton Downs subdivision will constrain this network, and we expect that our pressure threshold will be reached in RY2022. We will monitor the pressure and demand on the network, and increase the NOP in RY23 if needed.
36								kPa	59	51	43	78	78	78	
37	Wellington	Tawa A	Karori	130	65	1,756	13	scmh	1757	1757	1757	1757	1757	1757	Pressures measured through our monitoring programme are better than previously modelled. We will continue to actively monitor this network. There is no immediate substantial subdivision growth known in this subsystem that would cause a capacity exceedance. However, to replace aging assets in RY23 and alleviate constraints on the IP feed into Karori, a rationalisation has been tabeled.
38								kPa	64	64	64	72	72	72	
39	Wellington	Tawa A	Wellington 25 kPa	25	13	10,335	29	scmh	10314	11295	12607	12607	12607	12607	The Wellington CBD pressure upgrade project will increase the performance of this system. Development in the suburb of Island Bay might lower pressures locally. We will continue to actively monitor pressures in the area.
40								kPa	13	13	13	13	13	13	
41	Wellington	Tawa A	Wellington CBD	10	5	2,283	25	scmh	2305	1397	0	0	0	0	The Wellington CBD upgrade project will connect this network to the Wellington 25kPa. The Wellington CBD (LP) pressure system will then cease to exist in RY22.
42								kPa	4	4	NA	NA	NA	NA	

Company Name	Powerco Limited
AMP Planning Period	1 October 2020 – 30 September 2030

SCHEDULE 12b: REPORT ON FORECAST UTILISATION

This Schedule requires a breakdown of current and forecast utilisation (for heavily utilised pipelines) consistent with the information provided in the AMP and the demand forecast in schedule S12c.

sch ref

Forecast Utilisation of Heavily Utilised Pipelines

								Utilisation						
	Region	Network	Pressure system	Nominal operating pressure (NOP) (kPa)	Minimum operating pressure (MinOP) (kPa)	Total capacity at MinOP (scmh)	Remaining capacity at MinOP (scmh)	Unit	*Current Year CY* y/e 30 Sep 20	*CY+1* y/e 30 Sep 21	*CY+2* y/e 30 Sep 22	*CY+3* y/e 30 Sep 23	*CY+4* y/e 30 Sep 24	*CY+5* y/e 30 Sep 25	Comment
43	Wellington	Tawa A	Wellington LIP	1,200	600	26,088	262	scmh	26291	26580	26753	26897	27013	27124	The low point on this system is Karori. The Minimum Operating Pressure has been reviewed and set to 300kPa. We will continue to monitor through SCADA. To replace aging Karori assets in RY23 and alleviate constraints on the IP feed into Karori, a rationalisation has been tabeled. This will shift the low point on this system to Newtown.
44								kPa	417	401	393	515	512	509	
45	Wellington	Tawa A	Wellington North	185	93	4,745	83	scmh	4818	4976	5134	5278	5395	5505	The lowest pressure point on the network is at a small regulating station (Butavas St PRS) feeding into the Wellington 25kPa netowrk. This is not likely to be impacted by growth, nor is it likely to impact customer pressures, however, a mains overlay supplying the station has been nominally tabled for RY22 if monitoring shows it is required. Subdivision activity in the northern region will increase demand. We expect constraints in Grenada North, Woodridge and Churton Park over the planning period. We will reinforce with several overlays described in the Network Development Plans. This system is being continuously monitored.
46								kPa	45	44	117	106	129	122	

47 ** Current year utilisation figures may be estimates. Year 1–5 figures show the utilisation forecast to occur given the expected system configuration for each year, including the effect of any new investment in the pressure system.*

48

49 **Disclaimer for supply enquiries**

The information in this table contains modelled estimates of utilisation and capacity. Any interested party seeking to invest in supply from Powerco's distribution networks should contact Powerco or their retailer and confirm availability of capacity.

50

51

52 **Notes and assumptions**

53 Growth patterns used are outlined in the 2020 Gas AMP, reflecting our knowledge at the time of writing.

54 If the growth was expected to spread over multiple years, it was uniformly spread over the foreacsted growth timeframe unless more accurate information is known.

55 The number of lots identified in the 2020 Gas AMP was multiplied by 0.6scm/h to calculate a diversified load per connection. This was summed and placed at a single point in the model where the load is expected to occur.

56 If the growth specified in the 2020 Gas AMP was inferior to our other supply forecasts, we would reconcile these by adding the load at one extremity of the network.

57

58

A3.5 SCHEDULE 12C: REPORT ON FORECAST DEMAND

Company Name	**Powerco Ltd**
AMP Planning Period	**1 October 2020 – 30 September 2030**

SCHEDULE 12c: REPORT ON FORECAST 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

	Current year CY **30 Sep 20**	*CY+1* **30 Sep 21**	*CY+2* **30 Sep 22**	*CY+3* **30 Sep 23**	*CY+4* **30 Sep 24**	*CY+5* **30 Sep 25**
Consumer types defined by GDB						
Residential	1,862	1,878	1,889	1,898	1,905	1,910
Commercial / Industrial	103	104	104	105	105	105
Total	1,965	1,981	1,994	2,003	2,010	2,015

12c(ii): Gas Delivered

	Current year CY **30 Sep 20**	*CY+1* **30 Sep 21**	*CY+2* **30 Sep 22**	*CY+3* **30 Sep 23**	*CY+4* **30 Sep 24**	*CY+5* **30 Sep 25**
Number of ICPs at year end	111,591	113,133	114,587	116,000	117,371	118,697
Maximum daily load (GJ/day)	40,028	40,493	40,586	40,680	40,773	40,866
Maximum monthly load (GJ/month)	983,377	994,792	997,088	999,384	1,001,679	1,003,975
Number of directly billed ICPs (at year end)	-	-	-	-	-	-
Total gas conveyed (GJ/annum)	8,715,266	8,975,044	9,141,173	9,307,302	9,473,431	9,639,560
Average daily delivery (GJ/day)	23,812	24,589	25,044	25,499	25,884	26,410
Maximum monthly amount of gas entering network (GJ/month)	983,377	994,792	997,088	999,384	1,001,679	1,003,975
Load factor	73.85%	75.18%	76.40%	77.61%	78.81%	80.01%

A3.6 SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2020 – 30 September 2030**
Asset Management Standard Applied	**ISO55001: 2014**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	3	Powerco has a company-wide published Asset Management Policy which has been approved by the Chief Executive Officer. It is circulated inside the company, and published in the Gas Asset Management Plan. The policy has guided the development of our Asset Management System and Objectives, and Plan.	Widely used AM practice standards require an organisation to document, authorise and communicate its asset management policy (e.g., as required in PAS 55 para 4.2 l). 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	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?	3	Our Strategic Asset Management Plan (SAMP) exists as a standalone document and is described in Chapter 5 of our AMP. The SAMP is aligned to our Asset Management Objectives that fall out of our Corporate Strategy. Stakeholder requirements and operating context have guided its development. As a result, the predominant drivers of the Asset Management Strategy and associated documents are safety, affordability, and practicality of implementation.	In setting an organisation's asset management strategy, it is important that it is consistent with any other policies and strategies that the organisation has and has taken into account the requirements of relevant stakeholders. This question examines to what extent the asset management strategy is consistent with other organisational policies and strategies (e.g., as required by PAS 55 para 4.3.1 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	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?	3	Our SAMP, the Asset Class Strategies, and the suite of associated documents, consider the status of the assets in their lifecyle. For example, we apply a different strategy for existing assets, to those newly built. This Reliability-Centred Maintenance (RCM) approach that we are implementing improves the efficiency of our asset lifecycle management.	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	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?	3	Our Asset Class Strategies and Technical Standards are well developed and set the basis for all activities required during the lifecycle of our assets. this has allowed us to refine our maintenance programme, aligning it with the principles of reliability-centred maintenance.	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	**Powerco Limited**
AMP Planning Period	**1 October 2020 – 30 September 2030**
Asset Management Standard Applied	**ISO55001: 2014**

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.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
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?	3	Our plans are widely shared with relevant stakeholders. The Gas Asset Management Plan is made available to the public on our website. It is communicated to our service providers, internal teams and external stakeholders. We also run roadshows presentations on an ad-hoc basis to facilitate the understanding of the plan.	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	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	3	Designated responsibilities for asset management plan delivery are described from a strategic level in Chapter 3 of the AMP. From an operational view point, further detail of responsibility is documented across the business and including the Business Plan, business unit tactical plans, position descriptions and employees' annual review and development forms. Powerco has detailed documents on responsibilities of service providers as well.	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	Asset management plan(s)	What has the organisation done to ensure that appropriate arrangements are made available for the efficient and cost effective implementation of the plan(s)? (Note this is about resources and enabling support)	3	We use different mechanisms to ensure a cost-effective, on-time and on-quality delivery of the plans. We have the possibility to insource or outsource the design and project management of the plans. All field activities are outsourced and delivered through market-tested agreements, guaranteeing efficient pricing.	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	Contingency planning	What plan(s) and procedure(s) does the organisation have for identifying and responding to incidents and emergency situations and ensuring continuity of critical asset management activities?	3	Well developed and established procedures for dealing with network incidents and emergencies are in place through our Public Safety Management System, and managed centrally by our Network Operations Centre. Our dedicated Risk and Assurance Team is the custodian of our ISO31000-based Risk and Compliance Management Policy. A Safety and Operating Plan and the Emergency Response plan exists and is reviewed on a regular basis. A comprehensive approach to staff training is taken with a range of courses offered though a planned approach annually.	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	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.

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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
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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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
37	Structure, authority and responsibilities	What has the organisation done to appoint member(s) of its management team to be responsible for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s)?	3	Chapter 3 provides an overview of responsibilities and delegations, with a dedicated gas division, led by the General Manager Gas, to provide an end-to-end process. Responsibilities are detailed in the Asset Policy, then reflected in the Business Plan, tactical plans, position descriptions and personal objectives. The gas division structure makes asset management-related responsibilities clearer to the business and ensured role descriptions reflect and cover all areas of the end-to-end asset management process. Examples of changes driven by the restructure are that project work now goes through a sign-off process taking into account the new organisation structure and delegated Financial Authorities have also been reviewed to enable staff to be fully responsible.	In order to ensure that the organisation's assets and asset systems deliver the requirements of the asset management policy, strategy and objectives responsibilities need to be allocated to appropriate people who have the necessary authority to fulfil their responsibilities. (This question, relates to the organisation's assets e.g., para b), s 4.4.1 of PAS 55, making it therefore distinct from the requirement contained in para a), s 4.4.1 of PAS 55).	Top management. People with management responsibility for the delivery of asset management policy, strategy, objectives and plan(s). People working on asset-related activities.	Evidence that managers with responsibility for the delivery of asset management policy, strategy, objectives and plan(s) have been appointed and have assumed their responsibilities. Evidence may include the organisation's documents relating to its asset management system, organisational charts, job descriptions of post-holders, annual targets/objectives and personal development plan(s) of post-holders as appropriate.
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	3	As part of the ISO55000 accrediation work, new Resource Management Plans are being developed which identify resource requriements to complete all works within the Asset Management SYstem (AMS). The gas division restructure reviewed human resource needs and subsequently reallocated role tasks and introduced new roles to optimally deliver the asset management strategy. As our workload is not highly dynamic, the resource requirements has been able to remain relatively steady. Regardless, these resources are reviewed annually as part of the annual planning process, and a pool of engineering consultants, and service providers have been constituted to increase the volume of work delivered. We are also securing procurement arrangement to deal with the availability of materials critical for the delivery of the work programme.	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 charge hands 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	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	3	A range of activities are undertaken to communicate the importance of meeting asset management requirements. The requirements are reflected in the Business Plan, which has a comprehensive communication process via road shows, KPI reporting and emails from the CEO. The GM Gas also provides regular briefings on progress. Specific asset management objectives are set up for the business from a board level and reported back. The Gas division has an internal communications process that ensures all staff are aware of asset management targets and actuals. For tactical projects, a more formal process to engage with the wider audience in the company (Finance, Programme office, etc.) is being developed.	Widely used AM practice standards require an organisation to communicate the importance of meeting its asset management requirements such that personnel fully understand, take ownership of, and are fully engaged in the delivery of the asset management requirements (e.g., PAS 55 s 4.4.1 g).	Top management. The management team that has overall responsibility for asset management. People involved in the delivery of the asset management requirements.	Evidence of such activities as road shows, written bulletins, workshops, team talks and management walk-abouts would assist an organisation to demonstrate it is meeting this requirement of PAS 55.

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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
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.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
45	Outsourcing of asset management activities	Where the organisation has outsourced some of its asset management activities, how has it ensured that appropriate controls are in place to ensure the compliant delivery of its organisational strategic plan, and its asset management policy and strategy?	3	Contractual arrangements are in place to provide a clear and accountable set of standards and work instructions, to agree, instruct and review field work. Dedicated roles exist within the Powerco operations team to manage the relationship and work. The Operations Manager has the responsibility of ensuring the overall delivery is achieved in line with guiding documentation. For health and safety matters, every contractor should go through a contractor approval process prior to execute works on the network to ensure they have the appropriate systems to follow our requirements.	Where an organisation chooses to outsource some of its asset management activities, the organisation must ensure that these outsourced process(es) are under appropriate control to ensure that all the requirements of widely used AM standards (e.g., PAS 55) are in place, and the asset management policy, strategy objectives and plan(s) are delivered. This includes ensuring capabilities and resources across a time span aligned to life cycle management. The organisation must put arrangements in place to control the outsourced activities, whether it be to external providers or to other in-house departments. This question explores what the organisation does in this regard.	Top management. The management team that has overall responsibility for asset management. The manager(s) responsible for the monitoring and management of the outsourced activities. People involved with the procurement of outsourced activities. The people within the organisations that are performing the outsourced activities. The people impacted by the outsourced activity.	The organisation's arrangements that detail the compliance required of the outsourced activities. For example, this this could form part of a contract or service level agreement between the organisation and the suppliers of its outsourced activities. Evidence that the organisation has demonstrated to itself that it has assurance of compliance of outsourced activities.
48	Training, awareness and competence	How does the organisation develop plan(s) for the human resources required to undertake asset management activities - including the development and delivery of asset management strategy, process(es), objectives and plan(s)?	3	In alignment with ISO55000, a Competency Framework has been developed for the Gas Asset Strategy Team. This framework is to be rolled out for the broader Gas Team over the current FY. Powerco's Human Resources Division has undertaken a range of analysis, in conjunction with the Gas Team, on training and competence needs required to deliver our services, and there is a structured approach to training in Powerco. If the competency of field staff is managed by service providers, Powerco is part of industry groups in charge of developping field competency frameworks with the Industry Training Organisation (ITO).	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	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	Training, awareness and competence	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	3	Powerco has a strong focus on training and development, supported by a structured annual review and development process. All employees have individual development plans that align with Powerco's competency standard, and a generous training budget is available. In the coming year we are looking to further refine our skills and competencies, assessments and training to align with our asset management expectations.	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	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
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?	3	Powerco's has clearly developed competence requirements for internal employees and contractors, including qualifications and training requirements that are based on industry standards frameworks. These are fully enforced and audited for health and safety reasons. For non-standard activities on the network, work instructions are developed and implemented with our service providers. In addition, every contractor should go through a contractor approval process prior to execute works on the network to ensure they have the appropriate systems to follow our requirements.	A critical success factor for the effective development and implementation of an asset management system is the competence of persons undertaking these activities. organisations should have effective means in place for ensuring the competence of employees to carry out their designated asset management function(s). Where an organisation has contracted service providers undertaking elements of its asset management system then the organisation shall assure itself that the outsourced service provider also has suitable arrangements in place to manage the competencies of its employees. The organisation should ensure that the individual and corporate competencies it requires are in	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
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.
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

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
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?	3	All of the AMS documentation (including AM Policy, SAMP, AMP, etc.) are available to all employees on our document management system. The Powerco AMP, and all other disclosed documenation is avalaible to service providers and the public on our website. Powerco's progress on KPIs is reported on the intranet for all staff to view and specific KPIs for service providers are made available through the gas contractor portal. We also seek a range of ways for staff to feed back into the asset management process, e.g. via discussions on the Business Plan. As a high priority, safety related discussion are regularly held and communicated to staff and contractors.	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	Asset Management System documentation	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	2	As part of the ISO55000 accrediation work, a significant amount of documentation is being written at the time of writing this AMP. The Asset Management System Manual will detail all documentaion created as part of our AMS. The expectation is that all this documentation will be compelted by the end of CY20. Powerco has an extensive range of documentation to support its asset management, such as standards, approval documentation and process mapping. Our new Entreprise Resource Planning system has resulted in numerous process flows being redesigned.	Widely used AM practice standards require an organisation maintain up to date documentation that ensures that its asset management systems (i.e., the systems the organisation has in place to meet the standards) can be understood, communicated and operated. (e.g., 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	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?	3	The implementation of our new Entrprise Resource Planning system will give us flexible tools to ensure our asset information is up to date and available. Powerco is undergoing other change to our suite of core systems that will support our end-to-end asset management processes. An Asset Information Policy has been compelted which states the direction Powerco wishes to take our information manageemnt. An Asset Information Strategy is also in draft.	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	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	Information management	How does the organisation maintain its asset management information system(s) and ensure that the data held within it (them) is of the requisite quality and accuracy and is consistent?	2	Powerco has a range of controls to ensure data is accurate and there is an adequate process of change management - for example, security controls, off-site back up and restricted fields. We have invested in an internal assurance team, to provide increased checks on data accuracy, however, this is an area we are always seeking to improve. Furthermore, as part of our Asset Information Strategy, Data Communities are being stood up to ensure we have and maintain high quality data.	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 (e.g., 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

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	3	The Gas Team has developed a Data Dictionary which states the required data for our assets, the system it belongs to and specific details of the data field. A qualitative quality assessment scoring is beign developed to state the quality level of data for each asset type. Projects will then perform a quanitative assessment on the quality of our asset data. The Data Dictionary was built when we replaced our core entreprise resource planning system.	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	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?	3	Powerco has a formal, documented process for risk management and a structured approach across the business for identifying risks, and a detailed risk register. Specific asset-related risks during their lifecycle are also taking place in the form a Failure Mode and Effect Analysis, ands Formal Safety Assessment. Planned activities that drive our work plans are based on a risk management methodology that focuses on whether risk levels are acceptable or not in terms or safety, reliability or delivery.	Risk management is an important foundation for proactive asset management. Its overall purpose is to understand the cause, effect and likelihood of adverse events occurring, to optimally manage such risks to an acceptable level, and to provide an audit trail for the management of risks. Widely used standards require the organisation to have process(es) and/or procedure(s) in place that set out how the organisation identifies and assesses asset and asset management related risks. The risks have to be considered across the four phases of the asset lifecycle (e.g., para 4.3.3 of PAS 55).	The top management team in conjunction with the organisation's senior risk management representatives. There may also be input from the organisation's Safety, Health and Environment team. Staff who carry out risk identification and assessment.	The organisation's risk management framework and/or evidence of specific process(es) and/ or procedure(s) that deal with risk control mechanisms. Evidence that the process(es) and/or procedure(s) are implemented across the business and maintained. Evidence of agendas and minutes from risk management meetings. Evidence of feedback in to process(es) and/or procedure(s) as a result of incident investigation(s). Risk registers and assessments.
79	Use and maintenance of asset risk information	How does the organisation ensure that the results of risk assessments provide input into the identification of adequate resources and training and competency needs?	2	Powerco has a structured approach to how risks are managed, and actions, including monitoring that reports to the Board Risk and Assurance sub-committee. Risk assessment processes are currently drafted, and this process can be improved. Currently we are working more on a reactive basis than a risk approach to asset management for day-to-day operations and will be looking at this further in the short term. Training is currently predominantly focused on safety.	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	Legal and other requirements	What procedure does the organisation have to identify and provide access to its legal, regulatory, statutory and other asset management requirements, and how is requirements incorporated into the asset management system?	3	Powerco has invested significant resources in all aspects of legal and regulatory compliance. The Risk and Assurance and Regulatory teams monitor changes and update the business. Given the high level of compliance impacting gas distribution, this is always an area we are looking to continually improve in by developing expertise. The team plays an active role in annual asset management planning and is responsible for ensuring requirements are communicated and understood by the Gas team.	In order for an organisation to comply with its legal, regulatory, statutory and other asset management requirements, the organisation first needs to ensure that it knows what they are (e.g., PAS 55 specifies this in s 4.4.8). It is necessary to have systematic and auditable mechanisms in place to identify new and changing requirements. Widely used AM standards also require that requirements are incorporated into the asset management system (e.g. procedure(s) and process(es))	Top management. The organisations regulatory team. The organisation's legal team or advisors. The management team with overall responsibility for the asset management system. The organisation's health and safety team or advisors. The organisation's policy making team.	The organisational processes and procedures for ensuring information of this type is identified, made accessible to those requiring the information and is incorporated into asset management strategy and objectives

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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

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
88	Life Cycle Activities	How does the organisation establish implement and maintain process(es) for the implementation of its asset management plan(s) and control of activities across the creation, acquisition or enhancement of assets. This includes design, modification, procurement, construction and commissioning activities?	3	Powerco has comprehenive processes to ensure the asset creation and acquisition are in line with our different plans. Multi-year planning, standards, safety in design, and periodic reporting are some examples of the activities we carry to ensure assets activities are justified and built according to our requirements.	Life cycle activities are about the implementation of asset management plan(s) i.e. they are the "doing" phase. They need to be done effectively and well in order for asset management to have any practical meaning. As a consequence, widely used standards (e.g., PAS 55 s 4.5.1) require organisations to have in place appropriate process(es) and procedure(s) for the implementation of asset management plan(s) and control of lifecycle activities. This question explores those aspects relevant to asset creation.	Asset managers, design staff, construction staff and project managers from other impacted areas of the business, e.g. Procurement	Documented process(es) and procedure(s) which are relevant to demonstrating the effective management and control of life cycle activities during asset creation, acquisition, enhancement including design, modification, procurement, construction and commissioning.
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?	3	Powerco has a clearly structured process for controlling the implementation of asset management plans. This includes dedicated regional resources to liaise with service providers, and prescribed work instructions agreed with service providers. A field audit programme is in place that is implemented through independent auditors who report non-compliance. Service provider KPIs are strongly lined to the proper application of work instructions. The KPIs are made available through the Gas Contractor Portal, and discussed on a monthly basis in contracts meetings.	Having documented process(es) which ensure the asset management plan(s) are implemented in accordance with any specified conditions, in a manner consistent with the asset management policy, strategy and objectives and in such a way that cost, risk and asset system performance are appropriately controlled is critical. They are an essential part of turning intention into action (e.g., as required by PAS 55 s 4.5.1).	Asset managers, operations managers, maintenance managers and project managers from other impacted areas of the business	Documented procedure for review. Documented procedure for audit of process delivery. Records of previous audits, improvement actions and documented confirmation that actions have been carried out.
95	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	2	Our Defect process provides us with essential detailed information on assets. Defects are captured within our ERP and are utilised to scructure our maintenance plans and fault/reactive works. Further work aims to feed the defect status of our assets into strategic asset planning. Chapter 4 outlines the AM objectives that are embedded in our asset management strategies. Many of these provide indications of our asset performance and condition. Assets which condition is critical for the deployment of the asset strategy have been identified through risks analysis.	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).

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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.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Gas 2020	Evidence—Summary	Why	Who	Record/documented Information
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?	3	A new safety and incident managemetn tool has been rolled out. The incident process, which has been rolled out to all our contractors, requries all incidents to be entered intot he new too. The new tool will then allocate the task of assessing, investigating (if required) and closing out the incident; for example, an asset failure will be allocated to asset strategy to assess, a third party damage will be allocated to the maintenance team to assess, etc. A strong focus has been placed on KPIs reporting around safety metrics, and they are reviewed monthly at various levels of management. Powerco has invested in expanding its Health and Safety team and in environmental compliance. Given the level of importance of this area, we continually aim to improve internal communication and making sure responsibilities for investigating incidents and their authorities are absolutely clear throughout the organisation. We currently have a process in place where investigations are held on a case-by-case basis by the Gas Operations team, with the support of our internal Health, Safety, Environment and Quality team.	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.
105	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	2	Powerco currently audit only the field activities and public safety activities. This is currently achieved through independent auditors who report non-compliance of work instructions. We will be looking to expand auditing across other appropriate asset related activities in the short to medium term. We also carry independent review of our asset management system against ISO55000, as the one completed in April 2018.	This question seeks to explore what the organisation has done to comply with the standard practice AM audit requirements (e.g., the associated requirements of PAS 55 s 4.6.4 and its linkages to s 4.7).	The management team responsible for its asset management procedure(s). The team with overall responsibility for the management of the assets. Audit teams, together with key staff responsible for asset management. For example, Asset Management Director, Engineering Director. People with responsibility for carrying out risk assessments	The organisation's asset-related audit procedure(s). The organisation's methodology(s) by which it determined the scope and frequency of the audits and the criteria by which it identified the appropriate audit personnel. Audit schedules, reports etc. Evidence of the procedure(s) by which the audit results are presented, together with any subsequent communications. The risk assessment schedule or risk registers.
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?	2	Powerco has established processes that identify and address safety and field audit issues. Identified issues are assessed for risk levels and, if required, appropriate actions are programmed. Further work needs to be done around rolling the process out to asset failures.	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	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	Continual Improvement	How does the organisation achieve continual improvement in the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle?	3	As part of the ISO55000 accreditation works, a formalised Improvement Plan has been developed for formal wortks to improve our AMS. This process is being assesse to be utilised for other BAU improvements. Current asset management performance is assessed and gaps used to drive improvement programmes. An example of this is the suite of improvement projects that have been planned as a result of the assessments identifying that an improvement in asset information is needed. Additionally, our service provider arrangements have been driven by identification of opportunities to reduce costs and improve asset management delivery. Powerco has a strong culture of continuous improvement supported by a dedicated team, as a result improvement opportunities are looked for in all areas of our asset management processes continually.	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.

