

Water Asset Management Plan

2021 - 2031

Waimate District Council

Waimate
District Council

Quality Record Sheet

Waimate District Council

Water AMP

2021-2031

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1.0 EXECUTIVE SUMMARY

WATER 	The water activity is a core Council activity that contributes towards the provision of good quality infrastructure and helps ensure public health and safeguards the environment. The water system comprises treatment facilities, pipes, pump stations and other assets that represent a significant council investment over many years.
FOCUS 	**New Capital and Growth** – to improve water treatment across the district and comply with the Health (Drinking Water) Amendment Act 2007 -to provide capacity to meet the required standards, future demand and support the expansion of development areas as identified by Council. **Renewals** – develop and implement a renewals strategy; including condition and criticality assessments. Ensure appropriate budgets are available to replace aging and/or deteriorating assets and align renewals with other infrastructure upgrades/renewals. **3 Waters Regulation** – will have a significant impact on the way the water service is delivered, managed, operated, maintained, monitored and reported on. There will be an increased holistic approach to 3waters management **COVID 19** - Central Government's programme and funding package to provide immediate post COVID 19 stimulus to maintain and improve three waters infrastructure
COMPLIANCE	**Resource Consents** - Council has a number of water related resource consents and aims to achieve compliance with all resource consent conditions. Regular compliance monitoring and reporting is undertaken
SERVICE DELIVERY 	**Service Delivery** - the water activity is delivered via a combination of in-house resources and contracted services with the operation and maintenance activities undertaken by inhouse resources. Operation and maintenance costs will increase: • To ensure compliance with DWSNZ • To ensure compliance with Resource Consents • As a result of expanding asset base, • increased community expectations
PERFORMANCE	**Performance** - a comprehensive performance monitoring and reporting framework ensures that legislative requirements and other KPIs are regularly assessed and reported on.
RISK & RESILIENCE	The ability to deliver capital projects on time may be affected by the skills shortage, increased monitoring and consultation processes required as part of Te Mana o te Wai processes **Understand** our communities, the hazards and risks and acknowledge that failure will occur. **Ensure** early detection and recovery through connecting communities, supporting community organisations and robust infrastructure assets

1.1 What are we doing

We protect public health and the environment by supplying water to the District's population through the operation of seven individual water supplies. These water supplies consist of:

- Waimate Urban,
- Cannington Motukaika,
- Hook Waituna,
- Lower Waihao,
- Otaio Makikihi,
- Waihaorunga and
- Waikakahi.

Council supports this service by:

- Providing, operating and maintaining of water infrastructure in compliance with New Zealand legislation and standards
- Responding to call outs and service disruptions quickly and efficiently
- Planning for future development and needs.

1.2 Why are we doing it?

Council has a legal obligation under the Health Act 1956 to improve, promote, and protect public health within the District. The Health (Drinking Water) Amendment Act 2007 places a further obligation on Council to comply with the Drinking Water Standards for New Zealand. In terms of the Local Government Act 2002 the continued operation of Water Supplies is required unless specific approval is sought to withdraw from the activity (in whole or part). The Council sees the provision of reliable and safe drinking water to the community as a major contribution to the District's economy and to resident's wellbeing.

Council's water supply activity contributes primarily to the following community outcomes

Community outcome	How it contributes
Thriving Community – A District that provides infrastructure for economic activity	The timely provision of utility services is essential to supporting growth
Safe and Healthy People A place where people are safe in their homes, work and public spaces	Protecting the communities from drinking water related health issues and providing firefighting capability
Our services, infrastructure and environment enhance quality of life	We have reliable, efficient and well planned water, wastewater, stormwater and solid waste infrastructure that meet the needs of residents
Sustainable District and Environment We value the natural environment, biodiversity and landscapes	Water is used efficiently and in a sustainable manner

Council identified a number of significant negative effects that the water activity may have on the well being of the community and the environment. Council developed appropriate mitigation measures to eliminate or minimise these effects.

1.3 Where are we headed?

Council's strategic goals for water over the next ten years is:

- To ensure that adequate water schemes are provided and maintained for the wellbeing of the public both now and in the reasonable foreseeable future
- To ensure that the long-term operation and maintenance of the water treatment facilities are environmentally sustainable
- To demonstrate responsible management in the operation, maintenance, renewal and disposal of Council owned water assets.

There are a number of key issues facing Council over the next ten years and beyond:

- Continue compliance with the Health Act and investment in meeting the Drinking Water Standards for New Zealand (*extent to be confirmed*)
- Compliance with new drinking water regulatory framework. The extent is still to be confirmed but will include:
    - registration of all drinking water supplies with only single household self-suppliers excluded
    - strengthened Water Safety Plans
        - multi-barrier approach to ensuring drinking water safety:
    - identifying and managing risks, source protection, treatment and reticulation
    - maintaining disinfection residuals in the reticulation
    - increased accountability
    - competency framework
- Central Government's 3 Waters Reform Programme and funding package to provide immediate post COVID 19 stimulus to local authorities to maintain and improve three waters infrastructure.
- Increased costs as a result of:
    - operation and maintenance costs
    - monitoring costs
    - training and qualification requirements
- Increased focus on ageing and failing infrastructure (cast iron and asbestos cement reticulation materials)
- Maintaining appropriate data and monitoring systems
- Ensure adequate in-house staff resource capacity and capability
- Progressively increase resilience of the water supply service
- Investigating and implementing improved efficiencies
- Ongoing affordability of the water supply
- Managing water demand

The water system represents a significant community investment. With age, asset condition and service potential reduce, and an important aspect of asset management is determining the right time and right level of renewals investment in order to maintain the agreed levels of service over the long term. Council will continue implementing the appropriate intervention strategies i.e. a combination of maintenance, repair and renewal activities to maintain the service.

1.4 How will we get there?

Council plans to maintain current levels of service for the life of this plan, unless legislation, consent conditions, or community expectations change. Over the next ten years Council plans to:

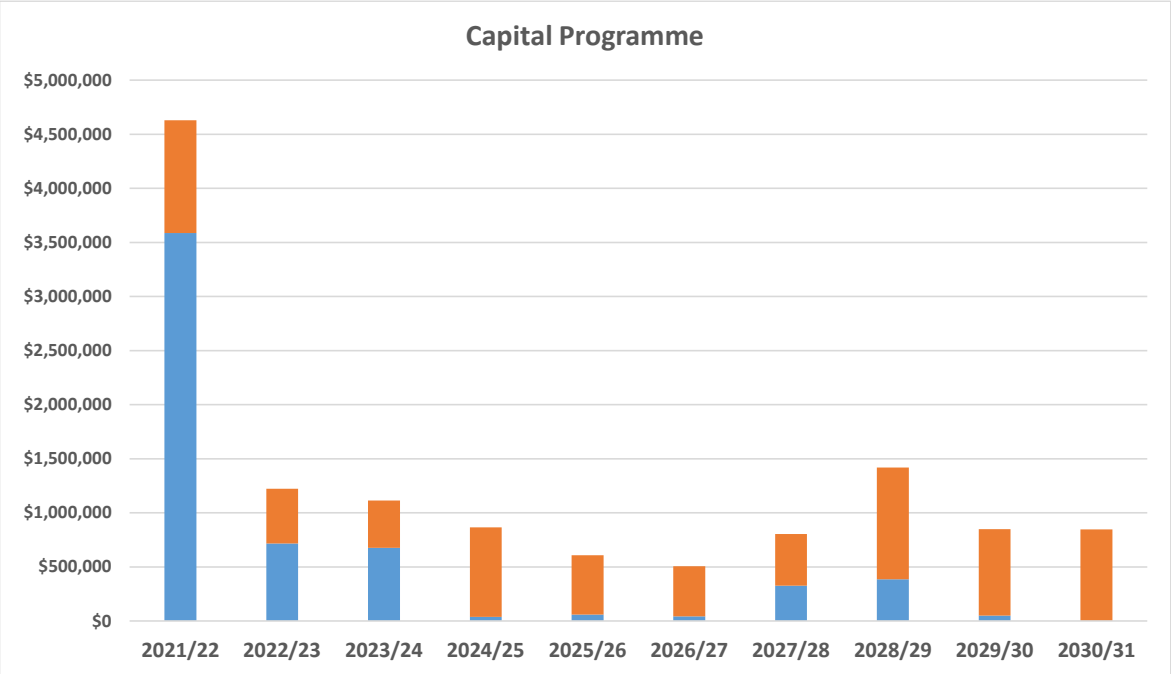
- Maintain consumer's access to water
- Continuing to invest in the implementation of Drink Water Standards and water safety upgrades to ensure a continuous supply of safe water
- Continue to monitor and respond to the Government's new Water Regulatory Framework

- Continue to develop and implement a robust water safety management framework
- Continue maintenance and renewal of the water network to meet the needs of current and future consumers.
- Plan for future development and needs
- Protect the environment through resource consent compliance
- Consult with the community on issues such as health and legislative compliance issues

This vision is supported by a detailed water asset management plan.

Significant projects and their funding sources are summarised in the following table and chart:

Project Description	Year	Inflated Amount
New Capital works -		
Drinking water upgrades (Hook Waituna, Lower Waihao, Waikakahi)	2021/22	$2,909,333
Bond Street Subdivision (Waimate)		$74,895
New bore (Otaio Makikihi) Booster pumps (Waimate)	2022/23	$127,182
Manchesters Road booster (Waimate)		$29,986
Chlorine monitoring (Lower Waihao),	2023/24	$57,008
Capacity upgrades (Hook Waituna, Otaiamo Makikihi)	2022 -30	$331,627
Water meters (Waimate)	2021/22	$472,045
Te Kiteroa Main (Booster, Reservoir)	2022-24	$799,699
Makers/Courts/Hunts Fitzmaurice Roads Extension & booster (Waimate)	2021-30	$980,232
Total		**$5,782,007**
Renewals		
Mains & plant renewals	2021/22	$1,042,164
Mains & plant renewals	2022/23	$505,006
Mains & plant renewals	2023/24	$438,643
Mains & plant renewals	2024/25	$827,496
Mains & plant renewals	2025/26	$548,953
Mains & plant renewals	2026/27	$463,416
Mains & plant renewals	2027/28	$476,381
Mains & plant renewals	2028/29	$1,032,904
Mains & plant renewals	2029/30	$798,622
Mains & plant renewals	2030/31	$845,877
Total		**$6,979,462**



Key projects:

- Drinking water compliance upgrades
  - Hook Waituna
  - Lower Waihao
  - Waikakahi
- Demand related
  - Booster – Bakers/Court/Hunts/Fitzmaurice Roads and Manchesters standby pump
  - Extensions – Bakers/Court/Hunts/Fitzmaurice Roads
  - Te Kiteroa main, booster and reservoir
  - Urban Water meters (Partial stimulus funded)
- Renewals – refurbishment, replacement of water assets estimated to be $6.98m over the next 10 years. All water supply system renewal work will be funded by the annual depreciation provision where funds are available

To ensure on-going affordability of the water supply service Council will continue to consider options in delivering the service.

1.5 How well are we doing and how well do we measure progress?

Council will continue to report on the non financial performance measures, in accordance with 261B of the Local Government Act 2002, as this covers the key expectations in terms of the delivery of the service.

Council have reviewed and updated its systems and processes to ensure alignment and compliance with these rules.

The linkage between community outcomes, levels of service and performance measurement is shown in the following table.

Community outcome	Level of Service	Performance Measure
Safe and Healthy People A place where people are safe in their homes, work and public spaces Our services, infrastructure and environment enhance quality of life	Safe drinking water	DWSNZ Compliance (NFPM1)
	Customer satisfaction	Number of complaints (NFPM4)
		Average consumption of drinking water (NFPM 5)
Thriving Community – A District that provides infrastructure for economic activity	Fault response	Response & Resolution times (NFPM3)
Sustainable District and Environment We value the natural environment, biodiversity and landscapes	Maintenance of the reticulation	Real water losses from reticulation (NFPM2)

1.6 What resources do we have and what resources do we need?

People –

The Water and Wastes Unit has seven full time equivalent staff, including operational staff. The Water and Wastes Unit provides management and engineering expertise to the Asset Group. The Unit utilises Council inhouse unit and contractors to maintain, renew, and construct assets through various contractual agreements. The Unit augments its skill base through the engagement of specialist consultants as required to undertake specific projects and works. The Waters and Wastes Unit is modestly resourced, but the outcomes of the new regulatory framework and Government 3Waters Review will place even greater demands on already stretched resources.

It is likely that a shortage of technically skilled people to design, construct and manage water assets will continue to have an impact on this activity in future years. This is a global issue which is also affecting other local authorities.

Physical Assets -

Council manages seven public water supply systems. These systems consist of treatment facilities, pipes, pump stations and other assets.

Length of water mains = 898 km
Number of valves/hydrants = 762/359
Number of pump stations = 18

The latest valuation, August 2020, estimates the replacement value of the water supply system to be $39.9m.

1.7 Who pays for it?

This activity is funded by targeted rates from properties that have access to water supply systems.

2.0 INTRODUCTION

This section sets out the scope and objectives of this Asset Management Plan (AMP), describes the interrelationships with other planning documents of the Waimate District Council (Council) and shows the AMP framework and describes the asset management progress.

2.1 Purpose of the AMP

The purpose of this AMP is to outline and to summarise in a coordinated manner the Council's long-term management approach (more commonly called Asset Management) for the provision and maintenance of Water Services throughout the District.

This AMP demonstrates how Council will:

- Detail the extent and quality of services demanded (or required) by the community and legislation now and in the future.
- Have clear linkage to community agreed outcomes and the agreed Levels of Service.
- Prudently manage the acquisition, maintenance, operation, renewal and disposal of water assets in ways that optimise the value of services delivered to the community.
- Assess the risks of failing to deliver levels of service for its activities and provide appropriate means of mitigating those risks.
- Justify short, medium and long term funding requirements.
- Manage the risk of asset failure.
- Provide adequate funding to manage the assets according to assessed priorities.
- Proactively and improve knowledge of its assets.

This AMP is intended to be read in conjunction with the 2021-2031 LTP and fulfils requirements of the Local Government Act 2002 (and amendments), Schedule 10

Asset Management

The overall objective of Asset Management is to:

Deliver the required Level of Service to existing and future customers in the most cost effective manner.

2.2 Assets Included in This AMP

The Council is responsible for one urban scheme and six rural water schemes. The rural schemes also supply the small communities of Studholme, Glenavy, Morven and Makikihi.

Table 2.1: Council Water Schemes

Scheme	Year Installed	Population served	Water mains (kms)	Replacement Costs
Waimate Urban	1906	3000	65.9	$21,114,428
Cannington Motukaika	1973	120	56.8	$1,051,797
Hook Waituna - Studholme ($25m^3$/day)	1973	1,350	252.1	$5,023,003
Lower Waihao - Glenavy ($200m^3$/day) - Morven ($50m^3$/day)	1978	600	125.1	$3,372,296

Scheme	Year Installed	Population served	Water mains (kms)	Replacement Costs
Otaio Makikihi - Makikihi (100m^3/day)	1969	430	155.1	$4,567,344
Waihaorunga	1977	141	67.1	$1,066,006
Waikakahi	1973	360	176	$3,712,108
Total			898.1	**$39,906,982**

There are three other rural schemes within the Waimate District.

- The Downlands water scheme is operated and managed by the Timaru District Council and provides water to properties within the Waimate District including St Andrews. The Council has a 14% stake holding in the scheme but has no direct involvement in the scheme apart from the collection of water rates on those properties.
- The Hakataramea Valley and Cattle Creek rural water schemes are within the Waimate District. They have not been included in this AMP as they are administered and operated privately by an incorporated society.

Replacement Cost of the Water Services Assets

In 2013 a major review of insurances was undertaken with adjustments to values on a practical basis as determined by Council staff. All figures were agreed and ratified by Council by way of formal resolution when recommendations regarding insurance levels and values were discussed in detail.

The replacement cost of the Water Services assets, owned by Council are shown below:

Table 2.2: Summary of Water Scheme Assets Replacement Costs

Valuation Category	Asset Description	Units	Quantity	ORC
Plant	Treatment Plants	No	10	$5,100,395
	Booster Stations	No	11	
	Bores	No	5	
	Reservoirs	No	13	
Service	Connections	km	20.5	$1,514,361
Point Assets	Valves	No	791	$3,533,525
	Hydrants	No	359	
	Manifold & meter	No	680	
	Manifold only	No	185	
	Meters	No	56	
	Tobies	No	1094	
Lines	Reticulation	km	898.1	$29,758,701
TOTAL				**$39,906,982**

2.3 Relationship with Other Plans

The AMP relates to the LTP and other key Council plans, documents, policies and processes. These are mainly driven by legislation and obligations that central government, through legislation,

devolved to local authorities. The community outcomes guide the strategic and day to day decision making for the Council.

2.4 How This AMP will be Used

Development of an Asset Management Culture

The on-going development and successful implementation of asset management requires an organisational culture of asset management from both 'bottom-up' and 'top-down'. To be successful the asset management culture needs to be consistently modelled and supported by the Chief Executive and senior managers in conjunction with the elected Council.

It also needs to align with and reflect the LTP and strategies. These requirements are supported in the new ISO 55000 standard for asset management. This process has been reinforced by the establishment of the Council's Asset Management Policy in 2009 and the AMP Policy process included in Section 2.6.

Roles and Responsibilities of Council Staff

The roles and responsibilities of Council staff have been defined in respect to the on-going to enable the AMP to remain relevant and current. Table 2.3 details how this is and will be carried out within Council.

Table 2.3: Activity Management Plan Enactment

	Item	How is this done
1	Organisational culture of asset management developed	Asset Management Policy 2009
2	Council Staff understand the reasons for the AMPs and the implications for the long term use of them	On department basis
3	The AMPs are adopted/accepted by staff	Adopted by Council
4	Council staff understand what is in the AMPs and how it could affect their day to day work including their responsibilities and reporting requirements as detailed in the different sections within the AMP	Training Programme
5	Understand all the reporting requirements for Levels of Service and Internal Benchmarking	Training Programme and Implementation of LGA 2002 amendments

Resourcing of Asset Management Programmes

To be effective asset management programmes must be adequately resourced and therefore require on-going budget to deliver identified improvements and keep AMPs and processes current with evolving practice. For asset management to be successful in Waimate District there must be a commitment recognised across the organisation. This commitment must translate into budget, human resources, and management accountability.

2.4.1 Implementation

This AMP includes improvement and expenditure programmes that will be implemented with the objective of achieving community outcomes and delivering the stated Levels of Service for the Water Services activity.

2.5 Water Services Activity Objectives

Public Water Supply

The sustainable use of a safe water supply is fundamental to the health of all people and to the protection of the natural environment.

In fulfilling Council's responsibilities to ensure that occupied buildings are sanitary the Local Government Act and the Health Act require the Council to continue to provide the reticulated water services that it owns and maintain its capacity (section 130 of LGA).

The Council provides drinking water to all urban areas and significant section of the plains rural area. These services provide an effective way to protect public health and to protect the natural environment.

2.6 Council's AM Policy – Appropriate Level

2.6.1 Objective of the Asset Management Policy

The objective of the Council's Asset Management Policy is to ensure that Council's service delivery is optimised to deliver agreed community outcomes and Levels of Service, manage related risks, and optimise expenditure over the entire life cycle of the service delivery, using appropriate assets and levels of management as required. The delivery of service is required to be sustainable in the long term and deliver on Council's economic, environmental, social, and cultural objectives.

The Asset Management Policy requires that the management of assets be in a systematic process to guide planning, acquisition, operation and maintenance, renewal and disposal of the required assets.

The Council's Asset Management Policy sets the appropriate level of asset management practice for Council's Utilities, Community Facilities and Transportation.

Asset Management Policy Principles

The following principles will be used by Council to guide asset management planning and decision making:

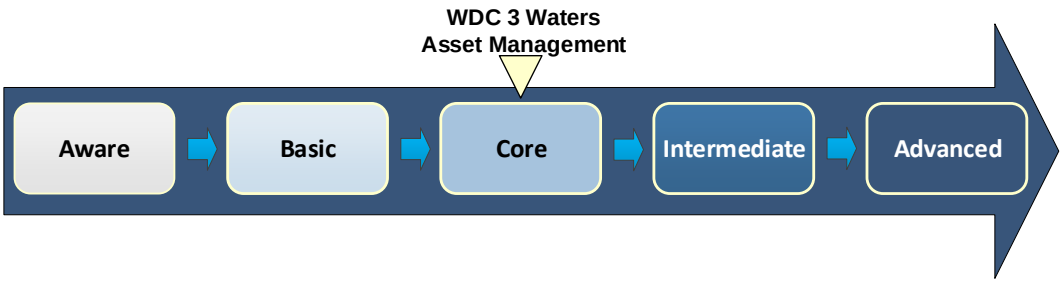
- Effective consultation to determine appropriate Levels of Service.
- Ensuring service delivery needs form the basis of asset management.
- Integration of asset management within and across Council utilising corporate, financial, business and budgetary planning using activity management plans and Council's LTP to demonstrate this.
- Integration of asset management within Council's strategic, tactical and operational planning frameworks.
- Informed decision making taking a lifecycle management and inter-generational approach to asset planning.
- Transparent and accountable asset management decision making.
- Sustainable management providing for present needs whilst sustaining resources for future generations.

Policy Linkages to Other Plans

This Asset Management Policy links to Council's LTP and the Water Services asset management. An approach where planning is based around communities of interest is favoured, as this aims to promote an integrated management regime and encourage efficiencies across the District's Water Services.

Structured Assessment of Asset Management Practice

Council has undertaken a structured assessment of the appropriate level of asset management practice for the Water assets in August 2009. This structured assessment follows the guidance provided in Section 2.2.4 of the International Infrastructure Management Manual (IIMM) 2006. The results of this assessment were that the Water was considered Core.



Implementation and Review of Policy

This Asset Management Policy has been implemented in conjunction with the 2011,2014, and 2017 AMPs and –corresponding LTP's. The next full review of this Asset Management Policy was programmed to be completed in June 2017. A light review has occurred with a full review scheduled as part of the improvement plan.

Asset Management Implementation Strategy

Council staff has completed a detailed analysis of appropriate asset management practice within the guidance offered by this Policy. This analysis has examined asset description, Levels of Service, managing growth, risk management, asset lifecycle decision making, financial forecasts, planning assumptions and confidence levels, improvement programmes, use of qualified persons and Council commitment to asset management planning.

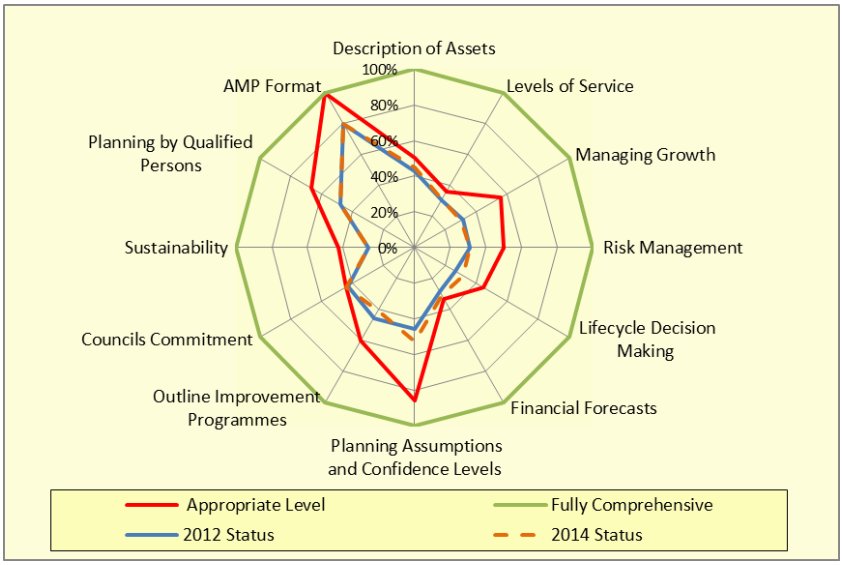
Appropriate Practice Policy

Develop long term improvement programme to achieve the Council's appropriate practice policy.

2.6.2 Water AMP Compliance Status

The assessment on the Water AMP in 2014 indicates a minor change in the management of the assets has occurred since the 2012 assessment was carried out. The long term programme to achieve the appropriate AM level is shown in Section 10 will assist in this process.

Figure 2-1: Water AMP Compliance Status (2011 & 2014)



2.7 Key Stakeholders

Key stakeholders are those who have significant specific involvement with the assets and/or the service facilitated by the assets and describes their particular main interests and is limited to the main issues for key stakeholder groups. 'Public Service providers' include schools, dentists, doctors,

hospitals, and other government organisations. 'Asset Managers' are those District Council staff (engineers and others) whose responsibility it is to manage the services made possible by the assets covered in this AMP.

The key stakeholders and the outcomes that they require for the Water Activity are detailed in Table 2.4. Different issues will require different levels of consultation; from a broad approach to specific and limited to those directly affected. This is indicated under Consultation Range (Broad ***, Moderate **, Limited *).

Table 2.4: Waimate District Stakeholders

Key Stakeholder		Consultation Range	Desired Stakeholder Outcome(s)
External	Council customers and resident population	***	Reliable service that meets strategic and sustainable drivers
	Canterbury Regional Council	**	Resource use is sustainable as directed in the RMA 1991
	Local Government New Zealand or Central Government	*	Ensure that Local Government Act is complied with (via Auditor-General)
	Department of Conservation	*	Enhance conservation value of natural waterways (i.e. rivers/streams)
	Local Iwi/Ngai Tahu	*	Enhance waterways and Mahinga kai, cultural/spiritual values
	Local Businesses/Industries	**	Water services to suit commercial needs and expansion, at affordable cost
	Wider Community	*	Enhance landscape and aesthetic values of farmland and plains.
	Ministry of Health	*	Water quality is suitable, consistently assured, does not spread diseases
Internal	Waimate District Council	***	Maximise the four aspects of well-being through provision of the Water Services Activity
	Elected Officials	***	Owner of assets, responsible for sustainable service levels under the LGA 2002 (2012 amendment)
	Council committees	*	As per delegated authority from Council
	Executive	***	Compliance with regulations, service reliability, quality and economy
	Asset Managers	*	As above plus policy, planning and implementation of infrastructure and service management activities (e.g. operations, demand management, maintenance, construction). Safety. Effective corporate support for decision-making, service management, procurement, finance, communications, I.T, staff and other resources
	Planners	*	AMP support for LTPs. Infrastructure support for current/future district activities
	Finance	**	Proper accounting for assets and for services consumed by asset management activities
	Customer Services	*	Systems which minimise and resolve complaints/enquiries about service
	Information Services	*	Clarity of technical and budget requirements for systems and support

2.7.1 Rural Water Scheme Committees

Each rural water scheme has a local advisory committee elected every three years at a specially convened public meeting. The purpose of the committee is to consult with its community and relay local concerns and preferences to the Council. The committees have terms of, which provide direction on their governance role. The terms of reference have been reviewed but require ratification by Council.

While committees play a significant role in the management of the Water Services, ultimate responsibility, and hence risk, lies with Council as the owner of the asset.

2.7.2 Relationships with Other Bodies and Organisations

Tangata Whenua - kaitiakitanga, tikanga

For Maori, linking the past, present and the future is an important concept of life. There is much value in learning from the past in planning for the future. Kaitiakitanga – safe guarding our future (guardianship) and Tikanga (protocols) are two powerful concepts embodied in Maori culture.

Council will seek to understand and exercise the principles of Kaitiakitanga so those who follow can enjoy what we enjoy today, and seek to establish the right Tikanga that will enable us to deliver Water Services in an integrated and sustainable way.

Canterbury Regional Council - Environment Canterbury (ECan)

Environment Canterbury is delegated responsibility for management of the water resources within the District and achieves this through Regional Plans. These plans provide a framework for the sustainable environmental management of Canterbury's physical and natural resources. The change of use of land, taking of water, diverting of water, disposal of water, and discharge to air, require resource consents. Therefore Council must liaise with Environment Canterbury in obtaining and complying with consents in relation to the Water Services Activity.

Water New Zealand

The Water NZ provides a forum for the exchange of ideas between those involved in the 'water industry'. Water NZ also manages projects such as the development of national codes of practice. In recent times, Water NZ has taken on the role of lobbyist to Government on water issues.

IPENZ, IPWEA, LGNZ, SOLGM

Each of these organisations provides peer support and exchange of information to foster appropriate practice and share/manage issues that arise.

2.7.3 Community and Public Health

Community and Public Health (CPH) have an interest in ensuring the public health of communities on behalf of the Ministry of Health. With respect to the Waters assets this role is predominantly concerned with the quality of drinking water the Council supplies to its consumers and the disposal of wastewater effluent where this could compromise community health.

CPH is the agency through which annual audits of the performance of Council's drinking water supplies against drinking water standards are implemented and through which applications for capital assistance from government for upgrades can be made. They are the regulator of Councils' water supplies under both the Health Act 1956 and the Health (Drinking Water) Amendment Act 2007.

2.7.4 Other Organisations

Council has a consultative relationship with other organisations including:

- Fish and Game, Central South Island
- Irrigation New Zealand
- Meridian
- Federated Farmers

2.8 Progress in Development of Asset Management

2.8.1 Background

Asset management in New Zealand has developed over the last 15 years in response to the requirement to justify and improve the level of investment in and management of community driven infrastructure. Council's asset management has mirrored this development to the point that it will be at the appropriate level within six to nine years.

This is a seventh generation AMP for the rural schemes and an eigth generation AMP for the urban scheme with the first AMP being produced in 2002.

2.8.2 Key Advances in the 2020 AMP

The following matters represent the most significant changes to this AMP, over the period 2011-2020

- Data – Systems and Quality
- Asset Data Capture
- Asset Data Quality
- Complaints resolution
- Criticality Assessment
- Condition Assessments
- Government and Industry Direction

2.9 Information

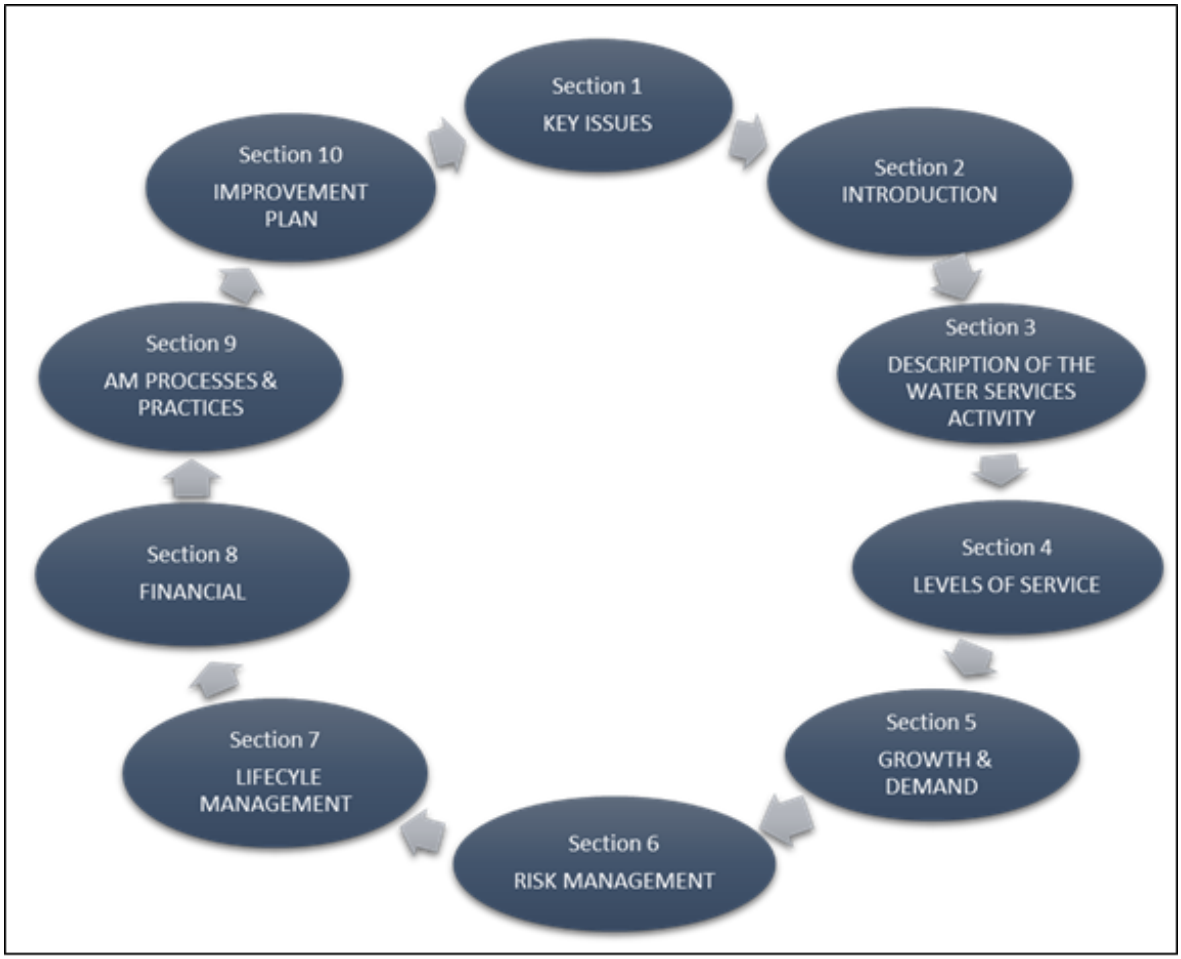
The information for this Water AMP has been derived from the following sources:

- 2020 Valuation (August 2020)
- 2018 AMP
- Council reports and staff knowledge

2.10 The AMP Format

A top down approach has been taken to develop the AMP, using existing data followed by data improvement. The structure of this plan mirrors the logical process followed for asset management planning as shown below:

Figure 2-2: Asset Management Process



2.10.1 Key Elements of this Asset Management Plan

The key elements of this AMP are shown in Table 2.5 below.

Table 2.5: Key Elements of AMP

Section	Content
Section 1: Key Issues	Describe the challenges and aspirations faced by the Water Services and inform of the strategic direction for the short term and long term.
Section 2: Introduction	Sets out the purpose of this AMP, indicates the key stakeholders, describes the asset management progress over the last 15 years and shows the plan framework.
Section 3: Description of the Water Services Activity	Covers the rationale for ownership of the Water Services assets and the description of assets covered under this AMP.
Section 4: Levels of Service	The Levels of Service for the Water Services are defined and the performance measures by which the service levels will be assessed.
Section 5: Growth and Demand	Provides details of growth forecasts, which affect the management, and utilisation of the Water Services assets.
Section 6: Risk Management	Details the Risk Management Processes utilised by Council for assessing and managing risk within the Water Services.
Section 7: Lifecycle Management	Outlines what is planned to manage and operate the assets at the agreed levels of service while optimising lifecycle costs.
Section 8: Financial	Identifies the financial requirements resulting from all of the information presented in the previous sections.

Section	Content
Section 9: AM Practices and Processes	Outlines the information available on the assets, information systems used and process used to make decisions on how the asset will be managed. It also provides details on planning for monitoring the performance of the AMP.
Section 10: Improvement Plan	This section details the improvements to Asset Management within Council that will lead to an increase in confidence in the management of the assets.

3.0 DESCRIPTION OF THE WATER SERVICE

This section of the AMP covers the rationale for ownership of the Water Services assets and the description of assets covered under this AMP. This section also highlights the critical Water Services assets.

3.1 Waimate District Overview

The Waimate District is located at the southern end of the Canterbury Region. The Canterbury Region has an estimated population of approximately 539,436 as of 2013 Census.

The Waimate District is bounded by the Waitaki and Pareora Rivers to the south and north respectively, the Hakataramea Valley and mountains of Mackenzie District to the West and the Pacific Ocean to the East.

The main centre of population is the town of Waimate itself, a town housing a population of some 2,778 people. This represents approximately 40% of the total population of the district of 7,536 (source 2013 census). Other centres of population include the coastal townships of Glenavy, Willowbridge, Makikihi, Morven and St Andrews.

The Waimate District community profile is presented in Table 3.1.

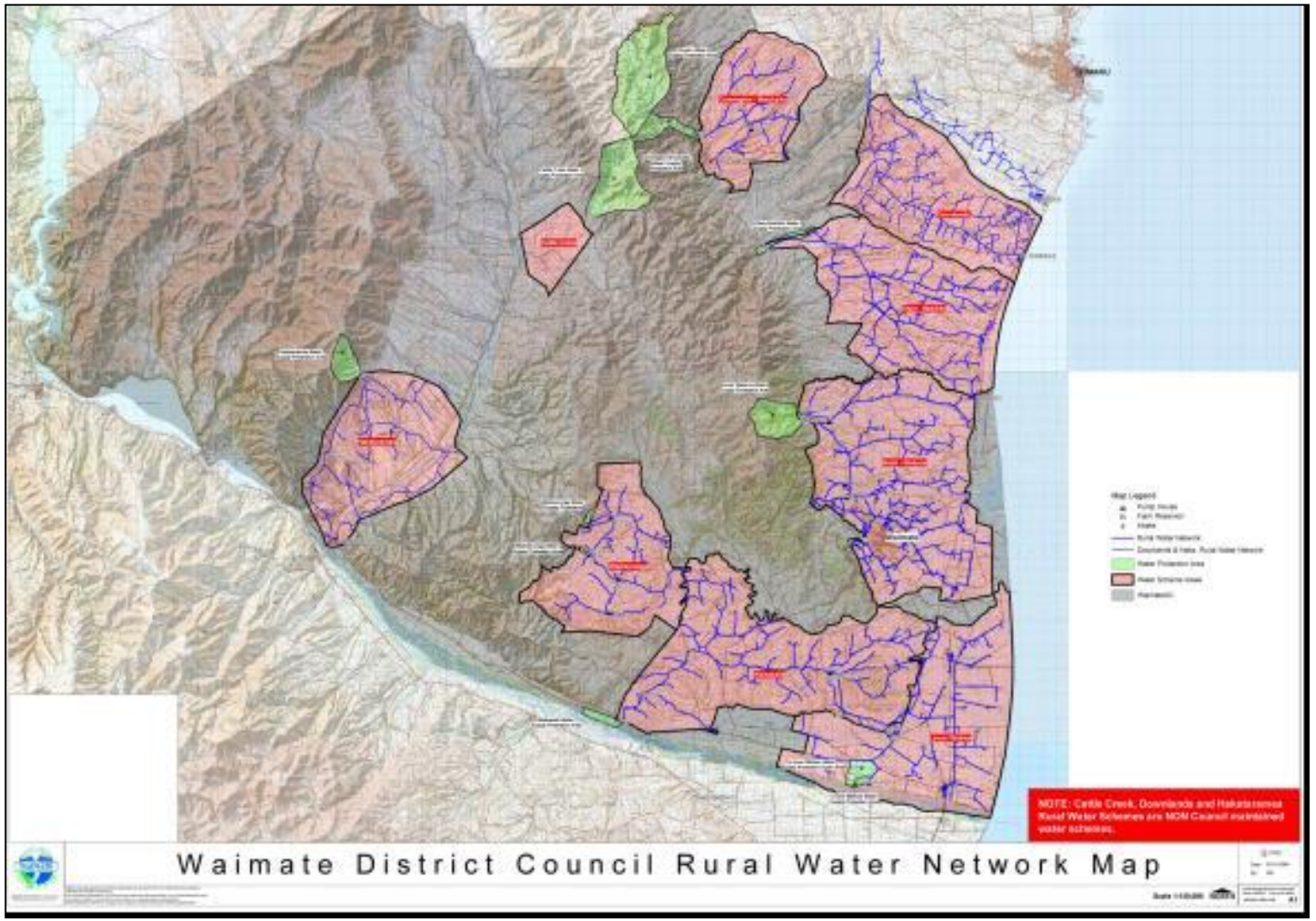
Table 3.1: Waimate Community Profile

Area	3,582 km^2		
Population (2013 census)	7,536	Households (occupied dwellings)	3,234
Employees	53.08 FTE's	Rating system: Mix of General Rates and Targeted Rates	
Infrastructure (as at 30 June 2020):		Total rateable properties	4,092
Length of roads/streets	1,335 km	Average total rates per property	$2,924 inc. GST
Length of wastewater pipes	39.2 km	Council debt	$2.60m
Length of stormwater pipes and drains	15.5 km	**Climate:**	
Length of water pipes	898 km	Mean Annual Rainfall (Te Aroha)	600 mm

3.2 Description of Activity

Council supplies water to approximately 3199 connections in the water schemes of Waimate Urban, Cannington Motukaika, Hook Waituna, Lower Waihao, Otaio Makikihi, Waihaorunga and Waikakahi.The Water schemes are presented in Figure 3-1.

Figure 3-1: Scheme Location and Area



3.2.1 Summary of Assets

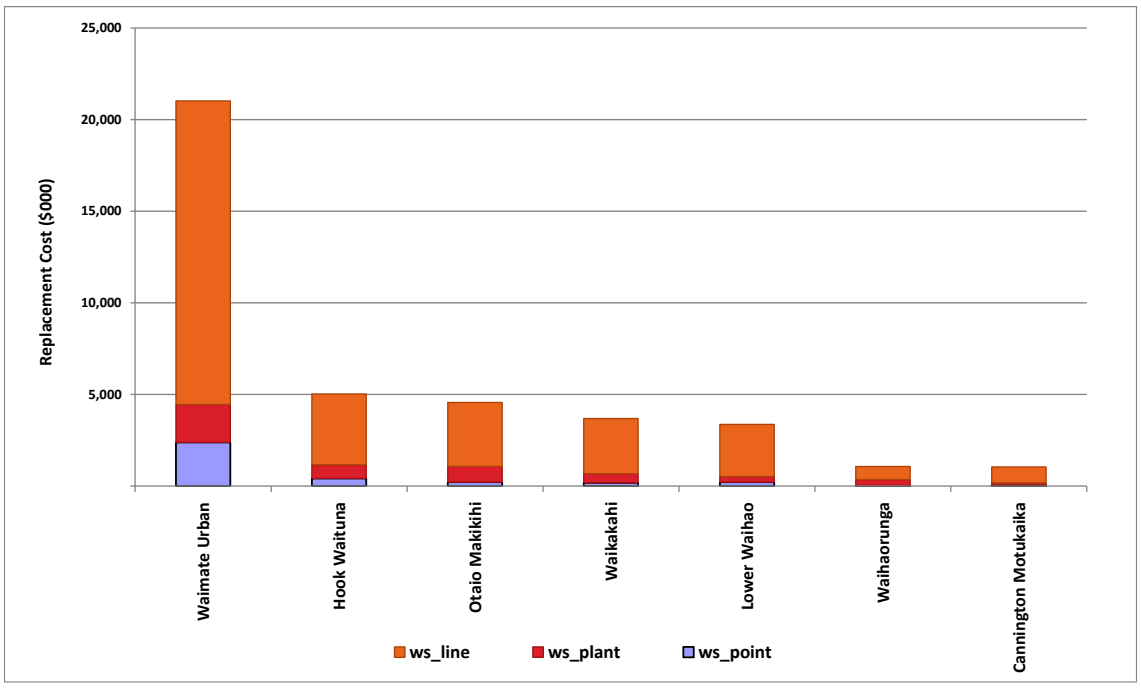
The majority of the rural water schemes source their water from river intakes as indicated in Table 3.2. In the rural schemes only the Lower Waihao sources its water from a shallow bore located next to the Waitaki River.

The Waimate Urban scheme sources its water from two bores, the Manchester Road bore (main supply) and Timaru Road Bore (supplementary source).

Table 3.2: Summary of Water Assets

Scheme	Year Installed	Treatment Plants	Supply Bores	River Intakes	Pumping Stations	Storage Reservoirs	Dams	Water mains (kms)	Service Lines (kms)	Replacement costs
Waimate Urban	1906	2	2		2	1		65.9	20.5	$21,114,428
Cannington Motukaika	1973	1		1	1	1		56.8		$1,051,797
Hook Waituna	1973	1		1	4	4		252.1		$5,023,003
Lower Waihao	1972	1	1		3	1		125.1	0.5	$3,372,096
Otaio Makikihi	1969	2	1	1	1	1		155.1		$4,567,344
Waihaorunga	1977	2		2	4	4		67.1		$1,066,006
Waikakahi	1972	1		1	3	2		176		$3,712,108
Total		**9**	**3**	**6**	**18**	**14**		**898.1**	**21**	**$39,906,982**

Figure 3-2: Water Components - Replacement Cost



The water schemes are made up of the following components:

- Water Lines: pipes, mains, connections
- Water Service Lines: property connections
- Water Points: valves, hydrants, manifolds, backflow prevention, meters and tobies
- Water Plant: bores and river Intakes, pumping and valve stations, water treatment plants and reservoirs
- Buildings

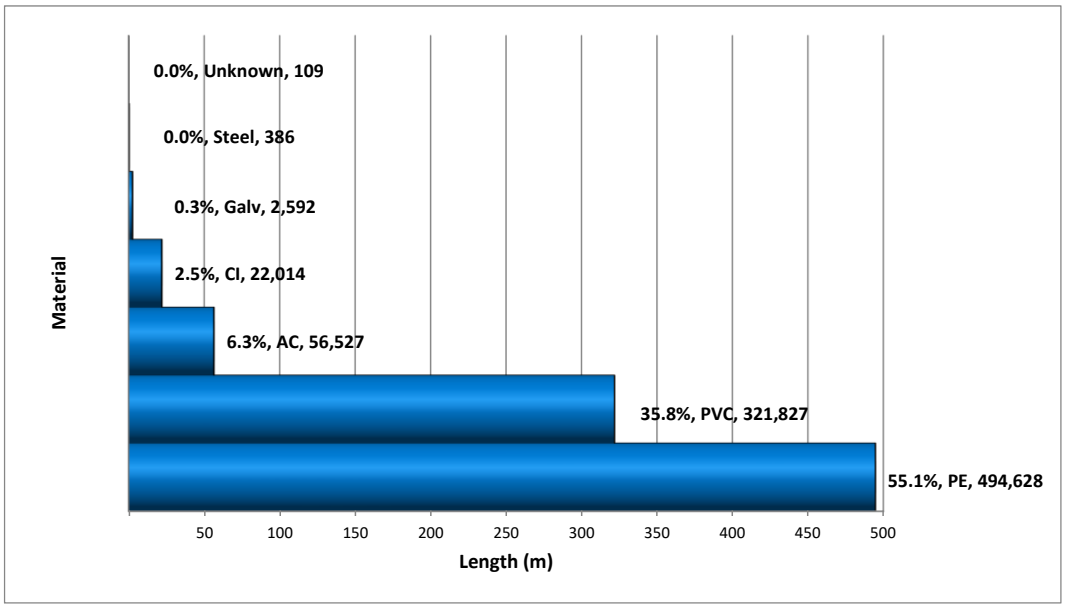
3.3 Water Reticulation

3.3.1 Asset Description

The total length of the combined reticulation is 898.1km. The main purpose of the reticulation system is to supply water from service reservoirs or treatment plants to the customer's point of supply while maintaining the quality of the water. The reticulation system also provides the capacity for fire-fighting supply within the Waimate Urban water scheme. The scheme networks have been hydraulically modelled. The reticulation which includes water mains, water points and service lines make up 78% of the total water asset value with the water mains (>20mm diameter) making up 74%.

The Council has water pipe assets ranging from new to 114 years of age. The distribution of pipe length verses remaining life can be seen in Figure 3-5. A summary of pipe materials is shown in Figure 3-3.

Figure 3-3: Summary of Pipe Materials



The majority (77%) of pipe is of a diameter 50 mm and less and pipes 51 mm to 150 mm making up a further 22%. This is as a result of the significant portion of rural schemes, which use small diameter mains for conveyance that do not provide firefighting capabilities. The summary of pipe length versus pipe diameter is presented in Table 3.3.

Table 3.3: Summary of Pipe Length vs. Diameter

Diameter (mm)	Length (m)	%
0 – 50	689,538	76.8%
51 – 100	131,144	14.6%
101 – 150	62,194	6.9%
151 – 200	9,507	1.1%
201 – 250	5,491	0.6%
251 – 300	134	0.02%
301-350	74	0.008%
Total	898,083	100%

Figure 3-4: Summary of Pipe Length vs Diameter

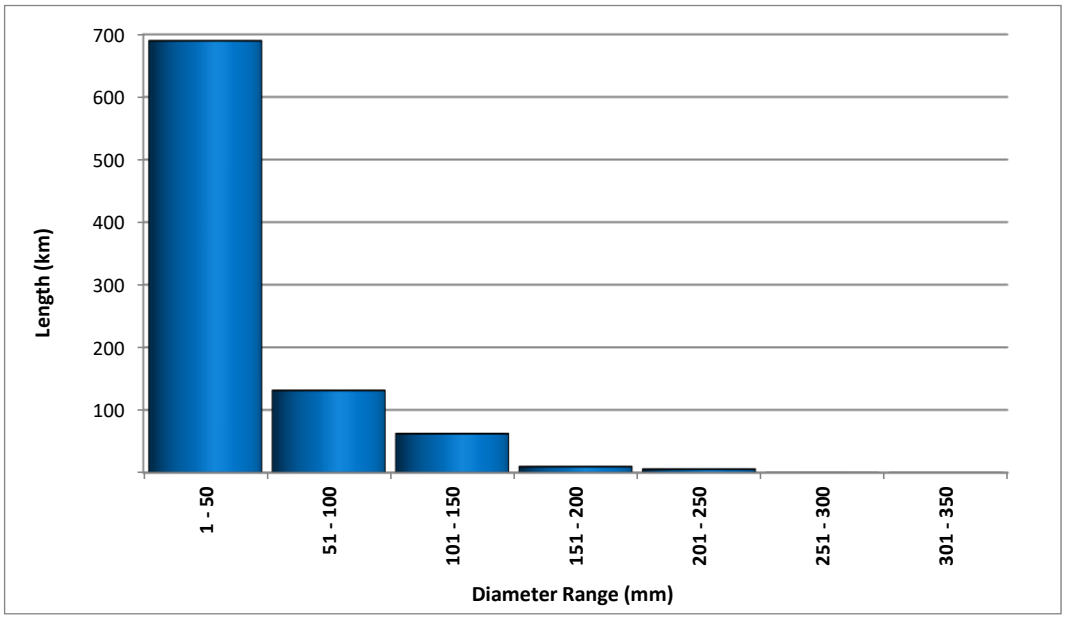
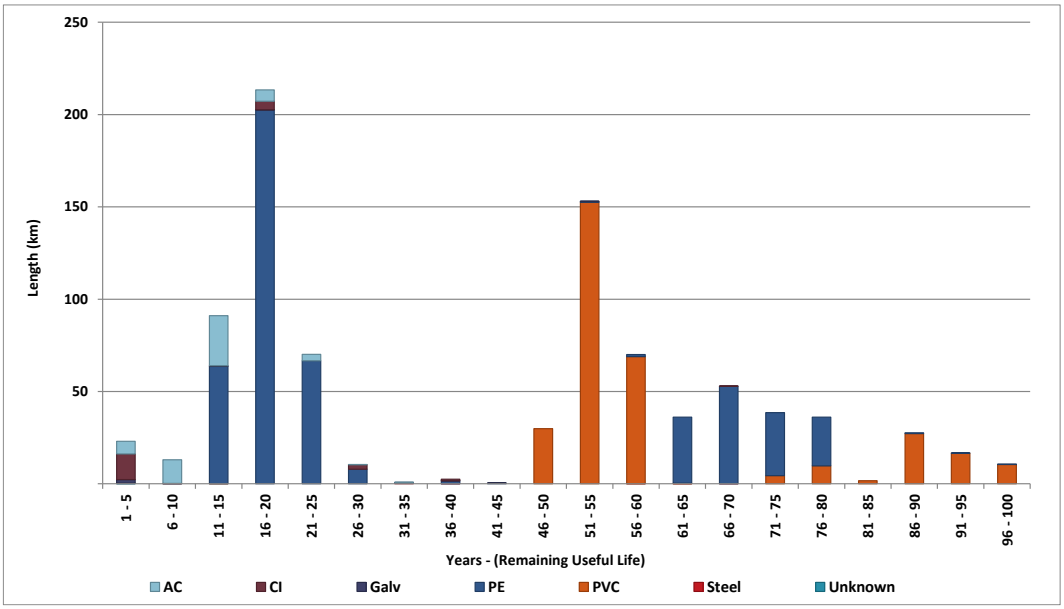


Figure 3-5: Pipe Length by Remaining Life



As shown in Figure 3-5 there is a significant amount of pipe, 341 km of PE, which will reach the end of its expected economic life within the next 30 years. There is also 7km of AC and 13.4km of CI pipe (all in Waimate Urban supply) that will reach the end of its expected economic life within the next five years.

Council engineers report that the AC pipe in the networks are becoming soft and pipe breaks are expected to increase on AC pipe mains.

3.3.2 Condition of Reticulation

Pipe condition ratings for all pipe assets are stored in the AssetFinda. These condition ratings have been based on pipe age, material and some field inspection.

The base life should be considered as a guideline only. While some non-pipe assets may be "past" their base life, Council engineers consider that they are still able to achieve the desired Level of Service and may do so for some time. Council operators assess asset condition during routine inspections in relation to potential effects on asset performance and reliability.

The condition of the pipe reticulation network can be determined by recording pipe failures and the taking and assessment of pipe samples.

AC Condition samples from Waimate Urban water scheme taken during 1999 indicated that pipe failures can be expected approximately 15 years from the date of the pipe evaluation, which is from 2014 onwards.

Cast Iron (CI) condition samples and assessments performed over the past 15 years indicate that the CI pipes in the Waimate Urban scheme are near the end of its useful life and pipe failures can be expected to show an increasing frequency over the coming years.

There is 13.4 km of CI pipe that will reach the end of its expected economic life within the first five years of this AMP. The condition assessments indicate that rehabilitation (relining) is not a viable option as the CI pipe is in poor condition with advanced graphitisation. It also indicates that the

surrounding soils are assisting the pipe to withstand internal pressures, but significant changes e.g. traffic loads, ground settlement or ground shaking will be likely to cause pipe failures.

To date limited pipe sampling has been undertaken for the rural schemes.

Staff are investigating an option of utilising its reactive maintenance records to assist with renewal programming. Since 2013 the utilities business unit has been recording, in real-time, breaks in the field. This dataset is now of considerable size and can be used to perform a statistical analysis to identify renewals. This is not to replace the conventional asset management approach, but will compliment it.

3.3.3 Performance of Reticulation

Over the last number of years Council has reduced its leakage through improved maintenance procedures and repairs resulting in a decrease for Waimate Urban water scheme in minimum night flows from 15 L/s to about 9 L/s. Minimum Night Flows are currently 11 – 13 L/s (January 2017).

3.4 Water Service Lines and Water Points

Water service lines (Waimate Urban water scheme only) are the pipe connection from the main to the property boundary. This includes the toby / manifold and any meter for monitoring or billing purposes.

Water 'points' are made up of valves, hydrants, manifolds, backflow prevention devices, water meters, sample points, tanks, tobies, capped ends.

There are 3,028 physical connections in the district. Council is continually updating its systems and capturing data to ensure that all connected properties are rated / billed.

3.4.1 Asset Description

Only the Waimate Urban water scheme has service lines. The rural schemes do not have service lines as the mains are usually small diameter pipes over long distances and as such are not counted as service lines. In general service lines in the Waimate Urban water scheme are 15 mm or 20 mm diameter.

Table 3.4: Length of Service Line by Pipe Material

Scheme	CI		Galv		PE		PVC		Unknown		Steel	
	No.	m	No.	m	No.	m	No.	m	No.	m	No	m
Waimate Urban	2	119	342	3,869	838	8,735	17	160	791	7,117	1	11
Total number of service lines					1,972							
Total length of service lines					20,016m							

Table 3.5: Point Water Assets

Community	Hydrant	Valves	Restrictor	Meters		Replacement Value ($)
				Retic	Service & Manifold	
Waimate Urban	359	383	-	2	702	$2,049,075
Cannington Motukaika	-	36	49	1	-	$55,091
Hook Waituna	-	128	514	8	4	$407,237
Lower Waihao	-	73	220	4	4	$195,199
Otaio Makikihi	-	88	213	6	3	$207,329
Waihaorunga	-	19	46	-	1	$39,114
Waikakahi	-	64	173	1	-	$154,681
Total	**359**	**791**	**1,215**	**22**	**714**	**$3,107,726**

3.4.2 Condition

The general condition of the point assets are considered by Council's engineers as good to excellent. The condition assessments were extracted from the asset valuation data with its base data the AssetFinda Asset Register. It is likely that these are default values and may not always reflect the true condition of a single asset. However, the total replacement value is small and don't represent a large financial risk to justify individual condition assessments.

Over the next three years additional condition assessment will be instigated to provide greater confidence in the condition.

3.4.3 Performance and Capacity

Residential connections within the town boundaries are unrestricted 15 mm and 20 mm diameter connections providing adequate supply for household use. Those consumers with higher demand such as businesses, industry and schools have larger metered connections by arrangement.

Consumers outside the Waimate Urban water scheme supply boundary generally have metered or restricted connections.

On average 30 urban water scheme service lines are replaced per year and Council strategy on service line replacement is to replace the service line and toby with a new service line, manifold (dual check), meter and manifold box. This adds improved backflow prevention to service connections and the ability in the future to record consumption for monitoring purposes, or to detect leakage on private properties.

3.4.4 Data Reliability

The reliability of three waters data held by Council has not, to date, been systematically assessed and remains ungraded as per the IIMM manual. However, the data is based on good records, procedures and is subject to ongoing quality assurance as a result of maintenance works and has been informally assessed as B/C (see 2020 Valuation Report). In order to address this short-fall we would propose to add an improvement item to the Improvement Plan (**IP 34**).

Condition assessments have been completed for a number of the 3W's assets and include, but are not limited to:

i. NDT of AC Water Mains

ii. CCTV of Sewer Mains (Inc. those programmed for renewal)

iii. Visual inspections during maintenance activities

The results of these condition assessments have been applied to similar, uninspected assets to provide more reliable condition assessment of the whole asset base. For example, smaller diameter Asbestos Cement water mains are known to be in poorer condition than their larger counterparts, and smaller diameter AC mains in the northern extents of the urban area are failing due to ground conditions and pipe material combination.

Condition ratings do exist within the AMIS on an equivalent scale of 1 to 5.

Renewal works are prioritised based on criticality (assessed), empirical knowledge of failure rates / historic maintenance activity, other unrelated (and concurrently programmed) capital works. It should be noted that predictive models being used are age based in the first instance.

An improvement item (IP 34) will be noted in the improvement plans to produce a second predictive model which includes weighting on Condition and Performance gradings held within AssetFinda.

3.5 Water Facilities

Water facilities are made up of water treatment plants, pumping stations and reservoirs.

3.5.1 Asset Description

The largest issue facing levels of service is with the quality of water supplied to the consumers and usually this also has the highest dissatisfaction level with customers. Council has started upgrading the treatment plants to improve water quality and comply with the Drinking Water Standards for New Zealand (DWSNZ) 2005 (revised 2018) as required by the Health (Drinking Water) Amendment Act 2007.

Council water treatment plants range from basic chlorination sites to the Waimate Urban scheme water treatment plant featuring filtration. A list of the treatment plants and their respective water sources is presented in Table 3.6.

Table 3.6: Waimate District Council Water Treatment Plants

Component	Unit	Waimate Urban	Cannington Motukaika	Hook Waituna	Lower Waihao	Otaio Makikihi	Waihaorunga	Waikakahi
Source	No 1	Groundwater	Surface water	Surface water	Groundwater	Surface water	Surface water	Surface water
	No 2	Groundwater			Groundwater	Groundwater	Surface water	
Intake	No 1	Bore	Stream	River	Well	River	Stream	Stream
	No 2	Bore			Well	Bore	Stream	
	Filter	Yes at bore 1	Roughing filter	River gallery	n/a	River gallery	River gallery	Yes
	Bore Depth (m)	B1 -110m B2 -83m	n/a	n/a	Outside 6m Inside 3.5m	n/a	n/a	n/a
	Dia. (mm)	B1 - 250mm		150PVC	Outside 200mm		50PVC	
		B2 – 300mm			Inside 100mm		150AC	
Treatment Capacity	(m^3/day)	B1 – 2,592m^3	475m^3	1,728m^3	1,633m^3	928m^3	455m^3	1,468m^3
		B2 – 1,728m^3				928m^3		
Treatment Process	Coagulation	No	No	No	No	No	No	No
	Flocculation	No	No	No	No	No	No	No
	Filtration	Yes at B1	Screen	Screen	No	No	No	No
	UV	B2 Yes		Yes		No.2 Yes		
	Disinfection	Chlorine	Chlorine	Chlorine	Chlorine	Chlorine	Chlorine	Chlorine
Treatment Plant Location		B1 Timaru Rd B2 Manchesters Rd	Backline Rd	Upper Hook Rd	Ferry Rd	Colliers Rd	Main pump Hursts Rd Tavendale pump Tavendales Rd	Hakataramea Ikawai Highway
Constructed	Year	B1 – 2000, B2 – 1972 *(Renew 2018/19)*	1973	1973	1978 *(Renew 2013)*	1969	1977	1973
Storage								
- Raw Water	m^3	None	None	None	None	None	None	None
- Treated Water	m^3	2,700m^3	25m^3	25m^3	350m^3	360m^3	150m^3	450m^3
Reticulation Length	km	66	56.7	252	125	155	67	176
Connections	No.	1,942	50	531	246	217	47	173
Fire Hydrants	No.	359	n/a	n/a	n/a	n/a	n/a	n/a

Component	Unit	Waimate Urban	Cannington Motukaika	Hook Waituna	Lower Waihao	Otaio Makikihi	Waihaorunga	Waikakahi
Approximate population (WINZ)		3,000	120	1,350	600	430	141	360
Grading		Ab	u	Ed	u	u	u	u

3.5.2 Condition of Treatment Plants

The Waimate Urban scheme water treatment plants were recently upgraded and the remainder of treatment plants in the District are soon to be upgraded to comply with the requirements of the Health Act. At this time the condition of the assets within these facilities were be recorded.

In general the condition and performance of asset components at the treatment plants are all considered by Council's engineers as good to excellent.

3.5.3 Capacity / Performance of Treatment Plants

The capacity of the water treatment plants are not known, but this will be considered under the water treatment plant upgrades and the available information captured into Table 3.7.

Table 3.7: Water Treatment Plant Capacity and Production

	Waimate Urban	Cannington Motukaika	Hook Waituna	Lower Waihao	Otaio Makikihi	Waihaorunga	Waikakahi
Average Demand (m^3/day)	1800	292	850	955	660	244	740
Peak Demand (m^3/day)	3600	389	1010	1360	790	374	979
Treated Water Storage (m^3)	2,700	22.5	nil	488	nil	180	450
Storage as a % of Peak Demand	75%	5.8%	-	36%	-	48%	46%
Treatment Capacity (m^3/day)	4,882	475	1728	1771	1296	455	1054
Resource Consent Allow. (m^3/day)	5,616	475	1,728	1,633	929	576	1,469
Design Population	6,300						
Maximum No of Possible Residential Connections	1,750						
Based on household occupancy	3.6						
Based on peak flow rate	45						
Average demand as % treatment capacity	37%	61%	49%	54%	51%	54%	70%
Peak demand as % treatment capacity	74%	81%	58%	77%	61%	81%	92%
Peak demand as % resource consent	64%	81%	58%	83%	85%	65%	67%
Total length of reticulation (km)	65.5	56.7	251.2	125.3	155.1	67	176.9
Length of undersized reticulation (km)							
Undersized as % total							
No. of Existing Connections	1,894	36	502	220	166	32	134
% Residential use	94.5	14.2[1.]				18.2[1.]	19[1.]
% Commercial use	5.5						
% Agricultural use		85.8[2.]				81[2.]	81.8[2.]

[1.] Based on number of rural dwellings at 1500L/day

[2.] Based on total volume sold, minus total rural dwellings at 1500L/day.

New Capital Expenditure planned to achieve compliance with the DWSNZ 2005 (Revised 2018) will incorporate any planned renewals.

3.6 Pumping Stations

3.6.1 Asset Description

The general details of the pump stations are presented below:

Table 3.8: Description of Pump Stations

Scheme	Pumping Station	Number of Pumps
Waimate Urban	Timaru Rd Bore	4
	Manchester Rd Bore	3
Cannington Motukaika	Booster	2
Hook Waituna	Hook Waituna Intake	4
	O'Donnells	2
	Simmons	2
	Tekit	2
	Brownleas	1
Lower Waihao	Lower Waihao Intake	2
	Lower Waihao Booster	3
Otaio Makikihi	Intake Otaio Gorge	2
	Campbell Forrests	4
	Tavistock Source	2
	Tavistock Booster	4
Waihaorunga	Main Intake	2
	Tavendale Plant	1
	Melford Booster	4
	Takitu Booster	2
Waikakahi	Stonewall Intake	2
	Lower Waihao Booster	1
	Dog Kennel	1
	Claytons Booster	2

3.6.2 Condition of Pump Stations

In general the condition and performance of asset components at the pump stations are all considered by Council's engineers as good to excellent.

3.6.3 Performance / Capacity of Pump Stations

The current performance of pump stations is adequate to achieve the desired Level of Service. However, electrical equipment within the pump stations is generally non-compliant with Electrical Regulations for wet areas. This increases the risk of failure of electrical equipment and loss of Level of Service. Council are undertaking steps to upgrade electrical equipment at pump stations.

The Council's engineers consider that there are no current issues with pump station capacity.

3.7 Reservoirs

3.7.1 Asset Description

Reservoirs provide multiple purposes, at treatment plants they normally allow the plant to even out the flows without the loss of water to the consumer in the event that problems occur at the treatment plant and when demand requires an increase in flow can buffer the additional requirements for water allowing the plant to increase production without compromising quality.

Treated water reservoirs are used to balance demand from the consumer and in the Waimate Urban scheme on demand supply to provide sufficient storage to meet NZ Fire Service requirements for fighting fires. Water is either pumped from the reservoir or water flows from the reservoir under gravity and depends on the available elevation around the network to ensure adequate pressure and flow.

3.7.2 Condition of Reservoirs

In general the condition and performance of asset components at the reservoirs are all considered by Council engineers as good to excellent.

3.7.3 Reservoirs Capacity / Performance

The current performance of the reservoirs is adequate to achieve the desired Level of Service.

Table 3.9: Reservoir Storage Capacity

	Waimate Urban	Cannington Motukaika	Hook Waituna	Lower Waihao	Otaio Makikihi	Waihaorunga	Waikakahi
Average Demand (m^3/day)	1800	292	850	955	660	244	740
Peak Demand (m^3/day)	3600	389	1010	1360	790	374	979
Treated Water Storage (m^3)	2,700m^3	22.5m^3	nil	488m^3	nil	180m^3	450m^3
Storage as a % of Peak Demand	75%	5.8%	-	36%	-	48%	46%
Storage as a % of Average Demand	150%	7.7%	-	51%	-	74%	61%

* Otaio reservoir not in use due to bore position

3.8 Environmental Effects

3.8.1 Resource Consents

There are a number of resource consents held for the Water Services activity. These range from permission to install a bore, to divert flow, to dam water and ultimately take water. There are no resource consents for "taking water" which are up for renewal within the timeframe of this AMP.

A number of resource consents expire within the timeframe of this AMP, but these are mainly related to a one off permit i.e. to install a bore. Consent CRC981066 is no longer required as it is the consent for the old intake for the Otaio Makikihi water scheme. The resource consents associated with water takes are detailed in Table 3.10.

Two of the consents held by the Waimate District Council to take water, are now for private water supplies. They are CRC940845 for Cattle Creek rural water supply intake and CRC981015 for Hakataramea rural water supply intake. The smaller Cattle Creek supply is not a registered drinking water supply, and is privately managed. The Hakataramea rural water supply is managed by the Hakataramea Water Scheme Committee Incorporated, and is a registered drinking water supply.

Table 3.10: Water Resource Consents

Consent Number	Status	Scheme	Activity	Issue date	Expiry date	Comment	Volume
CRC020225	Current	Waimate Urban	Discharge of Contaminated water Contaminant onto Land to Water	14/09/2001	11/09/2036	To discharge contaminants into land (from filter backwash - Timaru Rd, Waimate Water TP)	
CRC084606	Current	Waihaorunga	Take surface water	17/12/2008	16/12/2043	To take and use water from an unnamed tributary of the Waihaorunga Stream	not exceeding 1.4l/s or 847m^3/7 days
CRC084608	Current	Waihaorunga	Take surface water	17/12/2008	17/12/2043	To take and use water from the Waihaorunga Creek	not exceeding 5.3l/s or 3,185m^3/7 days
CRC092155	Current	Cannington-Motukaika	Take surface water	2/10/2009	1/10/2044	To take and use water (from Nimrod Stream - White Rock River, Cannington)	not exceeding 5.5l/s or 3,325m^3/7 days
CRC110693	Current	Cannington-Motukaika	Construct remove structure			To construct a Pipe bridge - 41 Mt Nimrod Road (Opus). No conditions.	
CRC940845	Current	Cattle Creek (Private Scheme)	Take surface water	25/02/1994	23/02/2029	To take water from a tributary of the North branch of the Waihao River for the Cattle Creek Rural Water Supply	not exceeding 1.6l/s or 138m^3/day
CRC940846	Current	Lower Waihao	Take groundwater	23/02/1994	23/02/2029	To take groundwater from bore for the Lower Waihao Rural Water Supply Scheme	not exceeding 18.9l/s or 1,633m^3/day
CRC962154.1	Current	Waikakahi	Take surface water	23/03/1998	29/05/2031	To take water from a tributary of the Waitaki River for domestic use and stockwater (SH82, Ikawai)	not exceeding 17l/s
CRC970320	Current	Waikakahi	Construct/remove a structure, works to divert water	27/03/1998	29/05/2031	To reconstruct and maintain a weir, and to disturb the bed of an unnamed tributary of te Waitaki River for a rural water supply (SH82, Ikawai)	not exceeding 1.5m high and 30 m wide
CRC970321	Current	Waikakahi	Dam surface water	27/03/1998	29/05/2031	To dam water for a rural water supply (SH82, Ikawai)	not exceeding 3,000m^3

Consent Number	Status	Scheme	Activity	Issue date	Expiry date	Comment	Volume
CRC980385	Current	Hook Waituna	Construct/remove a structure, works to divert water	27/05/1999	21/05/2034	To disturb the bed of, maintain and reconstruct a rock weir, in the Hook River (Upper Hook Road, Hook Bush)	not exceeding 1.6m high
CRC980386	Current	Hook Waituna	Take surface water	27/05/1999	21/05/2034	To dam, divert, take and use surface water from the Hook River for domestic & stockwater purposes and trickle irrigation of up to 25.2ha (Upper Hook Road, Hook Bush)	not exceeding 20l/s or 1,728m^3/day
CRC981015	Current	Hakataramea (Private Scheme)	Divert surface water	23/1/1998	21/01/2033	To divert water in the Hakataramea River for erosion and flood control purposes (Wrights Crossing, Hakataramea River)	
CRC981066	Current	Otaio-Makikihi	Works for maintenance/protection	30/01/1998	28/01/2033	To disturb the bed of the Otaio River for the improvement of water flow to a pump chamber (Otaio River, Blue Cliffs Rd)	Surrendered
CRC981876.1	Current	Otaio-Makikihi	Take surface water	12/05/2004	22/04/2034	To take surface water for the Otaio-Makikihi RWS (Backline Rd, St Andrews)	not exceeding 15l/s or 6,500m^3/ 7 days
CRC992050	Current	Otaio-Makikihi	Construct/remove a structure	~~25/05/1999~~	21/05/2034	To disturb the bed of the Otaio River by installing and maintaining an intake structure (Backline Rd, St Andrews)	
CRC202845	Current	Waimate Urban	Take groundwater	25/08/2020	14/06/2034	To take and use water (Timaru Rd & Railway Reserve)	not exceeding 65l/s or 4,320m^3/day
CRC122551	Current	Otaio-Makikihi (Otaio Gorge intake & Tavistock Road bore combined)	Take Groundwater	06/07/2012	06/07/2047	to take groundwater for domestic and stock water purposes	not exceeding 15l/s or 6,500m^3/ 7 days and no more than 351,500 m^3 / year

Consent Number	Status	Scheme	Activity	Issue date	Expiry date	Comment	Volume
The resource consents for the Hakataramea Rural Water Supply is held in the name of the Hakataramea Water Scheme Society.							
CRC030733	Current	Hakataramea	To divert, take and use surface water	26/08/2003	25/08/2038	.	Not exceed 12.6 litres per second
CRC030734	Current		Discharge to land	17/09/2003	25/08/2038		Not exceed 12.6 litres per second

3.8.2 Environmental Monitoring and Reporting

Consent reporting within Council for Water and Wastewater is the responsibility of the Water and Waste Engineer. Information for consent compliance is provided by the Council's Water and Waste Group and forwarded to Environment Canterbury.

3.9 Assessment of Water Services

The Local Government Act 2002 places a specific requirement on local authorities to make assessments of water and sanitary services available to communities within the district. The Act requires that the assessment shall provide the following information in respect of Water Services:- The Water and Sanitary Services Assessment is an assessment of all services (public and private) relating to:

- Water
- Wastewater
- Rubbish and Recycling
- Public Toilets
- Cemeteries

The aim is to assess the adequacy of these services both now and in the future. It considers the risks that these services, or lack of these services, may pose to health and wellbeing of the community.

Table 3.11: Public and Private Water Supplies

Public Water Supplies Managed by Council	
Waimate Urban	Cannington Motukaika
Hook Waituna	Lower Waihao
Otaio Makikihi	Waihaorunga
Waikakahi	
Public Water Supplies Managed by other Councils	
Downlands Rural Water Supply (Timaru District Council)	
Camping Grounds: now owned, by Waimate District Council and administered and maintained by Council Parks and Reserves Group	
Briar's Gully Camp Site	Fisherman's Bend Camp Ste
Te Akatarawa Camping Ground	Waitangi Reserve Camp Ground
Private Water Supplies	
Hakataramea Valley Rural Water Supply	Cattle Creek (Upper Waihao) Rural Water Supply

Table 3.12 addresses specific risks and issues identified for the water schemes managed by Council.

Table 3.12: Quality and Adequacy

Scheme	Quality
Waimate Urban	Complies fully with DWSNZ 2005 (revised 2018). Plant regarded as Ab under the grading system. Is serviced by two sources. The majority of the year the Timaru bore is on standby. During hot dry months the Timaru bore assist in supply. Water supply restrictions have been put in place at times during recent years. Demand is increasing and it is envisaged that in terms of volume the Waimate Urban water scheme is not considered adequate for future anticipated demand
Rural Schemes	Recent enhancements have increased delivery volumes. Changes in farming practices i.e. changing from sheep to dairy farming may drive further demand. Single point failures remain a concern.

Scheme	Quality
	Not all DWSNZ 2005 (revised 2018) compliant. Steps have been taken towards DWSNZ compliance

3.9.1 Update of the Water & Sanitary Assessment (2005)

In accordance with Section 6, Schedule 10 of the LGA 2002, an Assessment of Water and Sanitary Services were conducted by Council during June 2011. As part of the Delivery Plan agreed with DIA, a Sanitary Survey will be carried out with the funding received under tranche 1 (COVID 19 stimulus) and was programmed for February/March 2021, however has not commenced, but will be completed by March 2022.

The update of the Water & Sanitary Assessment in 2011 noted the following:

i. There are many properties within the district which are not connected to a Council managed water supply scheme or to a private scheme. Many of these are isolated dwellings within more remote areas and are served by private sources.

ii. Other properties reliant on private sources are located within townships such as Willowbridge. In these areas a connection to a public water supply is available, but this option is not always taken up due to the inability of individuals to afford the connection costs or a personal preference not to do so. These areas are not served by sewerage reticulation and this enhances the likelihood of the contamination of the water supplies to these communities. Bores have been known to run dry in such areas.

3.10 Criticality

During 2017 Council performed a criticality assessment on 3 Waters assets by using the New Zealand Asset Metadata Standards methodology and criticality ranking. This including consideration of GIS, population, key facilities and hydraulic model data. The NZAMS defines criticality as "the significance of any individual component or asset to the ability of any part of a network or portfolio to deliver the service it was designed to perform". The methodology considered:

- residential population rating – the number of people affected by the removal of the asset
- facility importance rating – the importance of the facility based on the role the facility play in enabling the community to function.

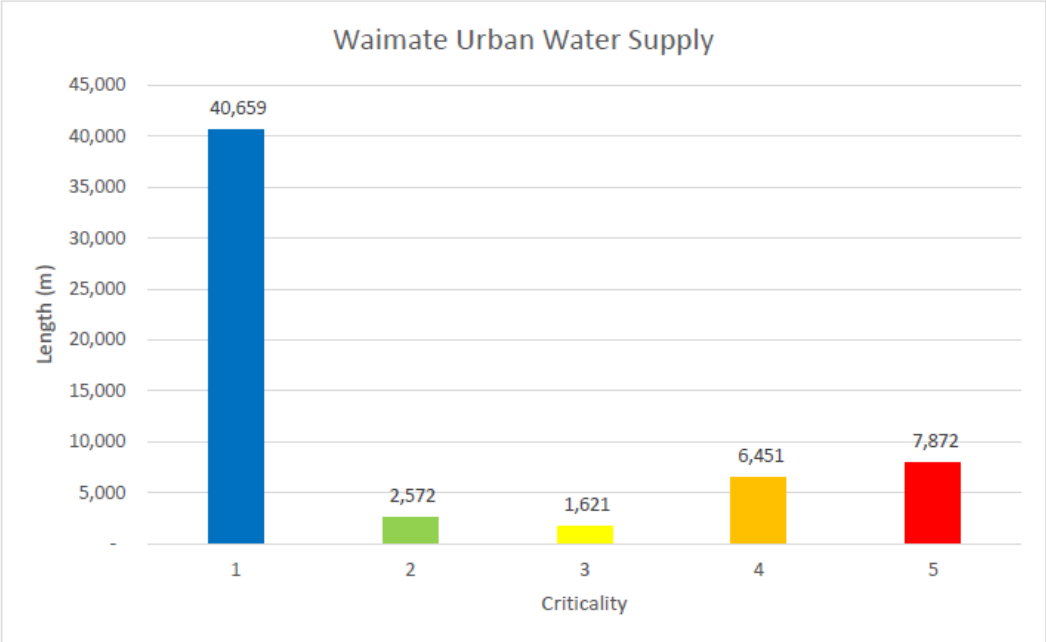
The global criticality ratings are:

1. very low
2. low
3. medium
4. high
5. very high

An additional diameter based component was included for water supply assets.
The criticality assessment provided the following results.

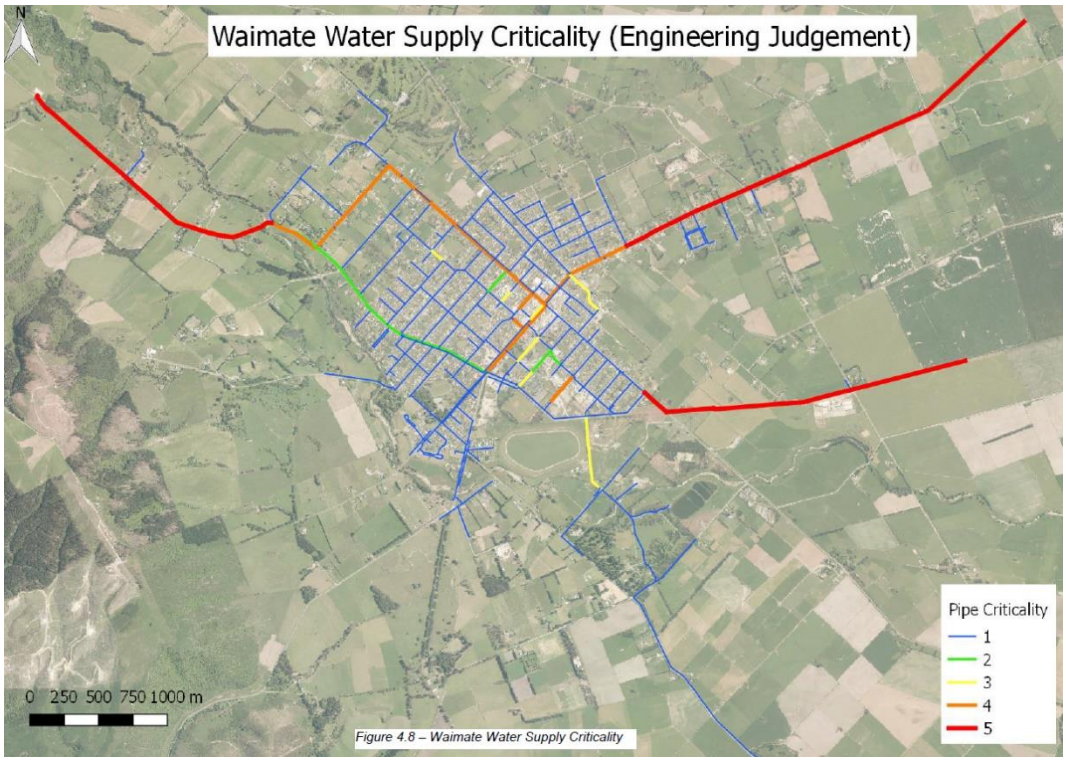
The figure below shows the pipe length distribution across the different criticality categories for the Waimate Urban Water Supply. Graphs are also available for the rural water supplies.

Figure 3-6: Waimate Urban Water Supply Criticality and Lengths Distribution



The figure below shows an overview plan of the criticality rating for the Waimate Urban Water Supply. Maps are also available for the rural water supplies.

Figure 3-7: Waimate Urban Water Supply Criticality Map



The criticality assessment provides Council engineers the ability to clearly identify the assets of highest importance and the greatest value. This ensures the asset can be managed more proactively in order to mitigate the risk associated with their failure. This proactive management includes:

- Prioritising condition assessments

- Adjusting economic lives with respect to renewal profiles
- Prioritising/deferring renewals
- Prioritising expenditure operation and maintenance planning
- Priorities for collecting asset information to the required level of confidence

It is important to align the asset data in AssetFinda with the criticality assessment ratings (**IP 31**).
The criticality assessment report made the following recommendations (**IP 32**):

- Plan a renewals program supported by a condition management program for critical infrastructure
- Plan around supplying critical customers and key facilities following a critical asset failure
- Identify sensitive customers (for example: dialysis patients) for a more detailed criticality assessment
- Update and maintain the water supply models, especially where new assets have been added (new bore and pump station in the Otaio rural water supply)
- Expand the stormwater model for a better understanding of stormwater flows and populations served by WDC's assets
- Maintain the GIS data, especially for the stormwater assets

In view of the pending outcome of the Havelock North Water Inquiry and change in political landscape Council may reconsider the Criticality assessment to ensure the four wellbeing's (social, economic, environmental and cultural) are adequately captured within the assessment (**IP 33**).

4.0 LEVELS OF SERVICE

This section defines the Levels of Service and performance measures by which the service levels will be assessed for Water Services. The service levels are aimed at meeting the strategic goals of Council. This section also contains information on the customer research undertaken and the legislative requirements adhered to in arriving at the service levels.

Levels of service define the type and extent of services delivered to the customer. They are written from a customer viewpoint such that Council can set targets against the levels of service to demonstrate outputs and performance against the community outcomes. Levels of service assist the Council in optimising all activities for each service, as well as providing a benchmark against which to meet customer expectations.

4.1 Community Outcomes

4.1.1 Revision of Community Outcomes for Community Plan

2009/19 Community Plan

During the development of 2009/19 Community Plan, Council resolved to update and revise the community outcomes. Council produced a survey document asking the District's residents to focus and comment on the existing 25 community outcome statements. As a result of this survey Waimate District's community outcomes statement were modified to retain the 25 outcomes from 2006, but group the existing 25 outcomes under five high-level well-beings statements (Economic, Social, Environmental, Cultural and Social).

2012/22 Long Term Plan

In 2011 the Council amended the community outcomes and these were subsequently reassessed for the 2015-25 Long Term Plan. The Council has indicated that there will be no significant change to the community outcomes for the 2018/2028 LTP. Changes relate to alignment with the Council Vision. These outcomes and linkage of the Wastewater levels of service are provided in Table 4-1 below.

2015/25 Long Term Plan

In 2017 the Council amended the community outcomes. These outcomes and linkage of the Water Services Levels of Service via the Rationale are shown in Table 4.1 below. There are no changes to the Community Outcomes for the 2021-31 LTP.