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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
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.
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.

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2020 – 30 September 2030**
Asset Management Standard Applied	**ISO55001: 2014**

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
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.

A3.7 SCHEDULE 14A: MANDATORY EXPLANATORY NOTES ON FORECAST INFORMATION

Company Name Powerco Limited

For Year Ended 30 September 2020

1. This schedule requires GDBs to provide explanatory notes to reports prepared in accordance with clause 2.6.6.
2. This schedule is mandatory—GDBs must provide the explanatory comment specified below, in accordance with clause 2.7.2. This information is not part of the audited disclosure information, and so is not subject to the assurance requirements specified in section 2.8.

Commentary on difference between nominal and constant price capital expenditure forecasts (Schedule 11a)

3. In the box below, comment on the difference between nominal and constant price capital expenditure for the current disclosure year and the 10-year planning period, as disclosed in Schedule 11a.

Box 1: Commentary on difference between nominal and constant price capital expenditure forecasts

The index used to translate nominal $ forecasts into constant $ forecasts is the Statistics NZ CPI (All Groups). The CPI index applied is the annual average rate of increase based on the CPI index predictions included in the NZIER Quarterly Predictions from June 2020.

For example, the index used for the year ending 30 September 2020 is based on the annual average movement using CPI predictions (actuals where available) as follows:

(Q1 RY20 + Q2 RY20 + Q3 RY20 + Q4 RY20)/(Q1 RY19 + Q2 RY19 + Q3 RY19 + Q4 RY19).

Commentary on difference between nominal and constant price operational expenditure forecasts (Schedule 11b)

In the box below, comment on the difference between nominal and constant price operational expenditure for the current disclosure year and the 10-year planning period, as disclosed in Schedule 11b.

Box 2: Commentary on difference between nominal and constant price operational expenditure forecasts

The index used to translate nominal $ forecasts into constant $ forecasts is the Statistics NZ CPI (All Groups). The CPI index applied is the annual average rate of increase based on the CPI index predictions included in the NZIER Quarterly Predictions from June 2020.

For example, the index used for the year ending 30 September 2020 is based on the annual average movement using CPI predictions (actuals where available) as follows:

(Q1 RY20 + Q2 RY20 + Q3 RY20 + Q4 RY20)/(Q1 RY19 + Q2 RY19 + Q3 RY19 + Q4 RY19).

POWERco

Network Asset Management Policy

Powerco's vision is to be a reliable partner, delivering New Zealand's energy future. Effective asset management is the cornerstone for the delivery of our vision and underpins our approach at all levels of the organisation.

We will strive to achieve the following asset management outcomes:

- Positioning the safety of the public, our staff and contractors as paramount
- Developing our networks in a way that delivers to the evolving needs of our customers
- Supporting environmentally sustainable and ethical practice, through the selection and life-cycle management of our assets
- Delivering a cost-effective service by optimising asset cost, risk and performance
- Being proactive, transparent, and authentic in our interactions with our stakeholders
- Meeting all statutory and regulatory obligations

We will achieve these asset management outcomes by:

- Developing and maintaining an Asset Management System (AMS) for each of our Electricity and Gas networks, integrated with Powerco's existing management systems
- Preparing and delivering to our plans set out in our Asset Management Plans
- Obtaining ISO 55001 certification by the end of CY 2020
- Managing data as an important asset and implementing a data management governance framework that supports asset management decisions
- Continually enhancing our asset management capability and skills over time
- Recognising the importance of our people and their development

Members of the Executive Management Team are accountable for resourcing, and delivering the outcomes of this policy as follows:

- As representatives of the Asset Owner, the Executive Management Team is responsible for setting the Asset Management Policy
- The Asset Management and Network Transformation General Manager shall own the Electricity AMS and alongside the Service Delivery and Systems Operations General Manager shall be jointly responsible to deliver the outcomes of this policy in the Electricity division
- The General Manager (Gas) shall own the Gas AMS and shall be responsible to deliver the outcomes of this policy in the Gas division
- Further roles and responsibilities will be documented in the respective Asset Management Systems

We strive to be New Zealand's leading asset manager, enabling us to provide excellent customer service, and a consistently safe, reliable and cost-effective service.

Nigel Barbour
Chief Executive

Policy – 350P001
Version 3 – 27 May 2019

APPENDIX 5 RELEVANT LEGISLATION

Powerco is accountable for complying with laws that are relevant to, or contain obligations for, our asset management approach. The key instruments include:

- Gas Act 1992
- Gas (Safety and Measurement) Regulations 2010
- Gas (Statistics) Regulations 1997
- Gas (Levy of Industry Participants) Regulations 2012
- Gas Governance (Compliance) Regulations 2008
- Gas Governance (Critical Contingency Management) Regulations 2008
- Gas (Switching Arrangement) Rules 2008
- Gas (Downstream Reconciliation) Rules 2008
- Gas Industry Company Determinations, Guidelines and Notices
- Commerce Act 1986 (Part 4)
- Customer Guarantees Act 1993
- Fair Trading Act 1986
- Government Roading Powers Act 1989
- Utilities Access Act 2010
- Railways Act 2005
- Cadastral Survey Act 2002
- Health and Safety at Work Act 2015
- Resource Management Act 1991
- Civil Defence Emergency Management Act 2002
- Local Government Act 2002
- Heritage New Zealand Pouhere Taonga Act 2014
- Privacy Act 1993

The Executive Management Team (comprised of the Chief Executive and his direct reports), is accountable for the organisation to fulfil compliance and issue an annual compliance statement.

APPENDIX 6 GENERAL NETWORK RISK ISSUES

For each hazard described in the table below, we describe what are the risks associated, their controls and risk level after mitigation.

HAZARDS	DETAILS
Gas release	Gas is released into the atmosphere (this is associated with the loss of structural integrity)
Gas release in an insufficient ventilated space	Gas is released and reaches a critical concentration that can cause asphyxiation or have the potential to be ignited if an energy source is present.
Fire and explosion	Gas is released, reaches a critical concentration and an additional energy source is present (i.e. ignition source)
Electricity	People are harmed due to the usage of electrical equipment (e.g. SCADA cabinet) or the presence of stray currents on metallic pipes
Pneumatic energy	The gas conveyed through the network is pressurised
Third-party interference	Assets are damaged or operated by an unauthorised person, including vandalism
Environmental conditions and natural disasters	Assets are damaged during earthquakes, volcanic eruptions, lahars, thunderstorms, flooding, tsunami or landslides
Heights	People are harmed by falling, slipping or tripping on the asset
Hazardous material	Assets are made of hazardous material
Confined spaces	Assets are located in a confined space

Risks are rated against six different levels that are dependent of their likelihood and their consequence as per the following table:

		Consequence						
		1. Negligible	**2. Minor**	**3. Moderate**	**4. Serious**	**5. Major**	**6. Severe**	**7. Catastrophic**
Likelihood	10. Daily	Low	Medium	Extreme	Extreme	Extreme	Extreme	Extreme
	9. Weekly	Low	Low	Very High	Extreme	Extreme	Extreme	Extreme
	8. Monthly	Very Low	Low	High	Very High	Extreme	Extreme	Extreme
	7. Probable	Very Low	Very Low	Medium	High	Very High	Extreme	Extreme
	6. Possible	Very Low	Very Low	Medium	High	High	Very High	Extreme
	5. Unlikely	Very Low	Very Low	Low	Medium	High	Very High	Extreme
	4. Rare	Very Low	Very Low	Low	Medium	Medium	High	Very High
	3. Improbable	Very Low	Very Low	Low	Low	Medium	High	Very High
	2. Highly improbable	Very Low	Very Low	Very Low	Low	Low	Medium	High
	1. Barely credible	Very Low	Very Low	Very Low	Very Low	Low	Low	Medium

A6.1 RISKS ASSOCIATED WITH GAS RELEASE

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**GMS equipment venting**	Overpressure on the inlet that causes physical damage to the equipment	− Overpressure protection installed at DRS − Regulators and DRS settings, inspection and maintenance plans	3. Improbable	3. Moderate	Low
2	**Faulty GMS equipment**	Due to a fault (e.g. seat or diaphragm failure), GMS equipment releases gas	− Equipment choice (token relief or full release equipment) − Regular inspection and maintenance of venting equipment	4. Rare	2. Minor	Very Low
3	**Contamination**	Presence of contamination on the network preventing the good operation of regulators	− Equipment choice (token relief or full release equipment) − Regulator maintenance on GMS and DRS (filter inspection) − Construction procedures	3. Improbable	2. Minor	Very Low
4	**DRS equipment venting**	Overpressure on the inlet that causes physical damage to the equipment	− Equipment rating − Pressure control and protection on upstream networks − Regulators and DRS settings, inspection and maintenance plans − Operational agreement with TSO	3. Improbable	3. Moderate	Low
5	**Faulty DRS equipment**	Due to a fault (e.g. seat or diaphragm failure), DRS equipment releases gas	− Equipment choice (token relief or full release equipment) − Regular inspection and maintenance of equipment	3. Improbable	3. Moderate	Low
6	**Corrosion on IP steel pipeline**	Leak on an IP steel pipeline due to corrosion	− Wall thickness − Corrosion protection (wrapping, cathodic protection) − Steel pipeline integrity plan	5. Unlikely	3. Moderate	Low
7	**Corrosion on MP or LP steel pipeline**	Leak on an MP or LP steel pipeline due to corrosion	− Wall thickness − Corrosion protection (wrapping, cathodic protection) − Steel pipeline integrity plan	7. Probable	2. Minor	Very Low
8	**Deterioration on PE 80 pipeline**	Leak on a PE pipeline due to wear or brittle material	− Wall thickness − Material choice	3. Improbable	2. Minor	Very Low
9	**Deterioration on PE 100 pipeline**	Leak on a PE pipeline due to wear or brittle material	− Wall thickness − Material choice	3. Improbable	3. Moderate	Low
10	**Slow plastic deformation of a PE pipeline**	Leak on a PE pipeline due to deformation related to pressure cycles	− Material choices	2. Highly improbable	2. Minor	Very Low
11	**Sudden deformation of a PE pipeline**	Leak on a PE pipeline due to overpressure on the network creating a permanent deformation of the pipe	− Material choice (pipe rating) − DRS design, maintenance and inspection to prevent overpressure	2. Highly improbable	4. Serious	Low
12	**Squeeze-off on PE pipeline**	Leak on a PE pipeline due to a plastic deformation following a squeeze-off	− Isolation procedures and equipment	6. Possible	2. Minor	Very Low
13	**Stress point failure on pipeline**	Leak on a PE pipeline due to stones, vegetation, other utilities, etc.	− Backfill material − Clearance standards − Stand-over, work permit and preparation standards	8. Monthly	2. Minor	Low

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
14	**Mechanical joint degradation**	Leak on a mechanical joint due to age	− Construction standards recommending electrofusion, flange joints, fully automatic butt joining and the limitation of joints − Replacement policy for mechanical joints − Pipeline integrity plan	6. Possible	2. Minor	Very Low
15	**Stress on mechanical joint**	Leak at a mechanical joint due to stress created by ground movement (temperature cycles, traffic, etc.)	− Construction standards recommending electrofusion, flange joints, fully automatic butt joining and the limitation of joints − Pipeline integrity plan	5. Unlikely	3. Moderate	Low
16	**Plastic fused joint degradation**	Leak at plastic fused joint due to age	− Jointing techniques and procedures (including pressure testing) − Pipeline integrity plan	6. Possible	2. Minor	Low
17	**Steel welded joint degradation**	Leak at steel welded joint due to age	− Jointing techniques and procedures (including non-destructive testing) − Pipeline integrity plan	3. Improbable	4. Serious	Low
18	**Electro-fusion joint degradation**	Leak at plastic electro-fusion joint due to age	− Jointing techniques and procedures (including pressure testing) − Pipeline integrity plan	3. Improbable	2. Minor	Very Low
19	**Valve degradation**	Leak at a valve due to wear or age	− Regular inspection and lubrication	8. Monthly	2. Minor	Low
20	**Third-party damage on IP pipeline**	Leak on a network asset running at IP after third-party damage. The asset doesn't leak at the time, it creates a dent on the pipeline or a damage to the coating.	− Location and record of underground assets − Depth of burial − Wall thickness − Signage − TPD prevention	4. Rare	3. Moderate	Low
21	**Third-party damage on IP pipeline**	Third party damage on IP pipeline causes immediate minor leak.	− Location and record of underground assets − Network material − Depth of burial − Signage − TPD prevention and site support	3. Improbable	4. Serious	Low
22	**Third-party damage on LP or MP**	Leak on a network asset running at LP or MP after third-party damage. The asset didn't leak at the time, it created a dent on the pipeline or a damage to the coating.	− Location and record of underground assets − Depth of burial − Physical protection − Signage − TPD prevention	8. Monthly	2. Minor	Low

A6.2 RISKS ASSOCIATED WITH GAS RELEASE IN AN INSUFFICIENT VENTILATED LOCATION

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Undetected gas release by venting (see gas release)**	An equipment vents gas that is not detected until it reaches high concentration in air	− Gas odorisation − Regulators, DRS and equipment maintenance − Response time to emergency − Public education, including signage on gas assets and retailer safety messages − Discharge point design	3. Improbable	4. Serious	Low
2	**Enclosed spaces**	Natural gas leaks or travels to an insufficiently ventilated enclosed space where it accumulates and subsequently causes asphyxiation	− Gas odorisation − Location standards − Discharge point design − Leak survey	3. Improbable	5. Major	Medium
3	**Unenclosed spaces**	Natural gas leaks or travels to an insufficiently ventilated unenclosed space where it accumulates and subsequently causes asphyxiation	− Gas odorisation − Location standards − Pressure protection equipment − Leak survey	3. Improbable	4. Serious	Low
4	**Gas outage**	Gas supply reinstated to the customer without checking the effective operation of the downstream equipment	− Outage and relight management plan (shutdown supply, doorknob notices, etc.)	2. Highly improbable	4. Serious	Low

A6.3 RISKS ASSOCIATED WITH FIRE AND EXPLOSION

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Ignition source**	Gas explosion caused by any ignition source introduced to an explosive condition (approx. 5 to 15% gas: air).	– Network materials – Network design standards – Pressure protection – Odorisation – Clearance around gas equipment – Signage on gas assets	2. Highly improbable	7. Catastrophic	High
2	**Naked flame**	Uncontrolled gas fire caused by any ignition source	– Network materials and network design standards – Odorisation – Signage on gas assets – Public education	3. Improbable	5. Major	Medium
3	**Potential difference of above-ground station**	The potential difference between the assets and workers acts as an ignition source	– Usage of earthing mats – Bonding continuity on assets	2. Highly improbable	5. Major	Low

A6.4 RISKS ASSOCIATED WITH ELECTRICITY

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Stray and inducted currents**	Electric shock caused by low frequency induction on a steel pipeline.	– Design standards – Procedures to work on steel pipelines at risk – Installation of PCR (Polarisation Cells Replacement) – Installation of isolation points	3. Improbable	4. Serious	Low
2	**Stray and inducted currents**	Electric shock from Earth Potential Rise (EPR).	– Procedures to work on steel pipelines at risk – Coating standards – Electrical standards	3. Improbable	5. Major	Medium
3	**Live lines**	Electrocution caused by live line coming in direct contract with above ground asset	– Clearance standards – Signage	3. Improbable	5. Major	Low
4	**Electrical appliances**	Electrical appliances bonded to the network by electrician	– Electrical isolation of the network – Bonding procedures	3. Improbable	4. Serious	Low
5	**Electrical network equipment**	Presence of electrical equipment on the network (e.g. SCADA)	– Construction to standards – Usage of competent electrician – Signage	3. Improbable	4. Serious	Low

A6.5 RISKS ASSOCIATED WITH PNEUMATIC ENERGY

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Asset failure**	The pressure within the network cause assets to fail and to act as projectile	− Material standards − Isolation procedures − Physical protection − Choice of operating pressure	4. Rare	3. Moderate	Low

A6.6 RISKS ASSOCIATED WITH THIRD PARTY INTERFERENCE

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Third-party excavations (LP or MP pipeline)**	Third party damage on LP or MP pipeline causes an immediate leak	− TPD prevention plan − Work permits, stand-overs, plan issues − Odorisation − Location and records − Separation − Signage	10. Daily	2. Minor	Medium
2	**Third-party excavations (IP pipeline)**	Hit on underground asset running at IP by machinery (e.g. digger) leading to a pipeline rupture	− TPD prevention plan − Work permits, stand-overs, plan issues − Location and records − Separation − Signage	4. Rare	5. Major	Medium
3	**Third-party excavations (IP pipeline)**	Third party damage on IP pipeline causes immediate minor leak	− TPD prevention plan − Work permits, stand-overs, plan issues − Location and records − Physical protection − Separation − Signage	3. Improbable	4. Serious	Low
4	**Vehicles**	Live gas asset damage caused by vehicle impact	− Location − Physical protection − Pipe material	2. Highly improbable	5. Major	Low

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
5	**Usage of tools**	Hit on underground asset by tools	− TPD prevention plan − Work permits, stand-overs, plan issues − Depth of burial − Physical protection − Separation − Signage	8. Monthly	2. Minor	Low
6	**Light vehicles**	Hit on above-ground asset by a “light” vehicle (e.g. cyclist)	− Location − Physical protection − Pipe material	4. Rare	3. Moderate	Low
7	**Vandalism**	Assets damaged by vandalism	− Location − Physical protection and locks − Pipe material − Security check as part of the maintenance inspections − SCADA monitoring	4. Rare	2. Minor	Very Low
8	**Terrorism**	Assets damaged in a terrorist action	− Physical protection − Emergency management plan	1. Barely credible	6. Severe	Low
9	**Vegetation**	Vegetation damaging assets	− Location − Physical protection	5. Unlikely	2. Minor	Very Low
10	**Landslips and rock falls**	Foreign objects falling on above-ground assets	− Location − Design (e.g. crib walls, retaining walls, material selection)	4. Rare	2. Minor	Very Low
11	**Other utilities**	Water leak blasting on underground assets	− Clearance from other utilities	4. Rare	3. Moderate	Low
12	**Access to an asset**	Intrusion into an asset site and operation	− Site security − Usage of special tools	2. Highly improbable	3. Moderate	Very Low
13	**Other assets in the vicinity**	Other asset owner changing the operating conditions (e.g. gate station pressure) or altering asset configuration	− SCADA monitoring − Physical protection and locks	2. Highly improbable	5. Major	Low
14	**Operator error**	Network configuration (e.g. pressure) altered because of an operator error	− Works procedures − Training	3. Improbable	3. Moderate	Low
15	**Incorrect information**	Network information is wrong and leads to a wrong operation	− Network records management	3. Improbable	2. Minor	Very Low

A6.7 RISKS ASSOCIATED WITH ENVIRONMENTAL CONDITIONS AND NATURAL DISASTERS

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Asset crossing fault line**	Harm caused by ruptured asset crossing fault line	− Pipe material − Pipeline route assessment − Emergency response plan	2. Highly improbable	6. Severe	Medium
2	**Earth movement during an earthquake**	Asset gets damaged by the earth movement	− Material choice at design stage − Emergency response plan	4. Rare	3. Moderate	Low
3	**External damage during an earthquake**	Foreign objects falling on and damaging above-ground assets	− Physical protection − Clearances − Emergency response plan	3. Improbable	2. Minor	Very Low
4	**Liquefaction**	Liquefaction after an earthquake causing network displacement	− Anchoring − Emergency response plan	4. Rare	2. Minor	Very Low
5	**Volcanic eruption**	Foreign objects and/or ashes falling on above-ground assets	− Physical protection − Clearances − Emergency response plan	2. Highly improbable	2. Minor	Very Low
6	**Lahar**	Above-ground assets damaged by lahars	− Construction standards − Isolation valves − Bridge inspections	2. Highly improbable	2. Minor	Very Low
7	**Lightning**	Electrocution caused by lightning travelling on steel pipeline	− Earthing − Procedures (weather awareness and stop work)	2. Highly improbable	5. Major	Low
8	**Flooding**	Above ground or underground assets damaged by flooding	− Physical protection (above-ground assets) − Clearance and location − Material choice (steel crossings)	3. Improbable	2. Minor	Very Low
9	**Tsunami**	Above-ground asset damaged and underground assets flooded	− Location − Emergency response plan	3. Improbable	4. Serious	Low

A6.8 RISKS ASSOCIATED WITH HEIGHTS

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Above-ground assets in the public space**	Assets can be unnoticed because of their location	− Location − Physical protection	5. Unlikely	3. Moderate	Low
2	**Asset with sharp edge**	Assets might have sharp edges that can lead to harm to the public	− Physical protection − Assets buried − Inspections as part of the maintenance programme	5. Unlikely	3. Moderate	Low
3	**Uneven ground**	Uneven ground or surface due to the presence of assets (e.g. valve lid)	− Inspections as part of the maintenance programme	5. Unlikely	3. Moderate	Low

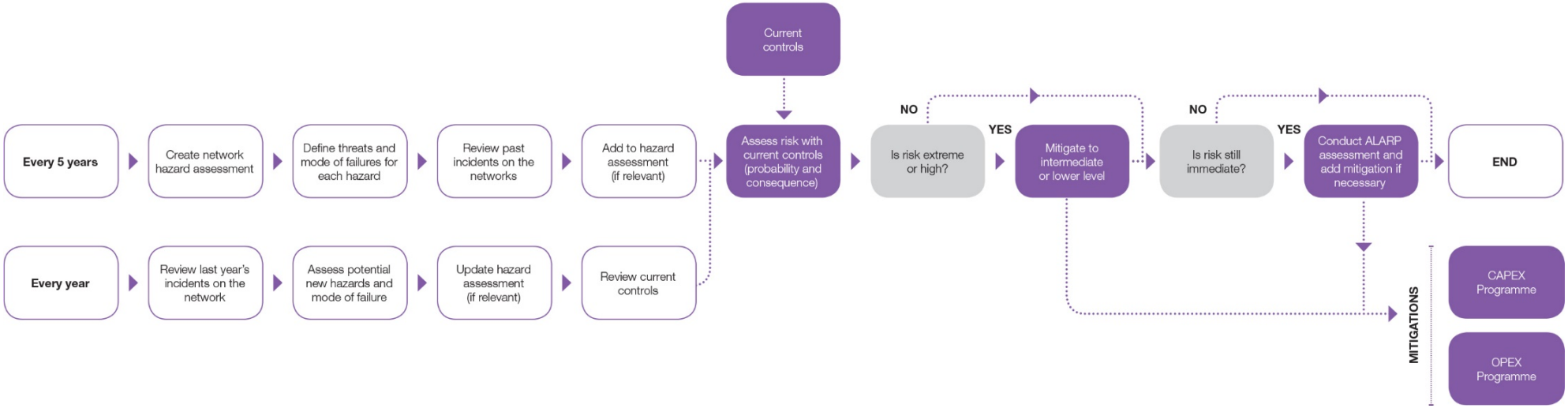
A6.9 RISKS ASSOCIATED WITH HAZARDOUS MATERIALS

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Live pipe is made of hazardous material**	The carrier pipe is made of hazardous material. Contractors can be exposed if they work on the asset.	− Material standards − Replacement programme − Hazard identification process − Work instructions	2. Highly improbable	5. Major	Low
2	**Duct made of hazardous material**	Harm from inhalation or ingestion of hazardous material from exposed duct.	− Material standards − Work instructions − Record management (Hazardous material is recorded in GIS) − Hazard identification process − Information to the wider public (including plan issuing)	3. Improbable	5. Major	Medium

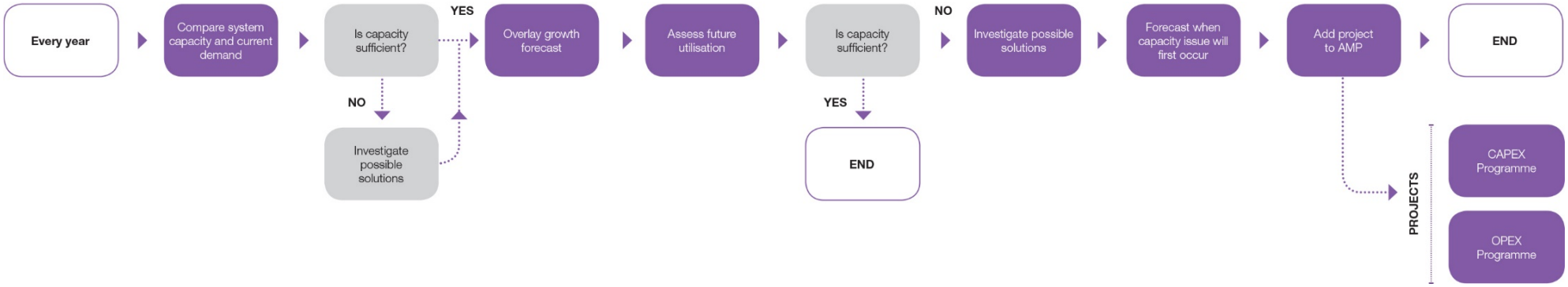
A6.10 RISKS ASSOCIATED WITH CONFINED SPACES