Table 4.1: Waimate District Council Community Outcomes 2021-31 and Water Services Rationale

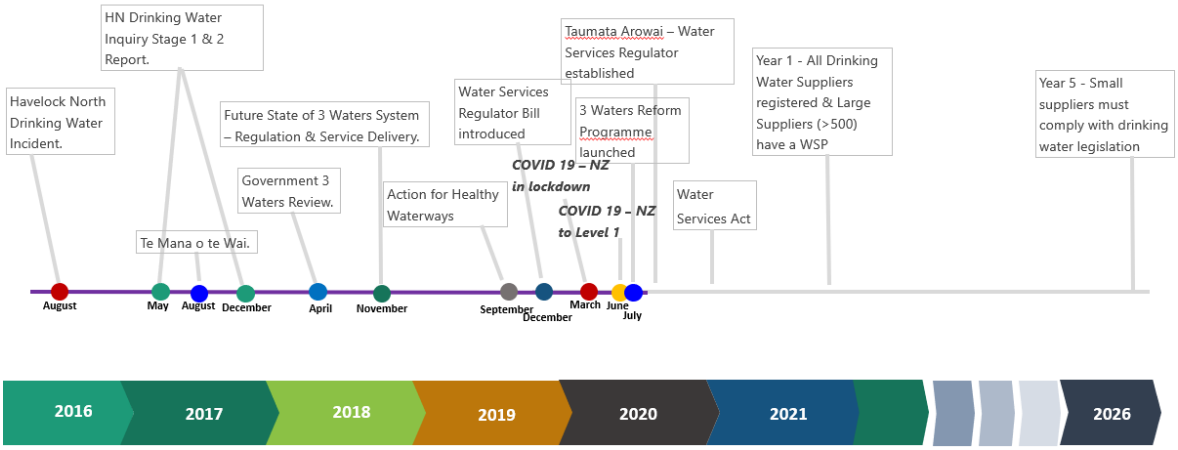
	COMMUNITY OUTCOMES			
	Thriving Community	**Safe & Healthy People**	**Sustainable District and Environment**	**Active, Diverse and Supportive Community**
	Economic Wellbeing	**Social Wellbeing**	**Environmental Wellbeing**	**Social Wellbeing**
	A District that encourages development	A place where people are safe in their homes, work and public spaces	The Waimate District is enhanced through sustainable and diverse development	All people are encouraged to participate in our democratic process
Rationale		***Water*** *– Protecting the communities from drinking water related health issues and providing firefighting capability*		
	A District that provides infrastructure for economic activity	Our services, infrastructure and environment enhance quality of life	Our heritage is valued and protected	District assets that provide recreation and leisure choice
Rationale	***Water*** *– The timely provision of utility services is essential to supporting growth*	***Water*** *- We have reliable, efficient and well planned water, wastewater, stormwater and solid waste infrastructure that meet the needs of residents*		
	A District that actively promotes itself and its businesses		We value the natural environment, biodiversity and landscapes	We celebrate and support the good things about our community
Rationale			***Water*** *– water is used efficiently and in an sustainable manner*	

4.2 National Strategies and Plans

4.2.1 Government and Industry Direction

In providing the 3 Waters Services the Waimate District Council keep a weather eye on the Central Government and Industry direction for the national infrastructure assets and public service provision. This is done through attending conferences and seminars, studying reports released by Central Government agencies and membership of industry organisations e.g. IPWEA, Water NZ, etc.

3 Waters - Government & Industry Direction



The August 2016 Havelock North Water incident and subsequent Inquiry has renewed the focus on the very high standard of care and diligence required to supply drinking water.

During 2017 the Minister for Local Government initiated the Government 3Waters Review to assess whether current local government practices and the system oversight are 'fit for purpose'. This review ran in parallel to the latter stages of the Havelock North Inquiry and raised a range of questions around the effectiveness, capability and sustainability of the current water service model.

During 2017 the Government announced changes to the National Policy Statement for Freshwater Management – Te Mana o te Wai. Te Mana o te Wai is a concept for fresh water, which when given effect, the water body will sustain the full range of environmental, social, cultural and economic values held by iwi and the community. This requires councils to involve iwi/hapū in the management of freshwater, work with them to identify their values and interests, and reflect those values and interests in decision-making.

The MfE discussion document 'Action for Healthy Waterways' released September 2019 signals the direction for urban development, rural land and water management including Risk Management Plans for wastewater systems and stormwater systems.

Towards the end of 2019, the Government agreed to establish a new drinking water regulator as an independent Crown entity. Associated legislation is expected to be passed in 2020/21 and the establishment and roll out of the new Regulator will follow and is expected to take a number of years.

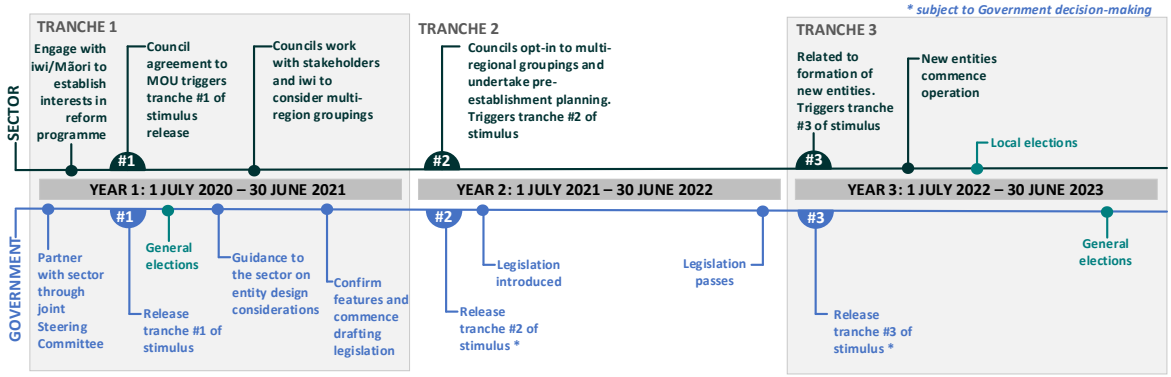
Following the global outbreak of the Corona Virus the Government announced New Zealand's four-level COVID-19 Alert System specifying public health and social measures to be taken against COVID-19. New Zealand went into Level 4 on Thursday 26 March 2020. Level 4 requirements included the general public to stay at home, educational facilities closed, only essential services & lifeline utilities remain open & operational, severe travel limitations, major reprioritisation of

healthcare services, etc. NZ progressively reduced the alert levels from 27 April and returned to Level 1 on 10 June 2020.

The response to COVID 19 will have a significant impact on the economy and the ability to implement and progress the abovementioned Government initiatives. Several Councils already signalled no rates rises for the 2020/21 year.

July 2020 saw the Government announce the 3 Waters Reform Programme consisting of a $761m funding package over the next three years to provide immediate post COVID 19 stimulus to local authorities to maintain and improve three waters infrastructure. Initial funding will only be made available to councils that sign up to the Memorandum of Understanding. Waimate District Council signed up to the Memorandum of Understanding, thus agreeing to participate in the exploration of future service delivery options for the three waters services and to collaborate with agencies involved in the reform.

Below is an indicative timetable for the full reform programme. While this is subject to change as the reform progresses, this provides an overview of the longer-term reform pathway.



The following themes are also signalled:

Source	Direction
Insights into local government: 2019 OAG June 2020	Among a range of observations the OAG states "*I remain concerned that Council's might not be adequately reinvesting in their critical assets*". To do this well, councils need to improve their asset management information. In particular, they need: • good data about their critical assets in order to value, depreciate, and plan renewals; • good processes and sufficient resources to maintain and update their critical asset data; • effective working relationships between asset management, finance, and strategic planning staff, all of whom have an important role to play in supporting a council's asset management function; and • timely engagement with, and involvement by, elected members.
Managing the supply of and demand for drinking water OAG Sept 2018	**Common challenges** • Working with iwi • Completeness and reliability of data • Staff capability and capacity • Under-delivery of planned capital spending

Source	Direction
Reflecting on our work about water management OAG Feb 2020	**A more strategic and integrated approach to water management is needed** • The Government is responding to the need for a more strategic and integrated approach to water management • A strategic and integrated approach would support targeting of investment decisions • A stronger focus on implementation is needed when setting strategy • Long-term thinking is needed when setting a strategic and integrated approach **Understanding of water resources needs to improve** • A national picture of the state of freshwater quality would support a more strategic and integrated approach • Information gaps can limit the ability to make well-informed decisions • Information needs to be understandable both to decision-makers and to those holding them to account • Good information depends on collecting quality data • There will always be some uncertainty **Water management challenges require adaptive ways of working** • Balancing different views and values requires flexible frameworks • Collaboration needs to translate into action • More can be done to involve Māori in water management Water management challenges require both central and local government response
Matters arising from our audits of the 2018-28 long-term plans OAG Feb 2019	**Recommendations** • that councils prioritise collecting condition and performance information of critical assets and, in the meantime, take a precautionary approach for significant services where the condition information of critical assets is unknown; • that the Department of Internal Affairs and the local government sector review the required content for long-term plans to ensure that they remain fit for purpose, particularly: – the current suite of mandatory performance measures; – the disclosure requirements for financial and infrastructure strategies; – disclosures required under the Local Government (Financial Reporting and Prudence) Regulations 2014; and – how assumptions are disclosed in long-term plans; • that the Productivity Commission, in its review into the adequacy and efficiency of the existing funding and financing options for councils, consider the trends arising in the 2018-28 long-term plans, particularly the trends and concerns we have raised about increasing debt; and that central government and local government continue to consider how increased leadership can be provided for climate change matters, particularly: – what data is needed and who collects this; – the quality of this data; and – how councils should consider this in future accountability documents, including the long-term plan.

Source	Direction
Local Government NZ	LGNZ are working on four significant projects with the sector at present: Water 2050; Climate Change; Housing 2030 and the Localism Project. **Water 2050** - The Water 2050 project promotes discussion and contribute to policy development by central and local government, particularly in regards to the Government's Three Waters Review, across five key areas: • Allocation • Water Quality • Infrastructure • Cost and funding • Governance **Climate change** - leading and championing policy to deal with the impacts of climate change is a key policy priority for LGNZ. Climate change poses an unprecedented level of risk and adapting to and mitigating the impacts of climate change is a new priority focus for councils. **Housing** is a significant issue for our communities' social and economic futures. Unaffordable housing is having a negative impact on local economies, discretionary household expenditure and social well-being. This means addressing matters of supply, how social and community housing needs are met and the importance of healthy homes. Underpinning the issue is the need for appropriate funding and financing. LGNZ efforts are focussed in three general areas: • Supply; • Social and community housing; and • Healthy homes. **Localism** - Local government is calling for a shift in the way public decisions are made by advocating for greater self-government at the local and an active programme of devolution and decentralisation. This document provides councils with guidance to • Assist with understanding and managing climate risk to the essential infrastructure that they own – particularly in relation to sea level rise, coastal hazards (such as storm inundation and erosion), and inland (pluvial) flooding; • Assist councils with addressing the issues that completion of the previous survey, which fed into the Vulnerable report, identified; and Help our community leaders prime and test council staff, constituents and stakeholders to engage in the most effective long-term planning for infrastructure investment, and make sensible investment decisions now, which don't preclude future options for infrastructure provision.
Vulnerable: the quantum of local government infrastructure exposed to sea level rise Local Government NZ January 2019	This project has two intended outputs. • The first is to research the current quantity and value of infrastructure (roads, 3Waters and buildings) exposed to sea level rise at four increments; 0.5, 1.0, 1.5 and 3.0 metres, and to quantify replacement value. The second and more important output of this research is to provide responses to rising sea levels. This study intentionally avoids specific and local costs, and targets discussion at a regional and national level in order to highlight trends and general areas

Source	Direction
	of high and low priority. It raises questions about how to improve procurement, appropriately share management of risk, and communicate with stakeholders about priorities.
Water NZ Competency Framework Water NZ	This document explores the workforce skills and capabilities for an effective, efficient, accountable and resilient three waters sector in New Zealand. It describes what people should be able to do and what they need to know to competently undertake their work. It is a work in progress and includes the following roles. • Drinking Water Treatment Operators • Wastewater Treatment Operators • Drinking Water Distribution Operators (to be developed) • Wastewater Network Operator (to be developed)

4.2.2 Infrastructure Commission, Te Waihanga

The New Zealand Infrastructure Commission – Te Waihanga – was established in 2019 as an Autonomous Crown Entity to carry out two broad functions – strategy and planning and procurement and delivery support on infrastructure investment.

InfraCom - Te Waihanga will work with central and local government, the private sector, iwi and other stakeholders, to develop a 30-year infrastructure strategy to replace the National Infrastructure Plan.

The first plan will be reported to government by the end of 2021 and thereafter at least every 5 years. The strategy will cover the ability of existing infrastructure to meet community expectations; current and future infrastructure needs and priorities; as well as any barriers which could impede the delivery of infrastructure or services arising from it.

4.2.3 National Policy Statement

The National Policy Statement for Freshwater Management (NPSFM) 2020 came into force on 3 September 2020 and documents the objective to ensure that natural and physical resources are managed in a way that prioritises:

a) first, the health and well-being of water bodies and freshwater ecosystems
b) second, the health needs of people (such as drinking water)
c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

The NPSFM includes a requirement to manage freshwater in a way that 'gives effect' to Te Mana o te Wai, including by actively involving tangata whenua in freshwater management, working with tangata whenua and communities to set out a 'long-term vision' in the regional policy statement, and through a new 'hierarchy of obligations' which prioritises the health and wellbeing of water bodies, then the essential needs of people (e.g. drinking water), followed by other uses.

Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.

'Action for Healthy Waterways' (Ministry for the Environment) signals the direction for urban development, rural land and water management including Risk Management Plans for wastewater systems and stormwater systems, likely regulatory requirements under a new 3 Waters regulatory framework.

These initiatives will flow through respective Regional Councils Policy Statements & Regional Plans.

4.2.4 National Policy Statement on Urban Development Capacity

The National Policy Statement on Urban Development Capacity 2016 (NPS-UDC) sets out the objectives and policies for providing development capacity under the Resource Management Act 1991.

The NPS-UDC came into effect on 1 December 2016 and has been described by the government as "the core issue of increasing land supply".

The NPS-UDC directs local authorities to provide sufficient development capacity in their resource management plans for housing and business growth to meet demand.

Development capacity refers to the amount of development allowed by zoning and regulations in plans that is supported by infrastructure. This development can be "outwards" (on greenfield sites) and/or "upwards" (by intensifying existing urban environments).

4.3 Key Legislation and Regulation– Implications for Asset Management

Legislation is established by Central Government and must be complied with at Local Government Level. Significant legislation and regulations affecting the Waters activities are provided in Table 4.2. Council must comply with any relevant legislation enacted by Parliament. Commentary related to some of the key legislation is provided below.

Different legislation has differing levels of impact on the Water Services activities; this is indicated under the Impact Range (Broad ***, Moderate **, Limited *).

Table 4.2: Legislation and Regulation Affecting the Water Services

Legislation & Regulation	Water Services Range
Building Act 2004 (and amendments)	*
Civil Defence Emergency Management Act 2002	***
Climate Change (Emissions Trading and Renewable Preference) Act 2008	*
Climate Change Response Act 2002 (and amendments)	**
Energy Efficiency and Conservation Act 2000	*
Environmental Protection Authority Act 2011	*
Epidemic Preparedness Amendment Act 2010	*
Fire and Emergency New Zealand Act 2017	**
Health (Drinking Water) Amendment Act 2007	***
Health Act 1956	***
Health and Safety at Work Act 2015	***
Heritage New Zealand Pouhere Taonga Act 2014	*

Legislation & Regulation	Water Services Range
Infrastructure (Amendments Relating to Utilities Access) Act 2010	**
Local Government Act 2002 (and amendments)	***
Local Government Act 1974 (and amendments)	**
Local Government Rating Act 2002 (and amendments)	**
Local Government Rating Act 1979	*
Ngai Tahu Claims Settlement Act 1998	*
Public Works Act 1981 (and amendments)	*
Reserves Act 1977 (and amendments)	*
Resource Management Act 1991 (and amendments)	***
Utilities Access Act 2010	***

4.3.1 Major Legislation Details

The legislation that has or will have the most effect on the Water services is expanded in the following section.

Civil Defence Emergency Management Act 2002

The expectations under the CDEM Act 2002 is that Council's services will function at the fullest possible extent during and after an emergency, even though this may be at a reduced level. In addition, Council has established planning and operational relationships with regional CDEM groups to deliver emergency management within our boundaries.

Water and wastewater services are regarded as critical services and are given special consideration within Council emergency management procedures. Every effort will be given to restore services immediately after an event to at least provide adequate water for sanitation and health albeit supply quantity may be limited.

Climate Change Response (Zero Carbon) Amendment Act 2019

The Climate Change Response (Zero Carbon) Amendment Act 2019 provides a framework by which New Zealand can develop and implement clear and stable climate change policies that:

- contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels
- allow New Zealand to prepare for, and adapt to, the effects of climate change.

The amendments establish four key items.

1. set a new domestic greenhouse gas emissions reduction target for New Zealand to:
    a. **reduce net emissions of all greenhouse gases (except biogenic methane) to zero by 2050**
    b. reduce emissions of biogenic methane to 24–47 per cent below 2017 levels by 2050, including to 10 per cent below 2017 levels by 2030
2. establish a system of emissions budgets to act as stepping stones towards the long-term target
3. require the Government to develop and implement policies for climate change adaptation and mitigation
4. establish a new, independent Climate Change Commission to provide expert advice and monitoring to help keep successive governments on track to meeting long-term goals. See the Climate Change Commission website.

The original proposal was for a separate piece of legislation called the Zero Carbon Bill to be passed into law. In May 2019, the Government decided to introduce it as an amendment to the Climate Change Response Act 2002. The objective was to ensure that all key climate legislation is within one Act.

Health Act 1956

The Health Act 1956 places an obligation on Council to improve, promote and protect public health within the District. The provision of water and wastewater services conserves public health and helps to protect land and waterways from contamination.

The Health Act requires Council to furnish from time to time to the Medical Office of Health such reports as may be required as to diseases, drinking water and sanitary conditions within it district.

The Health (Drinking Water) Amendment Act 2007

The Health Act 1956 was amended by the Health (Drinking Water) Amendment Act in October 2007 and aims to protect public health by improving the quality of drinking water provided to communities. The main duties in the Act only apply to water supplies above a certain size. Drinking water suppliers must comply with Sections 69S to 69ZC of the Act by the dates listed in the table.

Table 4.3: Dates for Compliances for Drinking Water Suppliers

Type of Drinking Water Supply	Amended Compliance By:	Water Scheme
Medium (5001-10,000)	1 July 2013	Waimate (3000)
Minor (501 - 5000)	1 July 2014	Hook Waituna (1350) Lower Waihao (600)
Small (101-500)	1 July 2015	Cannington Motukaika (120) Otaio Makikihi (430) Waihaorunga (141) Waikakahi (360)
Neighbourhood	1 July 2016	-
	Total	-

As a consequence of this Act, Council are required to take all practicable steps to comply with the DWSNZ and to implement Water safety plans (carried out between 2009 to 2017).

Fire Service Act 1975

Repealed on 1 July 2017 and replaced with Fire and Emergency New Zealand Act 2017.

Fire and Emergency New Zealand Act 2017

The Fire and Emergency New Zealand Act repeals the 2 Acts governing fire services, the Fire Service Act 1975 and the Forest and Rural Fires Act 1977, to give effect to a single, unified fire services organisation for New Zealand.

The Act establishes Fire and Emergency New Zealand (FENZ) and combines urban and rural fire services.

The Act introduces a range of changes and new measures for the detailed design and operational policy of FENZ, including the following:

- an updated offences and penalties regime, including a new infringement offence scheme
- removal of powers to recover the cost of rural fires
- new powers for managing hazardous substances incidents
- new measures to encourage compliance among levy-payers and to protect the integrity of the levy
- new powers for firefighters to enter premises to investigate the causes of fires and to take a sample or samples of objects for analysis.

The Fire and Emergency New Zealand (Levy) Amendment Act 2019 was passed into legislation on 7 May 2019. The legislation changes the commencement date for new levy provisions in the Fire and Emergency Act 2017 (Sections 80 to 140) to 1 July 2024.

In addition, two new exemptions will be put into force from 1 July 2019. New Zealand Defence Force property and Art and items in collections of cultural heritage bodies. Fire and Emergency New Zealand have prepared a guideline for the new exemptions which can viewed at https://www.fireandemergency.nz/assets/Documents/About-FENZ/Levy-and-payment-forms/Guideline-on-additional-exemptions-from-1-July-2019.pdf.

Health and Safety at Work Act 2015

The Health and Safety at Work Act 2015 (HSWA)was enacted on 4 April 2016 and is part of "Working Safer: a blueprint for health and safety at work" and reforms New Zealand's health and safety system following the recommendations of the Independent Taskforce on Workplace Health and Safety. Working Safer is aimed at reducing New Zealand's workplace injury and death toll by 25 per cent by 2020.

The HSWA:

- reinforces proportionality – what a business needs to do depends on its level of risk and what it can control
- shifts from hazard spotting to managing critical risks – actions that reduce workplace harm rather than trivial hazards
- introduces the "reasonably practicable" concept – focusing attention on what's reasonable for a business to do
- changes the focus from the physical workplace to the conduct of work – what the business actually does and so what it can control
- supports more effective worker engagement and participation – promoting flexibility to suit business size and need.

A guiding principle of the HSWA is that workers and other persons should be given the highest level of protection against harm to their health, safety, and welfare from work risks as is reasonably practicable. The HSWA shifts the focus from monitoring and recording health and safety incidents to proactively identifying and managing risks so everyone is safe and healthy.
The HSWA identifies four duty holders:

persons conducting a business or undertaking (PCBUs) – these may be individuals or organisations	have the primary responsibility for the health and safety of their workers and any other workers they influence or direct. They are also responsible for the health and safety of people at risk from the work of their business

officers	(company directors, partners, board members, chief executives) must do due diligence to make sure the business understands and is meeting its health and safety responsibilities
workers	must take reasonable care for their own health and safety and that their actions don't adversely affect the health and safety of others. They must also follow any reasonable health and safety instruction given to them by the business and cooperate with any reasonable business policy or procedure relating to health and safety in the workplace
other persons at workplaces	who come into the workplace, such as visitors or customers, also have some health and safety duties to ensure that their actions don't adversely affect the health and safety of others

Heritage New Zealand Pouhere Taonga Act 2014

Describes an archaeological site as "Any place in New Zealand that:

- Was associated with human activity that occurred before 1900
- Is the site of the wreck of any vessel where that wreck occurred before 1900
- Is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand"

It is unlawful to modify, damage or destroy any archaeological site – recorded or not – without an authority from the New Zealand Historic Place Trust.

Local Government Act 2002

Defines the purpose of local authorities as enabling local decision-making by and on behalf of the community, and allows local authorities the power of general competence. This Act specifically requires Councils to continue to provide water and wastewater services if they do so already. AMPs are the main method of demonstrating Schedule 10 requirements.

In addition to the general requirements of the Local Government Act there are some specific clauses that apply to water services.

Table 4.4: Water Services LGA 2002 Clauses

Section	Details	Applies to
S10	Restores the four aspects of community well-being by requiring local authorities to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future	Water and Waste Services
S17A	Requires that Councils review the cost effectiveness of the way they deliver their services to ensure they meet the needs of communities	All services
S101B	Requires a 30 Year Infrastructure Strategy	Core Services
S125	Places a requirement to assess water and other sanitary services from time to time	Water and Sanitary Services Assessment
S130	Imposes an obligation to maintain water services and places limitations on the transfer or selling of assets	Divestment of services
S 136	Empowers Councils to enter into Contracts relating to provision of water services for periods not exceeding 35 years whilst maintaining control over	Utilities Contract

Section	Details	Applies to
	the pricing of the service, retain legal responsibility for the service and being responsible for the development of policy related to the water services	
S 137	Empowers Councils to enter joint local government arrangements and joint arrangements with other entities for the provision of water services, with the same constraints as S136	Utilities and Professional Services provision and procurement
Pt 1 -2 Pt 3 - 23	Council provides groups of activities for financial, performance and negative effects reporting purposes. The Water and Waste unit will provide Group summaries for water (urban & rural), sewerage and stormwater	Water and Waste Services

Local Government Act 2002 – Section 17A

To date a formal, documented Section 17A review has not been completed for 3W's service delivery. Council informally reviewed 3W's service delivery in 2016/17.

Waimate, whilst not unique, is one of few councils that continues to provide maintenance operations "in-house" and resultantly did not have contractual arrangements in place to trigger a review between 2014 and 2017 (the statutory deadline for completing the first round of reviews).

At this point in time, investigations in to the Havelock North incident and subsequent indications that sector reforms were underway meant that the desire to change service delivery arrangements was low. Furthermore, Council was effectively comfortable that the potential benefits of performing a review did not justify the time and expense of completing the exercise. Subsequent acceleration of the reforms has bolstered this position in so far as service delivery is being addressed during the current calendar year (2021) and the impacts for 2021/22 are as yet unknown. Based on Councils decision regarding "opting in or out", this may trigger a Section 17A review (or not).

Management Plan.Local Government (Rating) Act 2002

In deciding whether to proceed with universal metering, it is worth noting the flexibility that Councils have under this Act to determine an appropriate water charging mechanism. Targeted water rates may be fixed charges per unit of water sold or according to a scale of charges.

Resource Management Act 1991

Governs all water takes and discharges. Water takes and discharges to waterways and land occur through the extraction of water from waterways and land. Resource consents obtained for water takes and discharge activities require parameters such as volume and quality to be monitored as well as taking steps to mitigate any adverse effects that may occur through the activity.

There have been numerous amendments to the Resource Management Act over the years with reform a key priority. During 2019 the Government appointed the Resource Management Review Panel to undertake a comprehensive review of the RMA. The Review Panel recommended:

- The RMA to be repealed and replaced with two new pieces of legislation
    - The Natural and Built Environments Act to strengthen the current system by not only seeking to protect the environment, but improve it.

- The Strategic Planning Act to give statutory weight to strategic spatial plans and, critically, force reconciliation and alignment across central and local government to ensure implementation.

Taumata Arowai–the Water Services Regulator Bill

Taumata Arowai – the Water Services Regulator Bill received Royal Assent on 6 August 2020. The Bill will establish Taumata Arowai–the Water Services Regulator and provide for its objectives, functions, and governance arrangements.

Taumata Arowai – the Water Services Regulator Bill will create a new regulatory body to oversee, administer and enforce a new and strengthened drinking water regulatory system. It will also have a national oversight role to improve the environmental performance of storm water and wastewater networks.

This Bill will be enacted during 2021.

A separate Bill, the Water Services Bill, to be introduced in early 2020, will give effect to decisions to implement system-wide reforms to the regulation of drinking water and source water, and targeted reforms to improve the regulation and performance of wastewater and stormwater networks. The Regulator's detailed functions and powers are located in that Bill.

Utilities Access Act 2010.

The Utilities Access Act 2010 provides for a coordinated approach to management of the road corridor. The Act requires the Corridor Managers to undertake a planning and access management role, and Utility operators to comply with an approved code of practice. It is an expected that the requirements detailed in the act will be carried out as described in the Code of Practice developed by the New Zealand Utilities Access Group, should it be approved by the relevant Minister of the Crown.

The Code is a mandatory requirement for all road and rail controlling authorities and utility network operators under the Utilities Access Act 2010, and came into effect on the 1st January 2012. The Code was reviewed during 2016.

The initial KPI data identified several issues including a lack of consistency, along with the fact that not all reporting entities had sent in their returns, meaning that any comparisons were incomplete. The situation was exacerbated by the fact that only 1 year's results are available, with any real value to come from analysis of changing trends over time. Refining of the data collection requirements will be a major focus moving forward, resulting in a more comprehensive reporting and analysis to be provided following the receipt of 2016-17 KPI data.

4.3.2 Relevant Regulations Affecting this Activity

Local Government (Financial Reporting) Regulations 2011

4.4 Standards, Codes of Practice and Guidelines

National environmental standards, design standards (AS/NZS ISO), Codes of Practice and Guidelines provide technical direction. National Standards must be complied under the direction of relevant legislation.

4.4.1 National Environmental Standards

National environmental standards are regulations issued under the Resource Management Act 1991 (RMA). They prescribe technical standards, methods and other requirements for environmental matters.

Local and regional councils [or local government] must enforce these standards (or they can enforce stricter standards when the standard provides for this). In this way, national environmental standards ensure consistent minimum standards are maintained throughout all New Zealand's regions and Districts.

4.4.2 National Environmental Standard for Sources of Human Drinking Water (2008)

The 'National Environmental Standard for Sources of Human Drinking Water' is intended to reduce the risk of contaminating drinking water sources such as rivers and groundwater. It does this by requiring regional councils to consider the effects of activities on drinking water sources in their decision making - resource consents and regional plans. Specifically, councils will be required to:

- Decline discharge or water permits that are likely to result in community drinking water becoming unsafe for human consumption following existing treatment.
- Be satisfied that permitted activities in regional plans will not result in community drinking water supplies being unsafe for human consumption following existing treatment.
- Place conditions on relevant resource consents requiring notification of drinking water suppliers if significant unintended events occur (e.g. spills) that may adversely affect sources of human drinking water.

4.4.3 AS/NZS Standards

The Code for Subdivision and Development AS/NZS 4404 is the principle document defining design requirements. Wherever possible, relevant AS/NZS standards are used as the basis for determining standards of design and construction.

Standards and guidelines relevant to the Water Services are shown in Table 4.5 below.

Table 4.5: National Environmental Standards and Guidelines

Year Released	Technical Discipline: Asset Management
2020	NAMS International Infrastructure Management Manual
2015	NAMS International Infrastructure Management Manual
2011	NAMS International Infrastructure Management Manual
2014	ISO 55000, ISO 55001 and ISO 55002 - Asset Management
2007 v2.0	NAMS Developing Levels of Service and Performance Measures Guidelines
2004 v1.0	NAMS Optimised Decision Making Guidelines
2006 v2.0	NAMS Infrastructure Asset Valuation and Depreciation Guidelines
2006	NZWWA New Zealand Pipe Inspection Manual
1999	NZWWA The New Zealand Infrastructural Asset Grading Guidelines
	Technical Discipline: National Environmental Standards
2006	NES Sources of Human Drinking-Water
2008	Code of Practice for Fire Fighting Water Supplies NZS PAS 4509:2008 set the minimum flow rates and pressure that must be obtainable from fire hydrants and spacing's.

4.4.4 NAMS International Infrastructure Management Manual

This AMP has refers to the both the 2011 and 2015 guidelines, with significant improvements made in areas including sustainability and Asset Management Policy.

4.4.5 ISO 55000 Asset Management 2014

This international standard was released in January 2014 and makes the previous BSI PAS55 Asset Management (2008) standards redundant. The new standard outlines the requirements for a management system for achieving a balance between cost, risk and performance in asset management to help guide asset related decision making and activities.

At the time of writing this Water Services AMP Council has yet to review whether current Council asset management practices will be changed to seek conformance with ISO 55000. However, improvement areas have been identified in this AMP which will assist in the move towards aligning with the requirements of ISO 55000 if this is the direction Council decide to take in the future.

4.5 Regional Plans

4.5.1 Natural Resources Regional Plan (NRRP)

The NRRP was revoked during February 2017 and replaced with the LWRP.

4.5.2 Land and Water Regional Plan (LWRP)

The Land & Water Regional Plan is a new planning framework for Canterbury and aims to provide clear direction on how land and water are to be managed and help deliver community aspirations for water quality in both urban and rural areas.

The Canterbury Land and Water Regional Plan (LWRP) identifies the resource management objectives for managing land and water resources in Canterbury to achieve the purpose of the Resource Management Act 1991. It identifies the policies and rules needed to achieve the objectives, and provides direction in terms of the processing of resource consent applications.

This LWRP is made up of 16 sections and a map volume:

- the first describes Canterbury's land and water resources, interrelated issues that need to be managed, the key partnerships, relationships and processes already underway, including the Canterbury Water Management Strategy (CWMS).
- The second section describes how the Plan works and contains the definitions used in the Plan.
- The subsequent three sections cover the region-wide objectives, policies, and rules.
- Sections 6 to 15 inclusive contain sub-region catchment specific policies and rules, and
- Section 16 contains the schedules.
- The maps referred to in the rules are in a separate map volume.

Rule 5.111 to 5.115 address small and community water takes. Rule 5.123 to 5.127 address the take and use of surface water. Rule 5.128 to 5.132 address the take and use of groundwater. The existing community water takes for Waimate public water supplies are discretionary activities and operated under current consents.

4.5.3 Regional and Iwi Plans

Regional and Iwi Plans affecting the Water Services activities are listed in Table 4.6. Each of these is a significant document, any impact on the current or proposed Waters Policy must be accounted for.

Table 4.6: Regional and Iwi Plan Documents

Canterbury Regional Council Plans	Key Impacts on Water Services
Canterbury Land and Water Regional Plan (LWRP)	Compliance through existing resource consents
Regional Coastal Environment Plan 2011. Covers coastal marine area and the coastal environment and its integrated management.	
Regional Policy Statement Sets the framework for resource management in Canterbury for the next 10 to 15 year	Notified June 2011. Climate change factors included. Review and submission required
Canterbury Water Management Strategy	Drinking Water – ensuring primacy of quality

4.5.4 Canterbury Mayoral Forum

The Waimate District Council is part of the Canterbury Mayoral Forum (11 member Councils) consisting of:

- Kaikōura District,
- Hurunui District,
- Waimakariri District,
- Christchurch City,
- Selwyn District,
- Ashburton District,
- Timaru District,
- Mackenzie District,
- Waimate District,
- Waitaki District (part of which lies within the Canterbury Regional Council area), and
- Environment Canterbury

Region wide issues identified by the Joint Working Group include:

- a need for more effort in compliance, monitoring and enforcement
- a greater focus on biodiversity outcomes monitoring and reporting
- opportunities for councils to share approaches and share resources
- addressing scale and complexities of issues, recognising the size of rating bases and capacities of councils.

Key work by Council supporting ecosystem health and biodiversity, drinking water and water use efficiency targets include:

- ecosystem health and biodiversity
    - restore Wainono lagoon
    - District Plan
- 3Waters
    - Major drinking water upgrades including Hook-Waituna, Lower Waihao, Waihaorunga and Waikakahi
    - Water safety plans in place and implemented
    - Global stormwater discharge consent in place
    - 3waters infrastructure renewals

- water use efficiency
    - water savings through upgrade of ageing infrastructure
    - water conservation measures in place
    - urban toby replacement with manifold meters

Key actions to meet 2025 Goals are tabled below:

Ecosystem Health
Biodiversity **Lowland Stream health** Fulfil requirements to obtain and comply with stormwater consents for townships by 2025. Progress improvement to stormwater infrastructure to reduce ecological damage to lowland streams from sediment and contaminants. Continue regular community education/behaviour change campaigns on stormwater issues and management.
Lowland Stream health Review the state and operation of the district's wastewater treatment plant infrastructure to address and reduce potential impacts on the district's highly valued rivers.
Biodiversity **Drylands** Identify and map SNAs on private land. Review status of SNAs listed in District Plan in line with NPSIB criteria and requirements by 2026. Implement system to actively protect SNAs and maintain indigenous vegetation. Work with Environment Canterbury to develop a biodiversity monitoring strategy. Secure funding for shared biodiversity role to undertake compliance monitoring. Advocate for indigenous biodiversity through regular education/behaviour change campaigns to improve understanding of the importance of protecting and conserving indigenous vegetation.
Biodiversity: **Drylands / Hill and High country streams** Review vegetation clearance rules as part of District Plan review to protect indigenous vegetation. Advocate for indigenous biodiversity through regular education/behaviour change campaigns to improve understanding of the importance of protecting and conserving indigenous vegetation.
Source Water Quality
Priority planning for water supply wells and new treatment plants, including rural water schemes (Waihaorunga, Cannington-Motukaika, and Waikakai). Review the state and operation of the district's wastewater treatment plant infrastructure to address and reduce potential impacts on the district's highly valued rivers and source groundwater Raise awareness of health impacts from high nitrate in drinking water. Run campaigns to recommend regular testing of private bores and consider options for secure water supply
Water Use Efficiency
Improve compliance with national regulations on the measurement and reporting of water takes. Manage water demand through meeting requirements under LWRP. Run local public relations education/behaviour change campaigns on water use efficiency to raise awareness and reduce usage.

Environment Canterbury provides quarterly updates to the Chief Executives Forum and Mayoral Forum on the regionwide progress towards implementing the CWMS. These quarterly reports provide a summary of the last three months' progress of zone committee projects and provide information on the latest freshwater related policy and RMA planning.

As work progresses on implementing the Fit for Future work programme, future quarterly reports to the Mayoral Forum will focus on reporting on the delivery of the CWMS Targets and review of the Canterbury Biodiversity Strategy in line with national direction.

4.6 Waimate District Council Strategies, Plans and Bylaws

4.6.1 Council Strategies

The following Council Strategies have impacts and are considered as part of the Stormwater services Activity

- District Wide Strategy
- Economic Development Strategy
- Procurement Strategy
- Infrastructure Strategy

4.6.2 Council Planning Documents

The following Council Planning Documents have impacts and are considered as part of the Stormwater Services Activity

- Waimate District Long Term Plan 2018-28 (current)
- Waimate District Long Term Plan 2021-31 (proposed)
- Waimate District Plan
- Waimate District Council Engineering Design Standards for Subdivisions and Development
- Structure Plans
- Waimate District Council AMPs

4.6.3 Council Bylaws

Section 146 of the Local Government Act 2002 provides for a Territorial Authority to make Bylaws in its district for the purposes of managing, regulating against, or protecting from damage, misuse, or loss, or for preventing the use of; the land, structures, or infrastructure associated with the Water Services.

Waimate District Council Consolidated Bylaw 2018, Chapter on Water Services consist of six parts:

- Part 1 General Conditions, applicable to all Network Infrastructure Services.
- Part 2 Urban Water Supply
- Part 3 Rural Water Supply
- Part 4 Stormwater Drainage
- Part 5 Sewerage
- Part 6 Trade Waste

The bylaw defines standards and obligations for the use, consumption, protection, access, conditions of supply and infringements.

4.6.4 Council Policies

Significance and Engagement Policy

Waimate District Council developed the Significance and Engagement Policy to determine the significance of issues within the District, and how to align Council engagement with the public based on the degree of significance of the issue.

This policy exists to:

- Inform the public can expect from the Waimate District Council regarding community engagement and the ways you can influence and participate in the decision-making of the Council.
- To provide Council with a tool that guides the assessment of significance during decisionmaking. A decision on significance and engagement provides direction on the level of community engagement that might be desirable to enable Council to develop a clearer understanding of community views and preferences on an issue or proposal.

This Policy identifies the following Strategic assets:

- Regent Theatre
- Waimate Public Library - building and collections
- Resource Recovery Park
- Parks and Reserves
- Public Toilets
- Cemeteries
- Roading Networks and connected infrastructure
- Sewerage Networks and Treatment Plants
- Norman Kirk Memorial Pool
- Stormwater Networks
- **Water Treatment, Storage and Supply Networks**
- Community Housing
- Local Government Centre
- Waimate Sports Stadium

Earthquake Prone Buildings

Earthquake Prone Buildings are no longer included in a Council Policy, but are now included in the Building Act 2004 under, Subpart 6A Building (Earthquake-prone Buildings) Amendment Act 2016. These new provisions came into effect on 1 July 2017.

Council is required to identify potential earthquake prone buildings or parts of Earthquake Prone Buildings and advise building owners that they are required to provide an Engineering Assessment that has been undertaken in accordance with the Earthquake Prone Buildings Methodology.

As the Waimate District is designated as being in a Low Seismic Risk Area the Council has until 1 July 2032 to identify potential earthquake prone buildings in the district. Council also has the ability to identify potentially Earthquake Prone Buildings at any time if they have reason to suspect it may be Earthquake Prone Building.

This Engineering Assessment is required to be provided by the building owner to the Council within 12 months of the building owner being notified by the Council of their building being considered to be an Earthquake Prone Building.

In the case where a building owner has had an Earthquake Prone Building Assessment undertaken prior to 1 July 2017, then this assessment is to be provided to the Council for review against the Earthquake Prone Building Methodology. The Council will assess these reports against the Earthquake Prone Buildings Methodology and decide whether the report is acceptable or may request either additional information or a new report to be provided.

The Council will also assign the Earthquake Prone Building rating and if it is less than 33% then the rating will be entered into the MBIE National Earthquake Prone Buildings database. The building owner will be required to erect and maintain the prescribed placards in the building in the

prescribed locations indicating what the Earthquake Prone Building Rating of their building is until such time as the building is strengthened or demolished. These placards are required to be displayed where members of the public will be clearly visible so members of the public are aware of the Earthquake Prone Rating of the building.

The period for building owners to undertake strengthening of buildings in the Waimate District is 35 years from the date when the Council advises the building owner of its decision that the building is an Earthquake Prone Building.

Dangerous and Insanitary Buildings

Council has revoked the Earthquake Prone Buildings, Dangerous and Insanitary Building Policy and separated the Dangerous Buildings and Insanitary Buildings into two individual policies to make easier for staff when dealings with these buildings. These new policies were adopted by Council in December 2017.

When either a Dangerous or an Insanitary Building are brought to Councils attention an assessment will be undertaken by staff to establish whether they are either Dangerous or Insanitary.

Council staff will work with the building owner to make the building safe and to remove or reduce the danger in the case of both dangerous building and insanitary buildings.

4.7 Level of Service Consultation

4.7.1 Consultation Processes

Community Outcomes for the Long Term Plan

The Council has carried out significant consultation to establish the Community Outcomes for the LTP; these were reviewed in 2011 following the changes to the Local Government Act in 2010. For the 2021 LTP the Community Outcomes retain the essence of those included in previous Waimate Community and Long Term Plans and were tested against the Waimate District Council vision statement.

Community Consultation

The Council has undertaken a range of consultation processes over the past few years specifically targeted at gathering information on preferred Levels of Service or the extent of infrastructure that Council will be required to install, future vision or how we manage the service. The extent of the historical and proposed consultation is detailed in Table 4.7 below.

Table 4.7: Waters Services Consultation Processes (Historical and Proposed)

Consultation Processes	Key Stakeholders Involved	Date	Reasons for Consultation	Extent of Consultation
Historical				
2012-2022 LTCCP process	All	2012	Legislative requirement criteria of LGA 2002	In accordance with the LGA 2002 consultation requirements
2015-2025 LTP process	All	2015	Legislative requirement criteria of LGA 2002	In accordance with the LGA 2002 consultation requirements

Consultation Processes	Key Stakeholders Involved	Date	Reasons for Consultation	Extent of Consultation
2018-2028 LTP process	All	2015	Legislative requirement criteria of LGA 2002	In accordance with the LGA 2002 consultation requirements
Water Safety Plan (Waimate Urban and Rural)	Urban and Rural customers	2013 & ongoing		
Proposed				
2021-2031 LTP process	All	2021	Legislative requirement criteria of LGA 2002 and RMA	In accordance with the LGA 2002 consultation requirements
District Plan Review	All	2024		
Bylaws	All	2018	Review of Bylaws	Public and Industry submissions requested

4.7.2 Rules for Performance Measures

In 2010, the Local Government Act 2002 was amended to require the Secretary for Local Government to make rules specifying non-financial performance measures for local authorities to use when reporting to their communities. The aim was to help the public to contribute to discussions on future levels of service for their communities and to participate more easily in their local authority's decision-making processes.