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	**Assets are located in confined spaces**	Operations and inspections of assets take place in a confined space. (NB: the risk of asphyxiation due to the presence of natural gas is already covered under "Gas release in an insufficient ventilated space")	− Location standards (including access restriction) − Hazard identification process − Work instructions and specific PPE − Improvement programme	2. Highly improbable	5. Major	Low

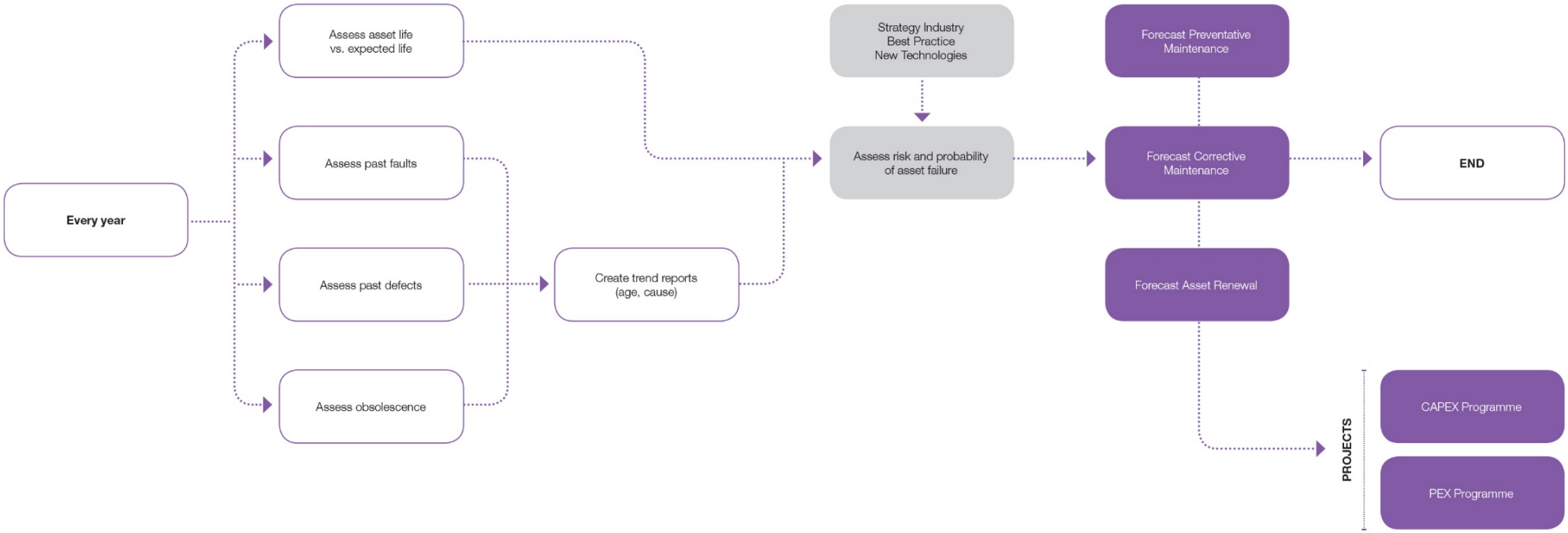
APPENDIX 7 FORMAL SAFETY ASSESSMENT PROCESS MAP



APPENDIX 8 CAPACITY ASSESSMENT PROCESS MAP



APPENDIX 9 RELIABILITY ASSESSMENT PROCESS MAP

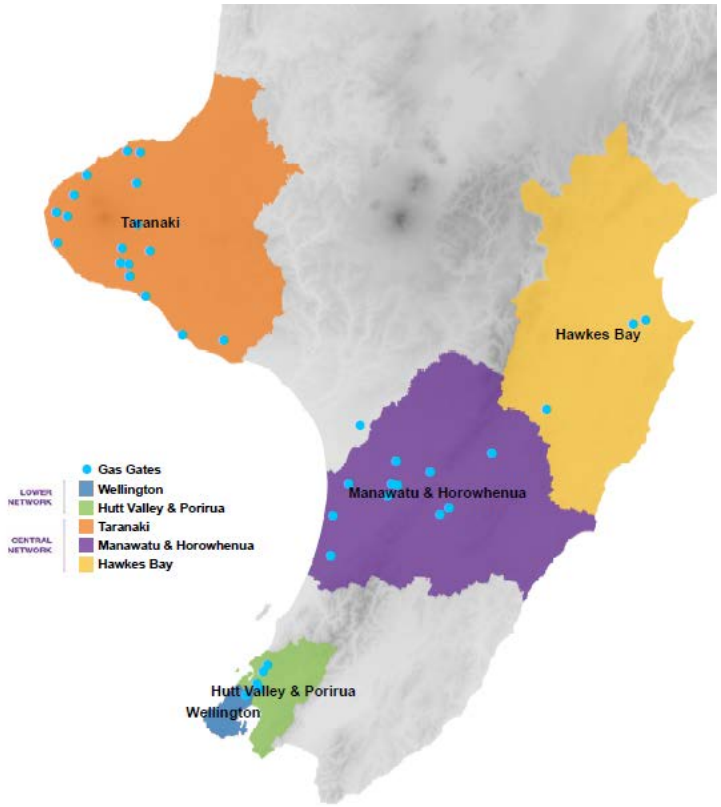


APPENDIX 10 INFORMATION DISCLOSURE SUB-NETWORK CORRELATION

As required within the Gas Distribution Information Disclosure Determination 2012 (IDD), Powerco is required to disclose, for each sub-network, the network configuration. The term 'sub-network' has been defined for Powerco to refer to two specific sub-networks:

1. **Central Network:** Wellington and Hutt Valley & Porirua network assets, and
2. **Lower Network:** Taranaki, Manawatū & Horowhenua and Hawke's Bay network assets.

For the purposes of this AMP, we have network configurations (refer to Table 3.1) in terms of the five regions: Wellington, Hutt Valley & Porirua, Taranaki, Manawatū & Horowhenua and Hawke's Bay. The five regions are how our network assets are managed within our asset management process. However, to aid the correlation between the IDD and this AMP, we have provided the below table that associates the network configurations for sub-networks with the five regions.



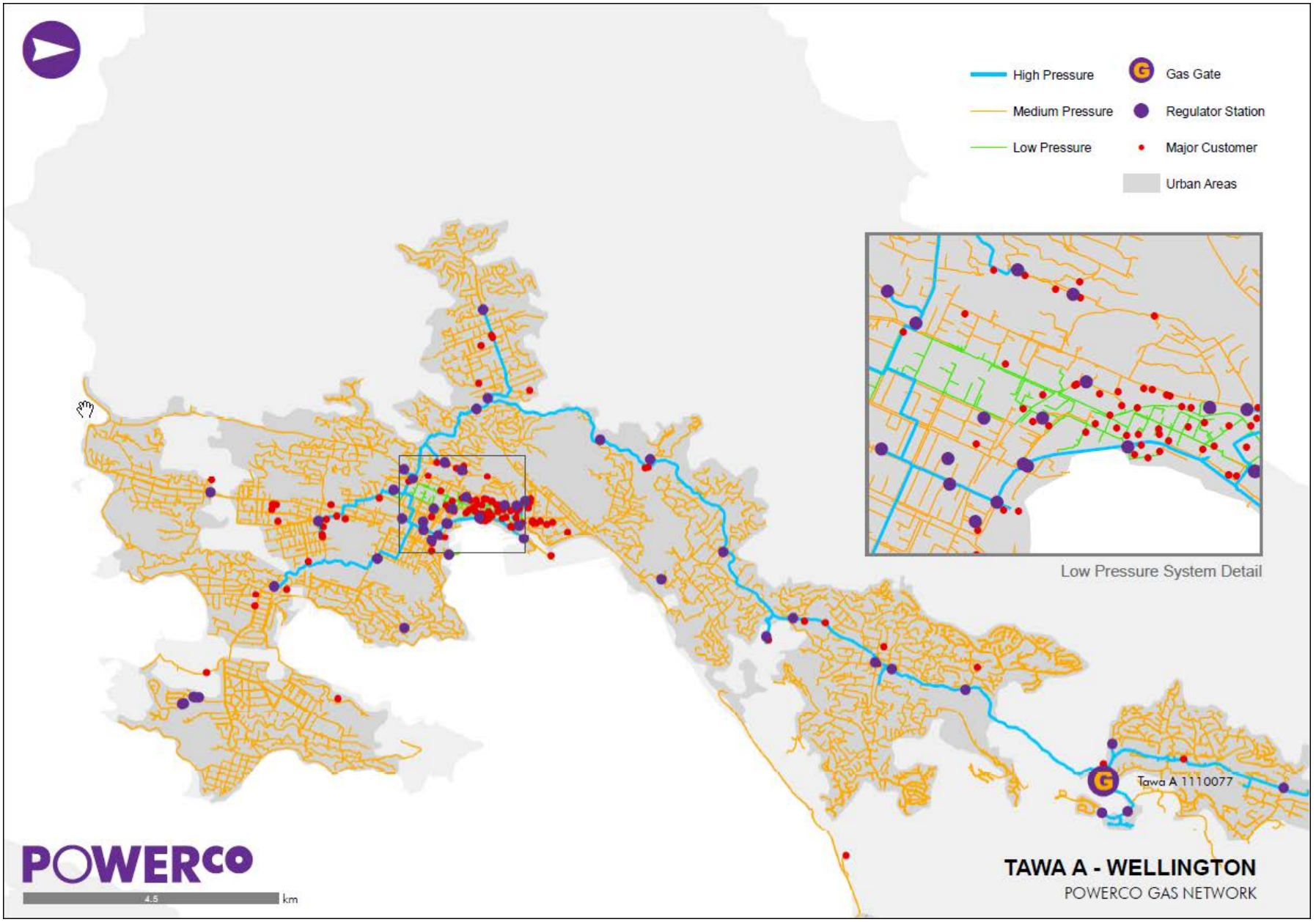
	CENTRAL NETWORK			LOWER NETWORK				TOTAL
	WELLINGTON	HUTT VALLEY & PORIRUA	SUBTOTAL	TARANAKI	MANAWATŪ & HOROWHENUA	HAWKE'S BAY	SUBTOTAL	
Mains Pipes (km)	684	1,207	1891	916	814	382	2112	**4,003**
Service Pipes (km)	470	484	954	386	612	99	1097	**2,051**
Line Valves	675	902	1577	381	408	281	1070	**2,647**
Stations	48	56	104	23	62	10	95	**199**
Special Crossings	27	113	140	102	66	51	219	**359**
Cathodic Protection Systems	7	11	18	17	18	1	36	**54**
SCADA Systems	23	19	42	11	18	6	35	**77**

APPENDIX 11 NETWORK MAPS BY REGION

A11.1 WELLINGTON

Table A11.1.1: Wellington region networks

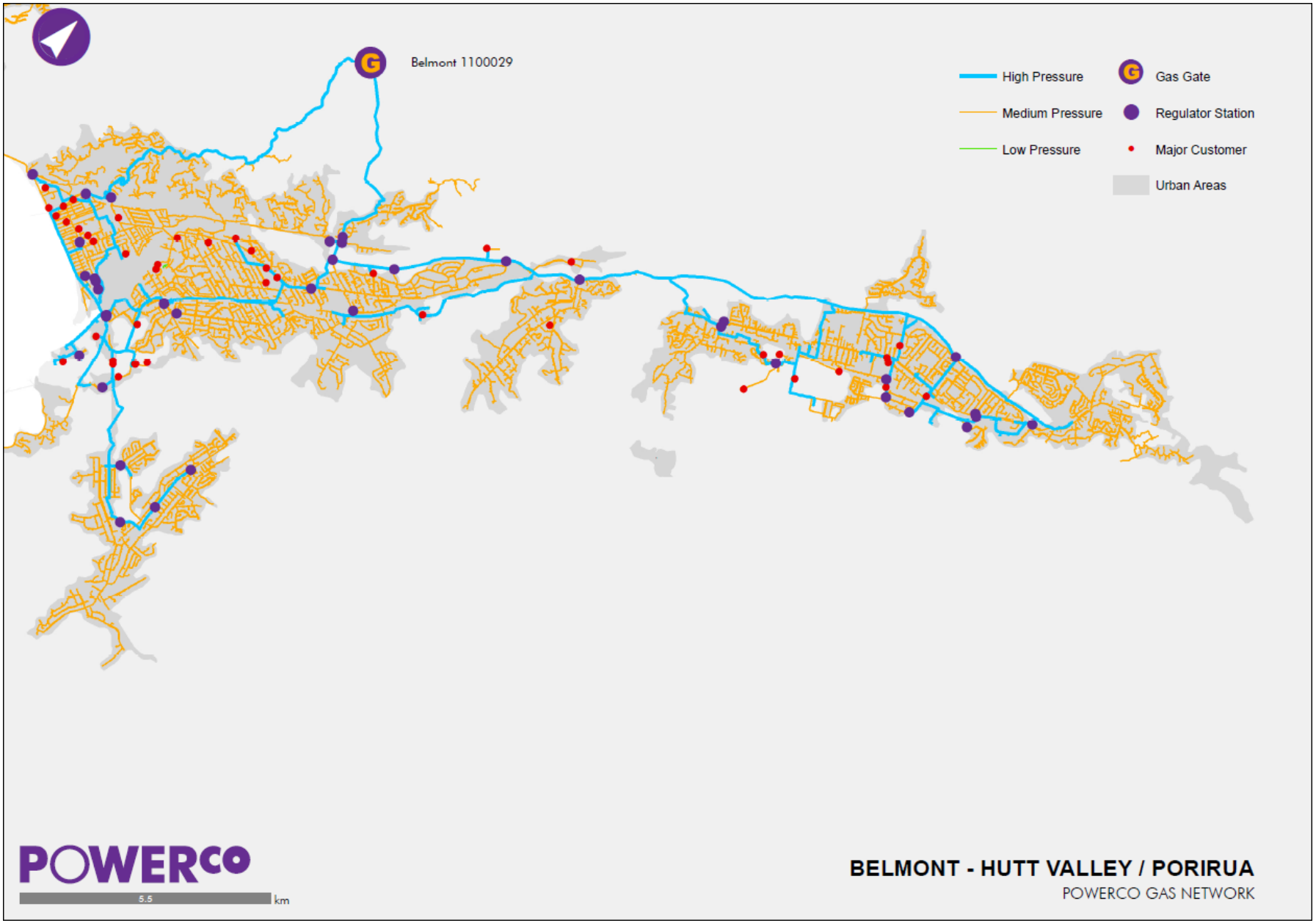
NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CUSTOMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Tawa A	City network supplying a wide range of customers, from residential to large industrials	Res./sml. com.: Commercial: Industrial:	30,947 781 13	IP: MP: LP:	33.0km 1,066.0km 36.8km	524.5GJ/h	2,062.5TJ

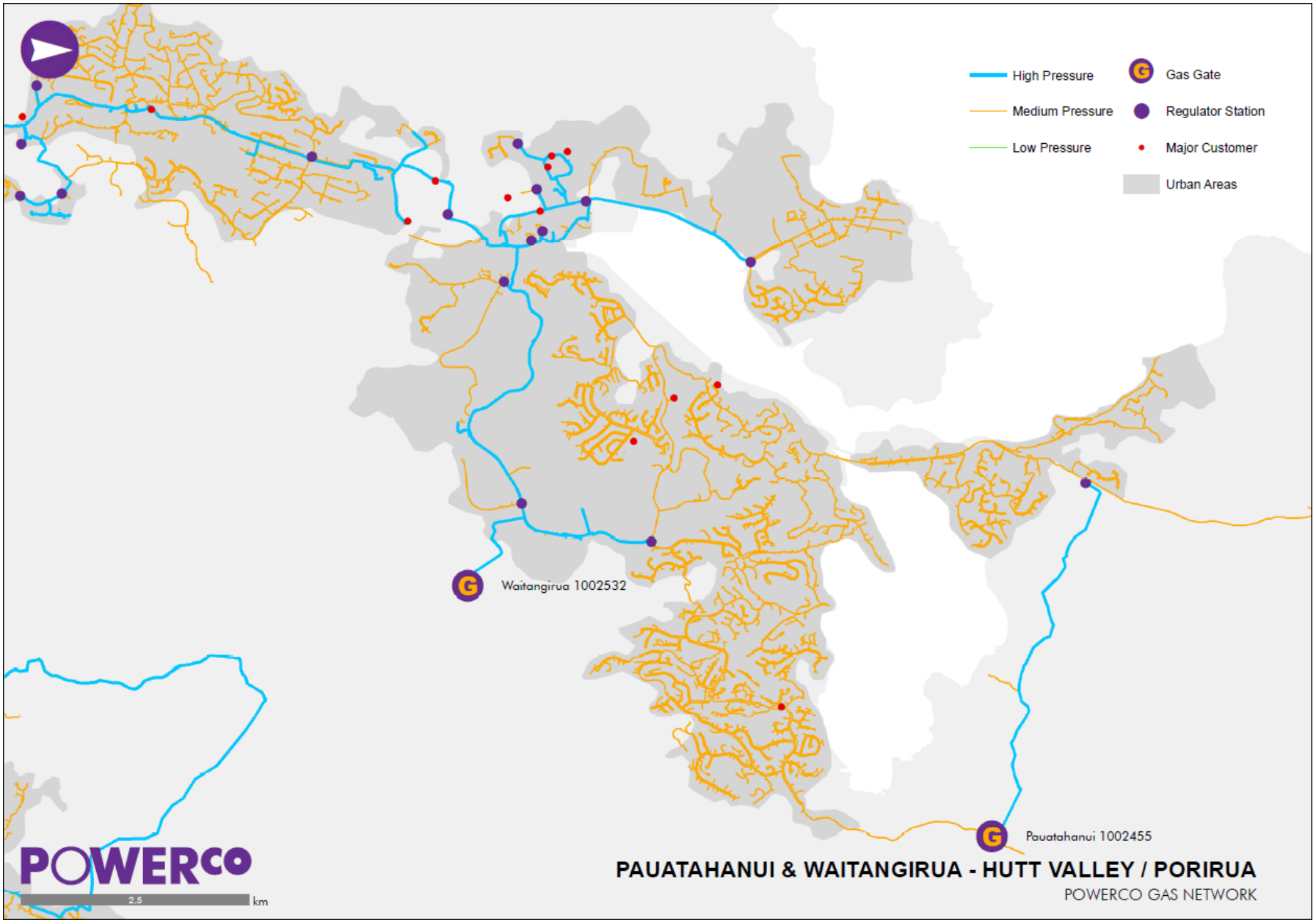

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Low Pressure System Detail
Tawa A 1110077
POWERCO
4.5
km
TAWA A - WELLINGTON
POWERCO GAS NETWORK

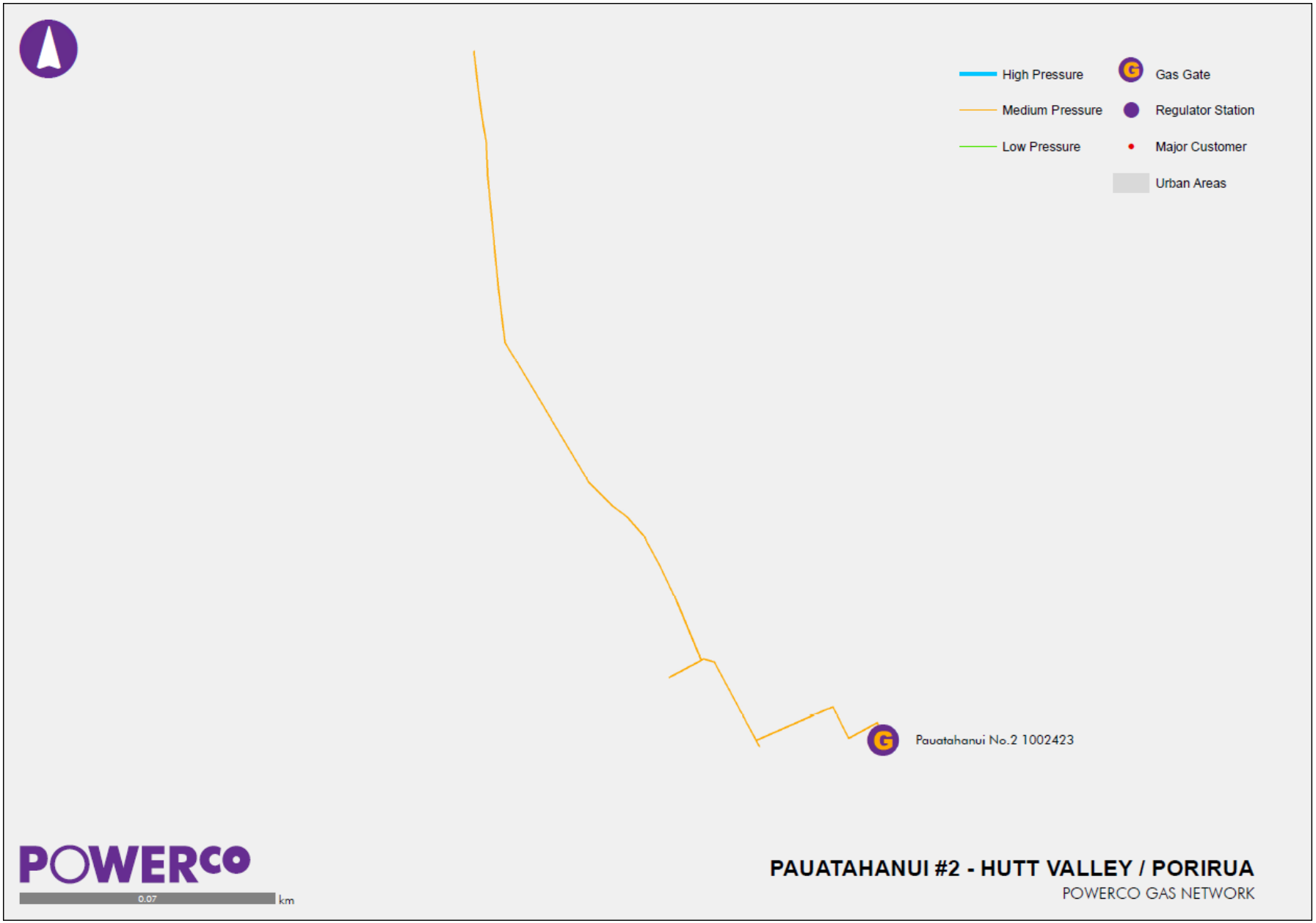
A11.2 HUTT VALLEY & PORIRUA

Table A11.2.1: Hutt Valley & Porirua region networks

NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CUSTOMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Belmont	City network supplying the whole Hutt Valley region, including the industrial areas in Seaview	Res./sml. com.: Commercial: Industrial:	22,935 643 11	IP: MP: LP:	101.0km 1,133.0km 0.8km	338.4GJ/h	1,390.4TJ
Waitangirua & Pāuatahanui #1	City network supplying the northern part of the Wellington region, including Tawa, Porirua and Paremata. Both gas gates are linked in Paremata.	Res./sml. com.: Commercial: Industrial:	7,120 193 4	IP: MP: LP:	34.3km 386.2km 0.1km	78.0GJ/h and 23.2GJ/h	339.9TJ
Pāuatahanui #2	Rural network supplying residential customers	Res./sml. com.: Commercial: Industrial:	4 0 0	IP: MP: LP:	0.0km 0.3km 0km	0.2GJ/h	0.5TJ


Belmont 1100029
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
5.5
km
BELMONT - HUTT VALLEY / PORIRUA
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Waitangirua 1002532
Pauatahanui 1002455
POWERCO
2.5
km
PAUATAHANUI & WAITANGIRUA - HUTT VALLEY / PORIRUA
POWERCO GAS NETWORK

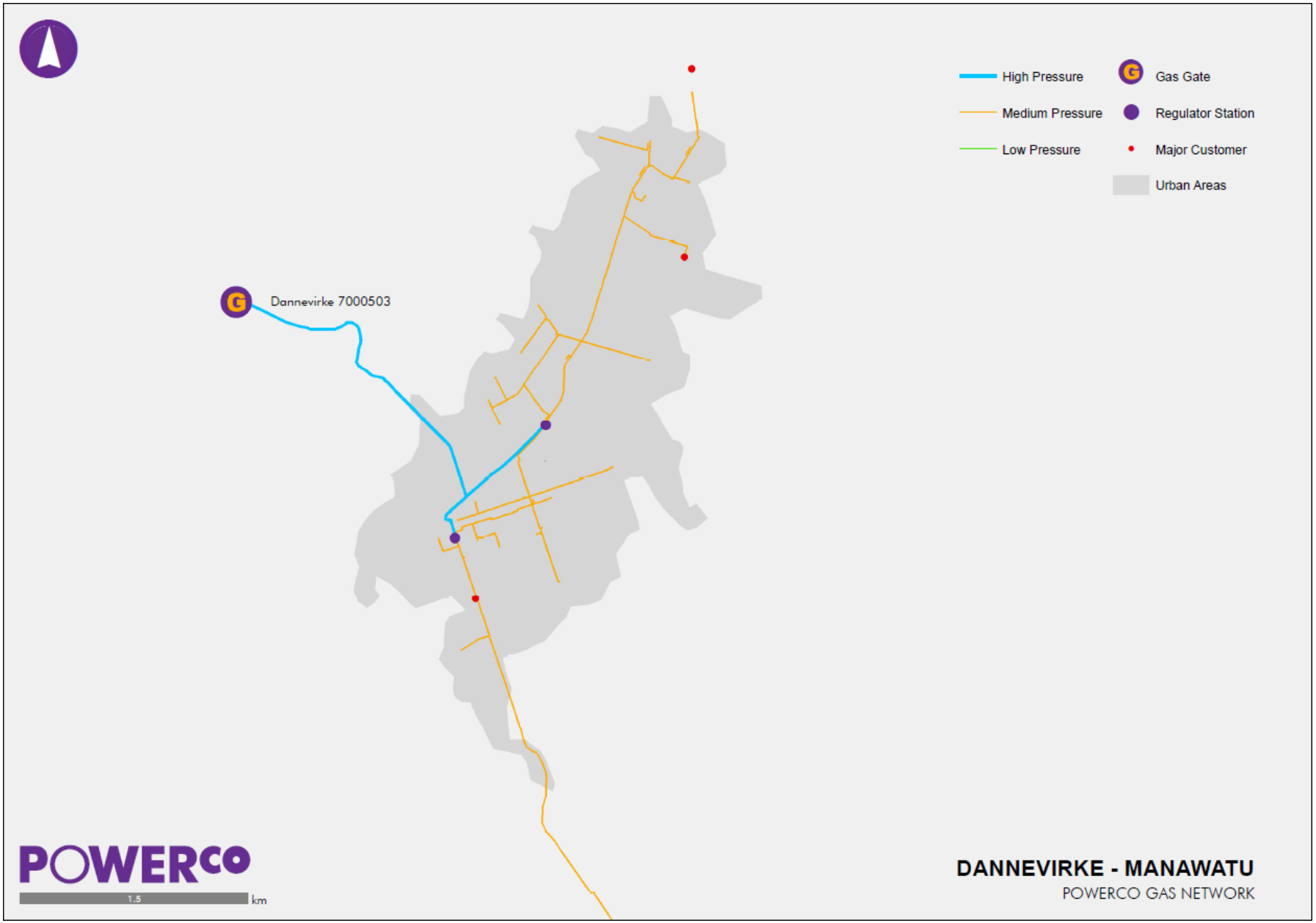

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Pauatahanui No.2 1002423
POWERCO
0.07
km
PAUATAHANUI #2 - HUTT VALLEY / PORIRUA
POWERCO GAS NETWORK

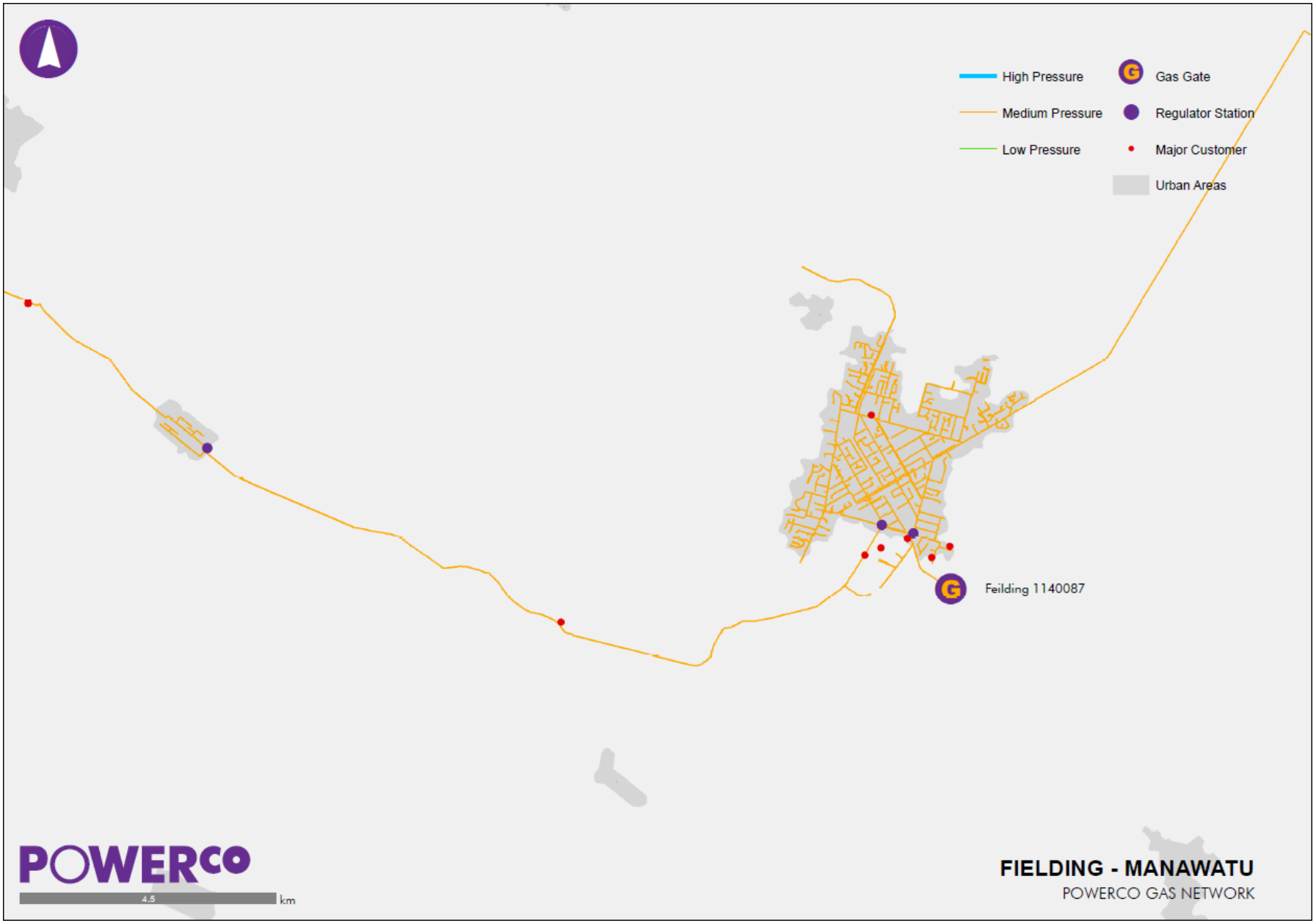
A11.3 **MANAWATŪ** & HOROWHENUA

Table A11.3.1: **Manawatū** & Horowhenua region networks

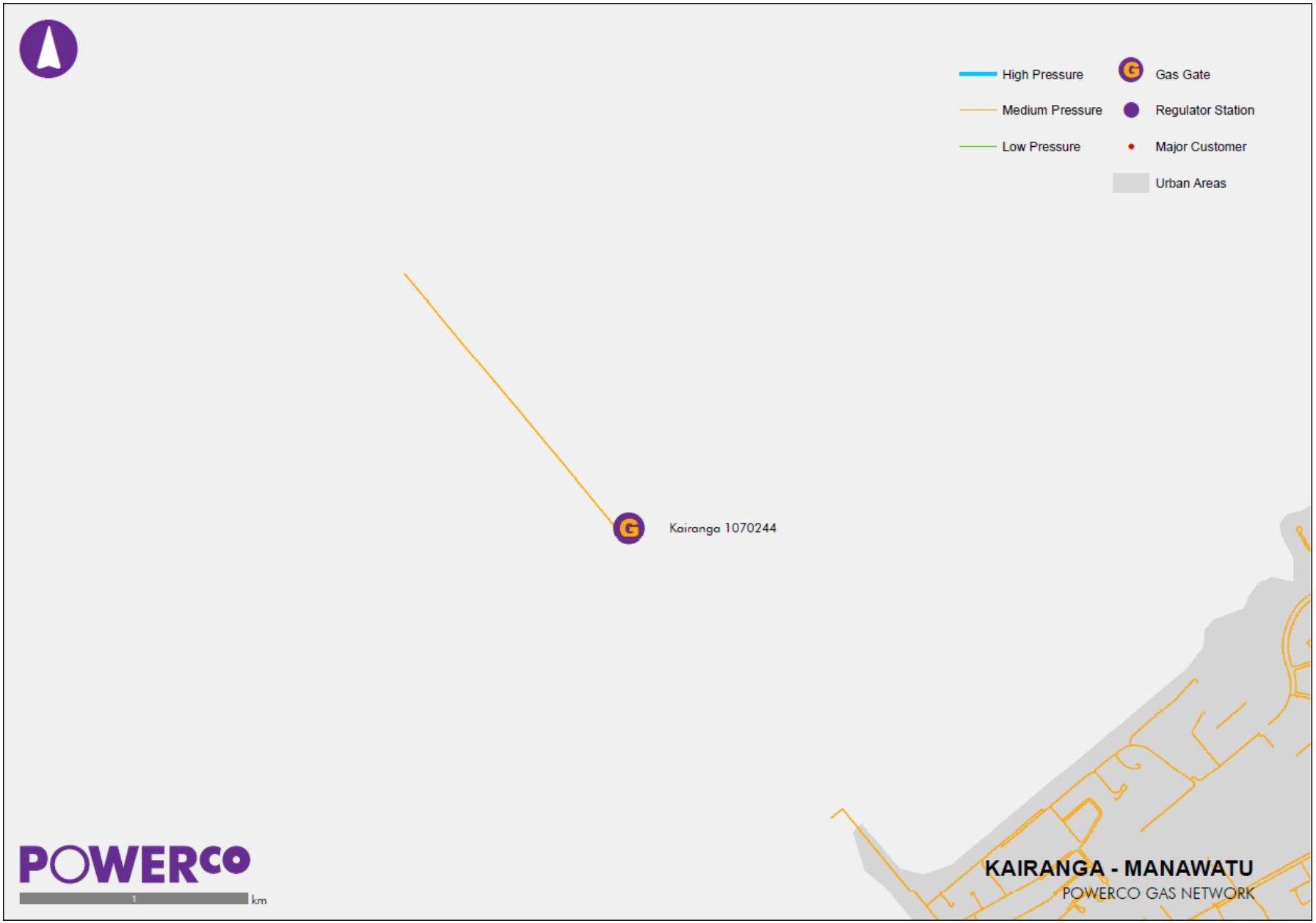
NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CUSTOMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Ashhurst	A small-town network	Res./sml. com.: Commercial: Industrial:	227 5 0	IP: MP: LP:	0.0km 25.2km 0.0km	2.1GJ/h	8.3TJ
Dannevirke	A small-town network also feeding a sawmill and an abattoir	Res./sml. com.: Commercial: Industrial:	89 14 2	IP: MP: LP:	3.4km 17.6km 0.0km	8.6GJ/h	35.1TJ
Feilding	A network supplying two towns, agricultural processing and an air force base	Res./sml. com.: Commercial: Industrial:	1,684 61 6	IP: MP: LP:	0.0km 183.2km 0.0km	44.2GJ/h	189.5TJ
Foxton	A small-town network	Res./sml. com.: Commercial: Industrial:	269 9 1	IP: MP: LP:	1.4km 46.2km 0.1km	9.2GJ/h	31.5TJ
Kairanga	A rural network	Res./sml. com.: Commercial: Industrial:	3 0 1	IP: MP: LP:	0.0km 1.9km 0.0km	0.0GJ/h	0.1TJ
Kākāriki	A rural network supplying a meat works	Res./sml. com.: Commercial: Industrial:	0 1 1	IP: MP: LP:	0.0km 10.2km 0.0km	14.3GJ/h	73.9TJ
Levin	A town network with a number of large commercial and industrial customers	Res./sml. com.: Commercial: Industrial:	2,617 72 5	IP: MP: LP:	0.0km 228.0km 0.1km	56.9GJ/h	260.8TJ
Longburn	A small-town network also feeding a number of industrial customers, a prison and an army base	Res./sml. com.: Commercial: Industrial:	298 6 6	IP: MP: LP:	9.2km 28.9km 0.0km	34.3GJ/h	217.3TJ
Mangatainoka	A rural network supplying a brewery	Res./sml. com.: Commercial: Industrial:	0 0 1	IP: MP: LP:	0.0km 1.2km 0.0km	0.3GJ/h	0.7TJ
Oroua Downs	A rural network supplying a large commercial nursery	Res./sml. com.: Commercial: Industrial:	2 1 0	IP: MP: LP:	0.0km 3.7km 0.0km	8.2GJ/h	5.8TJ
Pahiatua	A small-town network also supplying a large dairy factory	Res./sml. com.: Commercial: Industrial:	86 7 0	IP: MP: LP:	0.0km 12.9km 0.0km	2.2GJ/h	7.9TJ
Palmerston North	City network supplying a wide range of customers, from residential to large industrials	Res./sml. com.: Commercial: Industrial:	14,840 350 7	IP: MP: LP:	12.9km 838.7km 0.6km	208.6GJ/h	879.4TJ
Takapau	A rural network supplying a meat works	Res./sml. com.: Commercial: Industrial:	0 0 1	IP: MP: LP:	4.0km 0.0km 0.0km	19.7GJ/h	79.9TJ

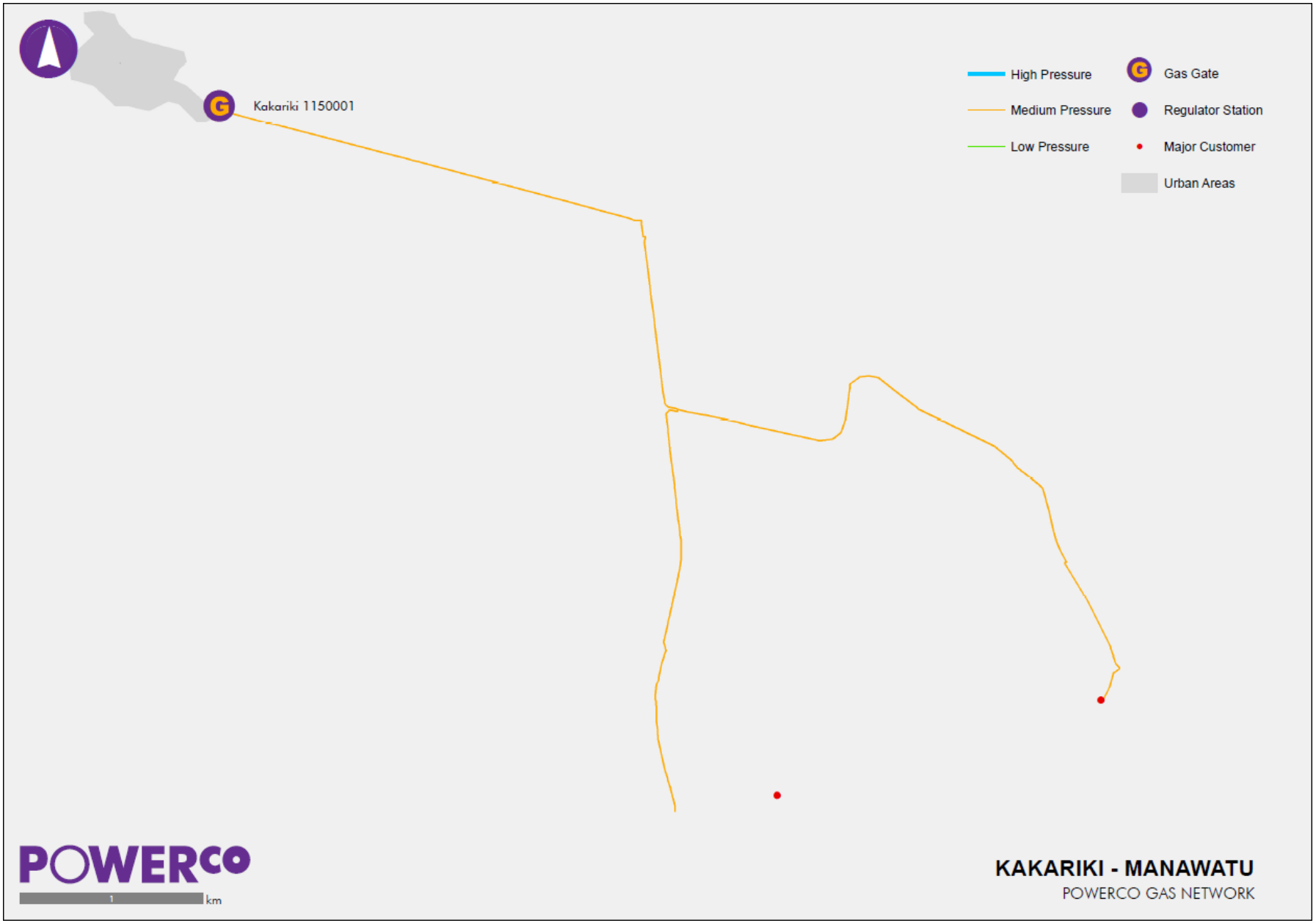

Ashhurst 7050001
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Ashhurst 7050001
POWERCO
0.85
km
ASHHURST - MANAWATU
POWERCO GAS NETWORK

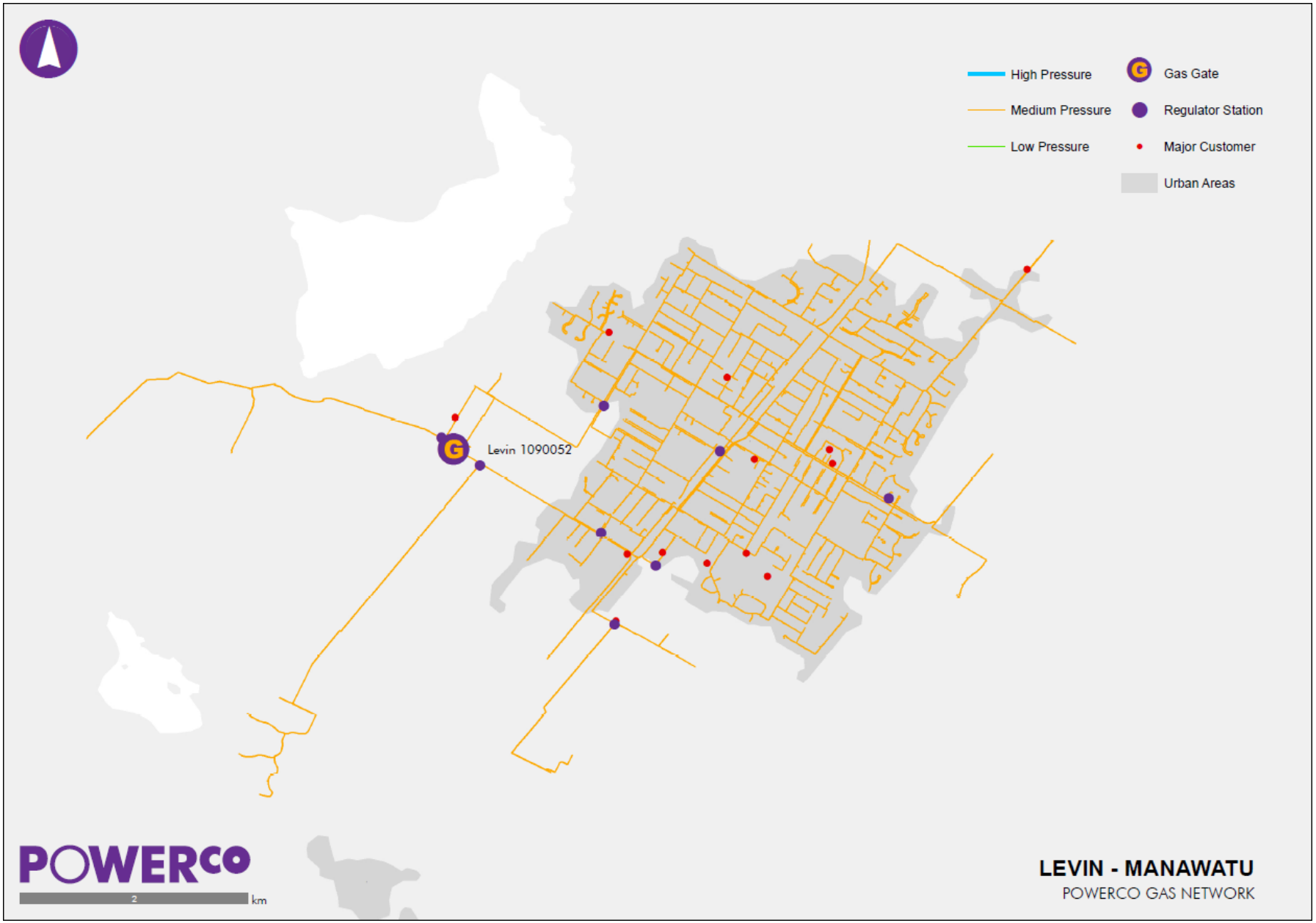

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Dannevirke 7000503
POWERCO
1.5
km
DANNEVIRKE - MANAWATU
POWERCO GAS NETWORK

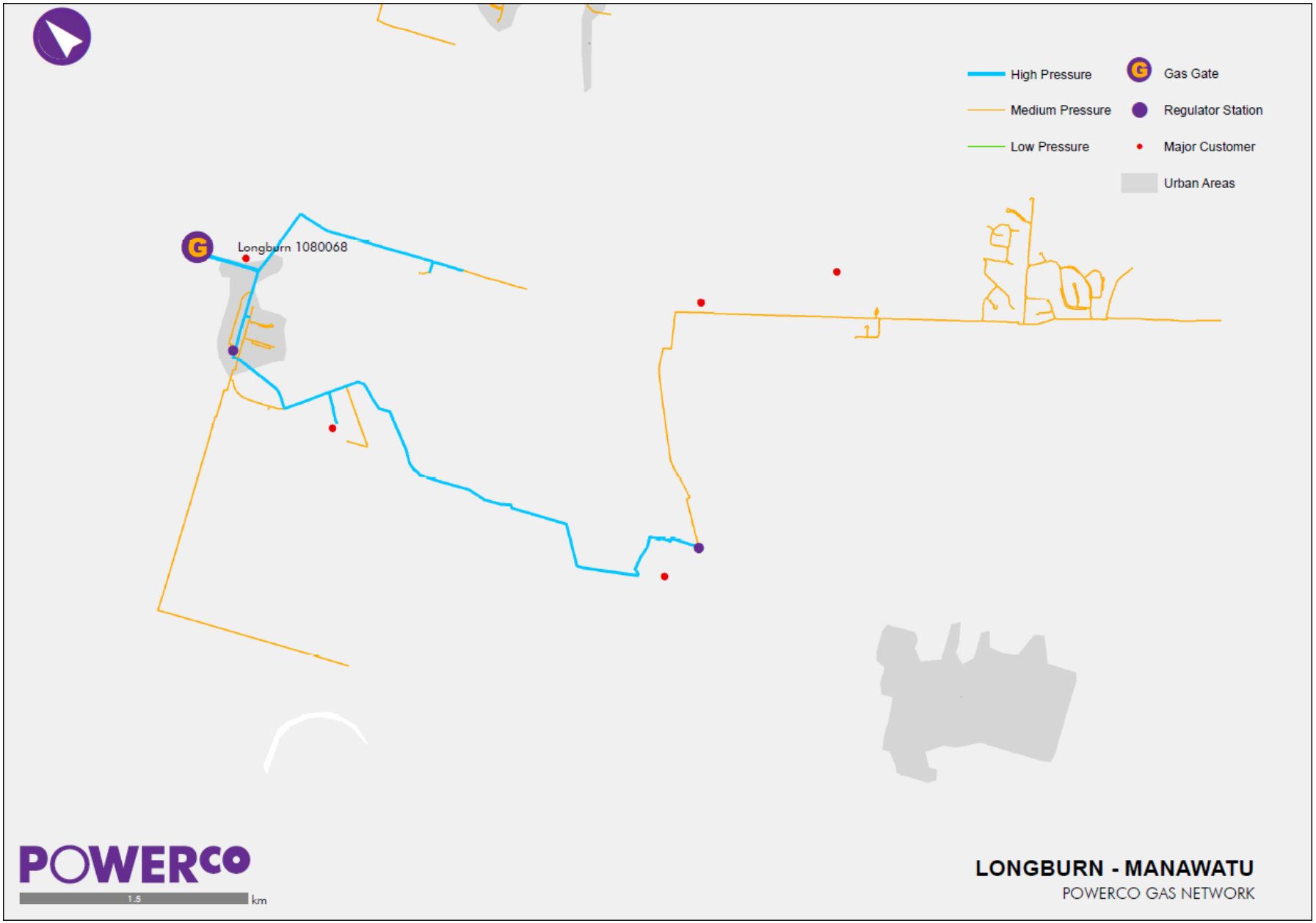

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Feilding 1140087
POWERCO
4.5
km
FIELDING - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Foxton 1001629
POWERCO
km
FOXTON - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Kairanga 1070244
POWERCO
1
km
KAIRANGA - MANAWATU
POWERCO GAS NETWORK