Performance measure rules come into force on 30 July 2014. Local authorities were required to incorporate the performance measures in the development of the 2015-2025 LTP. The performance measures were reported against for the first time in the 2015/2016 annual reports. The performance measures are:

- Performance measure 1 - Safety Of Drinking Water
- Performance measure 2 - Customer Satisfaction
- Performance measure 3 - Demand Management
- Performance measure 4 - Fault Response Times
- Performance measure 5 - Maintenance of the Reticulation Network

4.7.3 2021-2031 Water Services: Levels of Service

In 2017 the 2015 Customer Levels of Service were reviewed Table 4-9 details the results of this review.

Council reviewed the customer service requests system to ensure they align with the Mandatory Performance Measures and ensured the internal and Contractor reporting aligns with the Mandatory Performance Measures 'tasks'. Council's AMIS (AssetFinda) and associated Service Request module have been programmed to allow reporting aligned with the NFPM and to ensure consistency and accuracy of reporting.

Table 4.8: LTP 2021 – 2031 Water Services Levels of Service

What we do it	**Council provides a regular supply of water to the designated Waimate urban area and the six rural areas of Waimate to serve drinking, commercial and fire protection uses.**			
1. Provide safe drinking water				
How we do it	• Manage and monitor all water supplies under requirement of Drinking Water Standards • Monitor ongoing regulatory change for water supply activities • Implement Water Safety Plans for drinking water schemes			
How we measure performance		**Actual**	**Years 1 – 3 Target**	**Years 4 - 10 Target**
	Extent of compliance with Drinking Water Standards (Part 4) - Bacterial Compliance (M)	Partially achieved (2018/19)	Bacterial compliance – All schemes	Bacterial compliance – All schemes
	Extent of compliance with Drinking Water Standards (Part 5) - Protozoal Compliance (M)	Partially achieved (2018/19)	Protozoal compliance – All Schemes	Protozoal compliance – All Schemes

2. Provide a continuous, appropriate and safe water system throughout the District with excellent customer service				
How we do it	• Manage, monitor and test all water supplies • Respond to service failures and faults • Provide a customer service request system 24 hours a day 7 days a week			
How we measure performance		**Actual**	**Years 1 – 3 Target**	**Years 4 - 10 Target**
	Median attendance and resolution times for urgent and on-urgent callouts for water supply faults or unplanned interruptions to the urban network* (M)	Achieved (2018/19	Attendance to urgent callout - ≤ 1 hour	Attendance to urgent callout - ≤ 1 hour
		Achieved (2018/19	Resolution for urgent callout - ≤ 24 hours	Resolution for urgent callout - ≤ 24 hours
		Achieved (2018/19	Attendance to non-urgent callout - ≤24 hours	Attendance to non-urgent callout - ≤24 hours
		Achieved (2018/19	Resolution for non-urgent callout - 72 hours	Resolution for non-urgent callout - 72 hours
	Total number of complaints received about: 1. drinking water clarity 2. drinking water taste 3. drinking water odour 4. drinking water pressure or flow 5. continuity of supply 6. Council's response to these issues (M)	Urban and Rural water achieved (2018/19	Urban water supply: <10 complaints per 1,000 connections Rural water supply: ≤ 40 complaints per 1,000 connections	Urban water supply: <10 complaints per 1,000 connections Rural water supply: ≤ 40 complaints per 1,000 connections

	Percentage of residents receiving the service satisfied with water supply services	Urban and Rural water achieved (2018/19	≥ 86%	≥ 86%

3. Provide reliable, efficient and well planned water infrastructure and services that meets the needs of the community				
How we do it	• Monitor demand on all water supplies • Manage growth of network • Monitor condition and performance of water supply reticulation and assets and analyse data to predict asset failure/identify priority improvements required • Complete capital expenditure programme associated with developing the network • Minimise the disruptions to water supplies • Provide a restricted supply of water to customers on rural water schemes • Implement leak detection and reduction programme			
How we measure performance		**Actual**	**Years 1 – 3 Target**	**Years 4 - 10 Target**
	The average consumption of drinking water per day per resident within the Waimate district (**M**)	Achieved (2018/19	Average consumption ≤ 500 litres per person per day	Average consumption ≤ 300 litres per person per day
	Percentage of real water loss from Council's network reticulation systems (**M**)	Not achieved (2018/19	Real water loss - ≤ 35%	Real water loss - ≤ 20%
	Reactive maintenance (system failure) or programed work in the Waimate urban area that exceed 8 hours of not suppling drinking water to the community or a consumer.	Achieved (2018/19	< 1 per year	< 1 per year
	Reactive maintenance (system failure) or programed work in the Rural Water Supplies that exceed 3 days of not suppling drinking water to the community or a consumer.	Achieved (2018/19	< 1 per year	< 1 per year

The interpretation of the Non-Financial Performance Measures Rules are shown in http://www.dia.govt.nz/diawebsite.nsf/wpg_URL/Resource-material-Our-Policy-Advice-Areas-Local-Government-Policy?OpenDocument#ElectoralAct

Compliance (bacterial and protozoal) with drinking-water standards: This measure is only partially achieved as a number of the plants are yet to be upgraded to meet the bacteria and protozoal compliance criteria required by the drinking water standards. The following plants are to be upgraded:

- Hook/Waituna: A trial ultra-filtration plant has been trailed at the plant with good results. The upgrade is still in process and has been rolled over now and now into 2020/21 and 2021/22. A Request for Proposal, for Early Contractor Envolvement is currently being prepared for Hook intake, which will include Lower Waihao Intake as well. The scheme has a submitted Water Safety Plan waiting for approval.
- Lower Waihao: Drinking Water Standards upgrades was planned to be completed in 2020/21 year, but will rollover into 2021/22, and will be included in the combined Request for Proposal with Hook. The scheme has a submitted Water Safety Plan waiting for approval.
- Waimate: Manchester Bore is currently being upgraded to meet Drinking Water Standards. A new compliant bore was constructed in 2018, and a new plant was built with a UV reactor and chlorination unit, which was completed early December 2019. Timaru Road Bore Treatment Plant is under going treatment upgrad with addition of a UV reactor. Bore security in the future will not be sort again for either bore. Instead Borehead security (Criterion 2 DWSNZ 2005 [Revised 2018]) will be applied for. This decision not to try for "Secure Bore" status was due to the Havelock North event in 2016, and the fact that "Secure Bore" status is not good science, and very hard to prove satisfactorily. The supply has a current approved Water Safety Plan, but will require updating after all the upgrades are completed.
- Otaio-Makikihi: Tavistock bore has been upgraded with the installation of UV reactor in 2020. Again bore security not be sort for bore, as for the reasons above.Instead Borehead security (Criterion 2 DWSNZ 2005 [Revised 2018]) will be applied for. A new water safety plan is currently being written and will be be submitted by the end of the year for approval.

Other Rural Water scheme Plants are planned to be upgraded to meet the Drinking Water Standards, however there are continuing reviews of the present New Zealand drinking water standards, legislation and 3 Waters industry, and therefore compliance upgrade options for water supplies are still being reviewed. Because of these reviews and potential changes and options, the planned upgrades for Rural Water schemes have been put on hold to a later date. This has been in agreement with Drinking Water Assessor, on the condition of increase remote monitoring via telemetry and control, which has been done. Council continues to work with the rural water scheme Committees to ensure a suitable outcome as part of the 2018-28 & 2021-31 Long Term Plan and compliance with drinking water standards. The remaining plants to upgraded to meet compliance are:

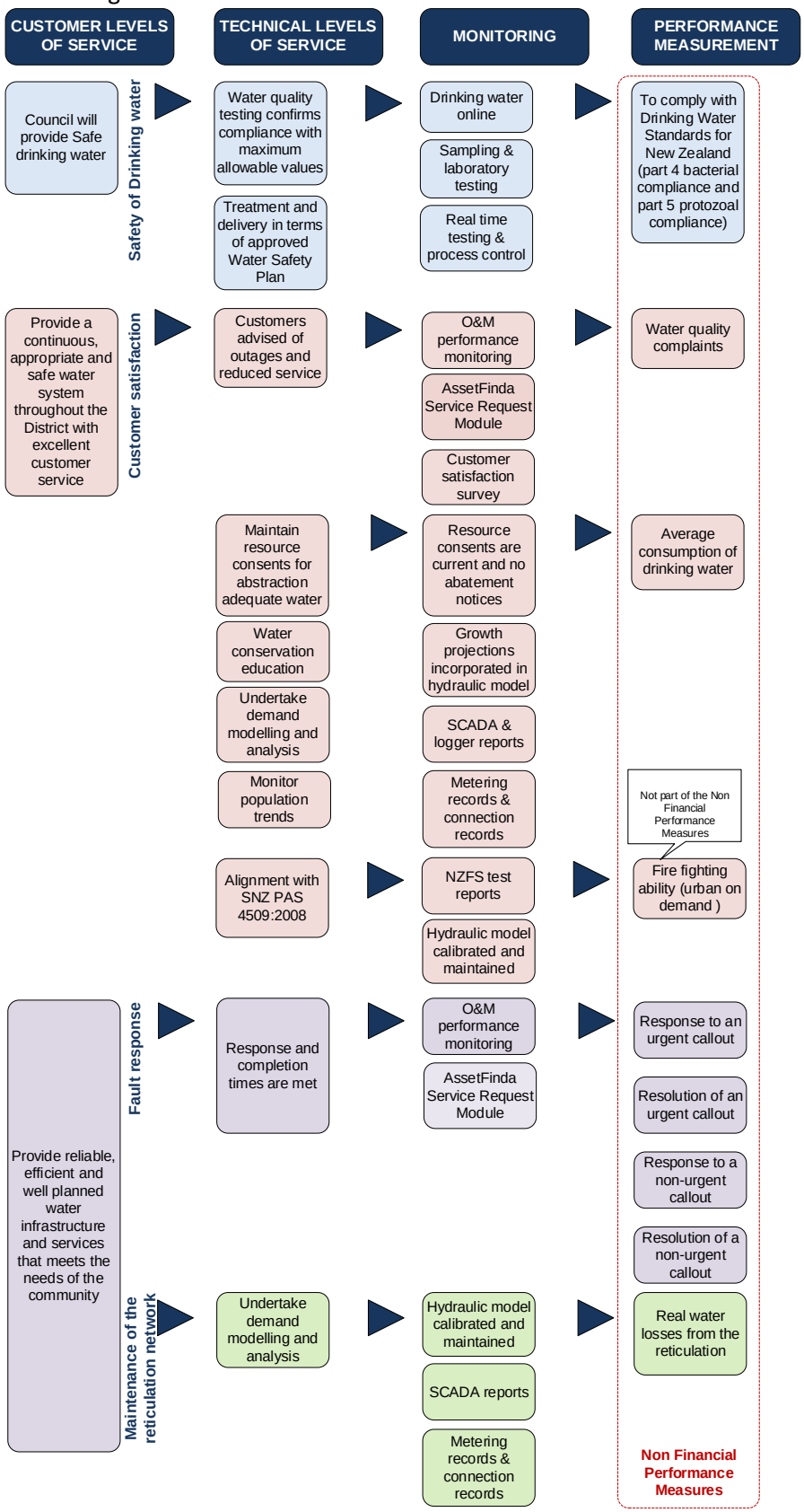
- Cannington-Motukaika: Cannington Intake
- Waihaorunga: Waihaorunga Main
- Waihaorunga: Tavendales
- Waikakahi: Waikakahi Intake

Complaints about rural water supply: Due to the nature and mechanics of a rural water scheme, and a number of factors beyond Council's control (i.e. members of public damaging pipe network) there is a greater potential for a loss of water pressure and continuity of supply. Council does have a renewals programme for pipe and points of supply (i.e. restrictor), a policy of 4 days point of supply storage, and public access to GIS maps of the water supplies on it website.

Real Water Loss: At present Council only has meters at the Timaru Road and Manchesters Road plants and no zone or points of supply meters. Therefore we are unable to measure true water usage in Waimate and have to rely on an assumed water loss calculation for this reporting.

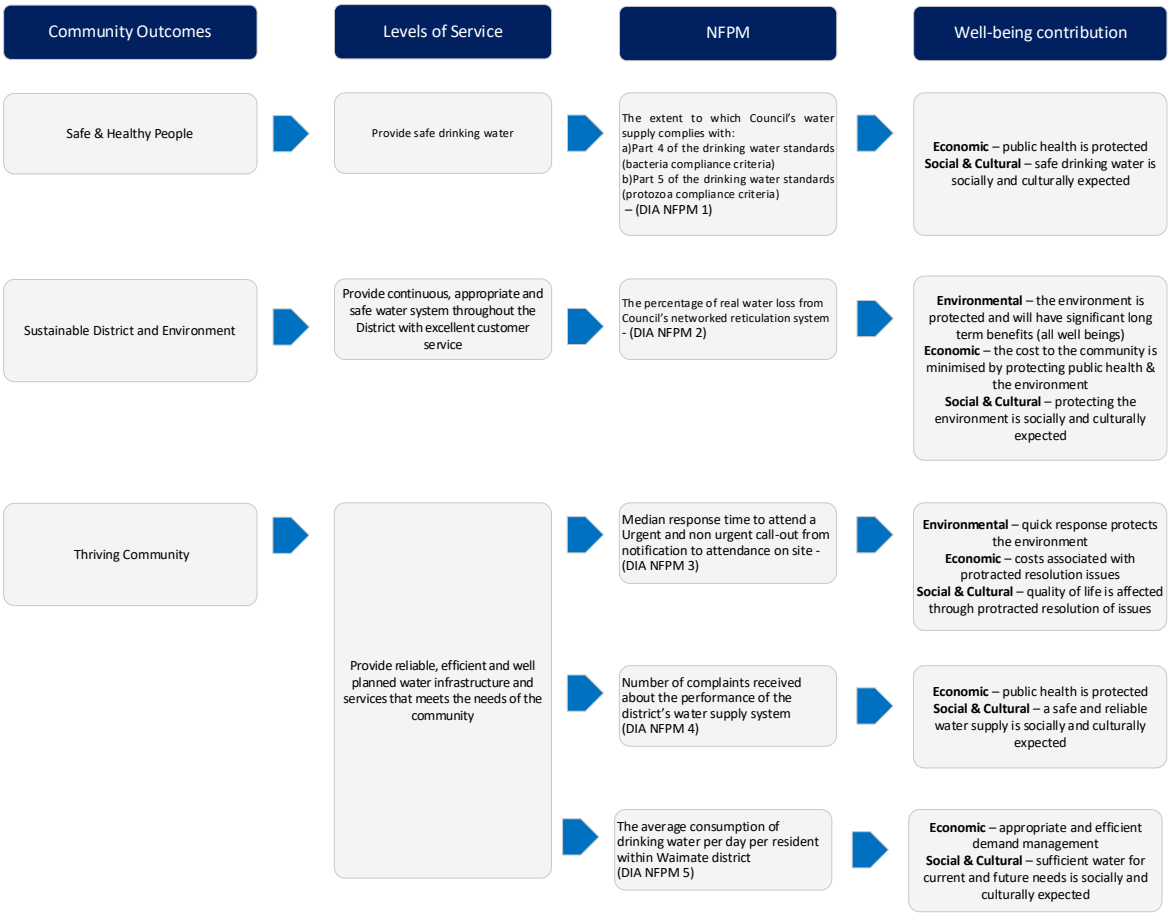
4.7.4 Customer and Technical Levels of Service

The Technical Service Standards for each Customer Levels of Service, along with linkages to the monitoring and Performance Measurements is described below.



4.7.5 Activity contribution to the Four well-beings

Section 10 of the Local Government Act restores the four aspects of community well-being by requiring local authorities to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future. The reinstatement of the four well-beings acknowledges that the Council has a broader role in looking after our communities, than simply providing core services. The water activity levels of service contribution to the four well-beings are shown below.



4.8 Performance Gaps

The results for the March 2017 Communitrak customer satisfaction survey as shown below. The results from the survey report that:

- 70% of residents are satisfied with the water supply and service (77% in 2017), with 36% being very satisfied (44% in 2017). 13% are not very satisfied and 18% are unable to comment.
- The percentage not very satisfied (13%) is similar to the Peer Group and National Average readings for water supply and 5% above the 2017 reading.
- 74% of residents say they are provided with a piped water supply and, of these, 86% are satisfied and 15% are not very satisfied.
- There are no notable differences between Wards and between socio-economic groups, in terms of those residents not very satisfied with the water supply and service.

The main reasons residents are not very satisfied with the water supply and service are:

- *needs to be boiled/filtered/undrinkable, mentioned by 3% of all residents*
- *poor quality/dirty/discoloured, 2%,*
- *chlorine content/chemical, 2%.*

Figure 4-1: Communitrak Survey Trends

Figure 4-1 shows the satisfaction levels have increased considerably over the period 2013 to 2017 with a slight reduction in satisfaction levels over the last two years.

A summary of the performance gaps are shown below along with a summary of how the gap(s) will be closed. These are further discussed in the Sections 5 to 10.

Table 4.9: Level of Service Performance Gaps

Level of Service	Ten Year Performance Measure	Performance Gap	Summary of How the Gap will be Closed
Council will provide potable water	Council provides water that complies with DWSNZ (revised 2018)	Yes	Increased water treatment and monitoring
Council manages the water schemes wisely	85% of satisfied or very satisfied residents with the overall performance of the Water service	Yes	Increased water treatment and monitoring

5.0 GROWTH AND DEMAND MANAGEMENT

Provides details of growth forecasts, which affect the management, and utilisation of all Waters assets and details demand management strategies.

5.1 Projects That Will Have An Impact On District Population

There are a number of projects that will or have had an impact on the districts population:

- Hunter Downs Irrigation Scheme – Did not proceed (2020)
- Waihao Downs Irrigation scheme (Commissioned)
- Oceania Dairy Factory
- Alps to Ocean Cycle Track (Commissioned)

Details of these projects are presented below.

Hunter Downs Irrigation Scheme

The Hunter Downs Irrigation Scheme was to be a community irrigation proposal developed originally by the South Canterbury Irrigation Trust (SCIT) and Meridian. The scheme would have potentially irrigated up to 40,000 ha of land from the Waitaki River stretching as far north as Otipua. The scheme was reduced to just 12,000 ha of irrigated land with construction supposed to start mid 2018. At the time of writing this AMP, the consent is close to lapsing.

Waihao Downs Irrigation Scheme

The Waihao Downs Irrigation Scheme irrigates 6,800 ha of farmland within a larger command area of 14,000 ha in the Waihao basin. The scheme involves taking water from the Waitaki River which is then distributed through a piped network to farms. There are a few potential farm conversions left.

Kurow Duntroon Irrigation Scheme

The Kurow Duntroon Irrigation Scheme, within the neighbouring Waitaki district, was developed by the Ministry of Works during 1965.

The original system consisted of a siphon drawing water from the Waitaki Dam into a 35 kilometres long open water race delivering water via a gravity fed system of manually operated gates.

This system was replaced during 2018/19 by installing 76 kilometres of pipelines from Waitaki Dam to Duntroon on the west bank of the Maerewhenua River. The system will ultimately enable irrigation of 5,500 hectares.

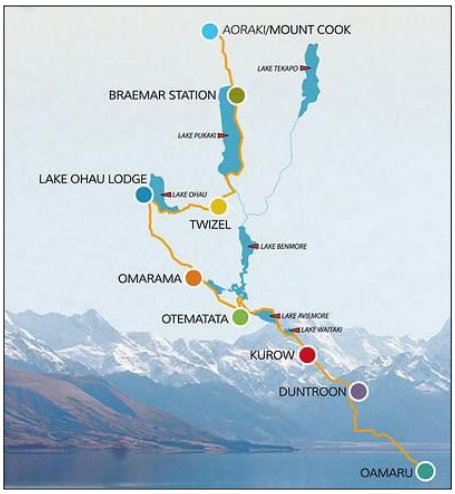
The Kurow Duntroon Irrigation Company (KDIC) is a community owned irrigation scheme, and holds a resource consent (CRC163429) from Ecan that expires in 2048, for an annual water take of 26.3 million litres. The scheme will increase activity in the rural service industries (on farm contractors and farm supplies) and processing companies (milk companies and vegetable processing).

Oceania Dairy Factory

Oceania Dairy Limited is a wholly-owned subsidiary of Inner Mongolia Yili Industrial Group (Yili), and is China's largest dairy producer. The state-of-the-art Glenavy processing plant has been designed for the production of milk powder for export to China where it will be used by Yili to produce infant formula. Stage Two is now complete.

Alps to Ocean Cycle Track

This is a cycle track from Aoraki/Mt Cook to Oamaru and is not yet fully complete. Construction of the off-road trail is ongoing, and will likely take another few years to finish.
Given central Otago Rail Trail didn't have real impact until a number of years later, Council has assumed that any impact will be similar for Waimate District.



With both the Hunter Downs and Waihao Downs Irrigation projects there is a high chance that Waimate will experience slight increases in population with changes in socio-economic structure and changes in land use.

5.2 Demand Forecasts

The Waimate District Growth Projections- 2020 (Rationale) report provides a projection of the population growth for the Waimate District over the next 30 years. The report provides growth projection outputs for usually resident population, employment, dwellings, rating units and visitors.

Typically, WDC used the growth projections prepared by Statistics New Zealand (StatsNZ). Council is now looking for a more in-depth understanding of what their district might look like over the next 30 years. This coupled with the delayed release of the Stats NZ projections, following 2018 Census, has led WDC to commission these growth projections to understand the future growth in their district and provide a single source of the truth for council.

Four growth scenarios have been modelled for each parameter representing different levels of ambition in terms of the district's growth over the next thirty years.

The report considered four growth scenarios i.e.

- Scenario 1 – Business as Usual (Pre COVID 19)
  - No impact from COVID 19 and no limit on dwellings that can be constructed
- Scenario 2 – High
  - minimal COVID 19 impact and currently zones land reaching capacity
- Scenario 3 - Medium
  - Expected COVID 19 impact, business as usual by 2025
- Scenario 4 - Low
  - Higher than expected COVID 19 impact

Scenario 3 is considered to be the most appropriate for WDC's long term planning as there will be short term effects due to COVID-19.

However, it is not yet known what, if any, long term effects there will be. Due to this uncertainty it is recommend that annual "check-ins" are completed with the most up-to-date data to monitor the impact of COVID-19 and the progress of recovery. At this time growth can be reprojected, if necessary.
Since this growth projections model was developed it has become apparent that a bubble between New Zealand and Australia will not be forming in 2020. To offer best value for money to WDC, and

due to the minimal impact on the final projections, Rationale recommend revisiting these assumptions once there is a known scenario and date for border reopening. {Rationale}.

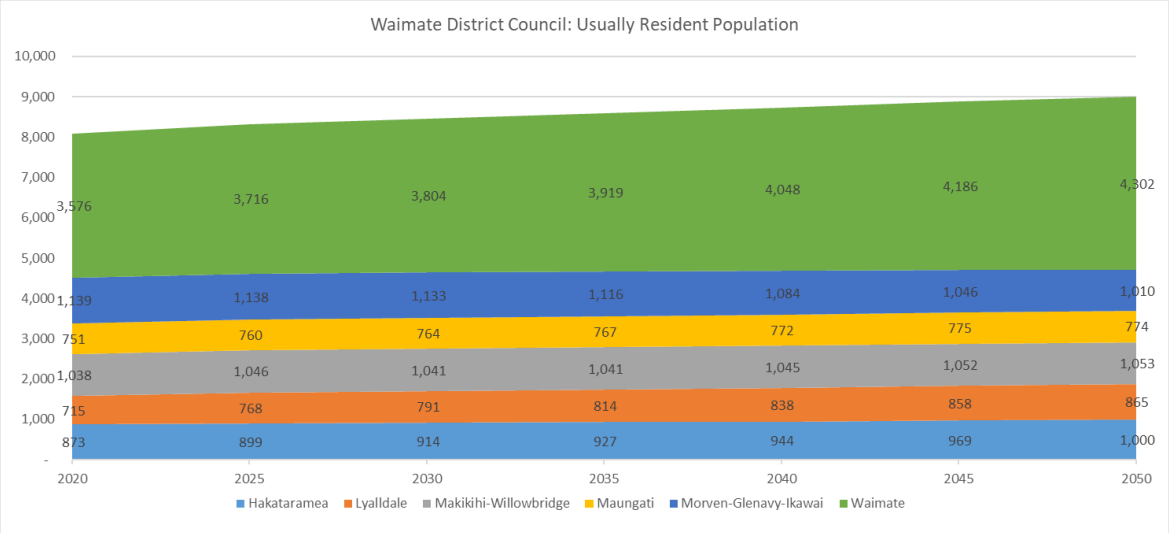
5.2.1 Growth Trends

Population Projections

The key characteristics of Waimate District's population are:

- Younger people leave the area for education and employment opportunities.
- People later in their working lives or early retirement are moving to the area for the lifestyle, affordability and/or retirement.
- Older people (over 70) are moving from the rural areas of the district to Waimate or leaving the area, likely in search of better healthcare or to be closer to family.

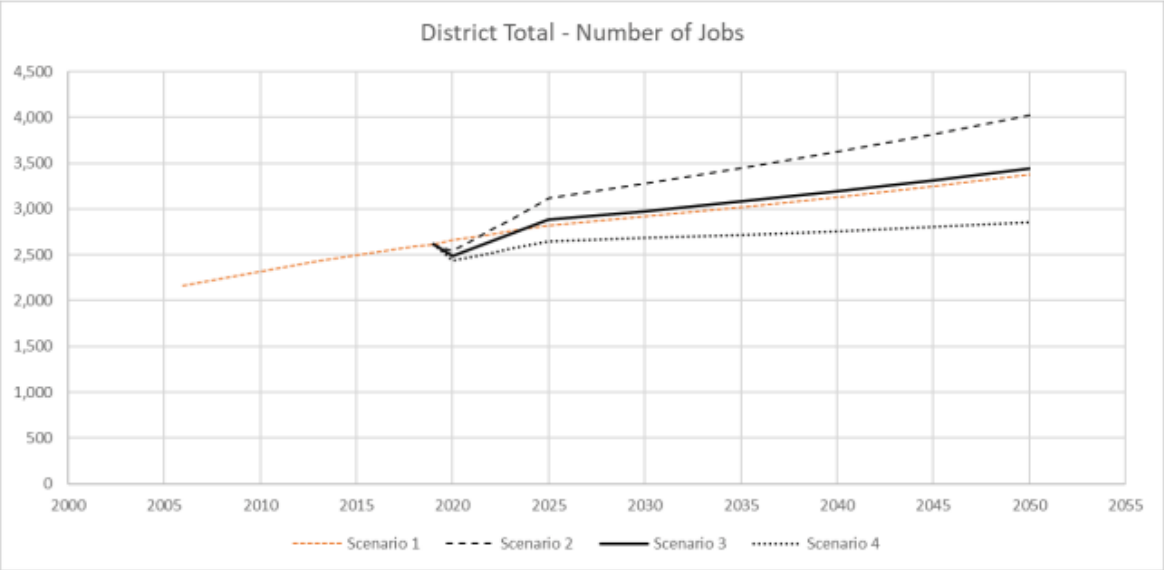
Over the next thirty years, the usually resident population of Waimate District is predicted to increase slightly. As a result there will not be any significant increase or decrease in demand for Council services based on change in population.



Employment Projections

It is projected that WDC will experience a short-term reduction in the number of jobs, but it is expected that come 2025 the economy and number of jobs will have normalised and be on the increase once again.

COVID-19 has some impact on employment in the district, but it is expected that those who lose their jobs will not move away. Typically, the most mobile and reactive portion of the population are those in their early working years, who do not have the necessary finances to "stick out" unemployment, or strong ties (family, property ownership etc) to the area. Waimate District has a relatively small proportion of the population in this age group, between 20 and 35. Therefore, modelling has assumed that if residents become unemployed, they will find work elsewhere and commute or remain unemployed in the area.



The average age of Waimate District's population is older than the national average of 37.3 years (StatsNZ). Looking across the district Waimate township has a significantly older average age of 48.6 years in2020 when compared to the outlying rural areas. This makes sense as people are living and working on farms then moving into Waimate for retirement.

5.3 Response to Projected Growth

The effects of COVID-19 will have a significant impact on nationally and to a lesser extent locally as the Waimate districts' primary industries, agriculture and forestry, are less affected than for example tourism.

The usually resident population is predicted to increase slightly and there will not be any significant increase or decrease in demand for Council services based on the growth projections.

5.4 Water Services Demand Drivers

There are significant projects planned within the Waimate District which will have a significant impact on the water demand.

The Hunter Downs Irrigation Scheme will have a direct impact on demand as land use will change from dry land to irrigated land farming practices resulting in an increase in on farm population and an associated increase in demand for potable water. There will also be increased demand for stock water, but it is expected that the irrigation scheme will, in part, satisfy this demand. The increase in demand will also require significant extensions in reticulation, where possible, for new development.

The change in land use from dry land to dairying has been occurring for a number of years and is continuing. The population increase from the Hunter Downs Irrigation Scheme and the associated support services will potentially place pressure on already limited resources.

The following table indicates how these factors are expected to be reflected in changes in domestic and non-domestic water usage.

Table 5.1: Water Demand Drivers

Water Demand Drivers	Domestic	Commercial	Industrial	Agricultural/ Horticulture
Growth	Population change in reticulated areas	Increase in commercial areas	Expansion of industrial areas	Change in land use
Water Usage - Consumption	Domestic water usage	Commercial water usage	Water Conservation Increase in "wet" industries	Domestic consumption in rural areas
Water Usage - Irrigation	Domestic Irrigation	Not Significant	Industrial water irrigation	Irrigation Intensive farming
Water losses	Water Losses – All Reticulated Areas			
Resource Consent - Renewals	The renewal of resource consents will require water conservation measures to be implemented and will place additional drivers to match demand and customer expectations. A water conservation strategy will be developed and promoted prior to future water extraction consent renewals			
Legislative changes	Central Government is signalling that the focus will change from water quality to water quantity			

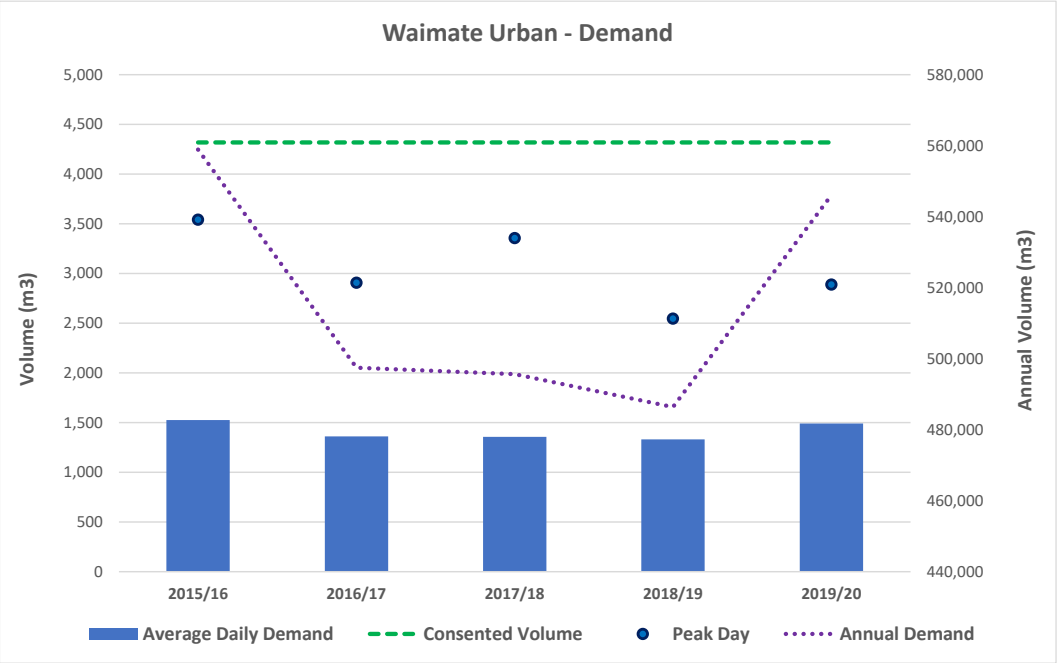
5.5 Water Usage Trends in Waimate District

Water intensive industries can have a large impact on the total daily water consumption for small water schemes. The impact of water intensive industries would need to be assessed as they arise and their effect on the scheme assessed at that time.

5.5.1 Waimate Urban Water Scheme

The Waimate Urban water scheme consented volume allows flows up to 65 L/s from two sources, Manchester Road bore (20 L/sec) and the Timaru Road bore (44 L/sec). The only limitation in the supply of water is the reticulations ability to distribute the full consented allocation and supply the reservoir. At peak times, Manchesters Bore can reach 21L/sec (10.3Bar), and Timaru Road Bore 35L/sec (10.25Bar) with minimal flow into the reservoir. More flow can be provided but at higher pressures. In 2008 Timaru Road Bore had been set to 12Bar pumping pressure to increase supply with negative effects on the reticulation pipework. Under the current normal conditions there is sufficient capacity for the Waimate Urban water scheme demand. However, during 2009 Council conducted a pressure management study "Waimate Water Supply – Pressure Management Study" (Opus International Consultants Ltd. 2009), which recommended pressure management of the system to defer renewals. Different options are currently under consideration, which includes a dedicated delivery rising main from the bores to the reservoir. In the last five years only water conservation measures have been implemented.

The following details the average daily water usage for the period 2015 to 2020. This indicates that usage has not markedly increased over this period. Note that these figures include water supplied to the Hook-Waituna Rural Water Supply.



The graph also shows that the average daily demand range between 1,332m^3 to 1,527m^3. The peak demand days range between 2,545m^3 to 3,541m^3. Annual demand range between 486,425m^3 in 2018/19 to 558,895m^3 in 2015/16.

Future Capacity

There is insufficient capacity within the Waimate Urban water scheme to service significant increases over the next 10 years. During peak summer periods the existing pumping system is operating 24 hours a day. The inclusion of a new 300mm diameter well (Winter 2018) at Manchesters Road and the commissioning of a dedicated delivery main by 2019/20 will ensure that increases in population are catered for. Additionally this will free up capacity within the existing reticulation.

5.5.2 Rural Restricted Schemes

The continued change in farming practices, mainly sheep to dairy farming, not only increases the demand for potable water but also affects the quality of water sources. Dairy farms in close proximity of water sources increase the potential for contamination.

There is increasing demand on the rural schemes to provide more water for stock consumption and in the case of dairy farms, high quality water for wash down of facilities. Council will carefully consider any application for extra water for all of the rural schemes.

In other districts where there has been a change from dry land farming to irrigated (with significant dairy farming), the demand for dairy stock water and wash-down water (within the milking sheds) is significantly higher than what a restricted scheme can supply. The restriction is usually the reticulation (main diameter). While the demand for stock watering with increased dairy farming may decrease, there is a corresponding increase in the number of houses and subsequent domestic water requirement. Note that the quantity of water supplied to rural properties is controlled via restrictors that can be adjusted to ensure that each property receives the correct amount of water.

Table 5.2: Water Demand

2018/19	Waimate Urban	Cannington Motukaika	Hook Waituna	Lower Waihao	Otaio Makikihi	Waihaorunga	Waikakahi
Average Demand(m^3/day)	1,332	319	957	740	652	267	891
Peak Demand(m^3/day)	2,545	531	1159	1,358	882	274	982
Treatment Capacity (m^3/day)	4,882	475	1,728	1,771	1,296	455	1,054
Resource Consent Allow. (m^3/day)	5,616	475	1,728	1,633	929	576	1,469
Service Connections (as at 2017)	1,953	50	525	241	213	47	173

Customer expectations are increasing, with demands for greater water pressure and availability. Increased water quality expectations are reflected in the DWSNZ (legislative) and in aesthetics qualities such as odour and taste. There is also a shift observed in lifestyles with more households having spa pools, landscaped gardens with water features and sprinklers to maintain the gardens and lawns. The result is an increasing demand on the water schemes (reticulation network and water treatment plants) to supply greater volumes of water of higher quality.

5.6 Legislative Changes

The legislative framework and government and industry direction is discussed in Section 4.2.

5.7 Demand Management

5.7.1 Background

Demand Management strategies are used as alternatives to the creation of new assets. They are aimed at modifying customer demands to achieve:

- Social, environmental and legislative objectives for Waimate District.
- The delivery of cost-effective services.
- Defer the need for new assets and optimise the performance/utilisation of the existing assets.

Council is working on a range of strategies to manage the demand for water and therefore the requirement for additional infrastructure. Table 5.3 lists strategies used by the Council.

Table 5.3: Demand Management Strategies

Strategy	Objective/ Description
Operations	Reduce unaccounted for water by leakage detection and control Investigate the level of water loss (leakage) to determine if a water loss problem exists
Operations	System Pressure Management: Pressure measurement is being considered to enable changes that will reduce operating pressures which impact on reticulation and reduces water losses. This needs to be balanced with levels of service with the consumer on adequate pressure
Waimate District Consolidated Bylaw 2008	The Water by-law does not have any direct water conservation requirements other than to prohibit water wastage and to ensure prudent use and require consumers to comply with any water restrictions publicly advertised during droughts, periods of unusually high demand or emergencies
Policy	Water Management Strategies: Council will consider developing a strategy to encapsulate the overall planned management of the water takes, use, and conservation education with an aim to reduce the per capita consumption. This is consistent with Councils resource consents requirements
Education	Water Conservation Strategy: Water conservation programmes aimed at increasing community awareness of the benefits of conserving water and reducing water demand. These

Strategy	Objective/ Description
	programmes include information on ways to conserve water and can be implemented through public signage in key locations and using the print media
Water Charges	Water meters are installed for all extraordinary supply users, therefore commercial, industrial, non-urban, and high usage consumers. This strategy is seen to help in terms of demand management although universal metering has a significant capital and operating costs that may not provide the long-term benefits of demand reduction. It has been observed that the consumption in metered areas is lower than the non-metered areas
Water Restrictions	Water restrictions are used to manage peak demand. Water restrictions typically include limits on the use of garden hoses

The NZS 4404: 2010 Land Development and Subdivision Infrastructure Standard specifies for design purposes the daily consumption as 250 L/person/day.

The Ministry of Health published "Household Water Supplies – The selection, operation and maintenance of individual household water supplies (2006)" which provides information about the supply of safe drinking-water to households not connected to town water supplies. These figures provide useful guidance as to what the Ministry for Health deems appropriate for personal consumption, cleaning and washing, which amounts to 300 L/person/day.

The 2007 AMP stated that the peak daily consumption (Total Demand – Leakage) was estimated to be 1,960 m^3/day, this equates to 710 L/per capita/day.

As part of the Non-Financial Performance Measures Rules 2013, consumption monitoring become a mandatory performance measure. From this monitoring the daily average consumption for the last two financial reporting years showed a reduction of 130 – 150L/day per person. This reduction in consumption can be attributed to the leak detection surveys, and the follow up maintenance and repairs.

The daily average consumption was 559L/person/day for 2015/16 and in the 2016/17 financial reporting year, 578L/person/day, which is still high considering the NZ standards and Ministry of health figures (250 and 300 litres/person/day). When adjusted for network water loss these figures reduce to approximately 310L/person/day (2016/17).

A Water Demand Management Strategy / Plan is required to:

- Identify the drivers for demand management in the Waimate context.
- Identify positives and negatives of demand management initiatives.
- Identify the following:
    - actual necessary use
    - wasteful use
    - losses (avoidable, economic and interference)
- Prioritise the areas where greatest need exist for demand management.
- Identify and implement appropriate demand management initiatives.

5.7.2 Reduction of Leakage

The reduction in water leakage rate within the Council's reticulation has a positive effect on maintenance costs (reduced pumping costs) and increases the time before additional capacity is required (optimisation of the existing assets).

The leakage rate in the urban area has historically been very high. Council staff has developed a strategy of assessing leakage in the urban area via measuring minimum night time flow rates.

During the period May to June 2009 Council actively targeted the repair of all leaks identified during the leak detection exercise. However, a review of telemetry flow data for the period pre/post leak repair showed that the minimum night flows increased from 10 L/s to 15 L/s. A further substantial leak was found and repaired. This highlighted the sensitivity of the network and its tendency to burst under high pressures. This also highlighted the need for pressure management to reduce burst rates, reduce leakage and extend asset lives.

In 2011 another survey was undertaken, leakage rates leakage rates reduced from 18 L/s to 9 L/s. To assist to achieve a target of 6 L/s, it is intended to zone the town into four to five sub-zones to better concentrate leakage reduction results. The leak detection service will be used on a three year cycle.

Again, in mid 2015 another survey was undertaken. 84 leaks were detected which equated to an estimated 171.2 L/m (2.8 L/sec) loss through leakage. 52 out of the 84 (62%) leaks were on private property, after the point-of-supply. This raised the question of individual consumer responsibility, water conservation, education and water meters (*Water and Wastewater Managers report for the District Infrastructure Committee meeting August 2015*).

Table 5.4: July 2015 Leak Detection Survey Leak Counts and Estimated Water Loss

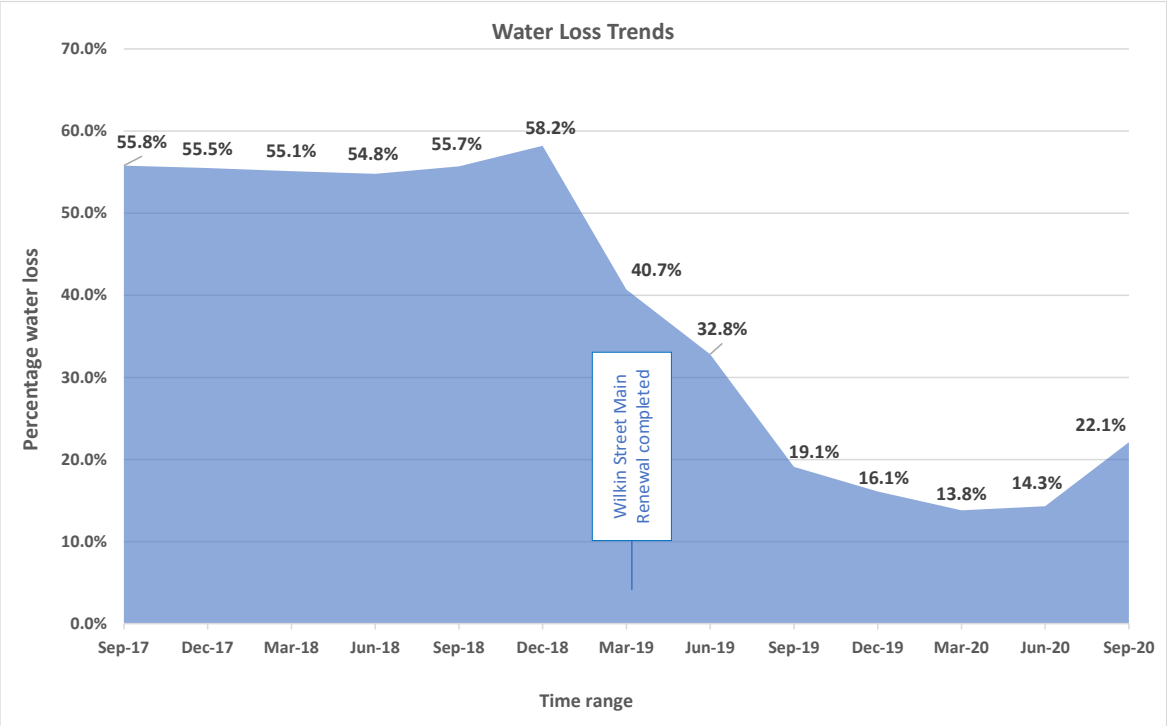
Leak Type	Count	Estimated Combined Leakage Flow Rates (L/min)
Private	52	134.4
Leak at Connection	19	4.75
Lateral	3	13
Sluice Valve	6	7.5
Fire Hydrant	3	1.5
Tapping/main	1	10

Water losses have also become a mandatory Non-Financial Performance Measure requirement. The last two financial reporting years have indicated, based on minimum night flows (MNF), there was 50% for 2015/16 and 46% in 2016/17 water loss, in the Waimate Urban supply.