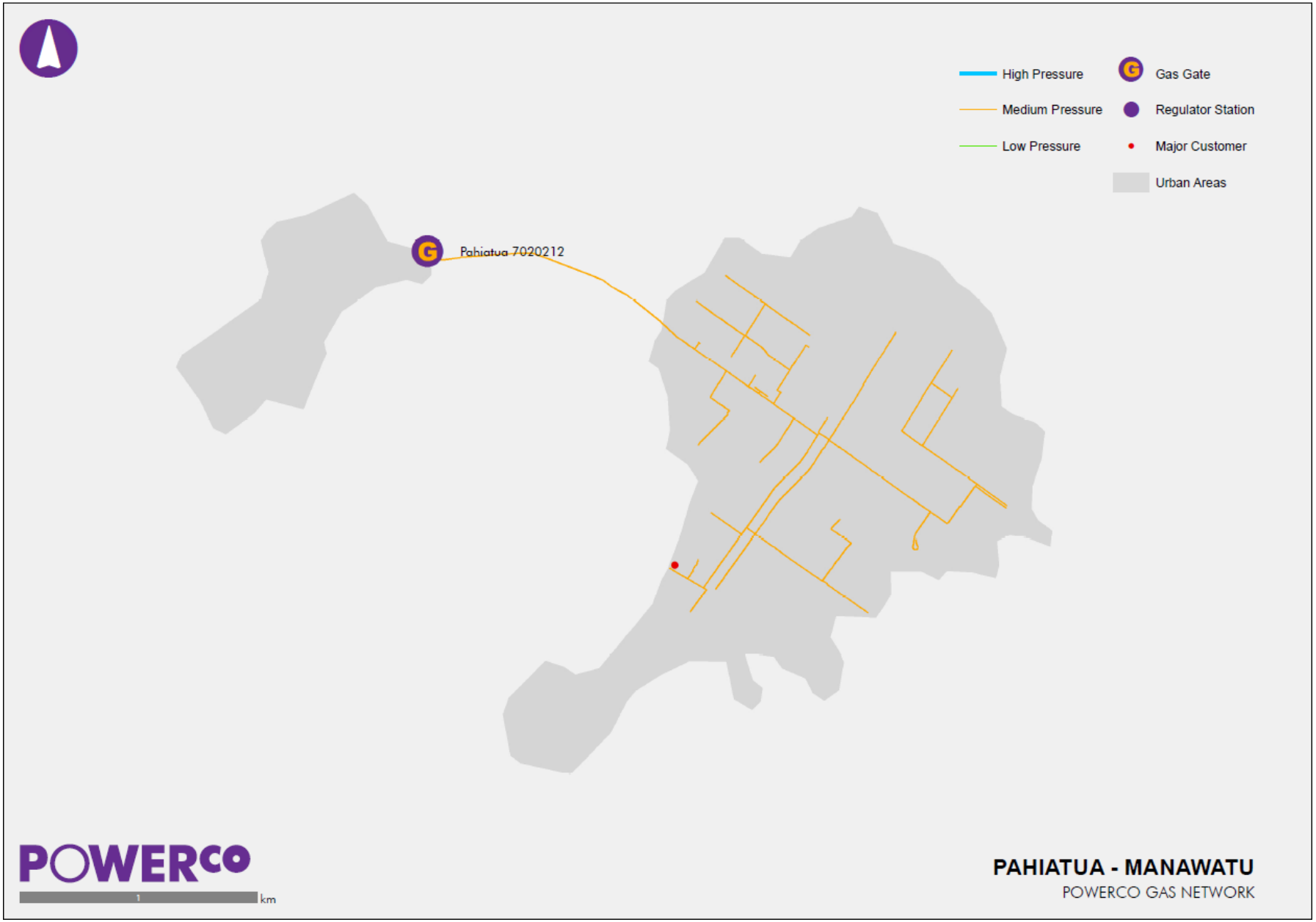

Kakariki 1150001
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
1
km
KAKARIKI - MANAWATU
POWERCO GAS NETWORK

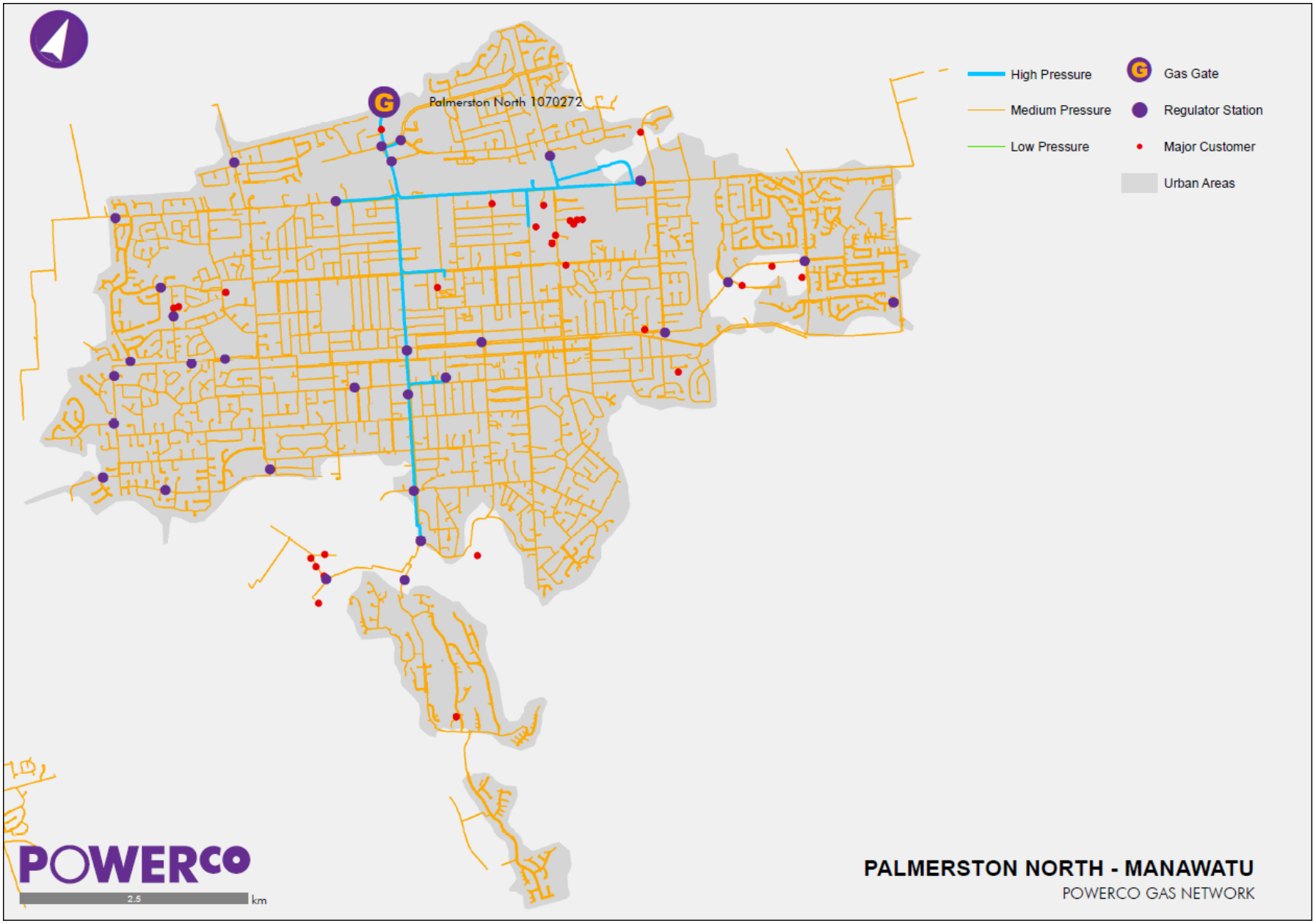

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Levin 1090052
POWERCO
2
km
LEVIN - MANAWATU
POWERCO GAS NETWORK

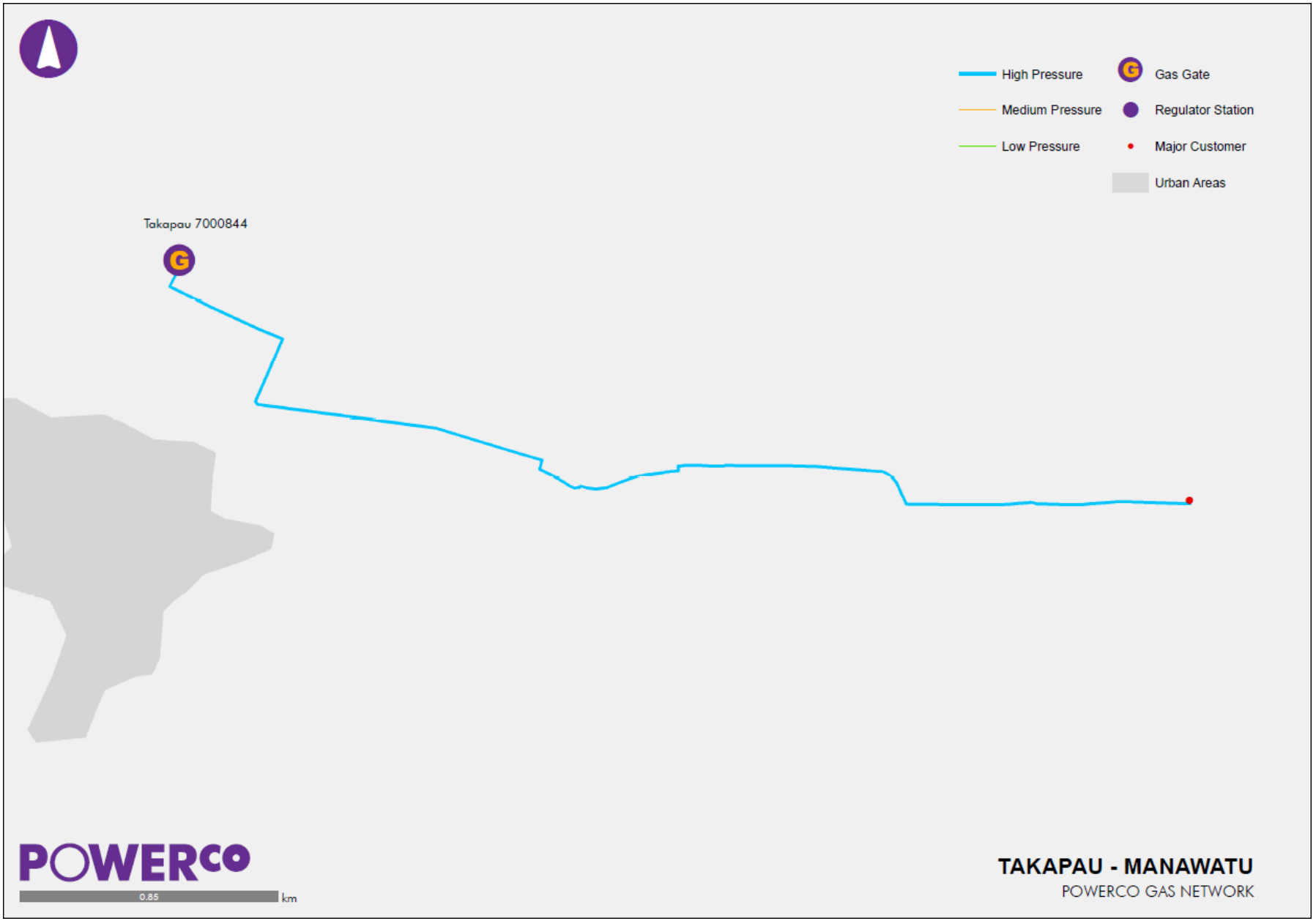

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Longburn 1080068
POWERCO
1.5
km
LONGBURN - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Mangatainoka 7030004
POWERCO
0.45
km
MANGATAINOKA - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Oroua Downs 1130051
POWERCO
km
OROUA DOWNS - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Pahiatua 7020212
POWERCO
1
km
PAHIATUA - MANAWATU
POWERCO GAS NETWORK


Palmerston North 1070272
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
2.5
km
PALMERSTON NORTH - MANAWATU
POWERCO GAS NETWORK

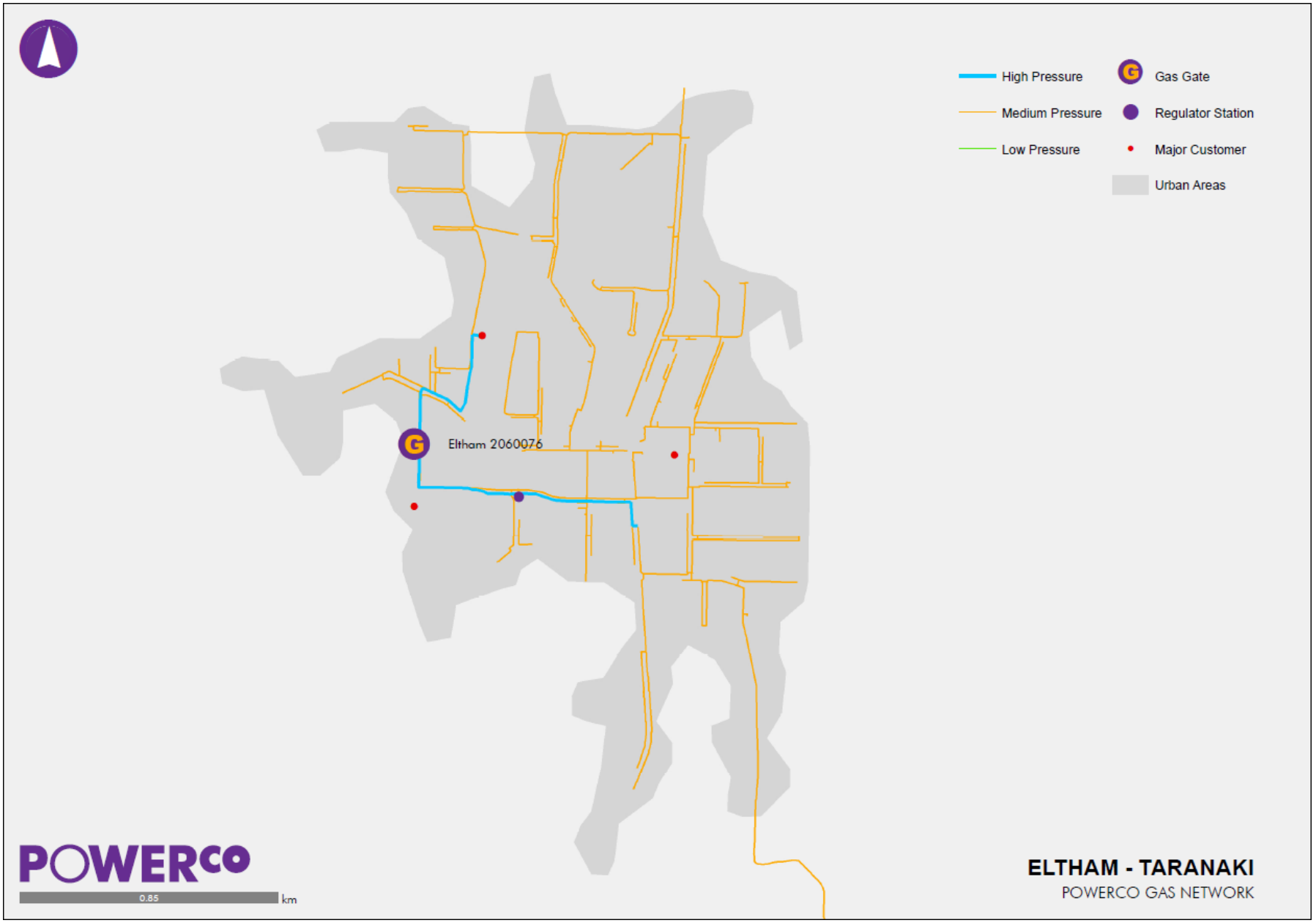

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Takapau 7000844
POWERCO
0.85
km
TAKAPAU - MANAWATU
POWERCO GAS NETWORK