No further leak detection was undertaken as the mains renewal programme resulted in a significant reduction in water loss. The MNF water loss calculations graphically showed below provides useful commentary on the reduction in water loss as a result of the mains renewal programme. It can be seen that MNF water loss hovered around 55% - 58% within the Waimate Urban Water Supply. Mains renewals, AC & CI, resulted in a significant reduction of 44% between December 2018 and March 2020. A major contributor was a significant water leak on the Wilkin Street mains, which was renewed from Edward Street to Michael Street. This Wilkin Street project was completed during March 2019.

However, the graph also show that water loss has increased from 13.8% in March 2020 to 22.1% in September 2020. As mains are replaced, reducing leakage in one area it increases pressures throughout the network which may lead to increased leakage or breaks in other areas and as a result water loss rates may fluctuate.

Figure 5-1: Water Loss Trends



As part of Council's delivery plan water meters are installed throughout the network. This will aid in leak detection on both private and commercial properties. Extra Ordinary users (high volume, commercial and businesses) with continue to be charged for water in excess of 200m^3 per six-month period. At the time of writing this asset management plan, Council is not considering a review of either charging mechanism or setting price points. The outcome of the three waters reform programme may well result in this decision being revisited in the future.

Consideration of future volumetric charging shall be based on the drivers created by the 3 Waters Regulatory reform and 'Water Sensitivity' i.e. improved management from source to customer. This includes programmes such as the Canterbury Water Management Strategy.

5.7.3 Network Modelling

Network modelling (InfoWorks WS) has been carried out for all schemes. The network modelling provides staff with:

- Determining the capacity of the existing network and identify areas not meeting the existing or future Levels of Service and upgrade requirements determined.
- An operational and management tool to assist in making the right decisions to improve and maintain service levels and reducing costs.
- New subdivisions can be modelled and effect on the network determined.
- Reliable calibrated hydraulic models provide a robust decision-making support framework in which numerous future scenarios of demand, population growth, climate change and land use variables can be readily evaluated to assist in the determination of optimal network improvements required to meet future or changing needs.

5.7.4 Universal Metering for Waimate Urban Water Scheme

The benefits of universal metering are as follows:

- It provides Council with a mechanism to implement a fair and equitable user-pays water billing system
- It promotes the efficient use of water through reduction in excessive consumption and minimising water losses through leakage
- It enables the Council to keep track of consumption and accurately identify the quantity of water lost to the system as leakage
- It may assist with obtaining resource consents for future bores

These benefits need to be balanced against the cost of installation, maintenance, and administration of the metering programme. A detailed economic assessment of the costs and benefits associated with universal metering for the Waimate Urban water scheme has been discussed in the report "Waimate Urban Water Supply: Issues and Options for Universal Water Metering" (Opus, 1998). This report concluded that the implementation of a universal water metering programme was not economically justifiable.

Although the direct costs of implementing universal metering could outweigh the direct benefits, it should be noted that there are benefits to the environmental, social and cultural well-beings of the District. Universal metering may require reconsideration of options in future.

With the recent events of Havelock North in 2016 the whole industry is under review. This will impact on cost of treatment and management of drinking water supplies, which may give justification for a universal water metering programme.

At present there is a progressive replacement programme of older service valve connections (Toby) when they fail, due to age or deterioration, to an upgraded manifold unit (dual checks) and water meter. Just under quarter of all connections now have a water meter. This progressive installation makes the cost of installation manageable. The installation of water meters allow monitoring of these connections to better understand consumer consumption, and understand water loss through leakage.

5.7.5 Public Education

Effective external education programs increase public knowledge about

- The need for water conservation,
- The potential benefits of demand management, and
- How to participate in local action

It is important for the public to permanently change their water use through an appreciation of the value of water and an understanding of simple and efficient ways to achieve at home. This can only be achieved through a well organised and consistent education and outreach programme.

6.0 RISK MANAGEMENT

This section looks at the Risk Management Processes utilised by Council for assessing and managing risk within the Water Services.

6.1 Risk Management Strategy

6.1.1 Overview

Council's Water Risk Management Strategy is in its formative stage. Council are progressing down the path of completing, implementing and maintaining risk plans (Utility Risk Management Plans) for the principal utility asset systems to minimise the likelihood of non-achievement of critical business objectives.

Risk analysis involves consideration of the sources of risk, their consequences and the likelihood that those consequences may occur. The objective of risk analysis is to separate the low impact risks from the major risks, and to provide data to assist in the evaluation and treatment of the risks.

6.2 Risk Assessments

There are essentially three levels of risk assessment that should be considered for each activity within Council:

- Level 1 - Organisational Risk Assessment
- Level 2 - Activity Management Risk Assessment
- Level 3 - Critical Asset Risk Assessment

Level 1 - Organisational Risk Assessment

Organisational Risk Assessment focuses on identification and management of significant operational risks that will have an impact beyond the activity itself and will affect the organisation as a whole. This approach allows the Integrated Risk Management framework to address risks at the organisational level, as well as at both the management and operational levels within the particular Council activities. The decision to implement the treatment measures identified will be at an organisational level, not activity level. To date the Council does not have a district wide risk policy. A Council risk policy will be developed that encompasses the above. **(IP6-1)**

Level 2 - Activity Management Risk Assessment

Activity Management Risk Assessment uses the same principal and consequence tables, but the focus has been at more detailed level. During this process, specific risk events were identified which would affect the operational ability or management of the activity as a whole. If an individual system within the activity was identified as being at a greater risk or would need to be managed in a different way to the rest of the systems, then it was highlighted for separate consideration.

A Risk Summary Table was established in 2011 (see Table 6.1 below), which identifies risk management strategies to minimise risks associated with the provision of the Water, wastewater, stormwater and solid wastes services. It is considered that the risks, mitigations and improvements have not markedly changed since the risk summary table was established in 2011. Notwithstanding this, specific risks associated with water quality are documented within the Water Safety Plans for each water scheme.

- Cannington-Motukaika Water Supply Water Safety Plan *Version 2.0 December 2017 (submitted for approval)*
- Hook-Waituna Water Supply Water Safety Plan *Version 3.3 November 2020*
- Lower Waihao Water Supply Water Safety Plan *Version 2.3 October 2020*
- Otaio-Makikihi Water Supply Water Safety Plan *Version 2.3 June 2020*

- Waihaorunga Water Supply Water Safety Plan *Version 2.2 December 2019 (submitted for approval)*
- Waikakahi Water Supply Water Safety Plan *Version 2.1 December 2019 (submitted for approval)*
- Waimate Water Supply Water Safety Plan *Version 3.0 January 2019*

The risk profile will be extended to encompass assets down to a component level in a Risk Management Plan. In the absence of component level assessments the risk summary table will be used to provide guidance for mitigation steps.

The risk management plan will be designed to ensure that:

- All significant operational and organisational risks are understood and identified.
- The highest risks that should be addressed within a 10 year planning horizon are identified.
- Risk reduction treatments which best meet business needs are applied:

Level 3 - Critical Asset Risk Assessment

Critical assets are considered those assets in which failure would result in a major disruption to the supply of water or levels of service. Usually the identification of critical assets is based on pipe diameter or population served.

The criticality of an asset reflects the consequence of the asset failing (not the probability). High Criticality assets are best defined as assets which have a high consequence of failure (not necessarily a high probability of failure).

A criticality assessment has been carried out in 2017. See Section 3.11

Table 6.1: Risk Summary Table (Showing Significant or High Risks only)

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
1	**Higher Level Policies, Procedures and Controls**					
1.5	The Council does not have an acceptable position on the impact of climate change on service delivery	Financial loss due to liability for property damage, loss of asset. Not able to provide service.	Significant	Council needs policy and relevant action plans including relevant design parameters) on Climate Change.	Low	Strategies to implement Councils future policy on the effects of climate change
2	**Financial**					
2.1	Lack of long-term financial planning	Higher than necessary financial costs	Significant	Existing network models are up to date and available	Low	
2.2	Service levels vs funding and works not clear	Service levels not being met due to lack of funding as decision makers not aware of implications for Service Levels.	Significant	Set performance targets for next 10 years and monitor and report on performance. Impacts of delayed capital works reported to Council.	Low	
2.3	Assumptions for financial forecasting not always understood	Additional costs incurred because assumption/uncertainties not accounted for i.e.: asset valuations, depreciation	Significant	Finance/managers need to be aware of assumptions and uncertainties behind financial forecasting information.	Moderate	Improvement of quality of information
2.4	Unforeseen Additional Costs	Reputation of Council detrimentally affected	Significant	Ensuring AMPs and asset information up to date	Low	
2.8	Insurance cover needs review	Insurance not adequate and unnecessary costs incurred	High	Insurance cover reviewed to ensure adequate cover on annual basis.	Low	
3	**Organisational Management**					
3.3	Lifelines Plan not up to date or implemented	Large scale asset failure due to a naturally occurring event resulting in prolonged and substantial loss of service to District	Significant	Ensure Lifelines Plan up-to-date and recommendations implemented that includes having a high level of risk reduction, readiness, response and recovery during and following Civil Defence Emergency.	Significant	Update lifelines plan

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
4	**Human Resources**					
4.3	Information in people's heads or inappropriate recording of information	Organisational knowledge lost with staff leaving	Significant	Ensure staff document and appropriately file everything that is relevant. Ensure good management succession when existing staff leave.	Moderate	Formalise and update maintenance schedules and procedures, contingency and operation and maintenance manuals.
4.4	Insufficient staff or not appropriately skilled	Programmed work not completed due to insufficient staffing or skill levels, having negative impact on service levels and creating public health risk.	High	Skill levels are appropriate	Low	Formal training programme required that includes the use of activity management plans.
4.5	Inadequate attention to staff succession	Organisational knowledge lost with staff leaving	High	Implement good staff/management succession plan and document procedures	Moderate	Ensure staff are appropriately trained and have a good understanding of the requirement for written procedures and manuals (inc. AMP's)
6	**Asset Management**					
6.1	Network modelling, condition assessments not undertaken.	Capital Works programme not optimised. Renewal works not completed due to lack of knowledge causing failure of assets. Future forecasting not accurate.	Significant	Undertake formal condition assessments of network and develop robust renewals programme based on sound knowledge.	Moderate	Network model informed once condition and performance data becomes available.
6.2	As-built information can be slow or incorrect coming from maintenance staff, Contractors, Consultants	Council faces legal action because of incorrect information provided (particularly with regard to LIMS)	Significant	Ensure As-builts up to-date and on record promptly. Ensure GIS capability	Low	
6.3	Criticality assessment not undertaken	Failure of critical assets resulting environmental damage or not meeting service levels	Significant	Undertake criticality assessment of assets and implement strategy for managing critical assets	Low	Incorporate criticality assessment of assets and implement strategy for managing critical assets.
6.5	Asset management systems not up-to-date or completed	Failure to of utility systems because maintenance work not completed or management system not operational.	Significant	Asset Management System in place and updated as required	Low	Continuous improvement required to retain appropriate level of sophistication.

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
6.8	Capital works delayed due to unforeseen circumstances	Programmed Capital Works not completed. Target Service Levels not met	Significant	Staff held accountable for delays & Staff trained in project management.	Moderate	Develop projects process that provides for project plans to be prepared for every approved renewal and capital development item.
6.9	Deferred renewal and maintenance not recorded or not done	Deferred maintenance not recorded causing unexpected, additional costs from asset failure	High	Record all deferred maintenance and renewals	Significant	Ensure all deferred renewals work recorded and management aware of impact on service levels if not funded.
6.10	Not all easements recorded or obtained	Council faces legal action or cannot carry out its activities because it does not have legal right to cross a property	Significant	Keep up-to-date record of easements. Establish clear policy for processes to be followed when easements are required.	Significant	Easement information needs to be improved with all identified easements provided with details of interested part. Legal situation to be clarified.
6.11	Insufficient documentation of escalating process decision making	Response to emergency situations reduced, higher expenditure	Significant	Employment of staff with the appropriate qualifications and skills	Low	
10	**Asset Risks - Stormwater**					
10.5	Insufficient overland flow paths	Flooding of houses and properties	Significant	Modelling of system will ascertain flow path requirements	Moderate	
10.6	Overland Flow Paths located on private property - no maintenance (overgrown/built upon)	Flooding of houses and properties	Significant	Council staff have good maintenance and monitoring provisions	Moderate	
10.7	Overland Flow Paths Located on Councils property or roads - no maintenance (overgrown etc.)	Flooding of houses and properties	Significant	Council staff have good maintenance and monitoring provisions	Moderate	
11	**Asset Risks - Wastewater**					
11.1	SCADA Failure	No alarm available	Significant	Back-up systems and procedures	Moderate	

6.3 Risk Management with Council

6.3.1 Business Continuity

Business Continuity is a progression of disaster recovery, aimed at allowing an organisation to continue functioning after (and ideally, during) a disaster, rather than simply being able to recover after a disaster.

It is proposed to develop Business Continuity and Emergency Management Plan (for rapid and structured response to emergency failures and significant hazards) and ensure review control process is carried out.

6.3.2 Succession Planning

Succession planning within any business is considered necessary to reduce the risk associated with staff leaving the organisation and forms part of the business continuity process. Succession planning allows institutional knowledge to be passed on, and assists in ensuring continuity of organisational culture. To this end the Water AMP is quite detailed to ensure all relevant documents and information required for appropriate decision making are recorded and knowledge transfer can occur even in the absence of key staff.

6.3.3 Health and Safety

Council is responsible for providing a safe work environment for its staff and public. A Health and Safety committee meets regularly, and provides information to all council staff on their obligations in this matter. Council provides training in general and specific safety areas as required.

The Council's Utilities staff, by the nature of their work are exposed to risks outside the office environment that are associated with the utilities services (reticulation and facilities). Council provides training in general and specific safety areas as required, examples for the utilities services are:

- Confined space requirements for supervisors and engineering staff that are associated with reticulation
- Traffic control at work sites via the code of practice
- Facilities Health and safety register and associated sign in/out procedures

6.3.4 Pandemic Response – COVID 19

The 2019–20 coronavirus pandemic is ongoing at the time of writing of this Plan. The timeline of events are as follows:

Table 6.2: COVID 19 Chain of events

Date	Event	NZ Government Response	Waimate DC Response
11/02/2020	World Health Organisation declares an official pandemic		
28/02/2020	NZ first reported case		
21/03/2020		Alert Levels (1-4) announced	
23/03/2020			Temporary closure of Council facilities
24/03/2020		Move to Alert Level 3	
25/03/2020		State of Emergency declared	Refuse services continue. Recycling services cease
26/03/2020		Move to Alert Level 4	
27/03/2020			Notice f Essential Services

Date	Event	NZ Government Response	Waimate DC Response
24/04/2020			Notice of Building Control Services under Alert Level 3
27/04/2020		Move to Alert Level 3	
30/04/2020			Emergency budget response
13/05/2020		State of Emergency lifted	
14/05/2020		Move to Alert Level 2	
10/06/2020		Move to Alert Level 1	

The impacts will be wide ranging and likely include a significant and protracted recession. This presents an opportunity for Council to collaborate with Central Government to invest and progress infrastructure projects giving the economy the injection it will desperately need.

As an initial response Central Government decided to fast track eligible development and infrastructure through amendments to the Resource Management Act. This will aid in getting much-needed infrastructure programmes underway as soon as possible.

Further response includes the establishment of the Infrastructure Industry Reference Group (IIRG) to seek out infrastructure projects that are ready to start as soon as the construction industry returns to normal to reduce the economic impact of the COVID-19 pandemic. These 'shovel ready' projects include water, transport, clean energy and buildings. They would also have a public or regional benefit, create jobs and be able to get underway in short order.

There is a preference for larger projects with a value of over $10 million, which would have an immediate stimulatory effect on the construction industry, its workforce and the economy.
Smaller projects will be considered if they demonstrate a direct and immediate benefit to the regional economies and communities in which they are based.

Council has applied for Government funding for 2 shovel-ready projects, with a combined value of more than $11.4 million.

The COVID 19 pandemic created a very dynamic environment where circumstances can change on a daily basis. At the time of writing this Plan the assumption is that the Waimate district will be able to weather the storm as the districts' primary industries, agriculture and forestry, are less affected than for example tourism. The Department of Internal Affairs 'Local Government Sector COVID-19 Financial Implications Report 2 – Alert Level Scenarios, Assumptions and Updated Analysis' report projects "The agriculture sector is expected to perform relatively well in the short- and long-term".

Council will first attempt to reduce spending in ways that do not require reductions to service levels. Higher levels of reduction in spending would be more likely to require deferral of larger capital projects which may impact on Council's ability to comply with legislation and environmental standards in the 3Waters area.

Council could defer the replacement of assets for a period and potentially reduce the priority of capital expenditure so they can sustain service levels. The deferral of asset replacement may increase infrastructure resilience risks and increase long term costs.

The response to COVID 19 provided a snapshot of how quickly our environment can change and how quickly we can adapt. People working from home. The uptake of technology. Change in transportation patterns. Online sales and deliveries. Outdoor activities. Socio economic impacts and response.

6.3.5 Operation & Maintenance

In the daily operation and maintenance of the water supply system Council employ a range of risk management procedures including but not limited to:

- Prevention of contamination of treated water
    - Minimum requirements for disinfection of existing water mains and fittings during planned and reactive maintenance
    - Separate wastewater vehicle and tools
    - Best appropriate practices for staff including contractors and materials
    - Illegal connections
    - Appropriate use of backflow preventers
- Critical consumers
- Shutdowns
- Health and Safety
- Asbestos handling
- Traffic control and management
- Overflows and Clean up

Council also have the following agreements in place with local contractors in relation to Civil Defence Emergency expectations:

- Provide plant and personnel on site to enable the emergency work to be undertaken
- Advise the Engineer immediately if unable to either commission sufficient resources or undertake the emergency work
- Co-operate with the appropriate authorities i.e. Police, Civil Defence
- Carry out emergency work immediately if such work is essential to ensure the health and safety of the community or to protect the environment
- Prioritise emergency work to reduce the risk to the community and environment to acceptable levels
- Advise the Engineer immediately of any situation where the emergency is likely to continue and affect the health and safety of the community and the environment

6.3.6 Havelock North Water Inquiry

Following the widespread outbreak of gastroenteritis in Havelock North in August 2016, with more than 5,000 people falling ill, the Government launched an Inquiry into the Havelock North water supply contamination incident.

The Stage 1of the Inquiry addressed the regulatory regimes, the facts concerning the campylobacter outbreak and the question of failures by various agencies to meet required standards.

Stage 2 will look at lessons to be learned, how to prevent outbreaks in the future and changes that would improve the safety of drinking water.

A background paper prepared for the WaterNZ by Dr. Steve Hurdey and tabled with the Havelock North Inquiry identifies the following:

Recurring Themes Evident from an Analysis of International Outbreak Experience

- Complacency
- Lessons that should have been learned and widely known are too often forgotten

- Groundwater is a common source in outbreaks if mistakenly trusted as secure
- Politicians and "responsible" officials are often sceptical about possible contamination
- There is a common myth about water being pristine which reduces vigilance
- Safety does not require stricter water quality numbers – better practice is needed
- Misplaced fear of chemicals has interfered with adequate management of pathogens
- Public health monitoring is generally unable to detect small outbreaks
- Miscommunication occurs among individuals who are relied on to ensure safety
- Even high-quality systems can fail
- Chance / luck is often a factor in avoiding or driving an incident
- Investigations into the causes of an outbreak will often find multiple causes
- Blaming failures on human error generally misrepresents the underlying problems
- Preventing failure requires learning from experience
- Risk-based approaches like Water Safety Plans cannot work if identification and understanding of risk is inadequate

and lists the evidence for guiding principles applicable to New Zealand

Principle 1 - The greatest risks to consumers of drinking water are pathogenic microorganisms. Protection of water sources and treatment are of paramount importance and must never be compromised
Principle 2 - The drinking water system must have, and continuously maintain, robust multiple barriers appropriate to the level of potential contamination facing the raw water supply.
Principle 3 - Any sudden or extreme change in water quality, flow or environmental conditions (e.g. extreme rainfall or flooding) should arouse suspicion that drinking water might become contaminated.
Principle 4 - System operators must be able to respond quickly and effectively to adverse monitoring signals.
Principle 5 - System operators must maintain a personal sense of responsibility and dedication to providing consumers with safe water, and should never ignore a consumer complaint about water quality.
Principle 6 - Ensuring drinking water safety and quality requires the application of a considered risk management approach.

Council engineers note these recurring themes and guiding principles identified by the author (international environmental health science authority). It is expected that the impacts from the Inquiry will be significant and wide ranging including but not limited to the way the water service is delivered, managed, operated, maintained, monitored and reported on. Council will stay up to date with developments in this area to protect public health and safety.

6.3.7 Government Review of 3Waters Services

During 2017 the Minister for Local Government initiated a review of 3Waters services to assess whether current local government practices and the system oversight are 'fit for purpose'. This acknowledge that effective 3 Waters services are essential for communities as:

- Health and safety - depends on safe drinking water, safe disposal of waste water and effective stormwater drainage
- Prosperity - depends on adequate supply of cost effective three waters services for housing, businesses and community services
- Environment - depends on well managed extraction of drinking water, and careful disposal of waste water and stormwater

A series of events indicated there are system-wide performance challenges and supported the perception that service failure is the only indicator that service delivery is not in accordance with the expected outcomes.

On 8 July 2020 the Government announced a funding package of $761m to provide immediate post COVID 19 stimulus to local authorities to maintain and improve 3Waters infrastructure, support reform of local government water services delivery arrangements, and support the operation of Taumata Arowai.

On 27 July 2020, the Water Services Bill was introduced to Parliament. The Bill contains all of the details of the new drinking water regulatory system, and provisions relating to source water protection and Taumata Arowai's wastewater and stormwater functions.

A second, complementary Bill, the Taumata Arowai – Water Services Regulator Bill, sets out Taumata Arowai's objectives, general functions, and operating principles, and establishes Taumata Arowai as a Crown agent.

6.3.8 Te Mana o te Wai

Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. Te Mana o te Wai is relevant to all freshwater management and not just to the specific aspects of freshwater management referred to in this National Policy Statement.

It provides for the three healths of Te Mana o te Wai –

- Te Hauora o te Wai (the health and well-being of the water),
- Te Hauora o te Tangata (the health and well-being of people), and
- Te Hauora o te Taiao (the health and well-being of the environment)

Te Mana o Te Wai is given effect through the National Policy Statement for Freshwater Management. Refer to Section 4.2.3.

During September 2019 the Ministry for the Environment (MfE) released the discussion document 'Action for Healthy Waterways' which highlighted the Government's objectives to:

- Stop further degradation of New Zealand freshwater resources
- Reverse past damage
- Address water allocation issues

This strengthens and upholds Te Mana o te Wai – the health and well-being of the water and signalled the direction for urban development, rural land and water management.

Add to this the regulatory changes requiring a multi-barrier approach to drinking water safety, including mandatory disinfection of water supplies, stronger obligations on water suppliers and local authorities to manage risks to sources of drinking water; and strengthened compliance, monitoring and enforcement of drinking water regulation.

6.3.9 Insurance

Background

Council has insurance cover for the Wastewater, Water, Stormwater and Solid Waste services, staff and property as detailed below. The insurance cover is updated on a regular basis following valuations to ensure the insurance cover is appropriate for its purpose.

Public Liability and Professional Indemnity

Third party cover for public liability and professional indemnity protection is provided by Risk Pool. Risk Pool is a mutual fund created by New Zealand Local Authorities to provide long term, affordable

legal and professional liability protection. Membership of Risk Pool is open to all local authorities. Contributions are levied according to each member's actual risk profile, claims experience and management of risk. The Fund is protected by reinsurance to protect its retained liability on a per claim and/or annual aggregate basis.

Other Insurance

Council's other insurance providers are:

- 'Above ground' insurance policies (Material Damage, Business Interruption, Motor Vehicle, Fidelity Guarantee, Personal Accident, Statutory Liability, Employers Liability, Employment Disputes and Airport Owners / Operators Liability, Standing Timber): Insured across a range of providers, primarily Vero and QBE, with specific insurances provided by Lumley, Ace and Primacy.
- Vero are owned by Suncorp Group, one of the largest financial and insurance operations in Australasia. Vero has a long history in New Zealand providing specialist insurance and risk management.
- QBE Insurance has been operating in New Zealand since 1890, the QBE insurance group is one of the world's top 20 general insurance and reinsurance companies..
- Lumley is a business division of IAG, Australia and New Zealand's largest general insurer. Lumley provide Council's motor vehicle insurance.
- Primacy, owned by Allianz, are a specialist crop and forestry insurer and Australia's largest provider in this field and provide Council's Standing Timber insurance.
- The insurance also provides some non-specified cover; e.g.
    - up to $2,000,000 for property in the course of construction
    - up to $250,000 for capital additions (property acquired)
    - up to $250,000 buildings non-specified
    - up to $250,000 contents (any one site) unless specified
- *'Below ground' infrastructure:* Local Authority Protection Programme (LAPP). A mutual pool created by local authorities to cater for the replacement of infrastructure following catastrophic damage by natural disaster (Civic Financial Services is the administration manager of the Fund); LAPP provides cover for 40% of relevant assets (with central government liable for the remaining 60%).
- *Personal accident cover (staff insurance)*: Ace Insurance for which cover is 24/7 worldwide with different levels of cover for 'management' and 'all other staff'.
- *Land:* is not insured.

6.3.10 Emergency Management

Background

Waimate district is subject to a wide range of natural hazards. Several significant natural events have been recorded which have caused damage to property and the environment with no one hazard being the "standard" event. The district has suffered five main events over the last 45 years:

- Snow storms: in 1967, 1992 and 2006 blanketed a large part of the Waimate district cutting road access causing power outages and stock deaths.
- High Winds: in 1975 damaged trees blocking roads and bringing down power wires.
- Floods: in 1981 and more recently have badly eroded land adjacent rivers damaging bridges and roads. Water supplies with surface water intakes were blocked with sediment. Power cuts also disrupted supply of water to consumers.

- Rural fire: As recently as last year caused disruption to power in Waimate and the surrounding rural margins.
- High Winds: in 2014 damaged trees blocking roads and bringing down power wires.

The Council has subsequently modified pumps stations to enable operation using standby generators.

Council has three generators at its disposal, and contact details for hiring generators. The generators that that belong to Council are the Civil Defence generator for the main Council building standby generation, and the other two are for and owned by the Otaio-Makikihi Rural Water Supply. These generators are mobile and can be moved around if not needed at those designated sites in and event.

Critical pipeline crossings over bridges have been strengthened or alternative pipe routes have been provided.

The impact of the Christchurch earthquake has served to further highlight the importance of adequate emergency planning.

Civil Defence and Emergency Response Plans

The Civil Defence Emergency Management (CDEM) Act 2002 requires Local Authorities to coordinate Plans, Programmes and Activities related to CDEM across the areas of Risk Reduction, Readiness, Response and Recovery. It also encourages cooperation and joint action within regional groups. Management systems for civil defence emergencies are detailed in the Council's CDEM plan.

A Lifelines Response Plan has been prepared for key Council utility services. The Lifelines Response Plan considers natural hazard events including earthquake, flooding, meteorological (snow/wind) and mass movement (land slip), and also takes account of fire and civil disruption events.

The principle objectives of the Lifelines Response Plan are to:

- Possess a management tool that identifies natural hazards for the individual utilities.
- Identify the consequences of the natural hazards.
- Identify immediate remedial actions.
- Define restoration levels, priorities and issues.
- Identify long term risk management issues.
- Ensure that Emergency Management knowledge is retained within Council.

The Lifelines Response Plan details the hazards, possible cascading effects and the interventions that may be applicable. It does not consider the effect on any individual community as these will change with the extent of the hazard i.e. the depth and extent of snow and the extent and makeup of that utility i.e. if the water scheme has a standby generator.

Disaster Resilience Summary Report

In 2006 the Council commissioned the Disaster Resilience Summary Report. The DRS is designed to: -

- Create an understanding of the Utilities Lifeline services and operation.
- Provide a clear summary of facts to assist CDEM undertake their role.
- Provide each Utility with a simple method for providing the only information that is required by the CDEM Groups.
- Increase CDEM Group knowledge of each Utility's organisation and operations in order to significantly increase the efficiency of future CDEM/Utility contact

The hazards have were identified that might affect the networks were:
Snow, earthquake, floods (after most floods there is a re-think of how the planning and network is managed), river change/management, rain, wind (trees falling across roads), electricity failure, networks weakness, tsunami, telecommunications and Pandemic planning.

Items requiring further works in progress include:

- Hazardous substance spill
- Fire
- Dam failure
- Drought/climate change
- Fuel supply failure
- Tsunami

6.3.11 Infrastructure Resilience

Recent high profile natural disasters have raised public awareness, but there is still a significant need to increase actual preparedness – both in general (e.g. household plans and emergency supplies) and for specific circumstances (e.g. tsunami preparedness in coastal communities).
However, resilience is not only applicable to natural hazards, but also needs consideration at an operational level where an asset failure is not necessarily a service failure.
Redundancy (duplication) does not provide Resilience. Resilience requires early detection and recovery, but not necessarily through re-establishing the failed system. Resilience is about the ability to plan and prepare for adverse events, the ability to absorb the impact and recover quickly, and the ability as a community to adapt to a new environment.
Council acknowledge that resilience is not only about physical assets. It is about the people. It includes but are not limited to:

- connecting people and communities (neighbour to neighbour; educate; access to household resilience items, etc.);
- supporting community organisations
- the built environment and asset systems which are robust

Adverse events/natural disasters/climate change and the related impacts cannot be avoided and as a result Council have to factor this into long term planning, civil defence planning and determining the infrastructure requirements moving forward to ensure the community's expectations are met with regard to safe and reliable services and general wellbeing.
In order to improve resilience Council approach will be to:

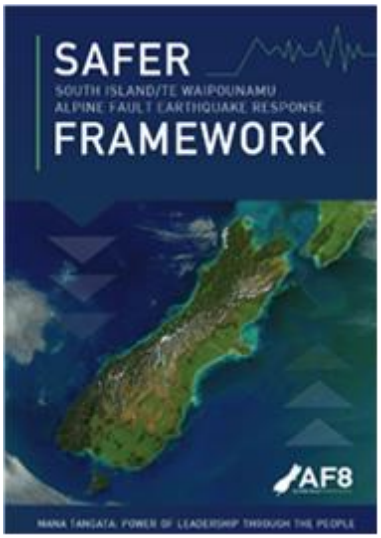
- Actively participate in CDEM planning and activities, at both regional and local levels
- Investigate options for alternative service provision and system redundancy
- Promote design and construction standards (where cost effective) that ensure infrastructure is able to withstand natural hazards and long term changes in circumstances such as those resulting from climate change
- Identify critical assets and ensure mitigation methods are developed
- Obtain insurance where this is deemed to be the most cost effective approach
- Invest in business continuity succession planning and training

Council will take guidance from 100Resilient Cities website http://www.100resilientcities.org/. This includes the strategies of Greater Christchurch and Wellington.

6.3.12 Project AF8

Project AF8 is a cutting edge risk scenario-based earthquake response planning project, informed by thorough earthquake source, expression, and consequences science. The focus of the project is New Zealand's South Island Alpine Fault. Project AF8 commenced in July 2016, with funding from

the Ministry of Civil Defence & Emergency Management's Resilience Fund, and is managed by Emergency Management Southland on behalf of all South Island CDEM Groups.



Project AF8 has been initiated to introduce outline planning for response actions, resources, and overall coordination within and between CDEM Groups across the South Island.

The South Island Alpine Fault Earthquake Response (SAFER) Framework provides a concept of coordination of response and priority setting across all six South Island Civil Defence Emergency Management (CDEM) Groups and their partner organisations in the first seven days of response. It is not intended to replace existing plans within agencies but to provide a coordinated picture of response across the South Island.

The SAFER framework includes:

- Scenarios
- Response assumptions
- Secondary and compounding risks such as:
    - Aftershocks
    - Ongoing structural failure
    - Cascading landscape effects
    - Tsunami
    - Severe weather
    - Communicable human diseases
    - Impacts on response operations
- Consolidated response framework

Council will keep a keen eye on the response actions and resources from the AF8 project and work with CDEM Groups.

6.3.13 Climate Change

It is now generally accepted worldwide that human activities have accelerated climate change, and that further future climate change is unavoidable. The effects of climate change include both effects on our climate (such as temperature increases or flooding), and a wide range of secondary effects (such as damage to strategic infrastructure). The following details climate change projections for the Canterbury region.

The National Climate Change Risk Assessment (MfE August 2020) identifies 43 priority risks across five value domains (natural environment, human, economy, built environment and governance) and highlights 10 risks considered to be the most significant. This MfE report highlights, among others, the following two domains (particularly applicable to Council infrastructure) as extreme risks:

Domain	Risk	Consequence
Economy	Risks to governments from economic costs associated with lost productivity, disaster relief expenditure and unfunded contingent liabilities due to extreme events and ongoing, gradual changes.	Extreme
Built environment	Risk to potable water supplies (availability and quality) due to changes in rainfall, temperature, drought, extreme weather events and ongoing sea-level rise.	Extreme
	Risks to buildings due to extreme weather events, drought, increased fire weather and ongoing sea-level rise.	

Waimate District is expected to experience two of the main impacts of climate change – sea level rise and more extreme weather patterns.

Sea level rise is considered the lesser of the influences as much of our coastline is elevated above MSL. Modelling of associated inundation, as a result of tsunami, is known to affect very few council controlled assets.

What is understood is that climate change associated risks will increase in time.

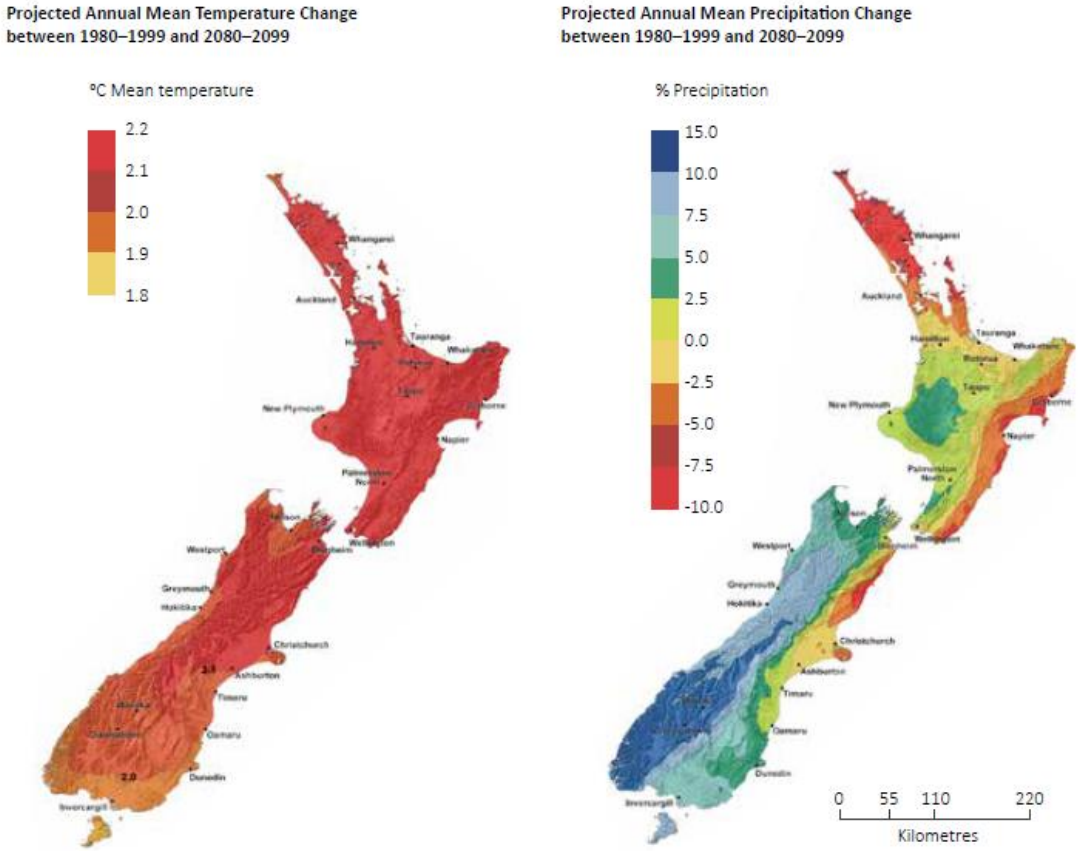
Waimate mayor Craig Rowley said climate change was a priority.

"As far as doing the work on something, we always take it into account looking at the of risk of climate change."

Rowley said it was a hectic time of the year with budgeting and planning, but climate change was something we certainly do recognise" (Timaru Herald 13/9/2017)

Council recognised the roles of Local Government, NZ, the Ministry of Primary Industries, and the Ministry for the Environment and the Royal; Society of NZ in researching and guiding a pragmatic response.

Figure 7: Average changes in annual mean temperature (left, degrees Celsius) and precipitation (right, percent) during 2080–2099 compared to 1980–1999, for a climate change scenario midway between low- and high-carbon futures.



Source: Climate change: implications for New Zealand (Royal Society of New Zealand, April 2016)

The local government position statement on climate change (2017) states

Climate change actions have three components:

1. actions to reduce emissions (mitigation);

2. planning and actions at the national and local level to support public safety and effective adaptation; and

3. limiting or removing pressure on systems affected by climate change.

All local authorities (city, regional, district and unitary) are at the frontline of climate change adaptation and have a role to play in mitigation.

The role of Council is key in delivering the outcomes sought by the community. Key drivers to support and manage the challenges are the National Climate Risk Assessment for New Zealand (Ministry for the Environment, 2020) and the Climate Change Projections for the Canterbury Region (NIWA, 2020).

Projections for Canterbury

Climate Change Projections for the Canterbury Region have considered the following scenarios, which take into account either cutting greenhouse gas emissions over time from 2019 levels – or not curbing emissions during the life of this Infrastructure Strategy.

Average Temperatures

- Increase with time and greenhouse gas concentrations.
- By 2040, annual mean temperature up 0.5 to 1.5°C.
- By 2090, up 0.5 to 2°C (if we cut emissions) or up 1.5 to 3.5°C (if we don't).

Maximum Daytime Temperatures

- By 2040, annual mean maximum temperature up 0.5 to 2°C.
- By 2090, up 1 to 3°C (if we cut emissions) and up 2 to 5°C (if we don't).
- By 2090, western Canterbury's alpine and sub-alpine areas could be 5 to 6°C warmer in spring and summer (if we don't).

Maximum Night-time Temperatures

- By 2040, annual mean minimum temperature up zero to 1°C.
- By 2090, up 0.5 to 1.5°C (if we cut emissions) and up 1 to 2.5°C (if we don't).
- The difference between a day's high and low increases with time and greenhouse gas concentrations.

Hot Days (25°C or more)

- By 2090, expect 20 to 60 more hot days in most of Canterbury (if we don't cut emissions).
- Inland areas feel it the most, particularly the southern Mackenzie Basin, which could have 60 to 85 more hot days.
- Most of these hot days would happen in summer.
- Our warmer season could get longer in relatively low-elevation areas, with 5 to 10 more hot days in autumn and spring.
- Increased fire risks.

Cold Days (Frosts)

- Expect fewer frost days throughout the region.
- Inland areas and higher elevations warm the most, with 10 to 30 fewer annual frost days by 2040, and 20 to 50 fewer by 2090.
- The frost season (the time between a year's first and last frost) will likely get shorter.

Rainfall

There is likely to be increased rainfall depth and intensity associated with climate change. In addition, the heat that comes from the condensation of this increased moisture will make storms more intense. These extreme events may exacerbate flooding risks for Waimate District.

- Most of the region can expect small changes in annual rainfall, up or down 5%.
- By 2040, autumn might be dryer in the Mackenzie Basin, with up to 10% less rain.
- By 2090, winters could be wetter in many eastern, western and southern parts of the region, with 15 to 40% more rain.
- By 2090, Banks Peninsula and many inland areas might get 5 to 15% less rain (if we don't cut emissions).

Snow

- Expect fewer snow days everywhere, especially in the mountains.

Drought

The modelling indicates that by the 2080s, there will be a significant increase in the average water deficit across Canterbury, with increases of between 2 weeks and over 6 weeks of pasture deficit as an average climate condition. By the 2030s, current drought events that are so severe that they only occur in 1 out of 20 years are projected to occur more frequently. Increased fire risks.

Windspeed

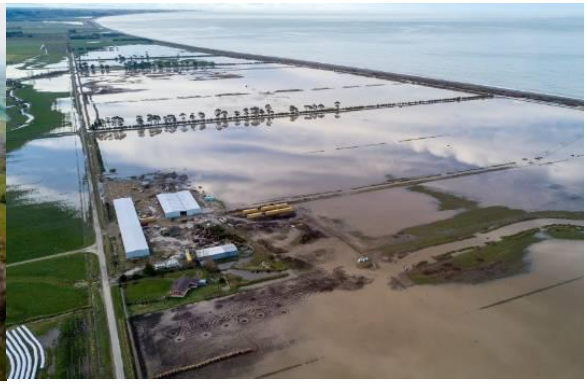
- Annual mean wind speeds up slightly, by nil to 5%.
- By 2090, winter and spring could be windier (up 5 to15%, if we don't cut emissions).
- That seasonal change might be more keenly felt in inland areas north and west of Rangiora (up 15 to 25%).
- Increased fire risks.