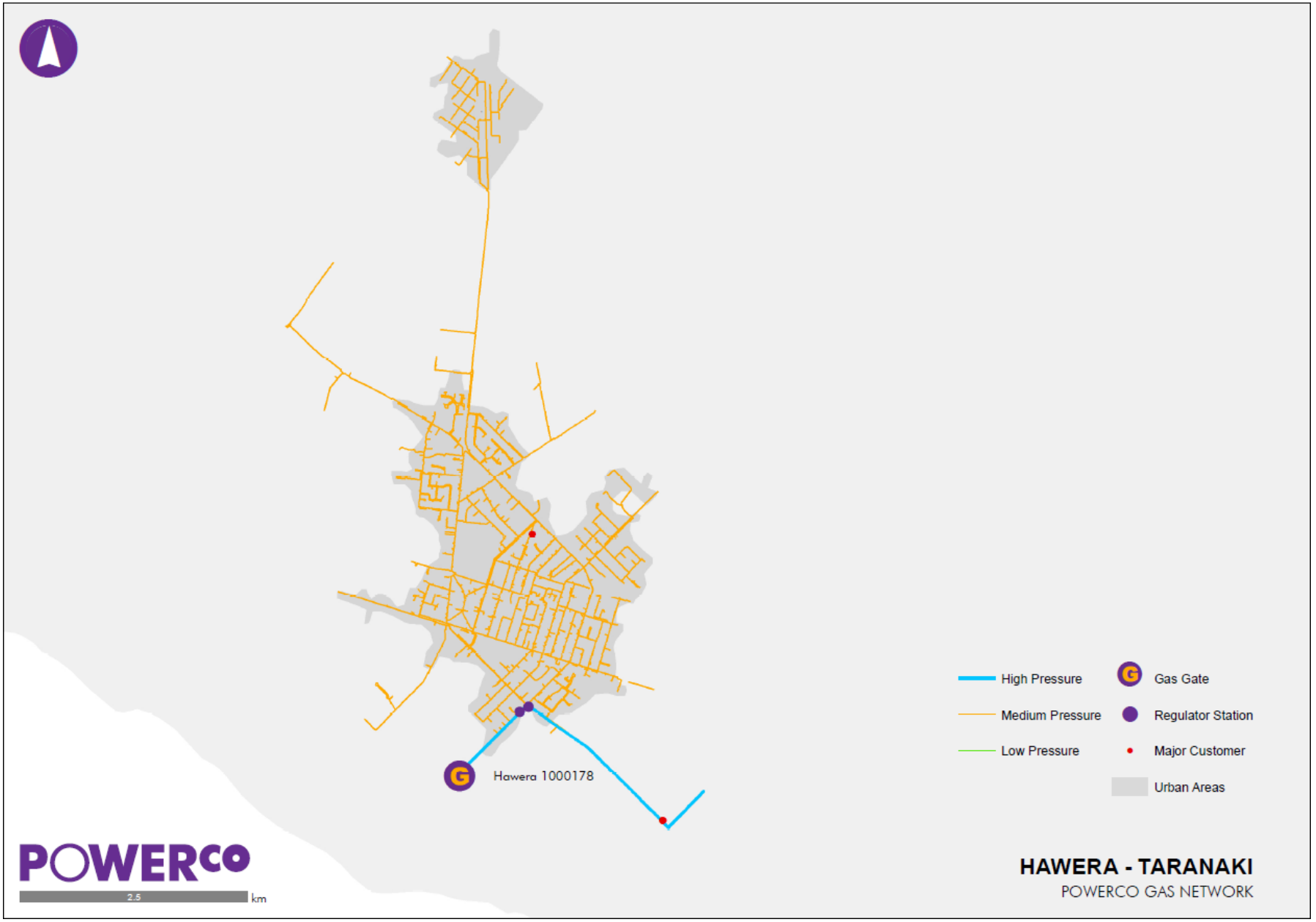
A11.4 TARANAKI

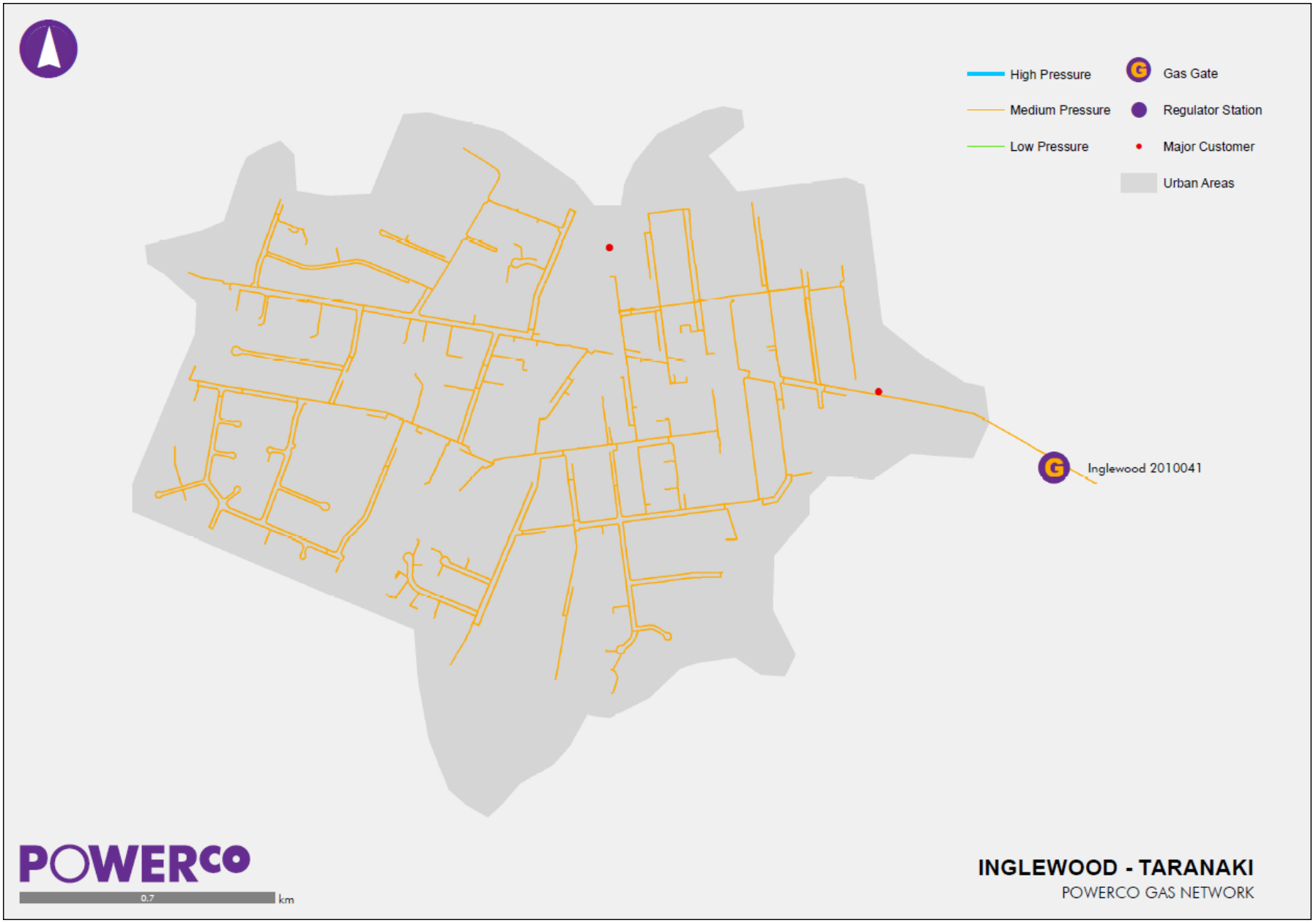
Table A11.4.1: Taranaki region networks

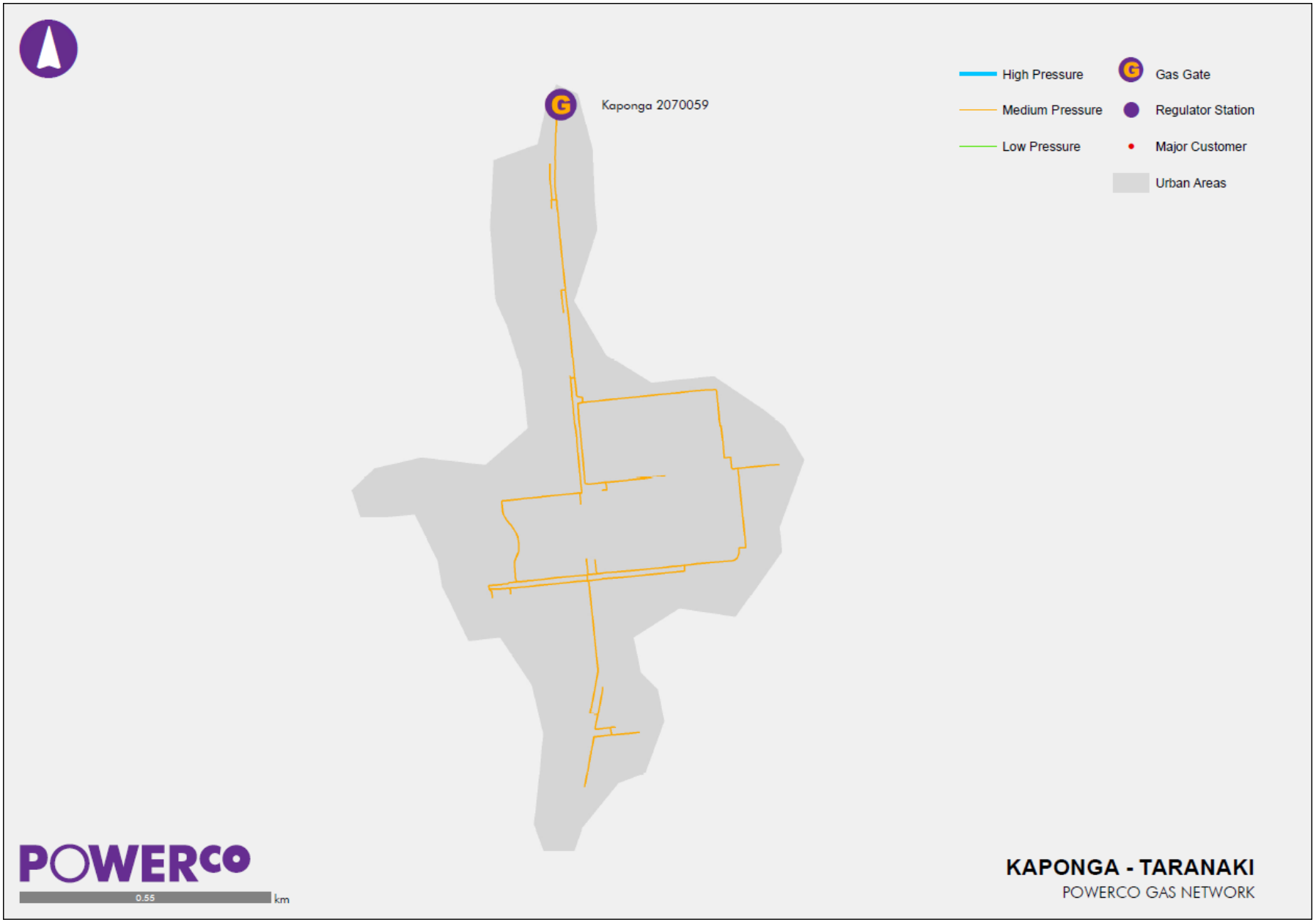
NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CUSTOMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Eltham	Small township network supplying large industrial customers: two dairy factories and one abattoir	Res./sml. com.: Commercial: Industrial:	326 6 3	IP: MP: LP:	1.6km 30.1km 0.0km	27.1GJ/h	144.0TJ
Hāwera	A network feeding two towns and a large dairy site outside Hāwera	Res./sml. com.: Commercial: Industrial:	2,811 40 2	IP: MP: LP:	3.8km 166.4km 0.1km	80.5GJ/h	281.6TJ
Inglewood	Town network supplying residential customers	Res./sml. com.: Commercial: Industrial:	627 9 0	IP: MP: LP:	0.0km 44.7km 0.0km	7.2GJ/h	29.3TJ
Kaponga	Township network supplying residential consumers	Res./sml. com.: Commercial: Industrial:	3 1 1	IP: MP: LP:	0.0km 5.8km 0.0km	0.4GJ/h	1.4TJ
Kāpuni	Very small township network supplying a dairy factory	Res./sml. com.: Commercial: Industrial:	55 1 0	IP: MP: LP:	0.4km 1.6km 0.0km	7.8GJ/h	19.6TJ
Manaia	Small township network supplying Ōkaiawa, Manaia and an industrial bakery	Res./sml. com.: Commercial: Industrial:	252 0 1	IP: MP: LP:	0.0km 29.3km 0.0km	3.3GJ/h	15.3TJ
Matapū	Rural network supplying farming installations	Res./sml. com.: Commercial: Industrial:	5 1 0	IP: MP: LP:	0.0km 1.9km 0.0km	0.1GJ/h	0.5TJ
New Plymouth	City network supplying a wide range of customers, from residential to large industrials	Res./sml. com.: Commercial: Industrial:	11,948 233 8	IP: MP: LP:	18.5km 671.7km 0.9km	168.7GJ/h	818.7TJ
Ōākura	Small township network supplying residential customers	Res./sml. com.: Commercial: Industrial:	305 6 0	IP: MP: LP:	0.0km 20.4km 0.0km	3.2GJ/h	8.5TJ
Ōkato	Small township network supplying residential customers	Res./sml. com.: Commercial: Industrial:	69 2 0	IP: MP: LP:	0.0km 8.5km 0.0km	0.7GJ/h	1.9TJ
Opunake	Small township network	Res./sml. com.: Commercial: Industrial:	189 10 0	IP: MP: LP:	0.0km 26.4km 0.0km	1.9GJ/h	7.2TJ
Pātea	Small township network supplying a greenhouse	Res./sml. com.: Commercial: Industrial:	185 2 1	IP: MP: LP:	0.0km 18.2km 0.0km	5.3GJ/h	16.5TJ
Pungarehu 1	Rural network supplying a single ICP since the dairy plant shut down	Res./sml Com.: Commercial: Industrial:	0 1 0	IP: MP: LP:	0.0km 0.2km 0.0km	0.0GJ/h	0.1TJ

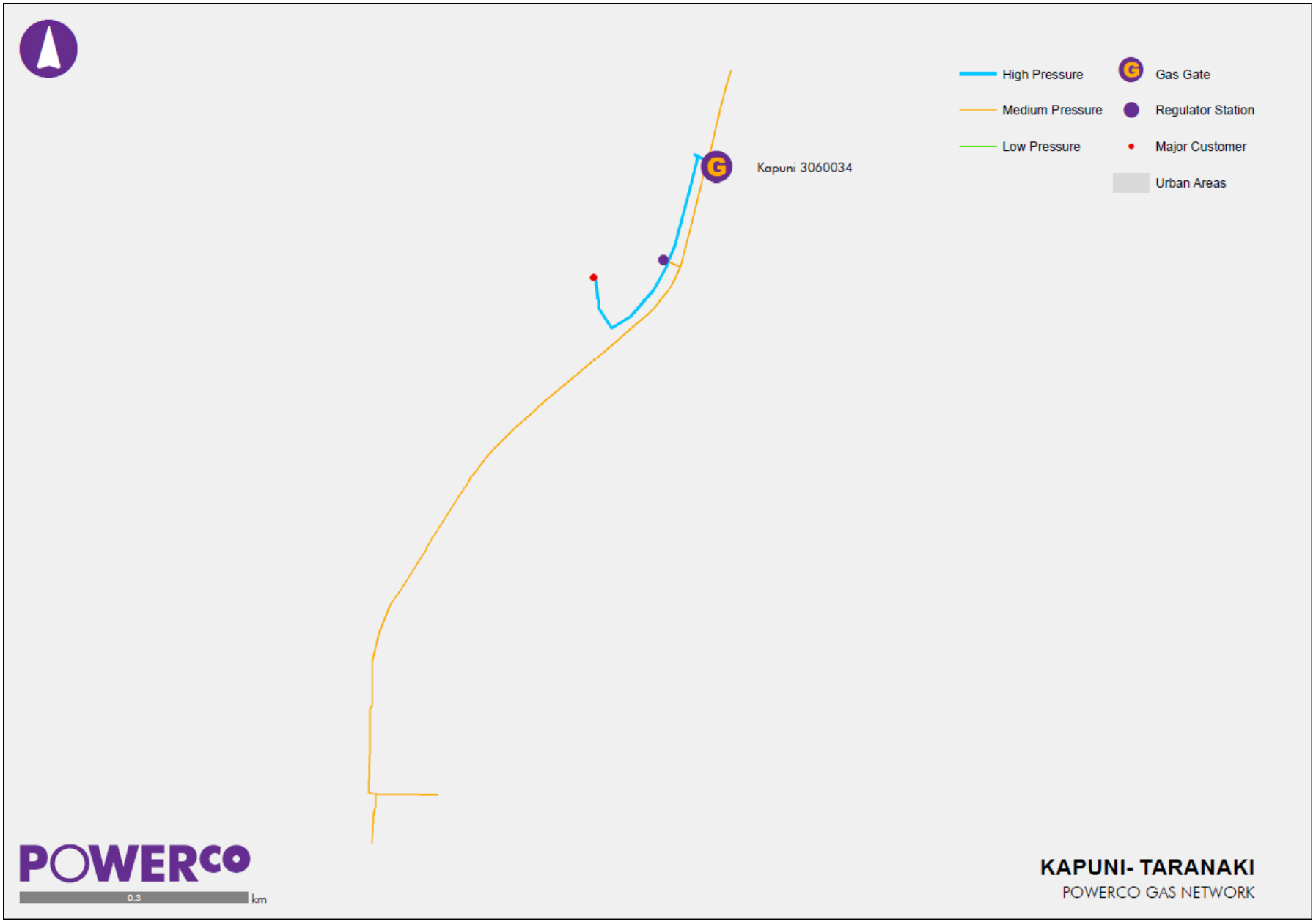
NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CUSTOMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Pungarehu 2	Very small township network built to supply a dairy plant now closed	Res./sml. com.: Commercial: Industrial:	14 1 0	IP: MP: LP:	0.0km 7.3km 0.0km	0.2GJ/h	0.4TJ
Stratford	Small town network supplying residential and small commercial customers, as well as an abattoir on the outskirts of town	Res./sml. com.: Commercial: Industrial:	960 27 2	IP: MP: LP:	5.4km 89.9km 0.0km	14.0GJ/h	53.9TJ
Waitara	Small town network with high density residential area (subdivisions) supplying a major food processing plant and the township of Lepperton	Res./sml. com.: Commercial: Industrial:	1,184 36 1	IP: MP: LP:	5.8km 108.5km 0.0km	24.3GJ/h	86.9TJ
Waverley	Very small township network supplying a major sawmill	Res./sml. com.: Commercial: Industrial:	8 0 0	IP: MP: LP:	0.0km 6.0km 0.0km	0.1GJ/h	0.1TJ

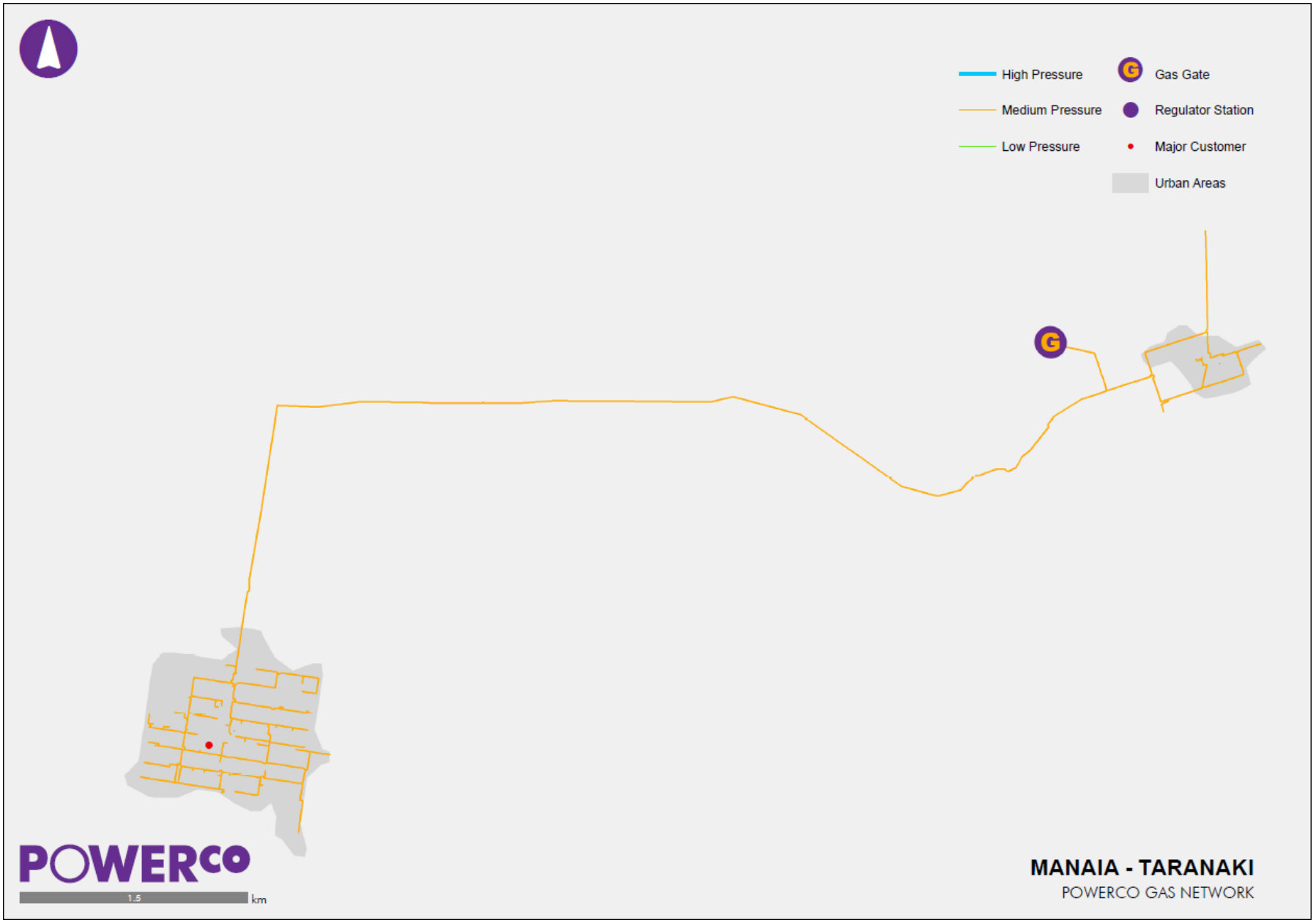

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Eltham 2060076
POWERCO
0.85
km
ELTHAM - TARANAKI
POWERCO GAS NETWORK

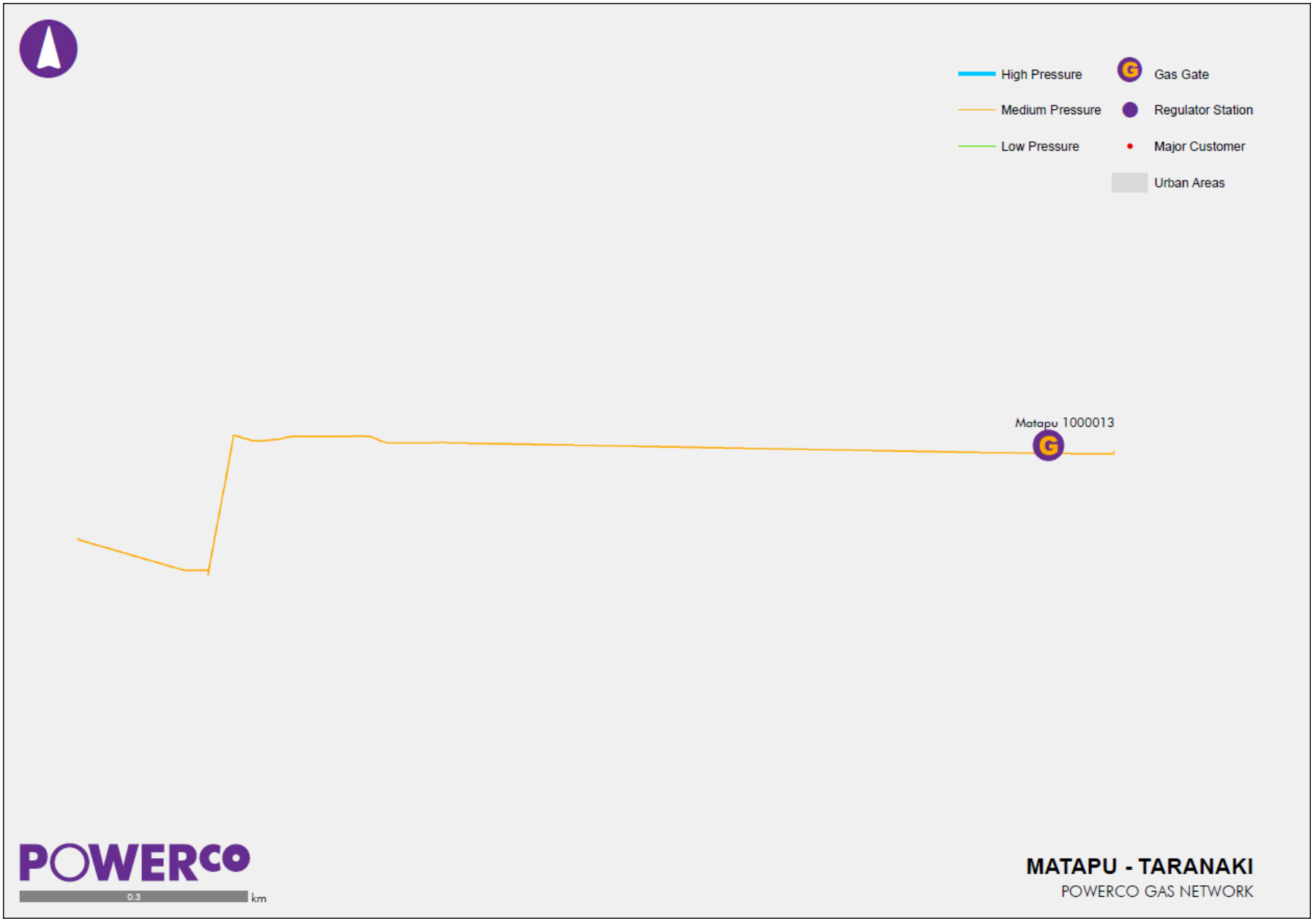

Hawera 1000178
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
2.5
km
HAWERA - TARANAKI
POWERCO GAS NETWORK

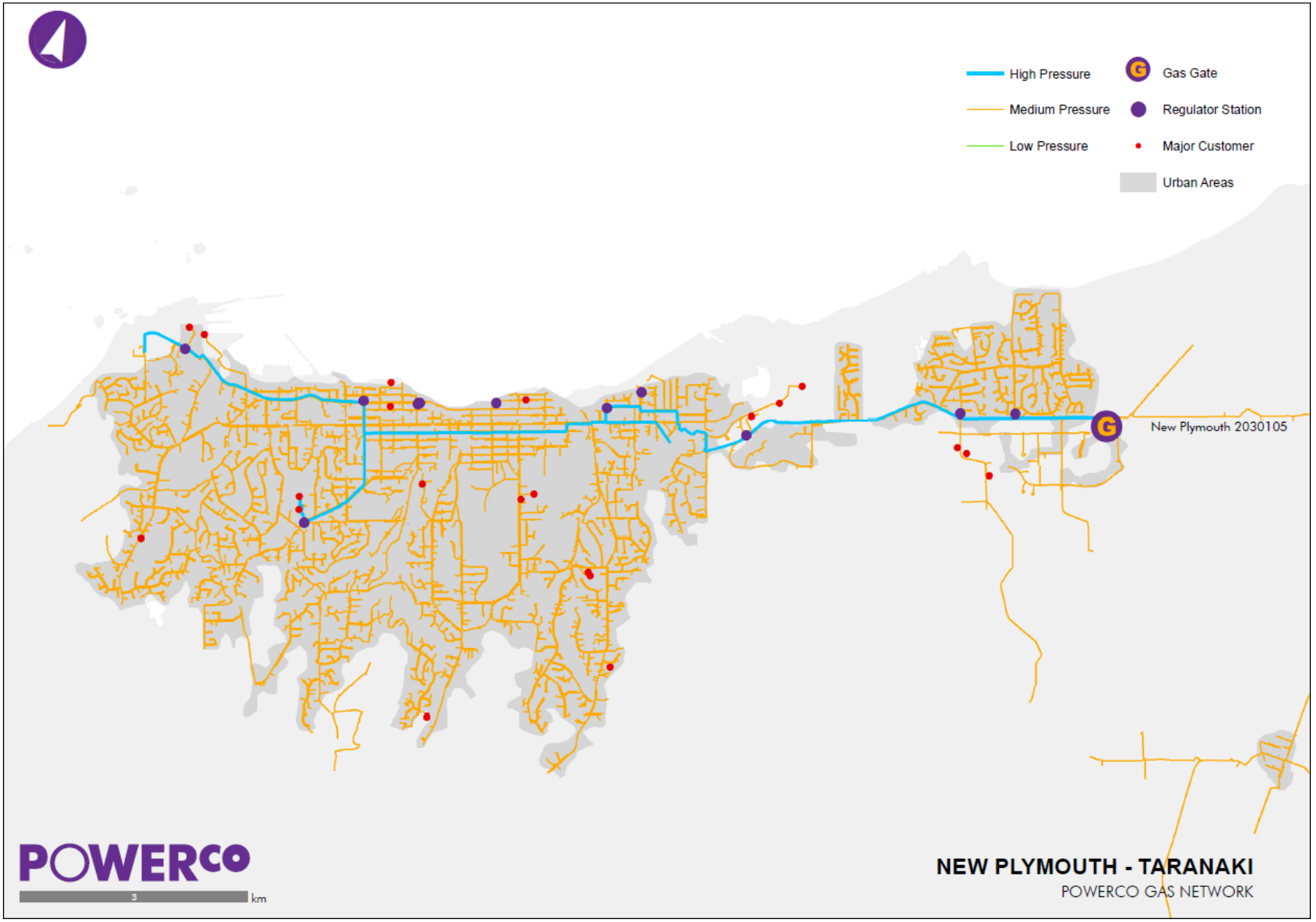

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Inglewood 2010041
POWERCO
0.7
km
INGLEWOOD - TARANAKI
POWERCO GAS NETWORK

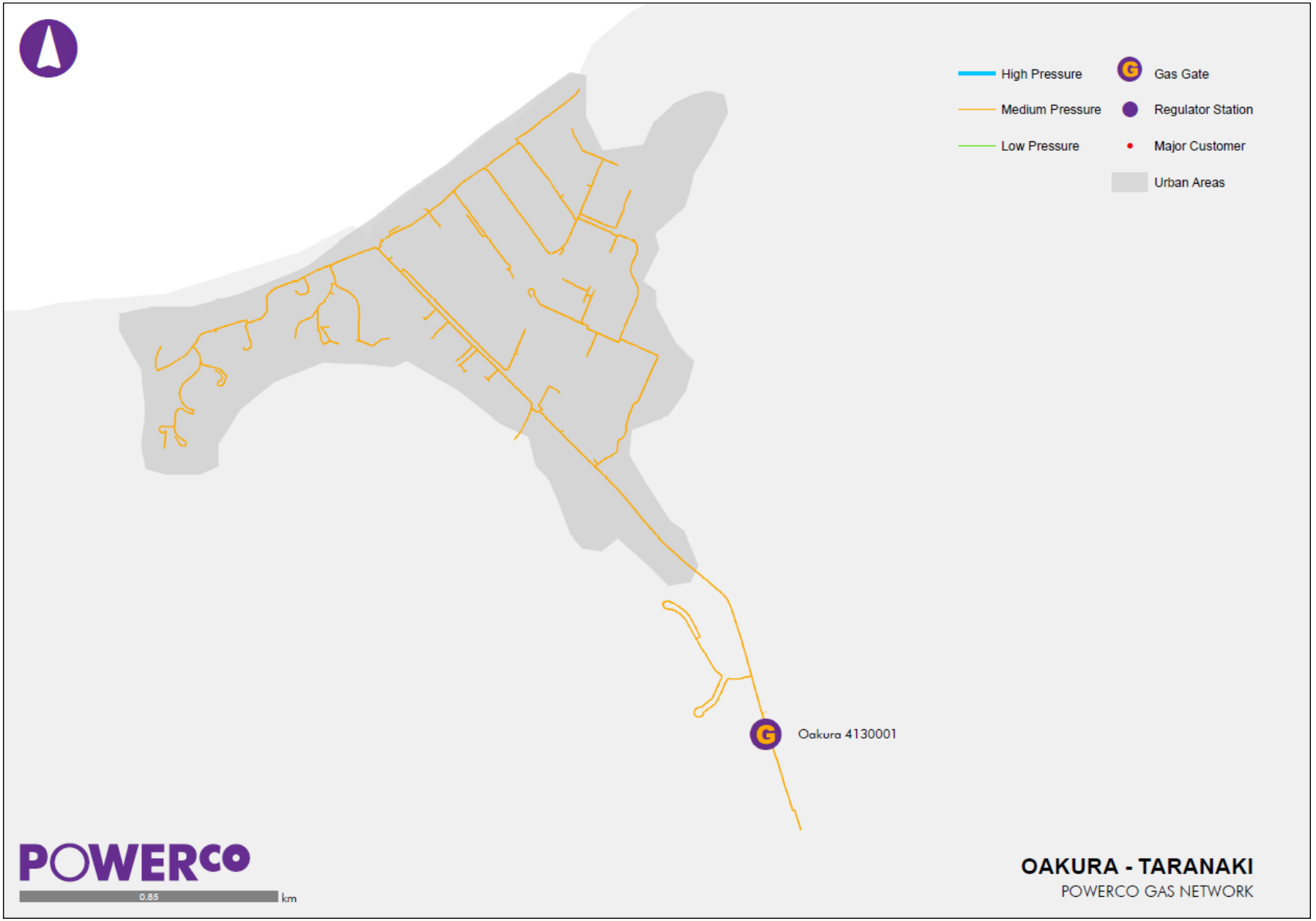

Kaponga 2070059
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
0.55
km
KAPONGA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Kapuni 3060034
POWERCO
0.3
km
KAPUNI- TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
1.5
km
MANAIA - TARANAKI
POWERCO GAS NETWORK

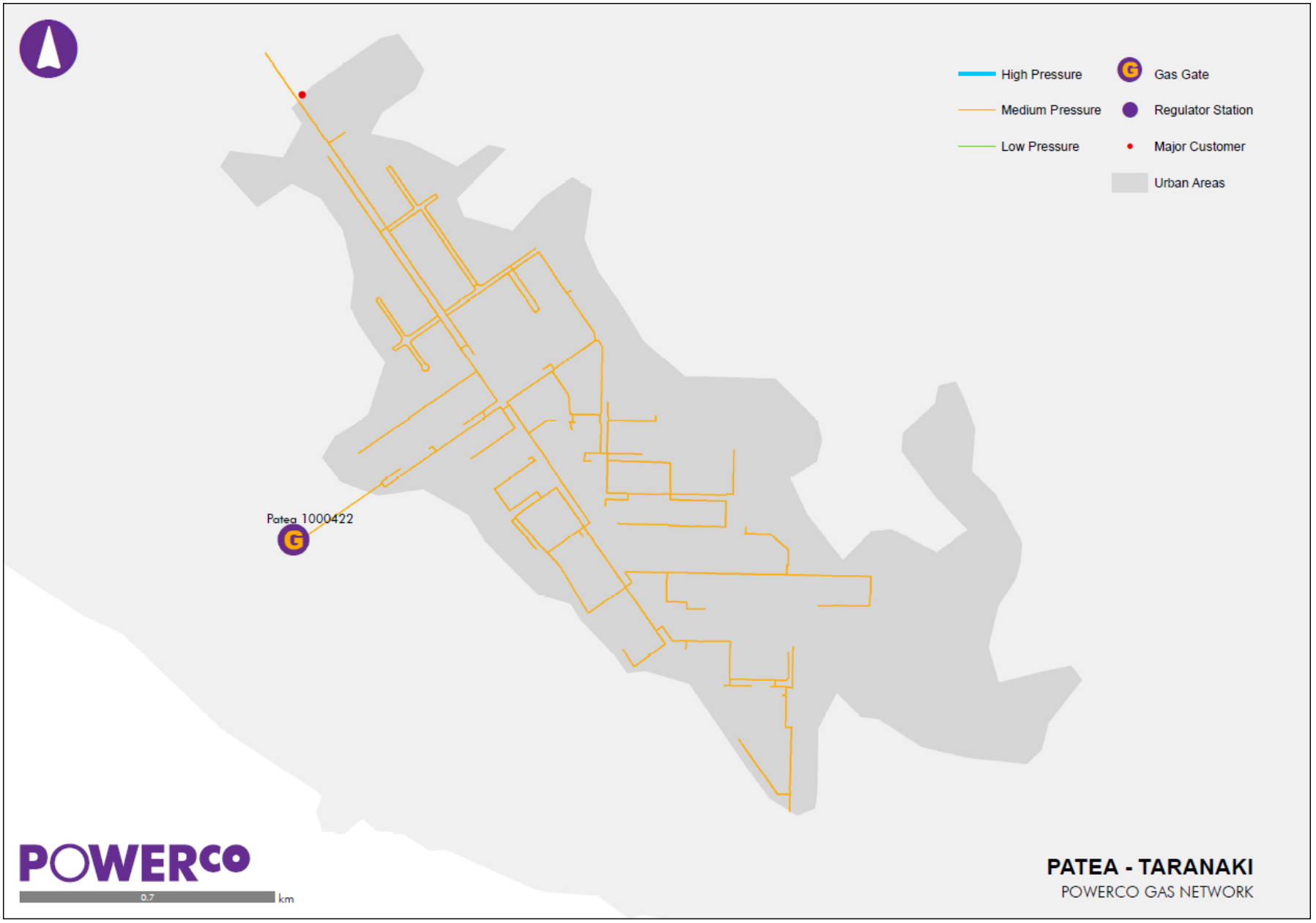

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Matapu 1000013
POWERCO
0.3
km
MATAPU - TARANAKI
POWERCO GAS NETWORK

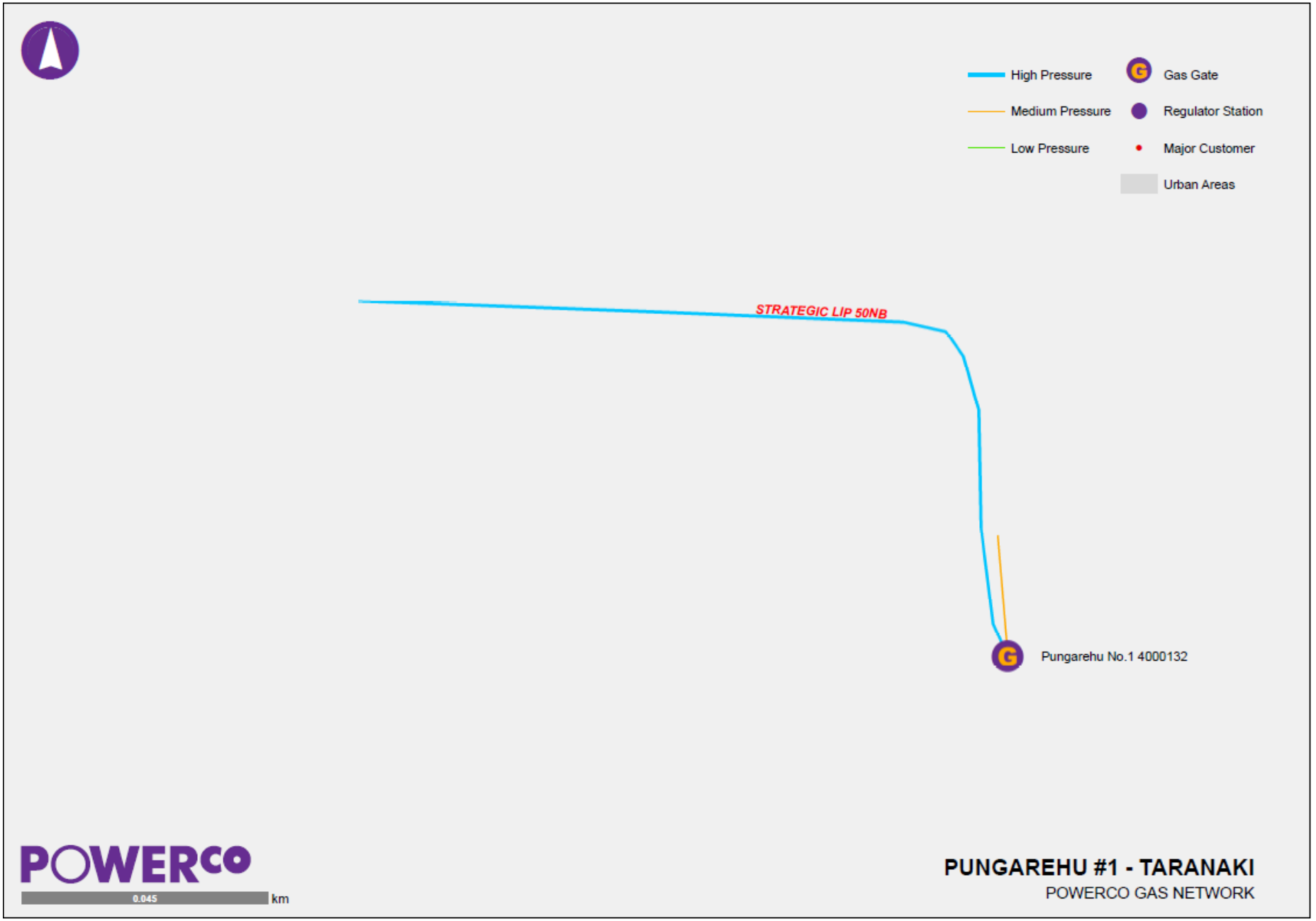

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
New Plymouth 2030105
POWERCO
3
km
NEW PLYMOUTH - TARANAKI
POWERCO GAS NETWORK

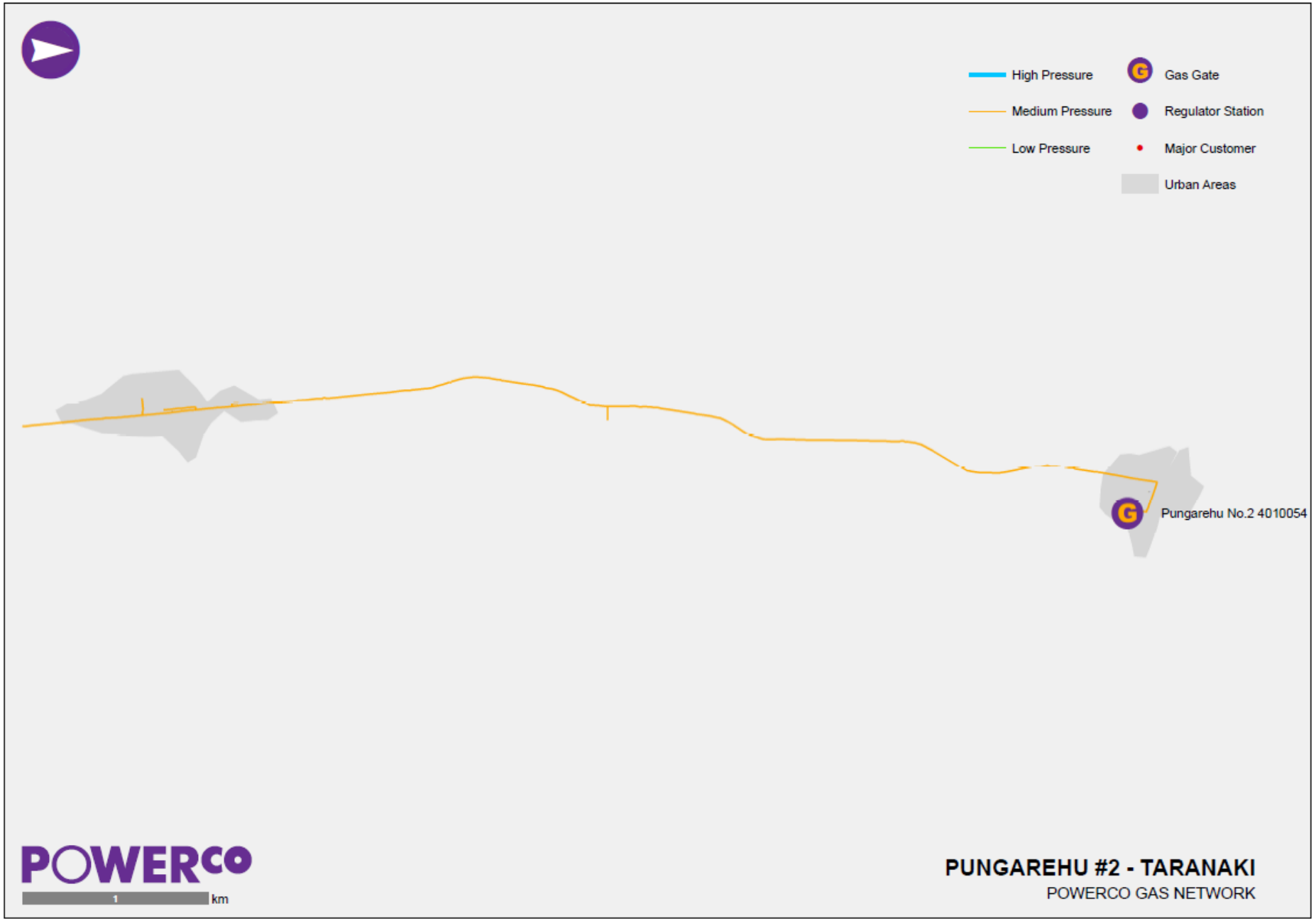

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Oakura 4130001
POWERCO
0.85
km
OAKURA - TARANAKI
POWERCO GAS NETWORK

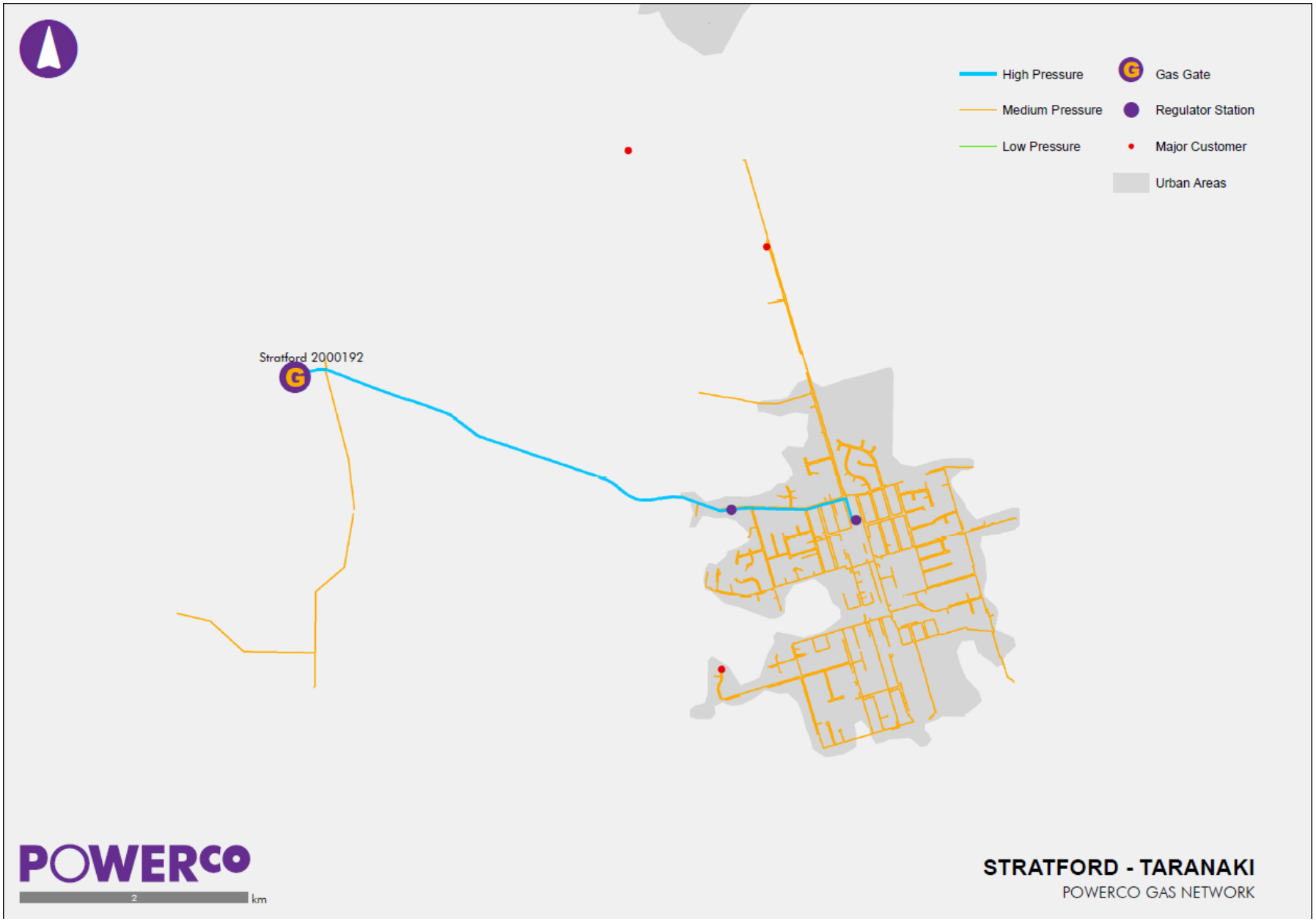

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Okato 4000231
POWERCO
1
km
OKATO - TARANAKI
POWERCO GAS NETWORK


Opunake 4000001
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
2
km
OPUNAKE - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Patea 1000422
POWERCO
0.7
km
PATEA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
STRATEGIC LIP 50NB
Pungarehu No.1 4000132
POWERCO
0.045
km
PUNGAREHU #1 - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Pungarehu No.2 4010054
POWERCO
1
km
PUNGAREHU #2 - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Stratford 2000192
POWERCO
2
km
STRATFORD - TARANAKI
POWERCO GAS NETWORK

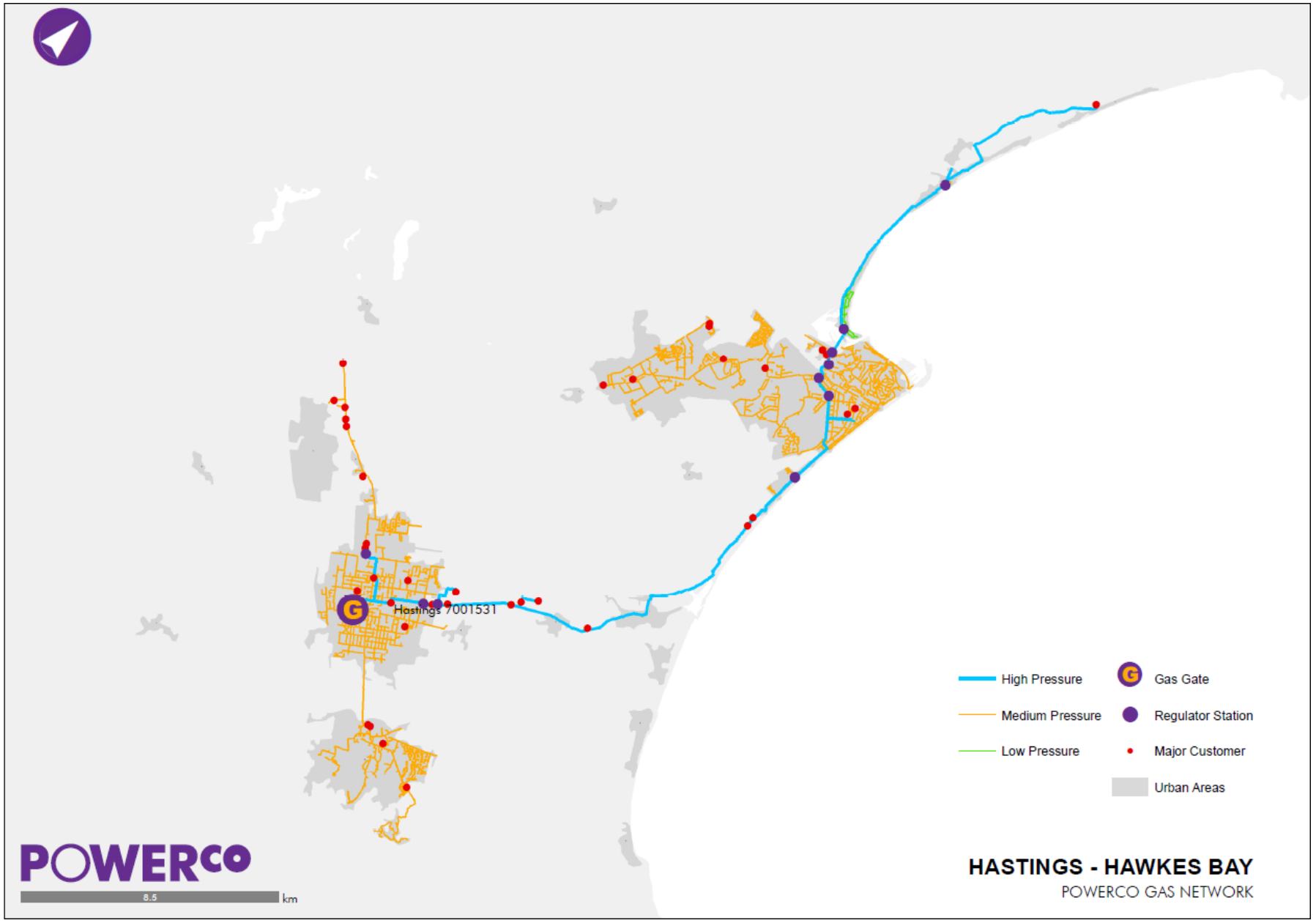

High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Waitara 2030046
POWERCO
2
km
WAITARA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Waverley 1030058
POWERCO
1
km
WAVERLEY - TARANAKI
POWERCO GAS NETWORK

A11.5 HAWKE'S BAY

Table A11.5.1: Hawke's Bay region networks

NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CUSTOMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Hastings	Network supplying many industrial and large commercial customers as well as the cities of Hastings and Napier.	Res./sml. com.: Commercial: Industrial:	4,684 319 21	IP: MP: LP:	42.6km 411.0km 8.5km	350.1GJ/h	1,716.6TJ


Hastings 7001531
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
8.5
km
HASTINGS - HAWKES BAY
POWERCO GAS NETWORK

APPENDIX 12 REGULATORY REQUIREMENTS LOOK-UP

GAS DISTRIBUTION INFORMATION DISCLOSURE DETERMINATION 2012

2.6 DISCLOSURE RELATING TO ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP CHAPTER WHERE ADDRESSED
2.6.1 Subject to clauses 2.6.3 and 2.13, before the start of each disclosure year commencing with the disclosure year 2014, every GDB must- 1) Complete an AMP that- relates to the gas distribution services supplied by the GDB; a) meets the purposes of AMP disclosure set out in clause 2.6.2; b) has been prepared in accordance with Attachment A to this determination; Gas Distribution Information Disclosure Determination 2012 – (consolidated in 2015) c) contains the information set out in in the schedules described in clause 2.6.6; d) contains the Report on Asset Management Maturity as described in Schedule 13; 2) Complete the Report on Asset Management Maturity in accordance with the requirements specified in Schedule 13; and 3) Publicly disclose the AMP.	(1) The AMP relates to gas distribution services, as stated in Chapter 1. (a) Compliance with 2.6.2 is outlined in the box below. (b) Compliance with Attachment A is outlined in Appendix 12. (c) The tables required by clause 2.6.6 are in Appendix 3 and the MS Excel schedules have been supplied to the Commission. (d) The report required is in Appendix 3 and the MS Excel schedules have been supplied to the Commission. (2) Schedule 13 is provided in Appendix 3 and is also discussed in Section 4.5. (3) This Asset Management Plan and its appendices are publicly available on Powerco's website (www.powerco.co.nz) and sent to the Commission.
2.6.2 The purposes of AMP disclosure referred to in subclause 2.6.1(1)(b) are that the AMP- 1) Must provide sufficient information for interested persons to assess whether- a) assets are being managed for the long term; b) the required level of performance is being delivered; and c) costs are efficient and performance efficiencies are being achieved; 2) Must be capable of being understood by interested persons with a reasonable understanding of the management of infrastructure assets; 3) Should provide a sound basis for the ongoing assessment of asset-related risks, particularly high impact asset-related risks.	(1) & (2): Powerco recognises that AMPs are large and complicated documents. To assist ease of understanding we have: • Structured the AMP, as described in Section 2.3; • Included our Network Asset Management Policy in Appendix 4 to reiterate our commitment to be cost efficient; and • Provided a glossary in Appendix 2 to assist understanding. (3): Risks are discussed in Sections 3.6.1, 6.1.1 and Appendix 6.
Clauses 2.6.3 to 2.6.5 relate to AMP updates	Not relevant
2.6.6 Subject to clause 2.13.2, before the start of each disclosure year, each GDB must complete and publicly disclose each of the following reports by inserting all information relating to the gas distribution services supplied by the GDB for the disclosure years provided for in the following reports: 4) the Report on Forecast Capital Expenditure in Schedule 11a; 5) the Report on Forecast Operational Expenditure in Schedule 11b; 6) the Report on Asset Condition in Schedule 12a; 7) the Report on Forecast Utilisation in Schedule 12b; 8) the Report on Forecast Demand in Schedule 12c.	Those reports are included in Appendix 3. They are publicly available on Powerco's website (www.powerco.co.nz) as part of the Asset Management Plan and sent to the Commission by 30 September 2020.