Sea Level Rise

Climate Change Projections for the Canterbury Region have identified worsening impacts over time at a regional and national level:

- Sea level rise projections for Canterbury are the same as for New Zealand.
- Up by 0.4m in the next 50 years and up 0.6 to 0.7m in 100 years (if we cut emissions).
- Up 0.5m in 50 years and up 1.2 metres in 100 years (if we don't).
- High tides get higher. At 0.65 metres of sea level rise, every high tide is above the spring tide mark (compared to 10% now).

Source: www.wetlandtrust.org.nz



Source: Stuff 24 July 2017

Climate Change Effects

The major effects that may impact on the Council's Infrastructure activities are set out below, along with potential mitigation options and an analysis of when the effects may occur. It should be noted that further work is required to understand how these effects will impact the Waimate District, but the collection and monitoring of data will be used to inform a more robust climate change response.

Dust from Unsealed Roads: Hotter temperatures and associated drought conditions could have detrimental effects in terms of increased dust from unsealed roads. This may mean that in future areas of unsealed roads need to be sealed, particularly close to residential properties. Council currently allows for $50k to part fund "dust seals" via policy. Road classifications and traffic volumes on our low use roads dictate the overall level of service. Individuals are able, with part funding by Council, to increase the level of service adjacent to their property to mitigate adverse effects associated with dust.

Council will continually monitor demand for this service and provide increased funding as required.

Hotter temperatures potentially have an impact on the timing of both grading and metalling activities which will need to be monitored over time.

In the shorter term this approach is considered appropriate but as the effects of drought conditions become more prevalent, Council may need to consider a revision of the level of service relating to unsealed rural roads which, in turn, will adversely affect funding requirements (increased).

- Likelihood - Possible (25 – 50%)
- Location - District Wide
- Timeframe - 2030 onwards
- Mitigation - Monitor

Changes in Demand: An overall decrease in the mean rainfall for the district could impact on land use and in turn change demand on certain areas of the Council's infrastructure networks. More intense rainfall events have the ability to damage crops and this may manifest in changing farming practices. These changes in farming practices could result in changing traffic volumes for particular areas, changes in demand from our water networks, and requirements for higher levels of service to mitigate the risks associated with nuisance flooding, to name the major impacts.

Council will need to monitor and understand these requirements to inform future work programmes. This is achieved through regular traffic counts, up-to-date hydraulic modelling of our water schemes and optimised renewal of drainage assets.

Council is mindful that changes in demand with manifest as changes to LoS, geographic demand and overall demand. In order to cater for this, underlying data is important to plan appropriate renewals in the future.

Council is also installing water metering within the urban water network as a means to manage demand, manage water losses and to increase the availability of potable water.

- Likelihood - Likely (50 – 70%)
- Location - District Wide
- Timeframe - 2030 onwards
- Mitigation - Monitor

Drainage Capacity: Extreme rainfall events in a generally dry region may cause surface flooding affects due to poor capacity of drainage assets. The cost of upgrading drainage assets for these extreme events is likely to be prohibitive for Council. Whilst, as a district, council is unable to build infrastructure to deal with these extreme flows and volumes, it is able to define the levels of service (20% and 2% annual exceedance probability) and therefore the level of protection that ratepayers and users can expect.

Mitigation of events outside of these parameters are dealt with through the protection and definition of overland flow paths, defined areas for detention and improved stormwater management practices. These practices (in an urban sense) are defined in Waimate District Councils draft Stormwater Management Plan which is an underpinning document for the global consent that is currently being sought through Environment Canterbury Regional Council. For example, Council defines on-site management of stormwater as the preferred solution up to a 1 in 50 year event. The defined 1 in 50 year design event takes in to account climate change factors defined by NIWA.

Extreme rainfall events have a detrimental impact on councils wastewater network where inflow of stormwater presents several challenges in terms of conveyance capacity and surcharging of manholes. In 2021, council is undertaking an inflow investigation to identify which areas are affected and formulating appropriate responses to mitigate the effects. Left unchecked, climate change impacts would adversely affect this activity. When addressed, this will lead to increased levels of service, allow for future growth by increasing available capacity and reduced compliance risks.

- Likelihood - Almost certain (70 – 99%)
- Location - District Wide
- Timeframe - 2021 onwards
- Mitigation - Design, planning, and policy

Increased Flood Damage Repair Work: Extreme rainfall events in a generally dry region may cause surface flooding affects and in turn increase requirements for flood damage repair works. Consideration will need to be given to design and location aspects for Council's assets to reduce the risk of damage or loss of service due to extreme weather events. There is no provision (currently) to fund these repairs and they are typically funded via existing budgets and often with co-funding from Waka Kotahi.

Council is continually monitoring the financial effects associated with flood events (and the diversion of existing budgets) and has considered (in the past) developing a "flood event" fund. This monitoring will continue with intervention likely if existing programmed work begins to be adversely affected. Potentially this issue will need to be consulted on as increased costs will result in increased rate requirement. Resultantly the community will receive a higher level of service than currently experienced.

Furthermore, storm events can impact on raw water quality from streams and bores used for water supply. This presents challenges associated with the provision of potable water in terms of reliability, treatability and therefore compliance with the Drinking Water Standards for New Zealand

- Likelihood - Almost certain (70 – 99%)
- Location - District Wide
- Timeframe - 2021 onwards
- Mitigation - Monitor and adapt funding if required

Water availability for Construction: Increasing demand for water is currently an important issue for Canterbury. This increased demand is likely to become increasingly critical in a future characterised by drier average conditions, and an associated increase in both drought frequency and intensity. This may mean, as an example, that it will be more difficult to obtain the required water to complete construction works.

Updating of hydraulic models for the council water supplies allows for optimised future renewals that address the location of demand within the schemes (up or down). They also allow Council to plan for growth and increased demand as a result of changes to legislation e.g. the Water Services Bill and its potential impact on water suppliers outside of the current reform programme.

- Likelihood - Almost certain (70 – 99%)
- Location - District Wide
- Timeframe - 2025 onwards
- Mitigation - Monitor and adapt future programmes as required (LoS, additional demand, changing demand)

6.4 Water Safety Plans

6.4.1 Legislation

The current Health (Drinking Water) Amendment Act 2007 requires drinking water suppliers to prepare and implement a Water Safety Plan (WSP)[1] for any water supply serving more than 500 people. For supplies serving less than 500 people WSPs may be prepared and used as an alternative means of compliance with DWSNZ 2005 (amended 2018). These WSPs must be submitted for approval by a Drinking Water Assessor, and reviewed and resubmitted for approval every five years thereafter.

6.4.2 WSP Programme

The latest WSPs are all approved by the current Drinking Water Assessment Unit.

These have and will result in a number of issues that required being resolved as follows:

- Water quality – upgrading or new treatment requirements.
- A number of minor management and operational areas that required modification or additional process.

The PHRMP and WSP process has identified a number of risks and shortcomings to public health for the rural water schemes and these are indicated in the following tables.

[1] Previously known as Public Health Risk Management Plans (PHRMPs)

Table 6.3: Rural Water Schemes Primary Shortcoming

Scheme	Primary Shortcoming
Cannington-Motukaika	Lack of an effective protozoa barrier, which precludes compliance with DWSNZ 2005 (revised 2018) and compromises the safety of the supply
Hook Waituna	Lack of an effective protozoa barrier, which precludes compliance with DWSNZ:2005 (revised 2018) and compromises the safety of the supply
Lower Waihao	Poorly protected source water catchment and the lack of an effective protozoa barrier. These precludes compliance with DWSNZ:2005 (revised 2018) and compromises the safety of the supply
Otaio Makikihi	Reliance on "Secure Bore" status
Waihaorunga	Lack of an effective protozoa barrier, which precludes compliance with DWSNZ 2005 (revised 2018) and compromises the safety of the supply
Waikakahi	Lack of an effective protozoa barrier, which precludes compliance with DWSNZ 2005 (revised 2018) and compromises the safety of the supply

The resolution of these primary shortcomings is shown in Table 6.4 below.

Table 6.4: WSP - Major Projects and Capital Works

Risk Level	Water Supply Area	Details of Proposed Works	Expected Cost	Intended date of Completion
Cannington-Motukaika				
Extreme	Source, Treatment	Upgrade Cannington-Motukaika Plant to comply with DWSNZ 2005 (revised 2018) • Maintain the existing source site's weir and roughing filter. • Upgrade treatment plant site to Log 4 treatment. o Selective abstraction based on turbidity. o Pre-treatment with an invalidated membrane o 1µm Filter. o UV reactor o Disinfection – Sodium hypochlorite o Increase post treatment storage o Install telemetry for data acquisition and control (SCADA)	$700,000	2020/21
Hook-Waituna				
Extreme	Treatment	Stage 2 Upgrade - Add a pre-treatments separation process to the new Hook Waituna Treatment Plant to aid the removal of the submicron particulate from the source raw water to achieve log 4 treatment and DWSNZ 2005 (revised 2018) compliance. o Pre-settling balance tank. o Course self-cleaning screen (50 -100 micron) o Pre-treatment with an un-validated membrane	$673,333	2021/22
Lower Waihao				
Extreme	Source, Treatment	Upgrade Lower Waihao Plant to comply with DWSNZ 2005 (revised 2018) • Upgrade treatment plant site to Log 5 treatment. o Selective abstraction based on turbidity. o Pre-treatment with an invalidated membrane o 1µm Filter. o UV reactor o Disinfection – Gas Chlorine	$797,000	2021/22

Risk Level	Water Supply Area	Details of Proposed Works	Expected Cost	Intended date of Completion
Waihaorunga				

Extreme	Treatment	Upgrade Waihaorunga Main and Tavendales Plants to comply with DWSNZ 2005 (revised 2018)
		• Upgrade Waihaorunga Main Treatment Plant site to Log 4 treatment.
		  ○ Selective abstraction based on turbidity.
		  ○ Pre-treatment with an invalidated membrane
		  ○ 1µm Filter.
		  ○ UV reactor
		  ○ Disinfection – Sodium hypochlorite
		  ○ Install telemetry for data acquisition and control (SCADA)
		• Connect Tavendale Intake Gallery to new Waihaorunga Main Treatment Plant, then boost treated water back to Tavendale booster.
			$526,500	2020/21

Waikakahi				

Extreme	Source, Treatment, Distribution	Upgrade Waikakahi Intake and Plant to comply with DWSNZ 2005 (revised 2018)
		• Find a new raw water source – *A more suitable source with less influence from surrounding environment and contaminates :*
		  ○ Shallow bore or gallery/bank-filtration close to the Waitaki River or irrigation scheme intakes.
		  ○ **Or**, Source raw water from irrigation scheme direct (Waitaki River water)
		• Upgrade treatment plant at new site to Log 4 treatment.
		  ○ Add selective abstraction based on turbidity.
		  ○ Pre-treatment with an invalidated membrane
		  ○ 1µm Filter.
		  ○ UV reactor
		  ○ Disinfection – Chlorine gas
		  ○ Continue using telemetry for data acquisition and control (SCADA)
		• New rising main to Waikakahi reservoir
			$1,439,000	2021/22

WSP Review and Reporting

Reviewing and reporting on the WSPs require the following:

- Review of the performance of the WSPs and adjustments to the WSPs will be undertaken annually.
- Report on the performance of the WSPs, including information of the review of the WSPs will be included in Council's Annual Plan Report each year.

6.4.3 New Zealand Drinking Water Compliance Upgrades

The costs associated with the compliance with the DWSNZ 2005 (revised 2018) are detailed below.

Table 6.5: DWSNZ Compliance Upgrades

Supply	Cost	Year
Hook Waituna	$673,333	2021/22
Lower Waihao	$797,000	2021/22
Waikakahi	$1,439,000	2021/22

6.5 Significant Negative Effects

Table 6.6 below identifies the negative effects for the Waimate Community that the Water Activity may have on the social, economic, environmental or cultural well-being of the community. It indicates how the existing approach or proposed action to address these in the future. There are no significant negative effects shown to occur for the Water Service.

Table 6.6: Negative Effects – Water Activity

Effect	Status of Effect		Impact on Well-Being (existing situation)				Existing Approach or Proposed Action to Address
	Existing	Potential	Social	Economic	Environmental	Cultural	
Water Treatment Plants							
Discharge of treated backwash water to rivers	⇔	⇧	Minor	Mod	Mod	Minor	Maintain current consents for all WTP discharges Upgrade treatment plants to ensure ongoing compliance with resource consents
Disposal of Backwash solids to land	⇔	⇧	Minor	Minor	Mod	Minor	Solids dried then disposed of to landfill
Discharge of odour	⇔	⇩	Nil	Nil	Nil	Nil	High degree of odour control
Pump Stations							
Noise	⇔	⇔	Minor	Nil	Minor	Nil	All pumps reside in buildings with appropriate sound proofing
Reticulation							
Overflows	⇔	⇔	Mod	Minor	Minor	Minor	Result from mains breaks, these are infrequent and provided renewal programme is maintained effects will be minor other than disruption to consumers

Effect	Status of Effect		Impact on Well-Being (existing situation)				Existing Approach or Proposed Action to Address
	Existing	Potential	Social	Economic	Environmental	Cultural	
Reservoirs							
Overflows	⇔	⇔	minor	minor	Mod	minor	Overfilling can result in discharge of treated water to the stormwater system. Shut off valves, pressure sensors and alarm systems are in place to prevent this
Water Takes							
Competition	⇔	⇧	Mod	Mod	Mod	Mod	The allocation of water is becoming an issue with competing needs for a finite resource Council is controlled through its resource consents but are developing Water Management Plan
Increased Demand	⇔	⇧	Mod	Mod	Mod	Mod	With planned growth so will the requirement for additional water. The combination of water reduction strategies, securing future water sources and monitoring demand will mitigate effects. This has the potential to become a significant negative effect if significant growth occurs

⇧ Increasing ⇔ Remaining the same ⇩ Decreasing

6.6 Capital Programme Delivery

Council has an ambitious capital programme driven by a number of factors:

- Continuation of the active renewal programmes;
- Capital works required to meet the current Drinking Water Standards for New Zealand (DWSNZ)under the existing legislative framework;
- Future capital works associated with compliance through the proposed Water Services Act; and
- Capital works associated with the Department of Internal Affairs stimulus funding.

Particular pressure is exerted in year one of the 2021-31 Long Term Plan (Figures 8.1 – 8.4). In order to mitigate risks associated with programme delivery, Council has implemented a number of tactical responses:

i. A Project Manager and support staff (1.5 FTE) have been engaged to ensure that proposed stimulus funded projects (total $3.68M) are completed by 31 March 2022.
ii. The Project Manager is also assisting with timely delivery of proposed LTP projects through procurement assistance.
iii. All capital works have been programmed for 2020/21 and 2021/22 and local contractors have been made aware of the timing. Where possible the programme has been modified to ensure successful and cost effective procurement can be realised.
iv. Council is aware that, given the effects of Covid 19, that material supply was likely to be impacted. Resultantly, Council addressed this issue by sourcing materials early and maintaining stock levels that can be drawn down on when projects commence. Sourcing

materials early has also mitigated, to some extent, elevated pricing as raw materials become more scarce.

v. Procurement is now completed through the Government Electronic Tenders System (GETS). This affords the ability to notify the wider contracting / consulting market of upcoming projects and will undoubtedly maximise submissions received once projects are tendered.

vi. Nearly $2.5M of projects budgeted for 2021/22 are likely to be tendered by 30 June 2021, or very early in the 2021/22 financial year. This maximises available construction time to achieve completion of the proposed capital programme.

The Waimate district is fortunate to have significant contracting resource located within the boundaries and at varying scale. In fact, one of the largest contractors in the South Island has its head office located within the Waimate town. Further afield, council is able to draw on further resource located to the North in Timaru and to the South in Oamaru.
As with any capital programme risks will always remain, even if mitigation has been employed. Known risks include:

- Dependent projects – Some proposed capital works are dependent on either technical investigations or other capital works. Delays in the latter could impact deliverability.
- Material Sourcing – Whilst proactive in sourcing materials, the risk associated with slow supply chains remain. There is also a risk associated with elevated pricing that could modify the scope of some projects.
- Compliance risks – A number of water supply compliance projects have been budgeted (2020/21 and 2021/22) to meet compliance requirements as defined in the current DWSNZ. Council is aware that enactment of the Water Services Act is highly likely to offer alternative means of treatment for some of these water schemes and anticipates, under this scenario, that the redefined capital works projects are likely to be more cost effective in the longer term. Timing associated with the “new standards” is restrictive in terms of construction. However, council is confident that these changes will occur and has selected to begin construction of the common requirements (pre and post Water Services Act) as Stage 1 to mitigate the potential loss of time.
- Delay in increased levels of service associated with the upgrade of individual water schemes for compliance with the DWSNZ. Whilst it is unlikely that the level of service will reduce, the current LoS will be extended until upgrades are commissioned.

7.0 LIFECYCLE MANAGEMENT PLAN

This section applies the specific work programmes required to achieve the goals and standards outlined in Section 3 to Section 6. It presents the lifecycle management plan for the Water Services assets, and includes:

- *Detailed management, operations, maintenance, renewal and development strategies*
- *Work programmes and associated financial forecasts*

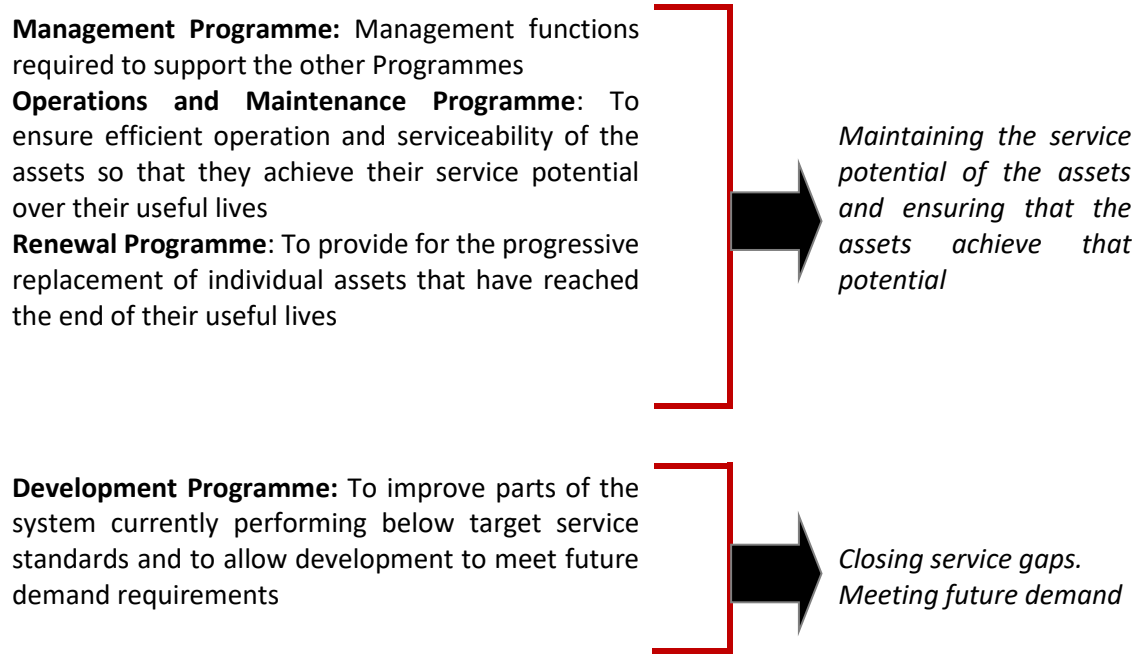
7.1 Asset Lifecycle

Assets have a life cycle as they move through from the initial concept to the final disposal. Depending on the type of asset, its lifecycle may vary from 10 years to over 100 years. Key stages in the asset life cycle are:

- Asset planning - when the new asset is designed. Decisions made at this time influence the cost of operating and maintaining the asset, and the lifespan of the asset. Alternative, non-asset solutions, should also be considered at this time.
- Asset creation or acquisition - when the asset is purchased, constructed or vested in Council. Capital cost, design and construction standards, commissioning the asset, and guarantees by suppliers influence the cost of operating the asset and the lifespan of the asset.
- Asset operations and maintenance - when the asset is operated and maintained. Operation relates to a number of elements including efficiency, power costs and throughput. This is usually more applicable to mechanical plant rather than static assets such as pipes. Maintenance relates to preventative maintenance where minor work is carried out to prevent more expensive work in the future, and reactive maintenance where a failure is fixed.
- Asset condition and performance monitoring - when the asset is examined and checked to establish the remaining life of the asset, what corrective action is required including maintenance, rehabilitation or renewal and within what timescale.
- Asset rehabilitation and renewal - when the asset is restored or replaced to ensure that the required Level of Service can be delivered.
- Asset disposal and rearrangement - When a failed or redundant asset is sold off, put to another use, or abandoned.

7.2 Lifecycle Management - An Overview

The Lifecycle Management Programmes cover the four key categories of work necessary to achieve the required outcomes from the Water Services activity. These programmes are:



The Operations & Maintenance and Renewal Programmes are focused on maintaining the current service potential of assets, and are primarily driven by the condition of assets although asset performance is often an indicator of asset condition.

7.3 Management Programme

7.3.1 Introduction

Management and monitoring strategies set out the activities required to support the maintenance, operations cyclic renewal and asset development programmes. These activities include:

- Strategic Planning
- Data Management and Evaluation
- Business Processes
- Monitoring
- Financial Management

Strategic planning and a focus on meeting the needs of water scheme consumers drives the design of management processes which in turn are reflected in the level of performance that is achieved. Collection of data necessary to manage the water schemes effectively and processes for the analysis and interpretation of this data support all management activities.

7.3.2 Management Strategies

Table 7.1 sets out the management strategies.

Table 7.1: Management Strategies

Strategy	Objective/ Description
Strategic Planning	
Human Resources	Developing the professional skills of the staff through adequate training and experience Personal Development Plans will be agreed with staff each year and a register maintained to record training history. Staff are encouraged to belong to appropriate professional bodies and to attend appropriate conferences, seminars and training courses.

Strategy	Objective/ Description
Strategic Alignment	This AMP will support the achievement of relevant Community Outcomes for Waimate District. Community Outcomes for Waimate District are set out in the LTP. The intended contribution of the Council water schemes to the achievement of Community Outcomes is clearly set out in this AMP.
Service Levels	Clear statement of Water Services provided and standards to be achieved as a basis for future consultation with the Community. In the first instance customer service standards have been developed as part of a wider performance management framework for the Water Services activity. This performance management framework incorporates: – Customer Service Standards – Standards for the Water Services from the end users perspective. – Activity Service Standards – Key high level standards which reflect the Waimate District Community Outcomes and which enable the overall performance of the Water Services activity to be monitored. – Technical Standards – More detailed standards that can be used by Waimate District Council to monitor the performance of aspects the Water Services activity on an "as required" basis.
Sustainable Management	Ensure all planning for the management, operation, maintenance, renewal and development of the water schemes is compatible with sustainable management principles. Council will pursue ways of limiting the use of natural resources including energy, valued landscapes (and other natural heritage) and adverse effects on waterways. This will involve auditing the systems and materials used, and developing ways to incorporate sustainable operation and development principles into its activities. For example, auditing power usage in pump stations, and using non-asset based solutions where possible.
Data Management and Evaluation	
Asset Management Systems	Optimise the application of Asset Management Systems over the short to medium term and develop functionality in line with business needs. Staff changes resulted in the neglect of this area. There is a significant portion of data held in the asset register in relation to private assets. Refinement of asset data requirements will occur as staff identify management applications for data and refine reporting capacity. WDC will review the adequacy of the systems for future asset management purposes and proactively introduce enhanced system functionality as justified by business needs to support a high standard of decision-making.
Network Modelling	Hydraulic network models exist. These models are operated by external consultants and are based in the InfoWorks modelling software. Computer models of the water scheme pipe network and utilities enables Council to: – Determine accurately the existing capacity of the system. – Identify inadequate sections of the system. – Operate the system in the most efficient manner. – Determine the impact of further development on the system. – Identify system upgrading requirements. – Compare options for upgrading the water schemes.

Strategy	Objective/ Description
Data Collection	Data collection programmes (condition, performance, asset registers) closely aligned with business needs will be implemented in accordance with documented quality processes Data collection, maintenance and analysis is expensive and it is important that programmes and techniques are cost effective and consistent with business needs. Systematic processes will be further developed for the collection and upgrading of essential/critical data including: – Asset attribute information – Asset performance data – Asset condition data Staff changes have impacted on the AssetFinda/GIS data acquisition, capturing, trending and analysis. This will increase as new assets are acquired through water treatment plant upgrades and will require improvement and refinement. Going forward Council will align its data collection and recording with the Metadata Standards
GIS Data Quality Assurance	GIS data will be the subject of defined quality assurance processes. Council will introduce quality processes intended to: ensure that all future data entered to the GIS system meets defined quality standards.
Business Processes	
AMP Updates	This AMP remains a strategic 'living' document and will be updated annually and reviewed at three yearly intervals or more frequently as necessary to incorporate significant improvements to asset management practices (as proposed in the improvement plan). The scope of the review will be influenced by changes in Community Outcomes for Waimate District, service standards, improved knowledge of assets, introduction of Asset Management improvements and corporate strategy/ policy and process.
Risk Management	Risk Management is an essential part of Asset Management. Water Services activity risks will be managed by developing a Risk Management Plan for the Water Services activity and the implementation of risk mitigation measures to maintain risk exposure at acceptable levels. Risk mitigation measures will include maintaining appropriate insurance cover, emergency response planning, condition monitoring of critical assets, preventative maintenance, use of telemetry, review and updating of WSPs and operations manuals, review of standards and physical works programmes.
Infrastructure asset valuation	Continue to perform valuations in a manner that is consistent with national guidelines and Council corporate policy. Asset valuations are the basis for several key asset management processes including asset renewal modelling and financial risk assessments. Valuations of the water schemes will be carried out based on data from the GIS and AMS systems to ensure auditability and alignment with other processes.
Statutory Compliance	Implement quality plans that identify legal obligations and processes adopted to achieve statutory compliance. Section 4.3 of this AMP sets out the legislative environment for the Water Services activity.
Quality Assurance	Document, review and implement quality processes for all key business activities in accordance with standard practices. Quality processes will cover activities such as reporting, data collection and management, contract monitoring, risk management, economic analysis, performance monitoring, strategic planning, customer contact, asset valuation, asset operation, work specification, etc.
Monitoring	
Asset Performance	Council will continue to monitor the performance of the water schemes assets as an input to asset renewal and asset development programmes. This monitoring includes: – Customer service requests – Asset failure records – Asset Maintenance records – Compliance with Resource Consents – Water Treatment Plant effluent quality – Critical asset audits

Strategy	Objective/ Description
Financial Management	
Budgeting	Prepare all expenditure programmes for the Water Services activity in accordance with Council funding and budget preparation policies and procedures. The different categories of expenditure within the financial programmes will be identified to enable the funding to be allocated in accordance with the Council's policies.
Financial management	Manage the Water Services activity budget in accordance with statutes and corporate policy. This will involve: – Economic appraisal of all capital expenditure – Annual review of AMP financial programmes – Recording of significant deferred maintenance and asset renewals – Continuous monitoring of expenditure against budget
Sustainable Funding	Ensure the water schemes are managed in a financially sustainable manner over the long term. The financial requirements for the provision of the Water Services sustainably and to acceptable standards over the long term will be identified and provided for in draft budgets. These requirements include: – Management of the Water Services – Operation and maintenance of the water schemes – Asset replacement – Asset development to ensure that the ability of the water schemes to deliver an acceptable Level of Service is not significantly degraded by growth in Waimate District

7.3.3 Management Standards

Council's Water Services are managed in accordance with the following standards:

- Generally accepted accounting practice (GAAP) and more specifically with FRS-3 "Accounting for Property, Plant and Equipment" (to be superseded by NZ IAS 16).
- The International Asset Management Manual.
- Resource Consent Conditions for the Waimate District Water Supply Activity.
- The Council's Health and Safety Plan.
- Council's Quality Assurance Documents.
- Operations Manuals.
- DWSNZ 2005 (revised 2018).

7.4 Operations and Maintenance Plan

7.4.1 Introduction

Operations and Maintenance strategies set out how the water schemes will be operated and maintained on a day-to-day basis to consistently achieve the optimum use of assets. Operations and Maintenance activities fall into the following categories, each having distinct objectives and triggering mechanisms:

Operations - Activities designed to ensure efficient utilisation of the assets, and therefore that the assets achieve their service potential. Operational strategies cover activities such as energy usage, control of mechanical and electrical plant, inspections and service management.

Maintenance - Maintenance strategies are designed to enable existing assets to operate to their service potential over their useful life. This is necessary to meet service standards, achieve target standards and prevent premature asset failure or deterioration. There are three types of maintenance:

- **Programmed maintenance** - A base level of maintenance carried out to a predetermined schedule. Its objective is to maintain the service potential of the asset system.

- **Condition maintenance (Proactive)** - Maintenance actioned as a result of condition or performance evaluations of components of the water scheme. Its objective is to avoid primary system failure.
- **Response maintenance (Reactive)** - Maintenance carried out in response to reported problems or system defects. Its objective is to maintain day-to-day Levels of Service.

7.4.2 Method of Delivery

The operation and maintenance of Council's Water schemes are carried out using a combination of Council staff and external contractors. Council staff generally carries out operational activities and maintenance of a routine nature with external contractors being used for specialist activities such as electrical work, laboratory testing and major overhauls of mechanical equipment. From time to time Council may use the services of local drain layers, earthworks contractors or plant hire. This is done through a mix of quotations and tendering with Council staff overseeing works.

7.4.3 Operations and Maintenance Strategies

Table 7.2 sets out operations and maintenance strategies.

Table 7.2: O&M Strategies

Strategy	Objective/ Description
Routine Maintenance	Routine Maintenance is carried out, supervised and monitored by Council's in house operational unit
Repairs and Corrective Maintenance	Reactive maintenance is undertaken as quickly as practically possible to restore an asset to a satisfactory condition after a failure or an unsatisfactory condition has been detected that is likely to fail in the short term. Council provides customer support for any associated requests for work related to the assets. In the rural restricted schemes minor work is not tended to immediately to ensure multiple tasks can be performed during a single site visit as indicated in the response time requirements.
Redesign and Modification	Redesign may be necessary if an asset or system does not meet its operational objective. Similarly, modifications may be necessary to improve the operating characteristics. Redesign and modifications will be undertaken in a methodical manner to ensure alternative options are considered and optimum decisions made.
Operations	Operational activities are undertaken by Council in house operational unit unless specialised advice is required. Council staff are responsible for the determination and optimisation of planned and unplanned works, work methods and maintenance scheduling to achieve the target service standards. Work is performed to Council's standards and specifications.
Physical Works Monitoring	The operational unit consist of skilled staff that are well versed on Council standards and specifications. Work is managed and overseen by the Utilities Supervisor. Weekly meetings are held to ensure work are completed on time and to Council standards.
Operation of Utilities	Utilities such as treatment plants, pump stations and reservoirs are operated in terms of defined parameters and standards set out in quality system manuals. Water Services utilities will be operated in terms of these quality manuals.
Incident management	Council approach is an escalation process from minor to major, all incidence is managed by the Council staff. Involvement is also judged by the potential consequences or asset criticality.
System Control and Monitoring	Where available, the SCADA system provides surveillance of the Treatment Plants, Bores, Intakes, Reservoirs and Pumping stations in the water schemes and will provide alarms when equipment fails or when operating parameters are exceeded. The SCADA system also records operational data.

7.4.4 Priority Response times

The Priority Response times targets for the Water Service are presented in Table 7.3.

Table 7.3: Priority Response Times

Priority	Response	Completion
P1	1 Hour	24 Hours
P2	4 Hours	48 Hours
P3	1 Day	5 Days
P4	5 Days	10 Days
P5	Projects	Specific Dates

The following details the priority for the individual utilities alarms and callouts.

Table 7.4: Alarm Priority

Utility	Description	Priority
Water:	SCADA Alarm	As recorded
	Health Issues	P1
	Maintenance - Urgent	P1
	No Water - Urban	P1
	Water Leak Urgent	P1
	Water Quality	P2
	Locate Asset	P2
	No Water - Rural	P2
	Tank Overflowing - Rural	P2
	Low Pressure / Low Flow	P2
	Water Leak	P2
	Maintenance	P3
	Change Restrictor	P5
	General Enquiry	P4
	Meter Read - Specific Date	P5

7.4.5 Operations and Maintenance Standards

The following standards are applicable to the operation and maintenance of the water schemes:

- NZS4404: 2010 Land development and subdivision infrastructure adopted by Council as its Engineering Code of Practice (which provides standards for materials and construction of piped water schemes).
- Relevant Resource Consents and the Resource Management Act 1991.
- Transit New Zealand Guidelines 'Working on the Road'.
- Health and Safety Plans.
- Electrical Regulations 1993.
- Council quality assurance processes, including contract management procedures.

7.4.6 Council Utilities Staff Qualifications

Table 7.5 details the utilities staff qualifications as at January 2018.

Table 7.5: Council Utilities Staff Qualifications

Position	Water Treatment	Wastewater Treatment	Reticulation Maintenance (Water & Waste)	Drain Laying & Plumbing	Backflow Prevention	Traffic Management		Confined Spaces	Heights	Asbestos	Chlorine	Chemical Handlers
						STMS	TC					
Water & Waste Manager	Level 3&4 Plus Diploma Level 5	-	-	-	-	-	-	-	-	-	-	-
Utilities Supervisor	Level 3&4 Diploma Level 5 (incomplete)	-	Level 3	-	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
Utilities Technician	Level 3&4	Level 4 (incomplete)	Level 3	-	-	Yes	-	Yes	Yes	Yes	Yes	Yes
Utilities Technician	Level 4	-	Plumber and Drainlayer	-	-	-	Yes	Yes	Yes	-	Yes	Yes
Three Waters Technical Administrator	-	-	-	-	-	-	-	-	-	-	Yes	-
Utilities Technician	Level 4 (Incomplete)	Level 4	Level 3	-	-	-	Yes	Yes	Yes	-	Yes	Yes

NZ Water Competency Framework

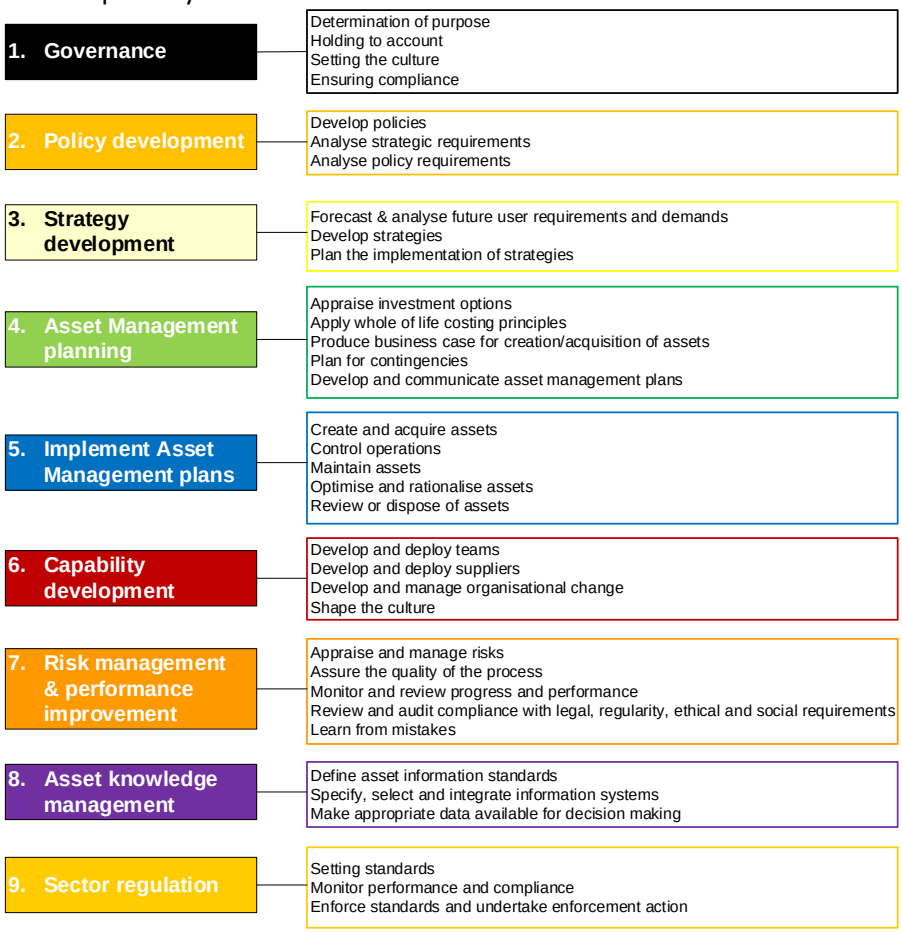
Assessment of staffing levels needs to consider the skill requirements to meet the demands of the infrastructure that Council does and will own and operate.

Increases in the complexity of water and wastewater treatment plants will occur as drinking water and environmental standards increase. The complexity of these plants and their associated resource consent compliance will require skilled and trained engineers for their operation, maintenance and supervision. Council needs to stay abreast of any resource requirements and qualifications to ensure the most appropriate method for delivery of the required levels of service.

During 2020 Water New Zealand released its draft Competency Framework which describes what people should be able to do and what they need to know to competently undertake their work. The Competency Framework use treatment operator roles, the people who operate, monitor and maintain water and wastewater services, as a starting point. Network/Distribution operators are still to be developed.

The Water Industry Professionals Association (WIPA) was jointly established by the Water Industry Operations Group and Water New Zealand to provide a system of recording the professional development of people working in the water and wastewater industry to ensure a high level of competency within the industry was maintained. At the time of writing this Plan registration is voluntary but may become compulsory under the new regulatory framework.

The Competency Framework identifies nine areas as shown below.



(*Source: Water NZ – Competency Framework*)

It documents core skills and knowledge needed by operators to competently undertake work within the water industry. It is envisaged that the industry will be able to use the final document as a guide to:

- assess levels of staff training,
- develop training programmes,
- determine the knowledge and skills required by a workforce, or
- other matters related to staff competence.

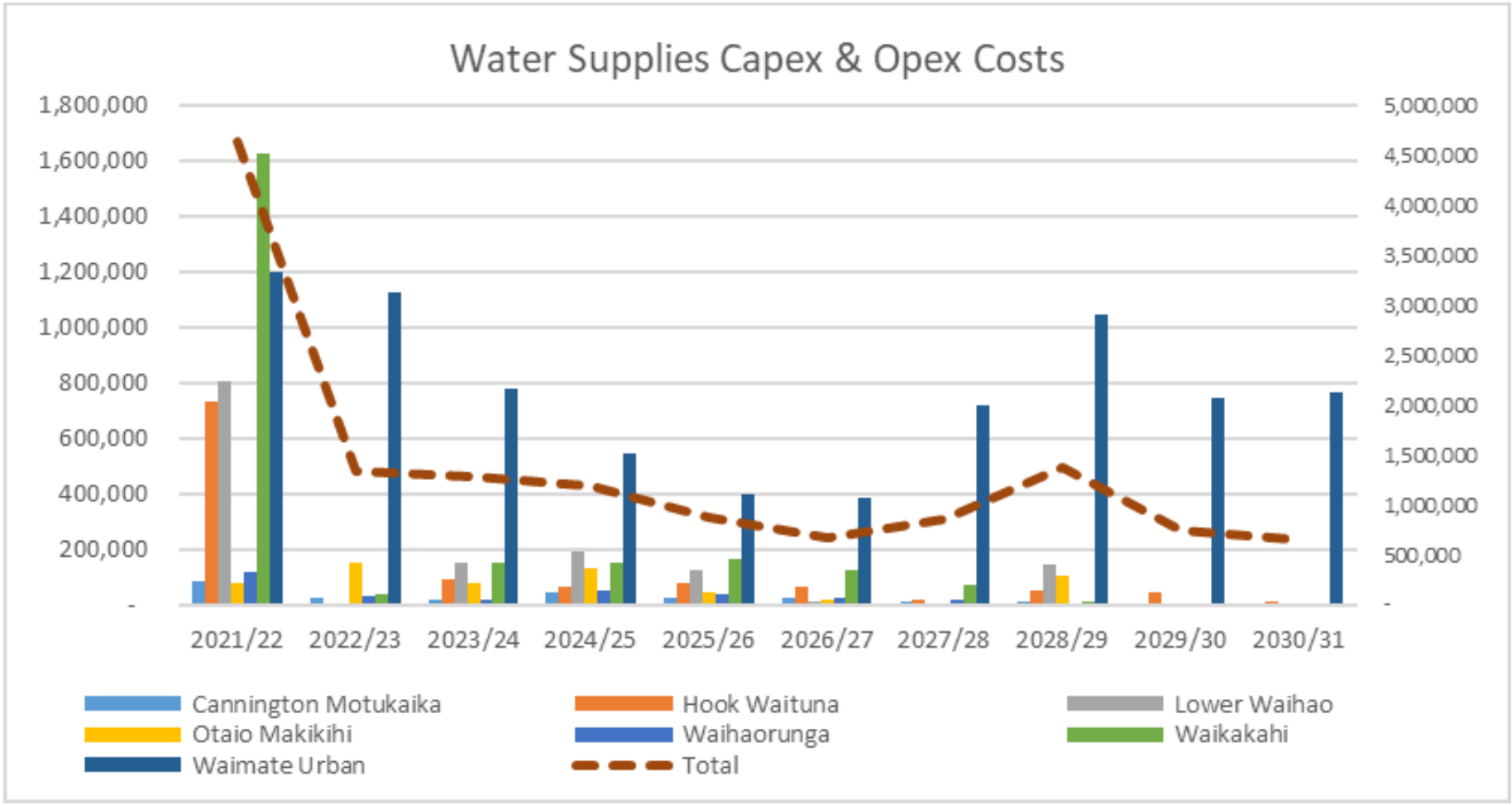
Council will keep abreast of developments in this area to ensure staff training meets industry best practice and standards.

7.4.7 Summary of Future Costs

Water Activity annual maintenance and operations costs are projected to increase from $2,650,143 (2019/20) to $3,746,752 (2030/31) over the 10 year period. There is no deferred maintenance scheduled over the period with cost increases being driven by inflation and increased interest payments associated with major compliance upgrades

O&M Costs	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Cannington Motukaika	103,628	107,865	110,871	112,636	115,086	119,772	121,638	123,803	128,604	132,034
Hook Waituna	364,683	388,958	397,947	401,666	409,282	423,105	428,453	431,334	446,593	457,803
Lower Waihao	383,172	414,835	425,106	430,401	441,213	455,707	460,259	464,050	481,850	490,055
Otaio Makikihi	315,103	325,857	338,744	341,567	347,651	359,941	366,045	371,657	387,671	396,926
Waihaorunga	182,494	187,120	192,984	195,158	198,346	205,200	208,473	211,870	220,491	226,198
Waikakahi	532,871	588,672	606,607	612,153	619,017	638,315	641,716	643,238	660,486	663,939
Waimate Urban	980,069	1,016,256	1,077,118	1,097,927	1,119,386	1,162,735	1,186,446	1,217,527	1,285,407	1,323,328
Total	**2,862,022**	**3,029,563**	**3,149,378**	**3,191,508**	**3,249,981**	**3,364,775**	**3,413,030**	**3,463,481**	**3,611,102**	**3,690,283**

Figure 7-1: Water Supplies Operation & Maintenance Costs



7.5 Renewal and Replacement Plan

7.5.1 Introduction

Cyclic renewal strategies are intended to provide for the progressive replacement of individual assets that have reached the end of their useful life. The rate of asset renewal is intended to maintain the overall condition of the asset system at a standard, which reflects its age profile, and ensures that the Community's investment in the District's Water Services infrastructure is maintained.