ATTACHMENT A: ASSET MANAGEMENT PLANS (AMP DESIGN)	AMP CHAPTER WHERE ADDRESSED
1. The core elements of asset management -	
1.1. A focus on measuring network performance, and managing the assets to achieve performance targets;	1.1: Chapter 4 outlines Asset Management Objectives, Chapter 5 describes the framework to manage assets to meet these targets, Chapters 3, 6, 7 and 8 outline how we manage our assets;
1.2. Monitoring and continuously improving asset management practices;	1.2: Sections 4.5 and 5.4 provide comments on the AMMAT and detail on Powerco's approach to continuous improvement.
1.3. Close alignment with corporate vision and strategy;	1.3 & 1.4: Chapter 4 and 5 detail the alignment between our corporate vision, strategy, and defines our strategies, objectives and service levels.
1.4. That asset management is driven by clearly defined strategies, business objectives and service level targets;	
1.5. That responsibilities and accountabilities for asset management are clearly assigned;	1.5: Section 3.3 describes accountabilities.
1.6. An emphasis on knowledge of what assets are owned and why, the location of the assets and the condition of the assets;	1.6: Section 3.4 details an overview of all assets. Chapter 6 provides an overview of Powerco's assets, their condition, performance, location. Schedule 12A and 12B (Appendix A3.4 and A3.4 respectively) provide the asset forecast.
1.7. An emphasis on optimising asset utilisation and performance;	1.7: Chapter 6 discusses asset performance; Section 7.3 discusses asset/network utilisation. Appendix 3.4 (Schedule 12B) discusses forecasted asset utilisation.
1.8. That a total lifecycle approach should be taken to asset management;	1.8: This is discussed throughout Chapters 4 and 7. Each asset lifecycle plan has a renewal strategy which considers the whole-of-life cost of each asset and therefore optimal replacement timing.
1.9. That the use of 'non-network' solutions and demand management techniques as alternatives to asset acquisition is considered.	1.9: This is discussed in Chapter 8.
2. The disclosure requirements are designed to produce AMPs that –	
2.1. Are based on, but are not limited to, the core elements of asset management identified in clause 1;	2.1: This is discussed through-out the AMP, and specifically in Section 5.2.1.
2.2. Are clearly documented and made available to all stakeholders;	2.2: This AMP is distributed to all stakeholders and is publicly available on Powerco's website (www.powerco.co.nz).
2.3. Contain sufficient information to allow interested persons to make an informed judgement about the extent to which the GDB's asset management processes meet best practice criteria and outcomes are consistent with outcomes produced in competitive markets;	2.3: Powerco's self-assessment against the AMMAT is provided in Appendix A3.6 (Schedule 13). Sections 4.5, 5.1 and 5.2.1 describe how our alignment with ISO55001 meet best practice criteria and outcomes are consistent with outcomes produced in competitive markets.
2.4. Specifically support the achievement of disclosed service level targets;	2.4: Powerco's service level objectives are discussed in Chapter 4.
2.5. Emphasise knowledge of the performance and risks of assets and identify opportunities to improve performance and provide a sound basis for ongoing risk assessment;	2.5: This is discussed in Section 3.6 and Chapter 6. Risks are presented in Appendix 6.
2.6. Consider the mechanics of delivery including resourcing;	2.6 is discussed in Sections 3.3.4 and 4.2.1.
2.7. Consider the organisational structure and capability necessary to deliver the AMP;	2.7 is discussed in Section 3.3.
2.8. Consider the organisational and contractor competencies and any training requirements;	2.8 is discussed in Sections 3.3.4 and 4.2.1.
2.9. Consider the systems, integration and information management necessary to deliver the plans;	2.9 is discussed in Sections 3.7, 5.2.5, 5.4.5 & Chapter 8.
2.10. To the extent practical, use unambiguous and consistent definitions of asset management processes and terminology consistent with the terms used in this attachment to enhance comparability of asset management practices over time and between GDBs; and	2.10: Powerco has used terminology in line with this appendix and has provided a glossary in Appendix 2.
2.11. Promote continual improvements to asset management practices.	2.11: Sections 4.5 and 5.4 provide comments on the AMMAT and detail on Powerco's approach to continuous improvement.
Disclosing an AMP does not constrain an GDB from managing its assets in a way that differs from the AMP if its circumstances change after preparing the plan or if the GDB adopts improved asset management practices.	

ATTACHMENT A: ASSET MANAGEMENT PLANS (CONTENTS OF THE AMP)	AMP CHAPTER WHERE ADDRESSED
3. The AMP must include the following -	
3.1. A summary that provides a brief overview of the contents and highlights information that the GDB considers significant;	Chapter 1 is an executive summary and provides a brief overview and the key messages and themes in the AMP.
3.2. Details of the background and objectives of the GDB's asset management and planning processes; and	Section 3.5 describes Powerco's operating environment, which is the background our objectives in Chapter 4 are based. The objectives of Powerco's asset management and planning process are provided in Chapter 4 and Section 5.2.
3.3. A purpose statement which - a) makes clear the purpose and status of the AMP in the GDB's asset management practices. The purpose statement must also include a statement of the objectives of the asset management and planning processes; b) states the corporate mission or vision as it relates to asset management; c) identifies the documented plans produced as outputs of the annual business planning process adopted by the GDB; d) states how the different documented plans relate to one another, with particular reference to any plans specifically dealing with asset management; and e) includes a description of the interaction between the objectives of the AMP and other corporate goals, business planning processes, and plans The purpose statement should be consistent with the GDB's vision and mission statements and show a clear recognition of stakeholder interest.	(a) The purpose statement is in Chapter 1 and Section 2.1. (b) Powerco's corporate vision and mission is discussed in Section 3.2 and is part of the Network Asset Management Policy provided in Appendix 4. (c) & (d) Sections 5.2.2 and 5.3. (e) This is described in Sections 4.2, and 5.2 – 5.3. The vision statement in Chapter 3.2 introduction aligns with Powerco's purpose and mission and includes the need of stakeholders, such as customers and owners.
3.4. Details of the AMP planning period, which must cover at least a projected period of 10 years commencing with the disclosure year following the date on which the AMP is disclosed Good asset management practice recognises the greater accuracy of short-to-medium term planning and will allow for this in the AMP. The asset management planning information for the second 5 years of the AMP planning period need not be presented in the same detail as the first 5 years.	Powerco's AMP planning period is from 1 October 2020 - 30 September 2030 as described in Chapter 1 and Section 2.1.
3.5. The date that it was approved by the directors	The AMP was approved on the 11th August 2020.
3.6. A description of each of the legislative requirements directly affecting management of the assets, and details of: a) how the GDB meets the requirements; and b) the impact on asset management	a) Sections 1.2 and Appendix 5. b) Sections 1.2, 1.4.2, 3.5.1, 3.6, 4.6.3, 5.2.7, 5.5 and Appendix 5.
3.7. A description of stakeholder interests (owners, customers etc.) which identifies important stakeholders and indicates: a) how the interests of stakeholders are identified; b) what these interests are; c) how these interests are accommodated in asset management practices; and d) how conflicting interests are managed	An overview of Powerco's stakeholders is in Section 3.5.1 (Table 3.4).
3.8. A description of the accountabilities and responsibilities for asset management on at least 3 levels, including: a) governance – a description of the extent of director approval required for key asset management decisions and the extent to which asset management outcomes are regularly reported to directors; b) executive – an indication of how the in-house asset management and planning organisation is structured; and c) field operations – an overview of how field operations are managed, including a description of the extent to which field work is undertaken in-house and the areas where outsourced contractors are used.	(a) Refer to Section 3.3. (b) Refer to Section 3.3.2. (c) Sections 3.3.3, 3.3.4 and 3.5.1.1 discusses field operations in detail.

ATTACHMENT A: ASSET MANAGEMENT PLANS (CONTENTS OF THE AMP)	AMP CHAPTER WHERE ADDRESSED
3.9. All significant assumptions a) quantified where possible; b) clearly identified in a manner that makes their significance understandable to interested persons, including c) a description of changes proposed where the information is not based on the GDB's existing business; d) the sources of uncertainty and the potential effect of the uncertainty on the prospective information; and e) the price inflator assumptions used to prepare the financial information disclosed in nominal New Zealand dollars in the Report on Forecast Capital Expenditure set out in Schedule 11a & the Report on Forecast Operational Expenditure set out in Schedule 11b.	(a) Refer to Chapters 2.2 and 9.2. (b) Section 2.2 provides key assumptions in the development of the AMP. Section 9.2 describes assumptions for each expenditure category forecast. (c) Non-relevant (d) Section 9.2 (e) Table 9.2
3.10. A description of the factors that may lead to a material difference between the prospective information disclosed and the corresponding actual information recorded in future disclosures	This is discussed throughout Chapter 9.
3.11. An overview of asset management strategy and delivery *To support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management strategy and delivery, the AMP should identify-* a) how the asset management strategy is consistent with the GDB's other strategy and policies; b) how the asset strategy takes into account the lifecycle of the assets; c) the link between the asset management strategy and the AMP; and d) processes that ensure costs, risks and system performance will be effectively controlled when the AMP is implemented.	(a) Refer to Section 5.2 (b) Chapter 6. (c) Section 5.3 describes the relationship. (d) Section 3.3 describes the accountabilities to ensure costs, risks and system performance is effectively controlled. Chapter 6 describes the lifecycle considerations of each asset class.
3.12. An overview of systems and information management data *To support the AMMAT disclosure and assist interested persons to assess the maturity of systems and information management, the AMP should describe:* a) the processes used to identify asset management data requirements that cover the whole of lifecycle of the assets; b) the systems used to manage asset data and where the data is used, including an overview of the systems to record asset conditions and operation capacity and to monitor the performance of assets; c) the systems and controls to ensure the quality and accuracy of asset management information; and d) the extent to which these systems, processes and controls are integrated.	Section 3.7 and Chapter 8 provide information on systems and information management data. (a) Chapter 6.1.6 discusses processes to identify data requirements for each asset class. (b) Chapter 8 provides details of systems and how they manage our data. (c) Refer to Sections 3.7, 6.1.6 and Chapter 8. (d) Refer to Sections 3.7, 6.1.6 and Chapter 8.
3.13. A statement covering any limitations in the availability or completeness of asset management data and disclose any initiatives intended to improve the quality of this data *Discussion of the limitations of asset management data is intended to enhance the transparency of the AMP and identify gaps in the asset management system.*	Limitations are described in Chapter 3.7.1.2 and 5.4.5.2. Initiatives are discussed in Chapter 8.4.
3.14. A description of the processes used within the GDB for: a) managing routine asset inspections and network maintenance; b) planning and implementing network development projects; and c) measuring network performance.	(a) Refer Sections 5.2.4, 5.5.1.4 & 6.1.5 (b) Refer Sections 5.4.2 & 5.5. (c) Refer Chapter 7.

ATTACHMENT A: ASSET MANAGEMENT PLANS (CONTENTS OF THE AMP)	AMP CHAPTER WHERE ADDRESSED
3.15. An overview of asset management documentation, controls and review processes *To support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management documentation, controls and review processes, the AMP should-* *a) identify the documentation that describes the key components of the asset management system and the links between the key components;* *b) describe the processes developed around documentation, control and review of key components of the asset management system;* *c) where the GDB outsources components of the asset management system, the processes and controls that the GDB uses to ensure efficient and cost-effective delivery of its asset management strategy;* *d) where the GDB outsources components of the asset management system, the systems it uses to retain core asset knowledge in-house; and* e) *audit or review procedures undertaken in respect of the asset management system.*	(a) is discussed in Section 5.2 (specifically Figure 5.4) & 5.3. (b) is discussed in Sections 5.1, 5.2 & 3.3. (c) is discussed in Sections 1.3, 3.3.4, 4.7.1 and 5.7.3.1. (d) is discussed in Section 5.2.6. (e) is discussed in Section 3.3.1.
3.16. An overview of communication and participation processes To support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management documentation, controls and review processes, the AMP should: d) communicate asset management strategies, objectives, policies and plans to stakeholders involved in the delivery of the asset management requirements, including contractors and consultants; and e) demonstrate staff engagement in the efficient and cost-effective delivery of the asset management requirements.	This is discussed in Section 5.3.4 and further in Sections 3.2, 4.2, 5.4 & 5.5.
3.17. The AMP must present all financial values in constant price New Zealand dollars except where specified otherwise;	All figures are constant September 2020 dollars.
3.18. The AMP must be structured and presented in a way that the GDB considers will support the purposes of AMP disclosure set out in clause 2.6.2 of the determination.	Since 2013, Powerco has structured its AMP to be easier to follow and for an interested person to understand. This includes a flow which better covers the total lifecycle approach of assets, efficient delivery of services and reaching an appropriate performance level.
4. The AMP must provide details of the assets covered, including:	
4.1. A map and high-level description of the areas covered by the GDB, including the region(s) covered; and	A map and high-level description of regions are shown in Chapter 3.4.
4.2. A description of the network configuration, including: If sub-networks exist, the network configuration information should be disclosed for each sub-network. a) A map or maps, with any cross-referenced information contained in an accompanying schedule, showing the physical location of: (i) All main pipes, distinguished by operating pressure; (ii) All ICPs that have a significant impact on network operations or asset management priorities, and a description of that impact; (iii) All gate stations; (iv) All pressure regulation stations; and b) if applicable, the locations where a significant change has occurred since the previous disclosure of the information referred to in subclause 4.2(a) above, including: (i) a description of the parts of the network that are affected by the change; and (ii) a description of the nature of the change.	Maps displaying the physical location of all required network elements are in Appendix 10. Network changes are described in Chapter 3.4.2.1.

ATTACHMENT A: ASSET MANAGEMENT PLANS (NETWORK ASSETS BY CATEGORY)	AMP CHAPTER WHERE ADDRESSED
5. The AMP must describe the network assets by providing the following information for each asset category: 5.1. pressure; 5.2. description and quantity of assets; 5.3. age profiles; and 5.4. a discussion of the results of formal risk assessments of the assets, further broken down by subcategory as appropriate. Systemic issues leading to the premature replacement of assets or parts of assets should be discussed.	Chapter 6 provides an overview of assets, with information on age profiles, quantities, pressure and then provides a lifecycle plan for each asset that discusses the condition and risk assessments.
6. The asset categories discussed in clause 5 above should include at least the following: 6.1. the categories listed in the Report on Forecast Capital Expenditure in Schedule 11a(iii); and 6.2. assets owned by the GDB but installed at gate stations owned by others.	The assets discussed in Chapter 6 (as required by clause 5 above), include those specified in clause 6.1 and 6.2

ATTACHMENT A: ASSET MANAGEMENT PLANS (SERVICE LEVELS)	AMP CHAPTER WHERE ADDRESSED
7. The AMP must clearly identify or define a set of performance indicators for which annual performance targets have been defined. The annual performance targets must be consistent with business strategies and asset management objectives and be provided for each year of the AMP planning period. The targets should reflect what is practically achievable given the current network configuration, condition and planned expenditure levels. The targets should be disclosed for each year of the AMP planning period.	Chapter 4 details the AMP performance objectives and how they are consistent with the business strategies and Asset Management Objectives.
8. Performance indicators for which targets have been defined in clause 7 must include: 8.1. the DPP requirements required under the price quality path determination applying to the regulatory assessment period in which the next disclosure year falls; 8.2. customer oriented indicators that preferably differentiate between different customer types; 8.3. indicators of asset performance, asset efficiency and effectiveness, and service efficiency, such as technical and financial performance indicators related to the efficiency of asset utilisation and operation; and 8.4. the performance indicators disclosed in Schedule 10b of the determination.	Chapter 4 provides the required indicators, including DPP requirements and customer-orientated indicators across our objectives. Chapter 4.10 provides a summary of the measures required under clauses 8.3 and 8.4.
9. The AMP must describe the basis on which the target level for each performance indicator was determined. Justification for target levels of service includes customer expectations or demands, legislative, regulatory, and other stakeholders' requirements or considerations. The AMP should demonstrate how stakeholder needs were ascertained and translated into service level targets.	This is discussed in Chapter 4., also see Section 3.5.
10. Targets should be compared to historic values where available to provide context and scale to the reader.	Chapter 4 provides historical performance.
11. Where forecast expenditure is expected to materially affect performance against a target defined in clause 7 above, the target should be consistent with the expected change in the level of performance.	Non-relevant

ATTACHMENT A: ASSET MANAGEMENT PLANS (NETWORK DEVELOPMENT PLANNING)	AMP CHAPTER WHERE ADDRESSED
12. AMPs must provide a detailed description of network development plans, including -	Network development planning is discussed in Chapter 7 and provides detail on all network development plans.
12.1. description of the planning criteria and assumptions for network development;	The criteria are discussed in Section 5.4.2 and specifically in Chapter 7.
12.2. Planning criteria for network developments should be described logically and succinctly. Where probabilistic or scenario-based planning techniques are used, this should be indicated, and the methodology briefly described; and	The criteria are discussed in Section 5.4.2 and specifically in Chapter 7.
12.3. The use of standardised designs may lead to improved cost efficiencies. This Chapter should discuss: f) the categories of assets and designs that are standardised; and g) the approach used to identify standard designs.	Refer to Section 4.7.
12.4. A description of the criteria used to determine the capacity of equipment for different types of assets or different parts of the network. The criteria described should relate to the GDB's philosophy in managing planning risks.	This is discussed in Sections 3.7, 5.2.7, 6.1.1, 7.1.1 & Chapter 7.
12.5. A description of the process and criteria used to prioritise network development projects and how these processes and criteria align with the overall corporate goals and vision.	The process is described in Section 5.2. Chapter 5.1 provides an outline of how the overall asset management process aligns with the corporate vision and mission. Chapter 4 explains how the objectives align with the corporate objectives that relate to the use of reliability and security criteria and this is used in Chapter 6 for Asset Lifecycle plans and Chapter 7 for Network Plans.
12.6. Details of demand forecasts, the basis on which they are derived, and the specific network locations where constraints are expected due to forecast increases in demand; a) explain the load forecasting methodology and indicate all the factors used in preparing the load estimates; b) provide separate forecasts to at least the system level covering at least a minimum five-year forecast period. Discuss how uncertain but substantial individual projects/developments that affect load are taken into account in the forecasts, making clear the extent to which these uncertain increases in demand are reflected in the forecasts; and c) identify any network or equipment constraints that may arise due to the anticipated growth in demand during the AMP planning period. The AMP should include a description of the methodology and assumptions used to produce the utilisation and capacity forecasts and a discussion of the limitations of the forecasts, methodology and assumptions. The AMP should also discuss any capacity limitations identified or resolved in years during which an AMP was not disclosed.	a) The methodology is provided in Sections 7.1, 7.2 and 7.3. b) Sections 7.2 & 7.3 describe future demand by regions and projects that are impacted by this. c) Chapter 7 shows the networks where constraints are anticipated to occur during the planning period.
12.7. Analysis of the significant network level development options identified, and details of the decisions made to satisfy and meet target levels of service, including: d) the reasons for choosing a selected option for projects where decisions have been made; e) the alternative options considered for projects that are planned to start in the next five years; and (c) consideration of planned innovations that improve efficiencies within the network, such as improved utilisation, extended asset lives, and deferred investment.	Chapter 7 describes projects and rationale for decisions by region. Chapter 5.5.1.2 describe how we optimise investment.
12.8. A description and identification of the network development programme and actions to be taken, including associated expenditure projections. The network development plan must include: f) a detailed description of the material projects and a summary description of the non-material projects currently underway or planned to start within the next 12 months; g) a summary description of the programmes and projects planned for the following four years (where known); and h) an overview of the material projects being considered for the remainder of the AMP planning period. *For projects included in the AMP where decisions have been made, the reasons for choosing the selected option should be stated which should include how target levels of service will be impacted. For other projects planned to start in the next five years, alternative options should be discussed.*	Chapter 7 describes the development programme by region with a focus over the five-year horizon and, where possible, 10 years.

ATTACHMENT A: ASSET MANAGEMENT PLANS: LIFECYCLE ASSET MANAGEMENT PLANNING (MAINTENANCE AND RENEWAL)	AMP CHAPTER WHERE ADDRESSED
13. The AMP must provide a detailed description of the lifecycle asset management processes, including -	
13.1. The key drivers for maintenance planning and assumptions;	Maintenance-related assumptions are detailed in Section 6.1.5.
13.2. Identification of routine and corrective maintenance and inspection policies and programmes and actions to be taken for each asset category, including associated expenditure projections. This must include- i) the approach to inspecting and maintaining each category of assets, including a description of the types of inspections, tests and condition monitoring carried out and the intervals at which this is done; j) any systemic problems identified with any particular asset types and the proposed actions to address these problems; and k) budgets for maintenance activities broken down by asset category for the AMP planning period;	(i) Each asset class has a specific maintenance strategy, tasks and frequencies are outlined in Chapter 6. (j) Refer to the Lifecycle Management section, per asset type, detailed in Chapter 6. (k) Breakdown of the routine and corrective maintenance and inspection budgets by asset class is in Chapter 6, with forecasts in Chapter 9
13.3. Identification of asset replacement and renewal policies and programmes and actions to be taken for each asset category, including associated expenditure projections. This must include- l) the processes used to decide when and whether an asset is replaced or refurbished, including a description of the factors on which decisions are based, and consideration of future demands on the network and the optimum use of existing network assets; m) a description of innovations made that have deferred asset replacement; n) a description of the projects currently underway or planned for the next 12 months; o) a summary of the projects planned for the following four years (where known); and p) an overview of other work being considered for the remainder of the AMP planning period; and	13.3: Powerco's renewal strategy is discussed in the asset lifecycle plans in Chapter 6. Refer to Chapters 6 and 7 for further detail on projects and rationale.
13.4. The asset categories discussed in clauses 13.2 and 13.3 should include at least the categories in clause 6 above.	The asset lifecycle plans in Chapter 6, and include this material.

ATTACHMENT A: ASSET MANAGEMENT PLANS: NON-NETWORK DEVELOPMENT, MAINTENANCE AND RENEWAL	AMP CHAPTER WHERE ADDRESSED
14. AMPs must provide a summary description of material non-network development, maintenance and renewal plans, including -	
14.1. A description of non-network assets;	Section 8.2 describes non-network assets.
14.2. development, maintenance and renewal policies that cover them;	Section 8.1 describes these.
14.3. a description of material capital expenditure projects (where known) planned for the next five years; and	Sections 8.3 & 8.4 describe the proposed projects.
14.4. a description of material maintenance and renewal projects (where known) planned for the next five years.	Sections 8.3 & 8.4 describe the proposed projects.

ATTACHMENT A: ASSET MANAGEMENT PLANS: RISK MANAGEMENT	AMP CHAPTER WHERE ADDRESSED
15. AMPs must provide details of risk policies, assessment, and mitigation, including -	Section 3.6 provides an overview of risk management, including details on Powerco's policies and processes for assessment and mitigation.
15.1. Methods, details and conclusions of risk analysis;	Methods are discussed in Section 3.6 with asset-specific risks described in Section 6.1.1 and network-specific-risks in Section 7.1.
15.2. Strategies used to identify areas of the network that are vulnerable to high impact low probability events and a description of the resilience of the network and asset management systems to such events;	These are discussed in Section 3.6.2 & Chapter 7.
15.3. A description of the policies to mitigate or manage the risks of events identified in clause 15.2; and	This is discussed in Sections 3.7, 4.3 & 5.4.2.5. Emergency management procedures are detailed in Section 3.6.3.
15.4. Details of emergency response and contingency plans. *Asset risk management forms a component of an EDB's overall risk management plan or policy, focusing on the risks to assets and maintaining service levels. AMPs should demonstrate how the GDB identifies and assesses asset related risks and describe the main risks within the network. The focus should be on credible low-probability, high-impact risks. Risk evaluation may highlight the need for specific development projects or maintenance programmes. Where this is the case, the resulting projects or actions should be discussed, linking back to the development plan or maintenance programme.*	This is discussed in Section 3.6.3.

ATTACHMENT A: ASSET MANAGEMENT PLANS: EVALUATION OF PERFORMANCE	AMP CHAPTER WHERE ADDRESSED
16. AMPs must provide details of performance measurement, evaluation, and improvement, including—	
16.1. A review of progress against plan, both physical and financial; a) referring to the most recent disclosures made under clause 2.5.1 of this determination, discussing any significant differences and highlighting reasons for substantial variances; b) commenting on the progress of development projects against that planned in the previous AMP and provide reasons for substantial variances along with any significant construction or other problems experienced; and c) commenting on progress against maintenance initiatives and programmes and discuss the effectiveness of these programmes noted.	Chapter 4 discusses the performance of our objectives, and the rationale for these targets. Chapter 9 discusses our expenditure targets and describes the progress of previous projects and changes that occurred where relevant. Chapter 6 comments on the effectiveness of our maintenance initiatives.
16.2. An evaluation and comparison of actual service level performance against targeted performance d) in particular, comparing the actual and target service level performance for all the targets discussed in the previous AMP under clause 7 and explain any significant variances.	Section 4.9 shows the actual service levels over the previous years. Sectons 7.1 and 7.2 show the current and forecasted performance of the networks if no projects are carried out (status quo).
16.3. An evaluation and comparison of the results of the asset management maturity assessment disclosed in the Report on Asset Management Maturity set out in Schedule 13 against relevant objectives of the GDB's asset management and planning processes.	Refer to Section 4.5.
16.4. An analysis of gaps identified in clauses 16.2 and 16.3. Where significant gaps exist (not caused by one-off factors), the AMP must describe any planned initiatives to address the situation.	Sections 4.5 and 5.4 describe Powerco's planned initiatives to improve AMMAT scores.

ATTACHMENT A: ASSET MANAGEMENT PLANS: CAPABILITY TO DELIVER	AMP CHAPTER WHERE ADDRESSED
17. AMPs must describe the processes used by the GDB to ensure that	
17.1. The AMP is realistic, and the objectives set out in the plan can be achieved; and	Chapter 4.2 describes how Powerco ensures the AMP is realistic and objectives can be achieved.
17.2. The organisation structure and the processes for authorisation and business capabilities will support the implementation of the AMP plans.	Chapter 3.3 describes the processes and organisational structure Powerco uses for implementing the AMP.

APPENDIX 13 COMPLIANCE CERTIFICATION

CERTIFICATE FOR YEAR-BEGINNING DISCLOSURES

Pursuant to clause 2.9.1 of Section 2.9

We, John Loughlin and Philip Cory-Wright, being directors of Powerco Limited certify that, having made all reasonable enquiry, to the best of our knowledge:

a) the following attached information of Powerco Limited prepared for the purposes of clauses 2.6.1, 2.6.6 and 2.7.2 of the Gas Distribution Information Disclosure Determination 2012 in all material respects complies with that determination.

b) The prospective financial or non-financial information included in the attached information has been measured on a basis consistent with regulatory requirements or recognised industry standards.

c) The forecasts in Schedules 11a, 11b, 12a, 12b and 12c are based on objective and reasonable assumptions which both align with Powerco Limited's corporate vision and strategy and are documented in retained records.

Director

11.8.20
~~Director~~
Date

~~Date~~
Director

11.8.20
Date