The level of expenditure on cyclic asset replacement varies from year to year, reflecting:

- The age profile
- The condition profile
- The on-going maintenance demand
- Customer service issues
- The differing economic lives of individual assets

Failure to maintain an adequate renewal programme will be reflected in a greater decline in the overall standard of the system of assets than would be expected from the age profile of the asset system.

Cyclic renewal works fall into two categories:

- **Rehabilitation:** Involves the major repair or refurbishment of an existing asset. An example is the relining of an existing pipeline. Rehabilitation produces an extension in the life of an asset. It does not provide for a planned increase in the operating capacity or design loading

- **Renewal:** Does not provide for a planned increase to the operating capacity or design loading. Some minor increase in capacity may result from the process of renewal, but a substantial improvement is needed before system development is considered to have occurred

For the purpose of developing asset renewal programmes the water schemes assets have used the following components consistent with the asset valuation process:

- Water Lines (Pipes, Mains)
- Water Points, Water Service Lines (Property connections)
- Water Plant (Reservoirs, Treatment Plants, Pumping & Valve Stations & Buildings)

7.5.2 Renewal and Replacement Strategies

The following table sets out cyclic renewal strategies:

Table 7.6: Renewal Strategies: Existing and Future

Strategy	Objective/ Description
Identification of renewal needs	Renewal/replacement needs are identified by analysing; – Condition reports (as shown in Section 7.5.3), maintenance records (asset failure and expenditure history), water leakage studies, water quality test results, request for service (RFS) records, and observations of the Council's engineering and maintenance staff and contractors that they employ. – Records of breakages are recorded in AssetFinda that allows an overview of the short term issues. – Customer feedback is essential for monitoring asset performance and achieving levels of service. The feedback is quite often the early warning system that a problem maybe developing and can lead to more formal investigations. The short-term asset renewal programmes have been prepared from specific renewal needs identified from information received by Council maintenance staff. The long-term asset renewal forecasts are based on an assessment of remaining asset lives (from the 2017 valuation process) and use industry base lives as a default position where condition or maintenance records are lacking. Future renewal programmes will use the data obtained in the proposed pipe condition assessments and the updated AssetFinda data. The future renewals strategy will incorporate a process that uses the numbers of breaks in a main as an indicator for inserting onto short term renewal programme. This for the Waimate urban scheme may be five breaks per year but may increase for the rural schemes.
Prioritisation of renewal projects	Decisions on renewal works consider the short and long-term effects on the operating and structural integrity of the system. Renewal works are designed and undertaken in accordance with industry standards (or known future standards) and system design loadings. Short-term renewal priorities are reassessed annually taking account of additional information that becomes available via breakage reports etc.
Deferred Renewals	The quantity and impact of deferred renewals will be tracked. The Council recognises that although the deferral of some items on cyclic renewal programmes will not impede the operation of many assets in the short term, repeated deferral will create a future Council liability.
Inspections prior to major road works	The condition of water scheme pipelines is inspected prior to major road works to identify the risk of the road being damaged by pipeline failure or the need for pipeline replacement in the short/medium term. Pipelines in poor condition may be programmed for replacement prior to or in conjunction with the road works or reseal programme subject to funding.
Rider mains	Where possible rider mains are installed in the grass berm to eliminate or limit the number of laterals across the road.
Service connections	Tobies are replaced with manifolds (dual check), meters and manifold boxes.
Restrictors	Restrictor checks are done on a random basis but with all restrictors checked as resources allow. Customers are expected to maintain filters with filters available from Council free of charge. Recently installed network meters allow monitoring of zones for leakage or tampering.
Dedicated delivery main	Renewals within the Waimate Urban water scheme will consider upgrading of the current system to provide a dedicated delivery main from the Waimate Urban Water Treatment Plants to the reservoir on Mill Road. This will allow a reduced pressure regime within the network and will assist to extend reticulation asset lives.

7.5.3 Condition Assessment of Cast Iron, AC, Old PE and Garnite PVC Pipes

Development of a Condition Assessment Strategy to identify which, where and when condition assessments will be performed is include as an Improvement item. This will be done in consideration of criticality, LoS, asset records, Council engineers visual assessment of failures and specialists assessments as required. Implementation of the Condition Assessment Strategy and resulting information collected will then inform the renewal plan.

Cast Iron Pipes – Waimate Urban Water Scheme

Opus has carried out a number of assessments on the condition of cast iron pipes since 1998. The Condition Assessment report of March 2011 stated the following regarding the effects of graphitisation on cast iron pipes:

Graphitisation, a de-alloying process, occurs in corroded cast iron pipe. This process results in the iron being leached away, leaving behind a matrix of flake graphite which occupies approximately the same volume as the original casting. This graphite has minimal strength but often maintains structural integrity against moderate water and/or ground pressures. However, the beam strength of graphitised pipe is reduced and its ability to withstand pressure surges is compromised.

The process of graphitisation is rarely uniform and, as in the case of these samples, some parts of the pipe show little signs of graphitisation while at other areas the graphitisation has completely penetrated the pipe wall. The variability of the depth of graphitisation can be partly due to the protection afforded by the hot-dip bitumen coating.

Based on assessments of the condition of 10 samples of cast iron pipes recovered from the Waimate Urban water supply network over the past 13 years, Opus concludes that:

- All of the 3" (DN 75) and 4" (DN 100) cast iron pipes would not have complied with the BS 78:1917 for cast iron pipes. They may have been made to special order to minimise shipping weight and purchase cost.
- We expect that all of these small bore cast iron pipes are probably in a similar condition and are nearing the end of their useful lifetime.
- Failures can be expected to show an increasing frequency over the coming years.
- Failures will generally be associated with beam type failures (circumferential cracking) as small diameter, graphitised cast iron pipes do not have much strength in bending, such as caused by traffic loads, ground settlement or wetting and drying of clay soils.
- Pressure surges cause longitudinal cracking or blow-outs of weakened pipes.
- Three of the 1998 samples had split longitudinally, indicating fairly severe graphitisation
- We would expect that there have been other failures in the intervening years.
- It is likely that the consolidated soils surrounding the pipe are assisting the pipe to resist the internal pressure, however, any significant changes e.g. in traffic loads, ground settlement or ground shaking/vibration will be likely to cause pipe failure.
- These pipes have lasted extremely well considering their generally thin and highly variable wall thickness.
- We do not believe that rehabilitation (e.g. relining with cement mortar or epoxy paint) is an option as the pipe is in a poor condition with advanced graphitisation.
- All of the cast iron pipes of this vintage inWaimate should be programmed for renewal within the next approximately 10 years.

- To avoid a large 'spike" in renewal spending, the "worst" pipelines should be considered for renewal within the next few years, and the remainder progressively replaced when failure rate and water supply interruption starts to cause customer resistance.

The replacement value of cast iron pipes in Waimate as indicated in the 2017 valuation, of $5.6m (22.6km of pipe). If renewal were to occur over a 10 year period this amounts to an annual renewal of $557,000 (about 2.3 km per year).

The following photo shows a cast iron pipe joint failure, these are lead packed and when failure occurs the joint is sawn off and replaced by a gibault joint.

Figure 7-2: Cast Iron Pipe Failure

AC Pipes

Initially AC Condition samples from Waimate Urban taken during 1999 indicated that pipe failures should have been expected approximately 15 years from the date of the pipe evaluation - that is from 2014 onwards.

More recent AC Condition samples have indicated slightly longer timeframes, but have also identified areas where condition is not as expected. These are targeted for replacement in years 1 through 3.

As the AC pipe remaining life is effected by different:

- Pressure regimes with the schemes.
- Water quality.
- Diameter: Small diameter AC pipe has a very short life (35 – 45 years) but larger diameter may have significantly greater life.
- Quality of installation.

Council's maintenance staff has noted the softness of the pipes in the different schemes that is a very good indication that the pipes will need replacement in the shorter term rather than long term. To better understand the different AC pipe life a programme of assessing the condition of the pipes in all the schemes that contain AC pipe will occur. This condition data will be incorporated into AssetFinda to allow future renewal programmes to be produced and increased confidence in future valuations.

Old PE Pipe

The 2011 Valuation Report noted the following for old PE:
Old PE pipelines have an average life of 36 years. As significant operational problems are not yet observed, the 45 year assigned life may be conservative. The life of Old PE pipes has a significant impact on depreciation as they make up more than half of the rural pipeline system.

In January 2012 Opus reviewed the life of the old PE pipe and noted "*while a conservative mean useful life of 45 years might have been appropriate in the past, it is likely to be over-conservative now. A revised estimate of 60 years is proposed for the remaining older rural PE pipe*". The effect of this was that the replacement of a high proportion of the Old PE pipe will now occur outside the 2018 – 2028 LTP period.

To better understand the different "old PE pipe" life, a programme of assessing the condition of the pipes in all the schemes that contain Old PE pipe will occur. This condition data will be incorporated into AssetFinda to allow future renewal programmes to be produced and increased confidence in future valuations.

Asset renewal over recent years has removed the majority of the poor batches of pipe leaving an asset with a longer asset life.

Garnite PVC Pipe

Garnite was one of the first types of PVC pipe installed in the Waimate water supplies. These pipes have shown to be very brittle and prone to failure. Asset renewal over recent years has removed the majority of the poor batches of pipe leaving an asset with a longer asset life (50 years plus).

7.5.4 Pressure Management: Waimate Urban Water Scheme

The report "Waimate Water Supply – Pressure Management" by Opus (July 2009) was carried out as a previous distribution model study in 2008 found that there was excessive leakage within the system that was subject to relatively high pressures (half the town exceeds 70m).

The report considered a reduction in maximum pressures by 33% and assumed a burst frequency reduction of approximately 50% would give an annual savings of $6,000. These savings do not take into consideration the savings associated with delaying the renewal of mains within the urban area. The rough order of costs in 2009 was $1.2m. Council is currently in the process of replacing part of the critical rising main between the reservoir and the Waimate town. Once the new rising main section is commissioned some initial pressure management may be achieved (through closing of local reticulation valves).

7.5.5 Evidence Base

The asset data held for water supply and sewerage had been a focus for improvement over the last six years. This was reflected in the positive peer reviews undertaken of both the 2017 and 2020 valuations.
Road and footpaths data continues to be sound, based on twenty years of RAMM use. An increase in data analysis as part of the ONRC framework and capture of pavement performance data has improved knowledge of the asset further.
The 2020 asset valuation identified the accuracy of most roading asset data as "B" or "Reliable" (Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some data is old). Bridge data is of higher accuracy, "A" or "Highly reliable" (Data based on sound records, procedure, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset is complete).

The 2020 valuation has indicated (for three waters):

Confidence Level	Description	Accuracy	Condition	Quantity	Unit Cost	Base Life
A	Highly Reliable and Accurate	100%				
B	Reliable w ith Minor Inaccuracies	+/- 5%		B	B	B
C	50% estimated	+/- 20%	C			
D	Significant data estimated	+/- 30%				
E	All data estimated	+/- 40%				

From a valuation perspective the data reliability is considered (for all assets covered by the IS) to be “B” or +/- 5%. Council acknowledges that the reduced reliability associated with less accurate condition ratings (+/- 20%) could impact future financial forecasting. However, this is currently mitigated by empirical assessment of assets proposed for renewal. For example, roads identified for resealing are reassessed, alongside mains identified for renewal are investigated in regards to historical leaks, bursts and criticality.

Council acknowledges there are limitations with its data that affect decision-making. A commitment to improving data collection and analysis is indicated below. Additional part-time and full time roles have been added to the Council team to address data limitations and accuracy.

7.5.6 Base Life of Water Services Assets

The 2020 valuation used the base life for Water Services assets as shown in Table 7.7.

Table 7.7: Water Services Base Asset Life

Material	Life	Comment
AC	60	
CI	105	
Galv	60	Galvanized pipes have an average age of more than 48 years, but operational problems are not widely reported. The life has according been increased from 40 years to 60 years
PE	65 - 100	
PVC	100	
mPVC	100	
Steel	80	
Unknown	60	
Fire hydrant	75	
Meter	15	
Manifold	25	
Building	50	
Electrical	1 - 50	
Monitoring Equipment	3 - 40	
Pumps	10 - 20	

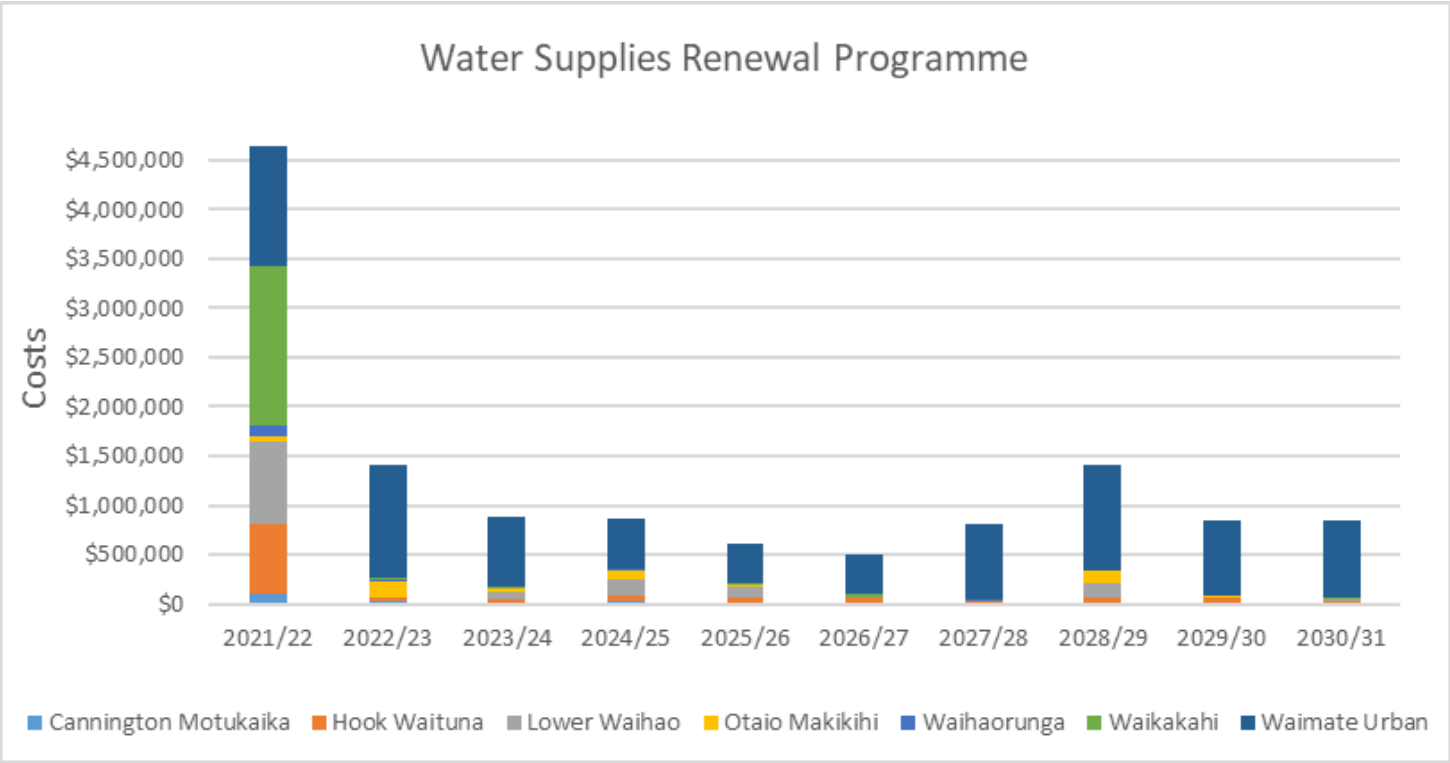
Ten Year Renewal Programme

The following table details the ten year renewal programme. Details are included within the Section 8.6.1.

Table 7.8: Ten Year Capex Programme (LoS, Growth, Renewals)

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Renewals	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**
Cannington Motukaika	$102,000	$39,499	$19,530	$25,488	$7,313	$10,542	$5,838	$6,031	$6,230	$6,398
Hook Waituna	$713,333	$20,680	$32,727	$56,160	$59,948	$58,947	$23,352	$60,305	$62,295	$26,870
Lower Waihao	$827,000	$5,170	$68,621	$170,748	$101,613	$5,668	$5,838	$150,763	$6,230	$7,805
Otaio Makikihi	$58,000	$158,202	$33,782	$91,800	$20,389	$-	$2,335	$117,474	$2,492	$6,398
Waihaorunga	$108,500	$22,748	$-	$5,400	$-	$-	$5,838	$-	$-	$6,398
Waikakahi	$1,615,296	$20,887	$16,891	$5,400	$21,719	$25,506	$15,179	$6,031	$6,230	$6,398
Waimate Urban	$1,219,393	$1,136,360	$704,004	$511,380	$396,700	$405,829	$744,929	$1,078,253	$764,983	$785,613
TOTAL	**$4,643,522**	**$1,403,545**	**$875,555**	**$866,376**	**$607,682**	**$506,492**	**$803,309**	**$1,418,856**	**$848,458**	**$845,877**

Figure 7-3: Programmed Renewals



Long Term Reticulation Renewals

Figure 7-4 details the 30 year renewal requirements for the water mains based on the 2020 valuation.

Figure 7-4: Water Main Renewals - 50 Years

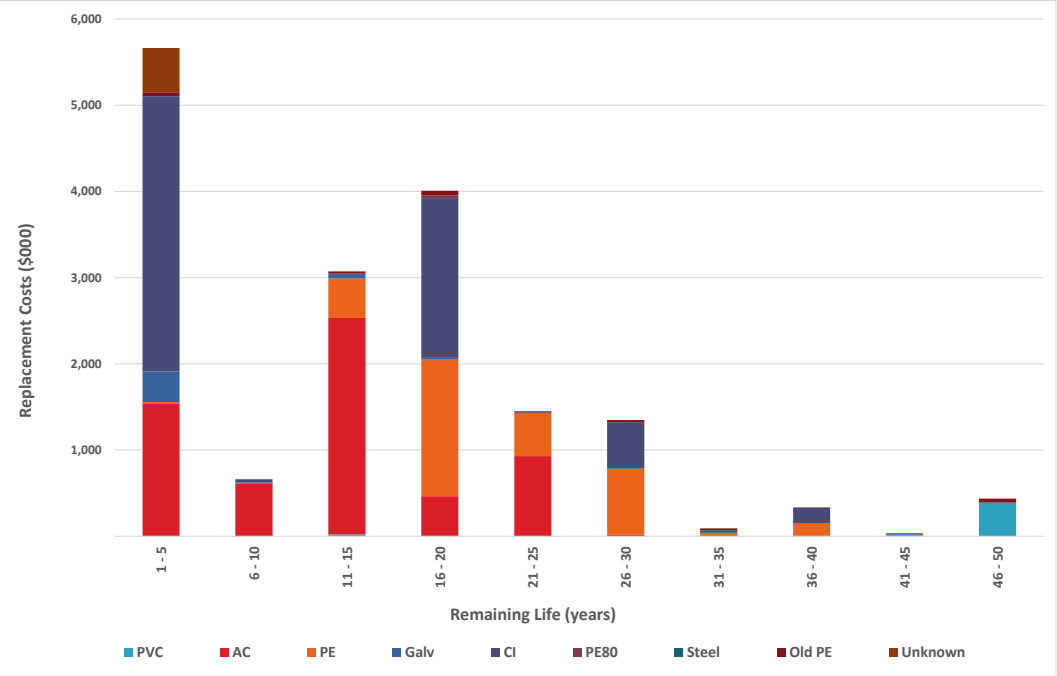
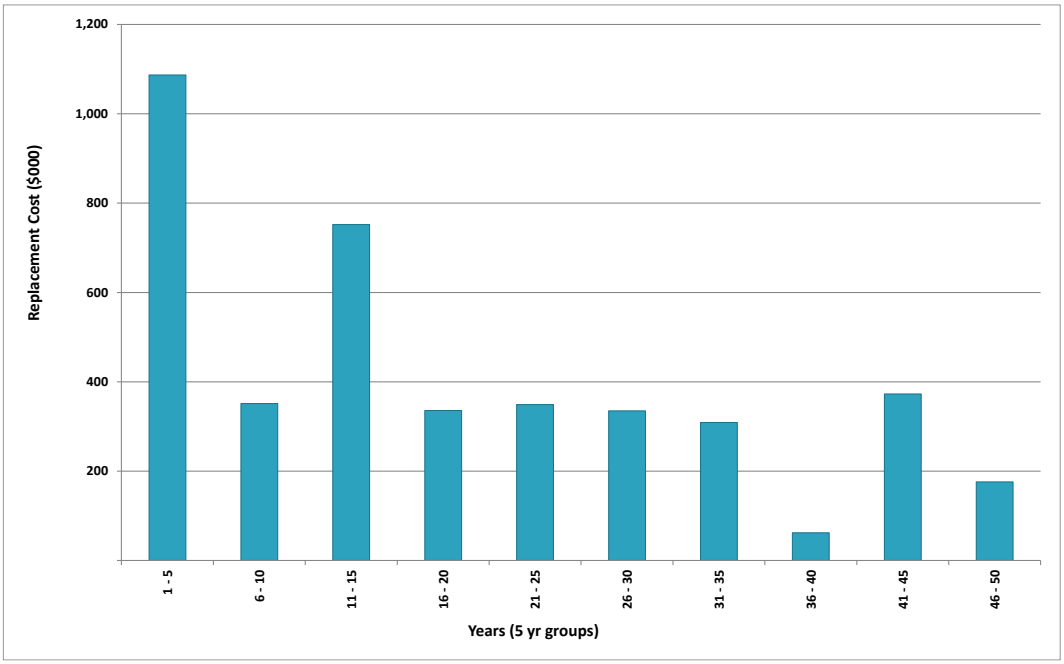


Figure 7-5: Water Plant Renewals - 50 Years



7.5.7 Cyclic Renewal Standards

The following standards are applicable to the renewal of water schemes assets:

- NZS4404: 2010 Land development and subdivision infrastructure adopted by Council as its Engineering Code of Practice (which provides standards for materials and construction of piped water schemes).
- Relevant Resource Consents and the Resource Management Act 1991.
- Transit New Zealand Guidelines 'Working on the Road'.
- Health and Safety Plans.
- Electrical Regulations 1993.
- Council quality assurance processes, including contract management procedures.

The Standards will be reviewed regularly and updated to incorporate relevant experiences, legislative requirements and changes in best practice.

7.6 Asset Development Plan

7.6.1 Introduction

Asset development provides for a planned increase in the service capability of the water scheme to:

- Close gaps between the current capability of the water scheme and target service standards.
- Accommodate growth.

Asset development and asset renewal can occur simultaneously. The purpose of asset renewal is to prevent a decline in the service potential of the assets whereas asset development is concerned with the service improvements, measured by asset performance.

7.6.2 Asset Development Strategies

The table below sets out the strategies used for developing capital development programmes for the Water Services. These strategies are intended to progressively close gaps between target service standards (taking account of demographic and economic growth projections) and the current service capability of the asset system.

Table 7.9: Development Strategies

Strategy	Objective/ Description
Identification of development needs	Asset development needs are identified from analysis of; Demand forecasts, System performance monitoring (pressure, flow, leakage rates, etc.), Network modelling, risk assessments (Risk Management Plan), and customer service requests. A provisional forward capital works development programme is maintained and updated in in conjunction with updates of the AMPs.
Development Project Categorisation	Development Projects will be separated into projects to close service gaps and projects required to accommodate growth. Development projects to close service gaps are generally funded entirely by Waimate District Council. Development projects to accommodate growth may be partly or wholly funded through Development Contributions.
Prioritisation of development projects	Development projects are justified and prioritised using a risk based process Decisions on development works consider the short and long-term effects on the operating and structural integrity of the water schemes system. In determining the requirement for capital or asset development works the short and long-term effects on the operating and structural integrity of the system are considered, together with any forecast increase in loading upon the system. All feasible options, including non-asset demand management options and the use of second-hand plant, are considered. Development works are designed and undertaken in

Strategy	Objective/ Description
	accordance with industry standards (or known future standards) and system design loadings.
Project Approval	A long-term development programme is prepared from projects meeting the assessment criteria, and all projects are approved through the Annual Plan process. The actual timing of asset development works will reflect the community's ability to meet the cost, as determined through the Annual Plan process. Scheduled projects meeting assessment criteria not funded are listed on the forward works programme for the following year.
Project design	All asset development works will be designed and constructed in accordance with current adopted industry standards (or known future standards) and system design loading. In determining capital or asset development work requirements the short and long-term effects on the operating and structural integrity of the system are considered, together with the demands of any forecast increase in loading upon the system. The system will be designed to minimise supply disruptions as far as practically possible by building in an appropriate level of redundancy. The standardisation of designs and specifications will be considered in the interest of facilitating replacement and operational simplicity.
Vested Assets	The risk, cost and benefits of accepting any new privately funded assets constructed in association with property development will be considered on a case by case basis in approval decisions. Such assets will be accepted into public ownership when satisfactorily completed in accordance with approvals given. Council will not contribute to the cost of such work unless there are exceptional service standard or equity issues.

7.6.3 Summary of Future Costs

The main focus for Council is to:

- Improve water treatment for all schemes to comply with the DWSNZ and therefore meet the requirements of the Health (Drinking Water) Amendment Act 2007.
- Monitor the outcomes of the Havelock North Water Enquiry to ensure future works / process meet both the recommendations and any legislative changes.
- Achieving compliance requires significant capital works to upgrade the treatment processes, estimated to cost $2.8million.

The water treatment plant upgrades fall into three broad categories:

- Building better treatment plants to treat the water that is currently used.
- Finding new more easily accessible and easily treated water and treating this.
- Augmenting supplies for economies of scale.

The preferred option will be selected by considering the cost to build, run and continue producing very high quality water in compliance with New Zealand standards and legislative requirements.

The Ministry of Health had previously established a subsidy scheme to provide funding assistance for lower socio economic communities to meet the DWSNZ. This was withdrawn in recent years but Council will continue to lobby central government for funding assistance to be re-established following the Havelock North Enquiry recommendations.

7.7 Disposal Plan

7.7.1 Introduction

The development of Asset Management Systems and use of Asset Condition / Performance data allows better planning for the disposal of assets through rationalisation of asset stock or when assets become uneconomic to own and operate.

All pipeline renewals identified in this Lifecycle Management Plan have a corresponding disposal either through the pipes being removed and disposed of at the landfill, or being left in the ground if the Water Services are refurbished using 'no-dig' techniques or the asset is replaced in a new location. Disposals are recorded within AssetFinda and the GIS. Buried assets remain in the ground unless economic to remove or they pose a potential hazard.

- In all cases asset disposal processes must comply with Council's legal obligations under the Local Government Act 2002, which covers:
- Public notification procedures required prior to sale
- Restrictions on the minimum value recovered
- Use of revenue received from asset disposal

When considering disposal options all relevant costs of disposal will be considered, including:

- Evaluation of options
- Consultation/advertising
- Obtaining resource consents
- Professional service, including engineering, planning and legal survey
- Demolition/making safe
- Site clearing, decontamination, and beautification

7.7.2 Asset Disposal Strategies

The following table details the disposal strategies.

Table 7.10: Disposal Strategies

Strategy	Objective/ Description
Asset Disposal	Assess each proposal to dispose of surplus or redundant assets on an individual basis, subject to the requirements of the relevant legislation Asset disposal will comply with the requirements of the Local Government Act 2002 and in particular the requirement for councils to retain a capability to provide Water Services Redundant pipes are removed where their alignment clashes with replacement pipelines or where their existence is considered dangerous. Abandoned water scheme pipelines have possible future value for other purposes (such as ducting for cabling). As the extent of this value (if any) is uncertain it is not recognised in the asset valuation When a water scheme asset is abandoned or replaced the Geographic Information System and fixed asset register are updated. A system of job number creation and asset identification is used to document this process
Residual Value	The residual value (if any) of assets, which are planned to be disposed of, will be identified and provided for in financial projections

7.8 Sustainability within Council

In addition to managing the assets in an economically sustainable way, Council will also manage its internal operations to optimise their cost, efficiency and effectiveness, so that in the long term the costs of administering the infrastructure are sustainable.

While the overall view of this is not a subject for this plan, the management of the asset services delivery unit is relevant.

7.8.1 Staffing Levels

Currently the Water and Wastes Group has eight full time equivalent employees. This includes the role of Asset Manager which encompasses a wider footprint of activities.

The greater emphasis being placed on the responsible management, distribution, operation and maintenance of existing and future resources will add to the tasks of the Water and Wastes Group. Compliance with the requirements of the Health Act, Health (Drinking Water) Amendment Act, DWSNZ 2005 (revised 2018) and increased Regional Rules (LWRP) will ask a great deal of effort and prudent decision making from the Water and Wastes staff.

The Health Act will impose an increased demand on human resources to meet the compliance with the requirements of the Heath Act. It will place an on-going demand on human resources to monitor and report on Health Act compliance. The current staffing levels are supplemented by outsourcing. However, outsourcing still requires scoping, input and supervision from Council staff and does not exonerate staff from outsourced work.

Staff changes have impacted on the AssetFinda/GIS data acquisition, capturing, trending and analysis. This will increase as new assets are acquired through water treatment plant upgrades.

Because of the above, assessment of staffing requirements will be required on an annual basis to ascertain the appropriate requirements for the increased workload. Assessment needs to consider the level of staffing coverage required to implement all of the Water and Wastes Group functions including internal management, information systems management, project management, design, supervision, construction, operations and maintenance.

7.8.2 Skills

In addition to staffing numbers, assessment of staffing levels needs to consider the skill requirements to meet the demands of the infrastructure that Council does and will own and operate.

Increases in the complexity of facilities such as water treatment plants and pump stations are occurring. This will require skilled and trained staffs for operation, maintenance and supervision. A review of Council policy on resourcing the operations and maintenance is required to ascertain the most appropriate method for delivery of the required levels of service should be considered.

Refer to Section 7.4.6

7.8.3 Training

Training of staff is presently on an ad-hoc basis with no structured long term development plans for the individual staff members in the asset management field. The link between asset life, and the ability to deliver of levels of service with the skills of the people who plan, design, install, operate and maintain the assets is inevitable. It is crucial that the skill gaps of staff, contractors and service

providers are identified; that there are structured training programmes to close these gaps; and that the effectiveness of the training provided is evaluated. Training programmes should be designed and reviewed for each individual – not for a business unit, contractor or service provider as an entity. Refer to Section 7.4.6.

7.8.4 Succession Planning

Succession planning within any business is considered necessary to reduce the risk associated with staff leaving the organisation. Succession planning allows institutional knowledge to be passed on, and assists in ensuring continuity of organisational culture.

Local Authorities have traditionally not been particularly successful at implementing succession planning techniques and practices. In previous decades the pool of experienced local authority and ex-public service engineers available meant that the negative effects of poor succession planning were not experienced. With a shrinking pool of experienced engineers, and near full employment these effects are now being experienced by more local authorities. Whilst there is always potential for staff in key positions to move on to further their careers, succession planning can help to mitigate the effects of this. Succession planning techniques can include:

- Sourcing replacement staff from within the organisation wherever possible
- Comprehensive personal career development plans in place for all relevant staff. This can include identifying weaknesses in training and experience and attempting to address those weaknesses by use of mentoring, relevant projects and continuing professional development programmes etc.
- Identifying likely staff retirements, promotions, resignations or position changes on an annual basis. Identifying potential internal staff to fill those positions, providing those staff with projects that extend them, and giving them relevant experience for filling the positions

No formal succession planning is implemented at present by Council. It is important that the current knowledge of existing staff on the Wastewater Services is continuously captured within AssetFinda and supporting asset management tools. This will reduce the risk to service continuation as a result of unplanned staff absences and any future retirements or resignations.

7.8.5 Efficient Use of Energy within Councils 3Water Facilities

The Three Waters uses a significant proportion of the Council total energy consumption via their extensive range of facilities. Instigation of energy management through the use of the Energy Efficiency and Conservation Authority (EECA) methodologies and subsidies will assist in reducing total energy consumption. Where new plant is to be installed, Council staff take the opportunity to use modern energy efficient devices such as variable speed drives, soft starters.

Efficient Operation of Facilities

The Council operates a SCADA system that allows the operation of the facilities (WTP and majority of water pump stations) remotely allowing efficiency monitoring and running the plant in off peak situations where it is practical to do so.

8.0 FINANCIAL SUMMARY

This Section sets out financial statements, funding strategy, depreciation forecast and charges for the Water Services in Waimate District.

8.1 Financial Strategy

This AMP will provide the substantiation for budget forecasts put forward in the LTP (2021-2031) for Water Services assets. Council will:

- Implement an improvement approach to asset management planning in the short term. A 10 year improvement plan is included in each AMP. Improvement projects will be monitored monthly by the Asset Group Manager.
- Prepare, maintain and periodically review an AMP outlining sustainable long-term asset management strategies. The AMP will typically be reviewed three-yearly in advance of the LTP. Annual amendments or updates may be undertaken if significant asset management changes occur.
- Report variations in the adopted annual plan budgets against the original AMP forecasts and explain the Level of Service implications of budget variations.

8.2 Development Contributions

Please refer to Financial Policy 404 - Financial Contributions Policy.

8.3 Depreciation

8.3.1 Background

The introduction of accrual accounting during the early 1990's changed the way in which local authorities accounted for their assets, particularly long life assets i.e. pipes and roads. This meant that instead of cash based accounting where the replacement/renewal cost of an asset is recognised only when it wears out, local authorities were required to spread the cost, and any reduction in the value of these assets over its useful life.

Section 100 subsection 1 of the LGA 2002 states: "A local authority must ensure that each year's projected operating revenues are set at a level sufficient to meet that year's projected operating expenses."
This requirement to set operating revenues at a level sufficient to meet operating expenses includes depreciation as Section 111 obliges councils to follow generally accepted accounting practice (GAAP) which includes a definition of "operating expenses." As depreciation is defined as an operational expense it must be included with other operational costs, including interest, when a council sets its operating revenue.

GAAP defines depreciation as follows:
Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life.[2]

Therefore, deprecation measures the annual consumption of an asset so that the reduction in its value is accounted for as it is consumed. The purpose of depreciation is not to provide for the replacement of the asset, although this is a consequence of depreciation. Deprecation ensures that each year's ratepayers pay their way.

The basic value of an asset reduces in accordance with the wearing out or consumption of benefits over the assets life arising from use, the passage of time, or obsolescence. This reduced value is called the depreciated value. It is accounted for by the allocation of the cost (or revalue amount) of the asset less its residual value over its useful life.

[2] Source: Depreciation in the local government context, July 2011. Local Government New Zealand

The decline in service potential is thus provided on a straight line basis on all fixed assets. Therefore Council complies with the requirements of FRS3 and NZIAS 16 and funds asset depreciation.

The Council revalues its assets every three years to keep them up to date and this means that depreciation charge reflects the cost of replacing the asset. It is the valuers role to appropriately identify the level of depreciation, though this will be better achieved through more robust data e.g. condition assessment.

Level of Depreciation Funding

Previously Council has funded depreciation for water assets 100%. As a consequence of the 2011 assets revaluation the new depreciation requirement will have an adverse political consequence it is proposed that the depreciation be ramped up to 100% over the next 3 years i.e. 2015 for the rural water schemes only.

8.4 Valuations

8.4.1 2020 Valuation Summary

Valuations of the three waters infrastructure were carried out in August 2020 and a summary is presented in Table 8.1 and Table 8.2.

Table 8.1: 2020 Valuation Summary

Scheme	ORC	ODRC	Annual Depreciation
Non Pipe Assets	$4,991,455	$2,575,374	$142,895
Pipe Assets	$34,915,527	$16,343,146	$384,553
Total Water Non-Pipes	**$39,906,982**	**$18,918,520**	**$527,448**

Figure 8-1: 2020 Valuation Summary

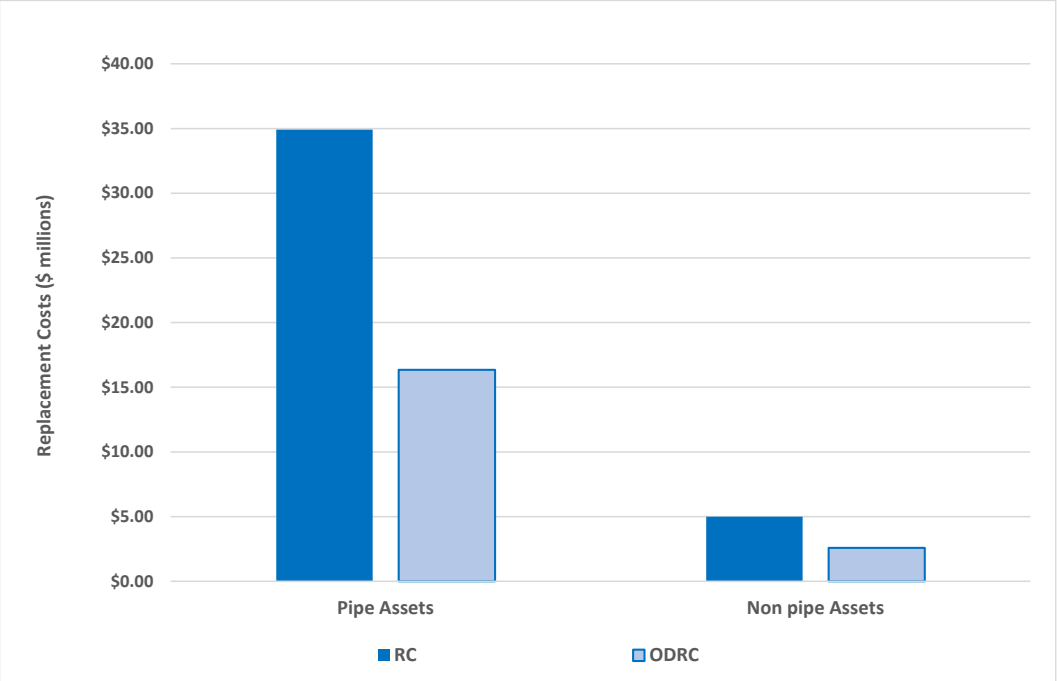


Figure 8-2: 3 Waters 2020 Valuation

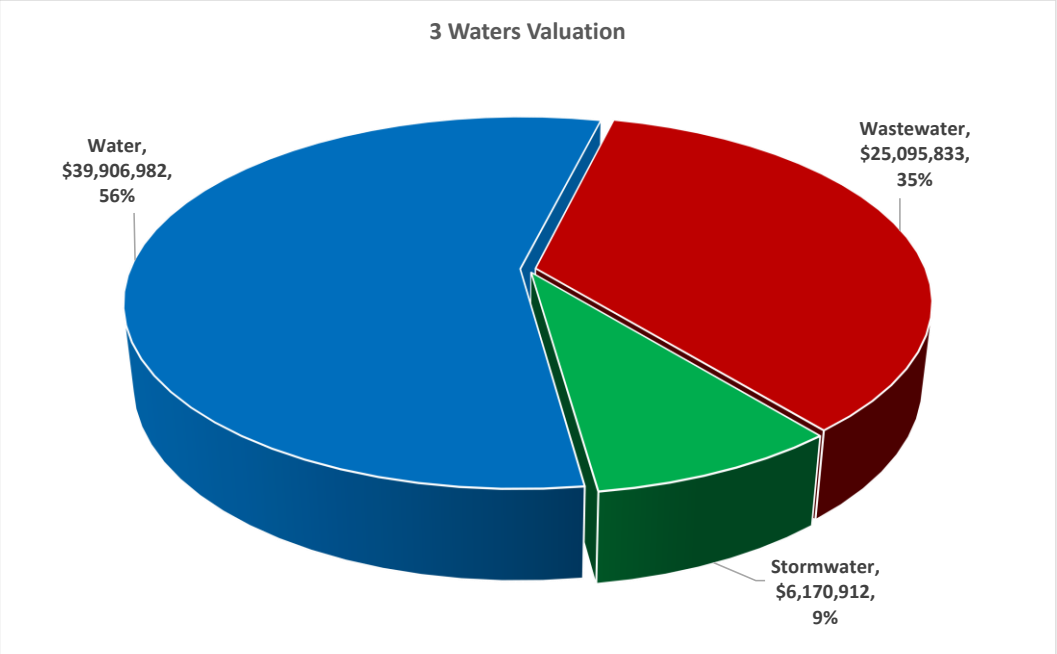
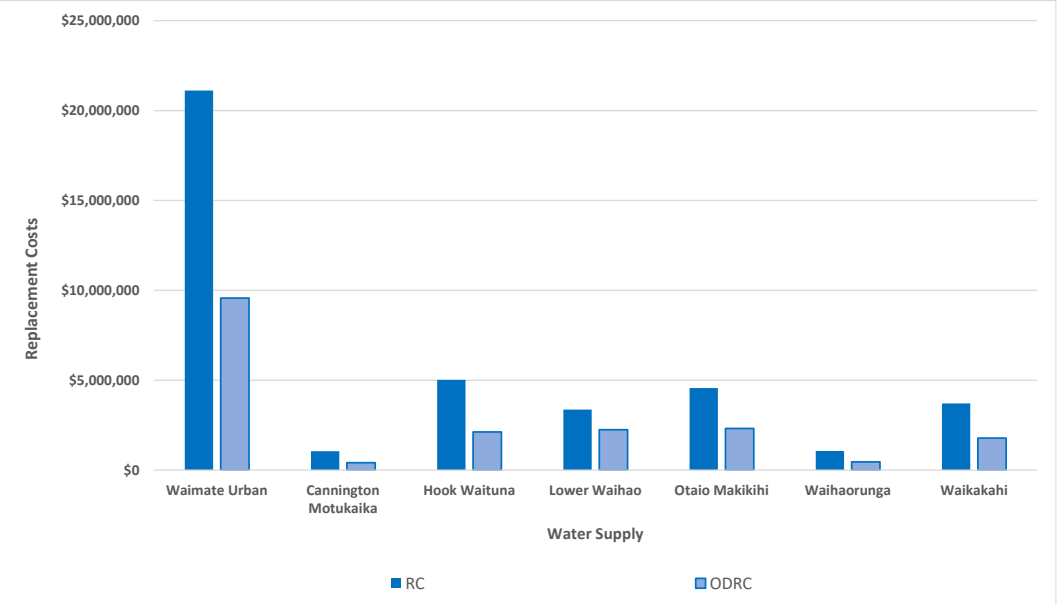


Table 8.2: 2020 Valuation Summary – Water Supplies

Scheme	ORC	ODRC	Annual Depreciation
Waimate Urban	$21,114,428	$9,577,047	$242,290
Cannington Motukaika	$1,051,797	$411,668	$15,275
Hook Waituna	$5,023,003	$2,128,179	$64,511
Lower Waihao	$3,372,296	$2,248,967	$46,723
Otaio Makikihi	$4,567,344	$2,317,285	$78,640
Waihaorunga	$1,066,006	$455,681	$19,437
Waikakahi	$3,712,108	$1,779,693	$60,572
Total Water Pipes	**$39,906,982**	**$18,918,520**	**$527,448**

Figure 8-3: 2020 Valuation Summary - Water Supplies



Change in ORC from 2017 to 2020

The ORC increase from the 2017 valuation to 2020 was $1,796,101 or 7.7%. The key reasons for the increase since the previous valuation are:

- Increases in unit rates.
- Values of new assets added

Valuation Improvements Identified

The improvements identified in 2017, manhole depth factors, the development of predictive modelling in AssetFinda and a number of attribute improvement priorities to improve subsequent revaluations, are being developed.

Also discussed was the review of useful lives for assets that have reached the end of the useful lives and, as in service but "expired" assets, no longer contribute to the annual depreciation figure. The assets in question are reticulation pipes and nodes. Unless there is evidence that warrants then adjusting these lives arbitrarily is not warranted. Instead, develop predictive modelling to assess the remaining useful lives for this purpose.

8.4.2 Confidence Levels

The quantity and quality of the data for the 2017 valuation is shown in Table 8.3.

Table 8.3: Assessment of Confidence Levels

Asset	Quantity	Replacement Cost	Life Expectancy	Condition
Water assets	B	B	B	C

It is accepted that most condition data across the data is anecdotal hence the C rating, however, it has not been taken into the overall data confidence grade as condition was not used to adjust remaining useful life. Taking condition out of the assessment, we consider a data confidence of B is appropriate for this valuation.

8.5 How We Fund Our Activity

The following summarises the ways in which the water activity is funded:

- Operations and Maintenance
- Individual scheme rates
- Water usage via water meters
- Renewals
- Depreciation
- Loans (either internal or external
- Capital
- Development/Financial contributions
- Private or Community contributions
- Government Subsidies (Drinking water Assistance Programme)

8.6 Financial Statements and Projections

8.6.1 Background

The financial summaries in this AMP cover a minimum 30 year planning horizon and are based on financial projections covering the lifecycles of the assets. Additional projections out to 20 years have also been provided to confirm if any major expenditure is likely to occur in the next planning horizon that may have an impact and should be considered as part of financial decision making process.

The following tables summarise the 30-year financial forecast for the Water Services activity under the following headings:

- Operations and Maintenance
- Capital works – Growth
- Capital Works – Increased Level of Service
- Capital Works – Renewals
- Capita Works – Vested Assets

8.6.2 Renewal and Operational Expenditure

As noted in Section 7.5.2 the renewals profile is based on an asset useful life. At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined over time by determining evidence-based useful lives using a combination of condition and performance data.

It needs to be noted that the water supply capital budgets in Tables 8-5 to 8-11 don't line up with the predicated capital expenditure from the 2017 valuations (book value). This is because a number of reasons:

- Assessment of pipe, adjustment for known risk factors, and actual number of breaks/leaks (Section 7.5.2)
- Positive impacts of the renewal work already done i.e. reductions in breaks/leaks
- The ability to all do the physical works required (staffing)
- The ability to finance all assets that have that fallen due for renewal, which includes those assets that have well past their useful lives and were not renewed at time of expiry.

Thirty Year Renewal Forecasts

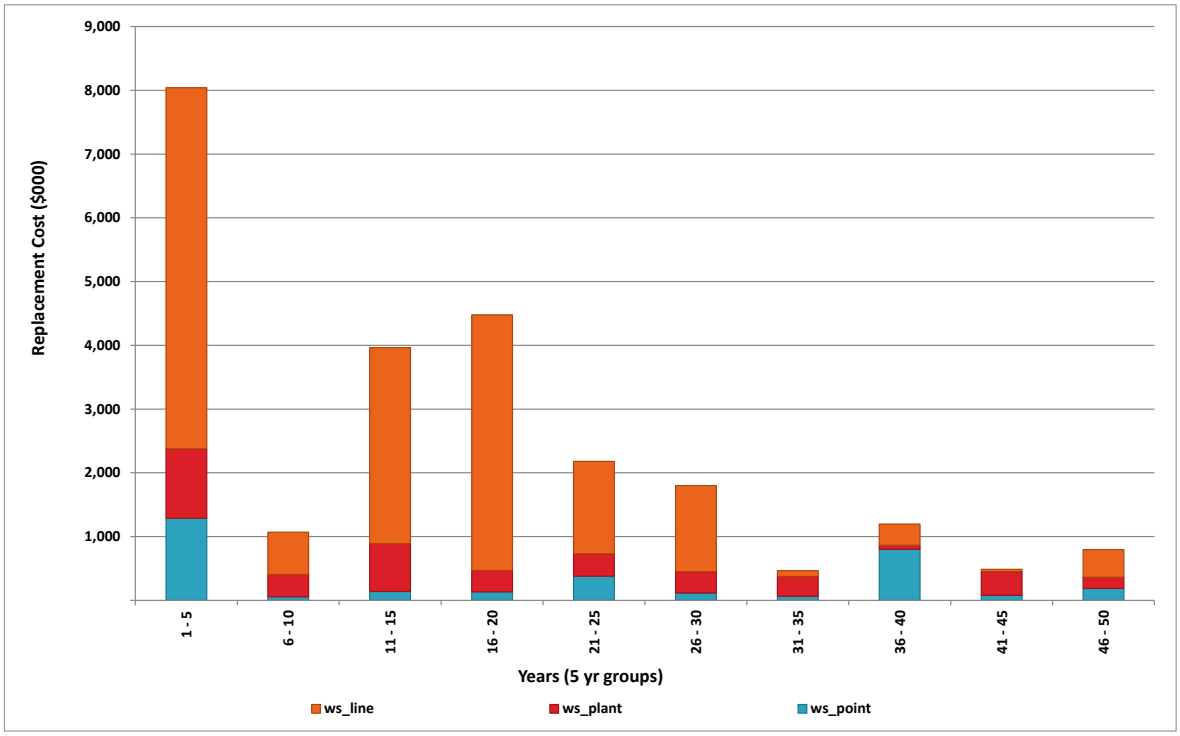
The renewals forecasts are shown below and are of a significant amount ($19m over the 30 year period).

Table 8.4: 30 Year Renewal Expenditure Forecasts – All Assets

Scheme Name	Remaining Useful Life Group	Point ($)	Plant ($)	Line ($)	Grand Total ($)
Waimate Urban	1 to 5	506,485	237,768	5,665,212	6,409,466
	6 to 10	23,707	16,473	51,192	91,373
	11 to 15	126,068	282,024	944,443	1,352,536
	16 to 20	109,678	234,333	2,068,186	2,412,197
	21 to 25	266,589	281,993	962,787	1,511,369
	26 to 30	39,499	201,902	596,116	837,517
Waimate Urban Total		1,072,026	1,254,493	10,287,939	12,614,458
Cannington Motukaika	1 to 5	43,724	78,777		122,501
	6 to 10	2,359	8,120		10,479
	11 to 15	1,132	5,341	257,443	263,916
	16 to 20	626		164,953	165,580

Scheme Name	Remaining Useful Life Group	Point ($)	Plant ($)	Line ($)	Grand Total ($)
	21 to 25	1,720			1,720
	26 to 30	2,935	71		3,006
Cannington Motukaika Total		52,496	92,309	422,397	567,202
432,624Hook Waituna	1 to 5	319,138	94,277		413,415
	6 to 10	5,799	83,497		89,296
	11 to 15	1,725	108,645	787,251	897,621
	16 to 20	6,424	30,185	934,710	971,320
	21 to 25	42,327	11,556	6,315	60,199
	26 to 30	24,182	36,339	80	60,602
Hook Waituna Total		399,595	364,499	1,728,357	2,492,453
Lower Waihao	1 to 5	121,548	93,523		215,072
	6 to 10	4,911	48,078		52,989
	11 to 15	3,909	15,753		19,662
	16 to 20	4,104	7,250	247,788	259,143
	21 to 25	33,185	21,355	275,003	329,544
	26 to 30	24,012	1,852		25,864
Lower Waihao Total		191,669	187,811	522,792	902,273
13,531Otaio Makikihi	1 to 5	129,740	123,877		253,618
	6 to 10	12,609	59,087	609,184	680,881
	11 to 15	1,396	247,742	426,037	675,175
	16 to 20	4,351	8,767		13,118
	21 to 25	20,271	1,866	800	22,938
	26 to 30	14,893	77,135	751,289	843,317
Otaio Makikihi Total		183,260	518,474	1,787,311	2,489,046
Waihaorunga	1 to 5	33,586	166,949		200,535
	6 to 10		24,356		24,356
	11 to 15	1,465	51,958		53,423
	16 to 20	908	23,350	133,046	157,305
	21 to 25	550	12,476	197,853	210,879
	26 to 30	3,175	1,375		4,550
Waihaorunga Total		39,684	280,464	330,899	651,048
Waikakahi	1 to 5	134,552	244,423		378,975
	6 to 10	5,967	94,857		100,824
	11 to 15	2,324	40,608	658,793	701,726
	16 to 20	6,331	30,252	459,061	495,645
	21 to 25	15,674	19,837	6,644	42,155
	26 to 30	6,254	15,813		22,067
Waikakahi Total		171,102	445,790	1,124,500	1,741,393
Grand Total		**2,109,832**	**3,143,842**	**16,204,198**	**21,457,873**

Figure 8-4: Water Renewals - 50 Years



Maintenance Expenditure

The maintenance requirements (as at 30/11/2020) are detailed below (including inflation). As the renewal works are progressed the existing maintenance expenditure will decease markedly. This will of course be offset by the increased operational costs as a result of the DWSNZ upgrade works i.e. higher labour, electricity and treatment consumables costs.

Table 8.5: Detailed Maintenance & Operational Expenditure: Cannington / Motukaika (figures are inflated)

Cannington Motukaika -5110	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Grand Total	**-14,991**	**-16,401**	**-3,026**	**20,046**	**17,344**	**12,664**	**7,700**	**2,955**	**-295**	**-4,545**
Total Operating Revenue	**- 80,070**	**- 83,654**	**- 82,156**	**- 83,582**	**- 90,521**	**- 98,207**	**- 104,936**	**- 112,131**	**- 120,067**	**- 126,183**
511001505 - Targeted Rate - Water	- 68,840	- 70,893	- 74,436	- 81,880	- 89,249	- 97,281	- 104,091	- 111,377	- 119,174	- 125,132
511005101 - Recoveries - General	-	- 117	-	-	-	-	-	-	-	-
511007101 - Dividend - SC Power	- 60	- 60	- 60	- 60	- 62	- 63	- 65	- 66	- 68	- 70
511007305 - Internal Interest	- 11,170	- 12,584	- 7,660	- 1,642	- 1,210	- 863	- 780	- 688	- 825	- 981
Total Operating Expenditure	**65,079**	**67,253**	**79,130**	**103,628**	**107,865**	**110,871**	**112,636**	**115,086**	**119,772**	**121,638**
5110304 - Conference, Seminars and Training	223	-	-	-	-	-	-	-	-	-
5110322 - Advertising and Notices	-	-	206	206	213	217	222	228	234	241
5110333 - General Expenses	105	34	514	514	531	543	555	570	583	600
5110336 - LAPP Disaster Fund	1,117	1,344	1,479	1,716	1,774	1,812	1,853	1,902	1,945	2,004
5110347 - Publications	70	-	-	-	-	-	-	-	-	-
5110349 - Repairs and Maintenance	-	-	206	206	213	217	222	228	234	241
5110356 - Telephone Expenses	113	113	130	130	134	137	140	144	147	152
5110357 - Utilities charges	19,176	20,036	13,878	24,544	25,379	25,911	26,508	27,197	27,823	28,658
511040313 - Depreciation	13,505	13,505	14,815	20,885	22,158	23,931	23,931	23,931	25,845	25,845
5110405 - Insurance	912	1,138	945	1,106	1,144	1,168	1,194	1,226	1,254	1,291
5110422 - Electricity - Cannington	4,217	6,091	4,000	6,100	6,307	6,440	6,588	6,759	6,915	7,122
511042405 - Internal Rent	2,160	2,232	2,386	4,331	4,447	4,580	4,765	4,863	4,967	5,104
5110425 - Rates	824	482	510	542	560	572	585	601	614	633

Cannington Motukaika -5110	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
5110501 - Asset Mgt Plan	680	742	4,355	2,555	2,642	2,697	2,759	2,831	2,896	2,983
5110504 - Consultants	-	-	1,098	1,098	1,135	1,159	1,186	1,217	1,245	1,282
5110506 - Contractors	115	178	1,098	1,098	1,135	1,159	1,186	1,217	1,245	1,282
5110508 - Line Maintenance	-	-	2,196	2,196	2,271	2,318	2,372	2,433	2,489	2,564
5110510 - Operational Maintenance	-	-	2,000	2,000	2,068	2,111	2,160	2,216	2,267	2,335
5110511 - Pump Maintenance	2,517	196	3,281	3,281	3,393	3,464	3,543	3,636	3,719	3,831
5110512 - Water Testing	3,810	4,167	4,000	4,900	4,653	4,751	4,860	4,986	5,555	5,254
5110520 - Source / Headworks	-	-	4,392	4,392	4,541	4,637	4,743	4,867	4,979	5,128
5110601 - HR Costs - 8125	325	289	353	291	356	363	370	376	383	390
511060101 - 8126 - Health & Safety O/H Recoveries	762	768	626	661	680	690	702	716	731	747
5110602 - Corporate Services Costs - 8120	2,744	3,202	3,416	3,336	3,450	3,475	3,564	3,648	3,691	3,763
5110604 - Utilities Costs - 8140	2,563	3,483	3,416	5,132	4,995	4,584	4,556	5,001	5,273	5,257
5110606 - Asset Management Unit Costs - 8160	3,735	4,006	4,250	6,013	6,279	6,350	6,414	6,497	6,612	6,715
5110608 - Network Costs	1,521	1,449	1,709	2,450	2,442	2,512	2,506	2,490	2,653	2,644
5110609 - CEO & Finance Costs - 8110	2,358	2,244	2,367	2,066	2,176	2,255	2,292	2,332	2,376	2,427
5110611 - Support - Asset Manager	1,529	1,555	1,504	1,880	2,788	2,818	2,858	2,975	3,098	3,145
Capital Projects										
511076001 - Cannington - Renewals	63,000	5,170	5,279	5,400	7,313	5,668	5,838	6,031	6,230	6,398
511076003 - Cannington - Pratts Pumphouse - New Board and Telemetry	23,000	-	-	-	-	-	-	-	-	-
511076004 - Cannington - Pratts Pumphouse - Pump 1 Renewal	-	-	-	-	-	4,874	-	-	-	-
511076005 - Cannington - Pratts Chlorine Analyser	16,000	-	-	-	-	-	-	-	-	-

Cannington Motukaika -5110	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
511076006 - Cannington - Renewal Maintenace of weir	-	-	14,252	-	-	-	-	-	-	-
511076007 - Cannington - Pratts pumphouse power supply	-	-	-	20,088	-	-	-	-	-	-
511076008 - Cannington - Line renewal PE 80mm Slip Line	-	34,329	-	-	-	-	-	-	-	-
Capex Total	**102,000**	**39,499**	**19,530**	**25,488**	**7,313**	**10,542**	**5,838**	**6,031**	**6,230**	**6,398**

Table 8.6: Detailed Maintenance & Operational Expenditure: Hook / Waituna (Figures are inflated)

Hook Waituna - 5130	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Grand Total	**18,310**	**-24,688**	**59,553**	**11,073**	**18,147**	**8,871**	**-2,811**	**-11,235**	**-14,061**	**-17,560**
Total Operating Revenue	**-309,697**	**-344,614**	**-330,775**	**-353,610**	**-370,811**	**-389,076**	**-404,477**	**-420,517**	**-437,166**	**-446,013**
513001505 - Rates Appropriation - Targeted	-278,035	-306,604	-321,657	-344,173	-361,382	-379,451	-394,629	-410,414	-426,830	-435,367
513002501 - Works - Application fee	-7,452	-6,710	-1,028	-1,028	-1,063	-1,085	-1,110	-1,139	-1,165	-1,200
513002503 - Works - Metered Supply Charges	-	-3,033	-	-	-	-	-	-	-	-
513005101 - Recoveries - General	-5,284	-1,493	-4,626	-4,626	-4,783	-4,884	-4,996	-5,126	-5,244	-5,401
513005103 - Recoveries - Works	-	-2,323	-	-	-	-	-	-	-	-
513007101 - Dividend - SC Power	-382	-362	-380	-380	-393	-401	-410	-421	-431	-444
513007305 - Internal Interest	-14,195	-16,264	-	-319	-	-	-	-	-	-
5130081 - Capital Contributions - Water	-4,348	-7,826	-3,084	-3,084	-3,189	-3,256	-3,331	-3,417	-3,496	-3,601
Total Operating Expenditure	**328,006**	**319,926**	**390,328**	**364,683**	**388,958**	**397,947**	**401,666**	**409,282**	**423,105**	**428,453**
5130322 - Advertising and Notices	113	24	206	206	213	217	222	228	234	241
5130333 - General Expenses	322	148	1,028	1,028	1,063	1,085	1,110	1,139	1,165	1,200
5130336 - LAPP Disaster Fund	3,796	4,701	5,172	6,001	6,205	6,335	6,481	6,650	6,803	7,007
5130349 - Repairs and Maintenance	-	-	925	925	956	977	999	1,025	1,049	1,080
5130356 - Telephone Expenses	362	362	400	400	414	422	432	443	453	467
5130357 - Utilities charges	95,178	74,368	97,660	91,119	94,217	96,194	98,409	100,969	103,293	106,391
513040305 - Depn - Office Equipment	133	107	93	-	-	-	-	-	-	-
513040313 - Depreciation	70,466	71,473	91,991	93,882	93,882	101,392	101,392	101,392	109,503	109,503

Hook Waituna - 5130	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
513040405 - Internal Interest Expense	4,685	5,600	9,230	-	15,360	13,708	11,914	10,473	8,893	6,954
5130405 - Insurance	4,054	5,075	4,935	5,652	5,844	5,967	6,104	6,263	6,407	6,599
5130407 - Loss on Assets	-	426	-	-	-	-	-	-	-	-
5130422 - Electricity	14,320	16,986	14,572	17,000	17,578	17,947	18,360	18,838	19,271	19,849
513042405 - Internal Rent	6,480	6,672	7,124	12,893	13,242	13,633	14,181	14,478	14,790	15,196
5130425 - Rates	2,142	2,266	2,420	2,546	2,633	2,688	2,750	2,821	2,886	2,973
5130501 - Asset Mgt Plan	2,028	5,101	12,652	8,852	9,153	9,345	9,560	9,809	10,035	10,336
5130504 - Consultants	480	-	3,000	3,000	3,102	3,167	3,240	3,324	3,401	3,503
5130506 - Contractor - Other	1,593	883	1,542	1,542	1,594	1,628	1,665	1,709	1,748	1,800
5130508 - Line Maintenance	-	603	1,250	1,250	1,293	1,320	1,350	1,385	1,417	1,460
5130510 - Operational Maintenance	-	-	2,000	2,000	2,068	2,111	2,160	2,216	2,267	2,335
5130511 - Pump Maintenance	332	-	1,500	1,500	1,551	1,584	1,620	1,662	1,700	1,751
5130512 - Water Testing	4,082	6,316	5,500	6,400	6,618	6,756	6,912	7,646	7,255	7,473
5130514 - Water purchases	18,051	23,528	24,000	26,000	26,884	27,448	28,080	28,811	29,474	30,358
5130520 - Source / Headworks	16,476	-	5,140	5,140	5,315	5,426	5,551	5,696	5,827	6,001
5130601 - HR Costs - 8125	1,720	1,529	1,873	1,135	1,388	1,415	1,444	1,468	1,492	1,519
513060101 - 8126 - Health & Safety O/H Recoveries	4,032	4,069	3,315	2,576	2,651	2,692	2,738	2,792	2,852	2,915
5130602 - Corporate Services Costs - 8120	14,512	16,966	18,100	11,780	12,183	12,273	12,586	12,884	13,034	13,289
5130604 - Utilities Costs - 8140	28,202	38,326	37,590	26,462	25,757	23,635	23,495	25,789	27,190	27,109
5130606 - Asset Management Unit Costs - 8160	11,638	12,496	13,258	15,403	16,082	16,265	16,428	16,641	16,937	17,200
5130608 - Network Costs	8,046	7,679	9,054	9,879	9,848	10,128	10,103	10,039	10,696	10,660

Hook Waituna - 5130	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
5130609 - CEO & Finance Costs - 8110	12,471	11,890	12,544	7,296	7,685	7,964	8,095	8,234	8,391	8,570
5130611 - Support - Asset Manager	2,292	2,331	2,254	2,817	4,179	4,224	4,284	4,459	4,643	4,714
Capital Projects										
513076001 - Hook / Waituna - Renewals	10,000	20,680	10,557	10,800	11,081	11,336	23,352	12,061	12,459	25,590
513076005 - Hook / Waituna - Drinking Water Intake/Plant Compliance Upgrade	673,333	-	-	-	-	-	-	-	-	-
513076007 - Hook / Waituna - O`Donnells Pumphouse Panel and Telemetry	-	-	-	-	-	-	-	-	-	-
513076012 - Hook / Waituna - Simmons Pumphouse Pump 1 Renewal	-	-	-	-	-	4,534	-	-	-	-
513076014 - Hook / Waituna - Flow Meter Replacement	4,000	-	-	6,480	6,759	-	-	-	-	1,280
513076015 - Hook / Waituna - Dual check augmentation	18,000	-	-	-	-	-	-	-	-	-
513076016 - Hook / Waituna - Line renewal Intake to O'Donnells	-	-	-	-	-	-	-	48,244	49,836	-
513076017 - Hook / Waituna - Line renewal investigation Garlands to Stud	8,000	-	-	-	-	-	-	-	-	-
513076018 - Hook / Waituna - Line renewal upper Nortons Reserve Rd	-	-	-	-	42,108	43,077	-	-	-	-
513076019 - Hook / Waituna - Line renewal Manchesters and Molloys Rd	-	-	22,170	38,880	-	-	-	-	-	-
Capex Total	**713,333**	**20,680**	**32,727**	**56,160**	**59,948**	**58,947**	**23,352**	**60,305**	**62,295**	**26,870**

Table 8.7: Detailed Maintenance & Operational Expenditure: Lower Waihao (figures are inflated)

Lower Waihao - 5140	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Grand Total	**- 19,985**	**- 29,684**	**83,243**	**20,251**	**26,079**	**9,493**	**- 591**	**- 5,969**	**- 8,053**	**- 15,489**
Total Operating Revenue	**- 308,758**	**- 318,818**	**- 316,592**	**- 362,921**	**- 388,756**	**- 415,613**	**- 430,992**	**- 447,182**	**- 463,760**	**- 475,748**
514001505 - Targeted Rate - Water	- 225,287	- 248,779	- 260,792	- 293,391	- 316,862	- 342,211	- 355,900	- 370,136	- 384,941	- 394,565
514002501 - Works - Application fee	- 452	- 752	- 617	- 617	- 638	- 651	- 666	- 684	- 699	- 720
514002502 - Works - Connection Fees	- 113	- 157	- 617	- 617	- 638	- 651	- 666	- 684	- 699	- 720
514005101 - Recoveries - General	- 13,762	- 6,014	- 5,140	- 5,140	- 5,315	- 5,426	- 5,551	- 5,696	- 5,827	- 6,001
514007101 - Dividend - SC Power	- 530	- 483	- 530	- 530	- 548	- 560	- 572	- 587	- 601	- 619
514007305 - Internal Interest	- 6,341	- 7,340	- 4,270	-	-	-	-	-	-	-
5140081 - Capital Contributions - Water	- 4,348	- 1,739	- 4,626	- 4,626	- 4,783	- 4,884	- 4,996	- 5,126	- 5,244	- 5,401
5140102 - Internal Water Recoveries	- 57,925	- 53,553	- 40,000	- 58,000	- 59,972	- 61,231	- 62,640	- 64,270	- 65,749	- 67,721
Total Operating Expenditure	**288,773**	**289,135**	**399,835**	**383,172**	**414,835**	**425,106**	**430,401**	**441,213**	**455,707**	**460,259**
5140322 - Advertising and Notices	75	-	206	206	213	217	222	228	234	241
5140333 - General Expenses	141	148	3,297	3,297	3,409	3,481	3,561	3,653	3,737	3,850
5140336 - LAPP Disaster Fund	2,233	2,820	3,102	3,598	3,720	3,798	3,886	3,987	4,079	4,201
5140349 - Repairs & Maintenance	-	30	1,028	1,028	1,063	1,085	1,110	1,139	1,165	1,200
5140356 - Telephone Expenses	3,389	3,389	3,580	3,580	3,702	3,779	3,866	3,967	4,058	4,180
5140357 - Utilities charges	63,294	53,158	66,820	65,783	68,020	69,447	71,046	72,894	74,572	76,808
514040305 - Depn - Office Equipment	55	44	38	-	-	-	-	-	-	-
514040313 - Depreciation	41,373	42,155	86,820	84,178	84,178	92,096	92,096	92,096	99,464	99,464

Lower Waihao - 5140	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
514040405 - Internal Interest	8,552	8,716	37,580	29,095	51,238	49,650	49,230	51,572	51,678	48,623
5140405 - Insurance	2,169	2,706	2,453	2,835	2,931	2,993	3,062	3,141	3,214	3,310
5140407 - Loss on Assets	-	175	-	-	-	-	-	-	-	-
5140422 - Electricity	78,488	76,040	71,000	77,500	80,135	81,817	83,700	85,878	87,854	90,489
514042405 - Internal Rent	4,320	4,452	4,761	8,624	8,856	9,118	9,485	9,682	9,891	10,162
5140425 - Rates	2,142	1,456	6,000	1,635	1,691	1,726	1,766	1,812	1,853	1,909
5140501 - Asset Mgt Plan	1,359	4,259	13,099	8,699	8,995	9,184	9,395	9,639	9,861	10,157
5140504 - Consultants	-	-	1,000	1,000	1,034	1,056	1,080	1,108	1,134	1,168
5140506 - Contractors	1,404	817	2,056	2,056	2,126	2,171	2,220	2,278	2,331	2,401
5140508 - Line Maintenance	-	-	1,250	1,250	1,293	1,320	1,350	1,385	1,417	1,460
5140510 - Operational Maintenance	8,657	5,450	8,500	8,500	8,789	8,973	9,180	9,419	9,636	9,925
5140511 - Pump Maintenance	-	1,982	1,542	1,542	1,594	1,628	1,665	1,709	1,748	1,800
5140512 - Water Testing	3,662	5,622	5,500	5,700	5,894	6,017	6,156	6,759	6,462	6,655
5140520 - Source / Headworks	-	-	1,799	1,799	1,860	1,899	1,943	1,993	2,039	2,101
5140601 - HR Costs - 8125	1,541	1,370	1,677	952	1,164	1,186	1,211	1,231	1,251	1,274
514060101 - 8126 - Health & Safety O/H Recoveries	3,611	3,644	2,969	2,160	2,223	2,257	2,296	2,341	2,391	2,444
5140602 - Corporate Services Costs - 8120	12,996	15,195	16,210	14,715	15,219	15,331	15,721	16,094	16,282	16,599
5140604 - Utilities Costs - 8140	17,171	23,335	22,886	17,716	17,244	15,823	15,729	17,265	18,203	18,149
5140606 - Asset Management Unit Costs - 8160	11,475	12,315	13,066	15,821	16,519	16,707	16,875	17,093	17,398	17,668
5140608 - Network Costs	7,206	6,877	8,108	7,972	7,948	8,173	8,153	8,102	8,632	8,603
5140609 - CEO & Finance Costs - 8110	11,168	10,649	11,234	9,114	9,600	9,948	10,112	10,286	10,481	10,705
5140611 - Support - Asset Manager	2,292	2,331	2,254	2,817	4,179	4,224	4,284	4,459	4,643	4,714

Lower Waihao - 5140	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Capital Projects										
514076001 - Lower Waihao - Renewals	30,000	5,170	5,279	5,400	-	5,668	5,838	6,031	6,230	6,398
514076003 - Lower Waihao - Drinking Water Intake/Plant Compliance Upgrade	797,000	-	-	-	-	-	-	-	-	-
514076004 - Lower Waihao - Glenavy Township Mains Renewal	-	-	-	-	77,567	-	-	124,590	-	-
514076005 - Lower Waihao - Glenavy Township Restrictor Renewal	-	-	-	-	11,081	-	-	20,142	-	-
514076006 - Lower Waihao - Glenavy Chlorine Monitoring Station	-	-	57,008	-	-	-	-	-	-	-
514076008 - Lower Waihao - Lower Waihao Boost Pump 3 Renewal	-	-	-	-	6,095	-	-	-	-	-
514076009 - Lower Waihao - Telemetry - Lower Waihao Boost Renewal	-	-	-	8,640	-	-	-	-	-	-
514076010 - Lower Waihao - Flow Meter Renewal	-	-	6,334	-	6,870	-	-	-	-	1,407
514076011 - Lower Waihao - Old Ferry Rd 150mm AC Renewal	-	-	-	-	-	-	-	-	-	-
514076012 - Lower Waihao - Glenavy line renewal	-	-	-	156,708	-	-	-	-	-	-
Capex Total	**827,000**	**5,170**	**68,621**	**170,748**	**101,613**	**5,668**	**5,838**	**150,763**	**6,230**	**7,805**

Table 8.8: Detailed Maintenance & Operational Expenditure: Otaio / Makikihi (figures are inflated)

Otaio Makikihi - 5150	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Grand Total	**18,734**	**9,337**	**44,241**	**38,242**	**27,129**	**16,490**	**217**	**13,958**	**23,511**	**26,467**
Total Operating Revenue	**245,834**	**271,123**	**259,175**	**276,861**	**298,728**	**322,254**	**341,350**	**361,609**	**383,452**	**392,512**
515001505 - Targeted Rate - Water	220,759	241,094	250,697	270,753	292,413	315,806	334,754	354,840	376,130	383,653
515002501 - Works - Application fee	1,789	2,277	518	518	536	547	559	574	587	605
515005101 - Recoveries - General	1,909	2,990	2,570	2,570	2,657	2,713	2,776	2,848	2,913	3,001
515007101 - Dividend - SC Power	448	421	450	450	465	475	486	499	510	525
515007305 - Internal Interest	7,017	6,080	2,370	-	-	-	-	-	398	1,728
5150081 - Capital Contributions - Water	13,913	18,261	2,570	2,570	2,657	2,713	2,776	2,848	2,913	3,001
Total Operating Expenditure	**264,568**	**261,786**	**303,416**	**315,103**	**325,857**	**338,744**	**341,567**	**347,651**	**359,941**	**366,045**
5150322 - Advertising and Notices	40	34	206	206	213	217	222	228	234	241
5150333 - General Expenses	141	148	777	777	803	820	839	861	881	907
5150336 - LAPP Disaster Fund	2,233	2,398	2,637	3,059	3,163	3,229	3,304	3,390	3,468	3,572
5150349 - Repairs and Maintenance	-	-	1,028	1,028	1,063	1,085	1,110	1,139	1,165	1,200
5150356 - Telephone expenses	1,505	1,536	1,542	1,542	1,594	1,628	1,665	1,709	1,748	1,800
5150357 - Utilities charges	45,558	33,505	48,316	49,612	51,299	52,375	53,581	54,975	56,240	57,927
5150358 - Vehicle Costs	-	-	-	100	103	106	108	111	113	117
5150398 - Vehicle Recoveries	1,242	95	400	-	-	-	-	-	-	-
5150401 - Bad & Doubtful Debts	2,065	-	-	-	-	-	-	-	-	-
515040303 - Depreciation - Plant & Machinery	2,544	4,577	3,662	2,928	2,342	1,874	1,499	1,199	960	768

Otaio Makikihi - 5150	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
515040305 - Depn - Office Equipment	41	33	29	-	-	-	-	-	-	-
515040313 - Depreciation	64,605	64,774	75,726	88,770	93,087	100,533	100,533	100,533	108,576	108,576
515040405 - Internal Interest	4,096	1,432	6,160	1,356	833	3,530	1,966	1,665	-	-
5150405 - Insurance	3,954	4,925	4,926	5,592	5,782	5,903	6,039	6,197	6,339	6,529
5150407 - Loss on Assets	-	148	-	-	-	-	-	-	-	-
5150422 - Electricity	69,824	66,723	60,000	67,000	69,278	70,732	72,360	74,243	75,951	78,229
515042405 - Internal Rent	4,320	4,452	4,761	8,624	8,856	9,118	9,485	9,682	9,891	10,162
5150425 - Rates	1,318	1,775	1,890	1,994	2,062	2,105	2,154	2,210	2,260	2,328
5150501 - Asset Mgt Plan	1,359	4,438	14,216	9,316	9,633	9,835	10,061	10,323	10,561	10,877
5150504 - Consultants	2,600	-	1,500	1,500	1,551	1,584	1,620	1,662	1,700	1,751
5150506 - Contractors	304	630	1,542	1,542	1,594	1,628	1,665	1,709	1,748	1,800
5150508 - Line Maintenance	-	-	1,000	1,000	1,034	1,056	1,080	1,108	1,134	1,168
5150510 - Operational Maintenance	-	6,028	3,500	3,500	3,619	3,695	3,780	3,878	3,968	4,087
5150511 - Pump Maintenance	376	-	2,056	2,056	2,126	2,171	2,220	2,278	2,331	2,401
5150512 - Water Testing	4,804	6,612	6,800	7,200	7,445	7,601	7,776	7,978	8,162	8,407
5150520 - Source / Headworks	-	-	1,024	1,024	1,059	1,081	1,106	1,135	1,161	1,196
5150601 - HR Costs - 8125	1,300	1,155	1,415	747	914	931	950	966	982	1,000
515060101 - 8126 - Health & Safety O/H Recoveries	3,047	3,073	2,504	1,696	1,746	1,772	1,802	1,838	1,877	1,919
5150602 - Corporate Services Costs - 8120	10,968	12,816	13,673	12,260	12,680	12,774	13,099	13,410	13,566	13,831
5150604 - Utilities Costs - 8140	11,985	16,287	15,974	15,354	14,945	13,714	13,632	14,964	15,776	15,730
5150606 - Asset Management Unit Costs - 8160	7,305	7,855	8,334	9,538	9,959	10,072	10,174	10,305	10,489	10,652

Otaio Makikihi - 5150	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
5150608 - Network Costs	6,081	5,801	6,839	6,308	6,288	6,467	6,451	6,410	6,829	6,806
5150609 - CEO & Finance Costs - 8110	9,425	8,982	9,475	7,594	7,999	8,289	8,426	8,570	8,733	8,920
5150611 - Support - Asset Manager	1,529	1,555	1,504	1,880	2,788	2,818	2,858	2,975	3,098	3,145
Capital Projects										
515076002 - Otaio / Makikihi - Renewals	48,000	-	2,111	-	2,216	-	2,335	-	2,492	-
515076003 - Otaio / Makikihi - New Bore Redundancy	-	127,182	-	-	-	-	-	-	-	-
515076004 - Otaio / Makikihi - Wilton - 2500m 80mm PVC + 400m 32 OD	-	-	-	-	-	-	-	-	-	-
515076005 - Otaio / Makikihi - Makikihi Township Mains Renewal	-	-	-	75,600	-	-	-	104,931	-	-
515076006 - Otaio / Makikihi - Makikihi Township Restrictor Renewal	-	-	-	10,800	-	-	-	12,543	-	-
515076009 - Otaio / Makikihi - Flow Meter Replacement	-	-	-	5,400	1,551	-	-	-	-	6,398
515076010 - Otaio / Makikihi - Line renewal Makikihi 100mm PVC	-	31,020	31,671	-	-	-	-	-	-	-
515076011 - Otaio / Makikihi - Consent Volume Review	-	-	-	-	16,622	-	-	-	-	-
515076012 - Otaio / Makikihi - Renewal Marshalls Road	10,000	-	-	-	-	-	-	-	-	-
Capex Total	**58,000**	**158,202**	**33,782**	**91,800**	**20,389**	**-**	**2,335**	**117,474**	**2,492**	**6,398**

Table 8.9: Detailed Maintenance & Operational Expenditure: Waihaorunga (figures are inflated)

Waihaorunga - 5160	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Grand total	**8,934**	**8,510**	**17,991**	**43,580**	**35,717**	**27,973**	**15,312**	**2,330**	**- 8,485**	**- 22,898**
Total Operating Revenue	**- 103,755**	**- 118,559**	**- 122,816**	**- 138,914**	**- 151,403**	**- 165,011**	**- 179,846**	**- 196,016**	**- 213,685**	**- 231,371**
516001505 - Targeted Rate - Water	- 99,667	- 114,854	- 120,586	- 138,674	- 151,155	- 164,758	- 179,587	- 195,750	- 213,367	- 230,436
516005101 - Recoveries - General	- 113	- 1,065	-	-	-	-	-	-	-	-
516007101 - Dividend - SC Power	- 240	- 240	- 240	- 240	- 248	- 253	- 259	- 266	- 272	- 280
516007305 - Internal Interest Income	- 3,734	- 2,400	- 1,990	-	-	-	-	-	- 46	- 655
Total Operating Expenditure	**112,688**	**127,069**	**140,807**	**182,494**	**187,120**	**192,984**	**195,158**	**198,346**	**205,200**	**208,473**
5160322 - Advertising and Notices	22	34	206	206	213	217	222	228	234	241
5160333 - General Expenses	115	-	514	514	531	543	555	570	583	600
5160336 - LAPP Disaster Fund	1,117	1,439	1,583	1,837	1,899	1,939	1,984	2,036	2,082	2,145
5160347 - Publications	48	-	-	-	-	-	-	-	-	-
5160349 - Repairs and Maintenance	-	-	382	382	395	403	413	423	433	446
5160356 - Telephone Expenses	113	113	123	123	127	130	133	136	139	144
5160357 - Utilities charges	27,560	32,809	22,616	40,746	42,131	43,016	44,006	45,151	46,190	47,575
516040303 - Depreciation - Plant and Machinery	401	360	352	129	116	104	94	84	76	68
516040305 - Depn - Office Equipment	38	31	27	-	-	-	-	-	-	-
516040313 - Depreciation	15,304	16,677	32,564	44,884	44,884	48,475	48,475	48,475	52,353	52,353
516040405 - Internal Interest	3,182	3,628	3,130	2,191	2,298	2,702	2,084	1,248	-	-
5160405 - Insurance	1,328	1,705	1,470	1,711	1,769	1,806	1,848	1,896	1,940	1,998

Waihaorunga - 5160	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
5160407 - Loss on Assets	-	1,937	-	-	-	-	-	-	-	-
5160422 - Electricity	24,815	26,714	22,000	27,000	27,918	28,504	29,160	29,919	30,607	31,525
516042405 - Internal Rent	2,160	2,232	2,386	4,331	4,447	4,580	4,765	4,863	4,967	5,104
5160425 - Rates	659	470	500	528	546	557	570	585	599	616
5160501 - Asset Mgt Plan	680	1,335	9,529	5,429	5,614	5,731	5,863	6,016	6,154	6,339
5160504 - Consultants	-	-	1,098	1,098	1,135	1,159	1,186	1,217	1,245	1,282
5160506 - Contractors	1,413	2,720	2,467	2,467	2,551	2,604	2,664	2,734	2,797	2,880
5160508 - Line Maintenance	-	-	518	518	536	547	559	574	587	605
5160510 - Operational Maintenance	-	-	1,600	1,600	1,654	1,689	1,728	1,773	1,814	1,868
5160511 - Pump Maintenance	825	-	1,028	1,028	1,063	1,085	1,110	1,139	1,165	1,200
5160512 - Water Testing	6,694	6,234	6,300	6,800	6,618	6,756	6,912	7,092	7,708	7,473
5160520 - Source / Headworks	-	-	555	555	574	586	599	615	629	648
5160601 - HR Costs - 8125	563	500	613	519	635	647	660	671	683	695
516060101 - 8126 - Health & Safety O/H Recoveries	1,319	1,333	1,085	1,178	1,213	1,231	1,252	1,277	1,304	1,333
5160602 - Corporate Services Costs - 8120	4,750	5,556	5,927	7,002	7,241	7,295	7,481	7,658	7,747	7,899
5160604 - Utilities Costs - 8140	3,935	5,348	5,245	9,572	9,317	8,550	8,499	9,329	9,835	9,806
5160606 - Asset Management Unit Costs - 8160	7,407	7,930	8,413	9,563	9,985	10,099	10,200	10,332	10,516	10,679
5160608 - Network Costs	2,633	2,514	2,965	4,367	4,353	4,477	4,466	4,437	4,728	4,712
5160609 - CEO & Finance Costs - 8110	4,081	3,894	4,107	4,337	4,568	4,733	4,812	4,894	4,987	5,094
Capital Projects										
516076001 - Waihaorunga - Renewals	108,500	-	-	5,400	-	-	5,838	-	-	6,398
516076003 - Waihaorunga - Drink Water Intake/Plant Compliance Upgrade	-	-	-	-	-	-	-	-	-	-

Waihaorunga - 5160	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
516076004 - Waihaorunga - Takitu Pumphouse - New Board and Telemetry	-	22,748	-	-	-	-	-	-	-	-
Capex Total	108,500	22,748	-	5,400	-	-	5,838	-	-	6,398

Table 8.10: Detailed Maintenance & Operational Expenditure: Waikakahi (figures are inflated)

Waikakahi - 5170	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Grand total	**10,268**	**16,492**	**134,006**	**147,615**	**146,539**	**99,203**	**54,648**	**6,390**	**- 34,904**	**- 78,272**
Total Operating Revenue	**- 321,967**	**- 354,266**	**- 336,031**	**- 385,256**	**- 442,133**	**- 507,404**	**- 557,505**	**- 612,627**	**- 673,219**	**- 719,988**
517001505 - Targeted Rate - Water	- 294,057	- 311,075	- 328,168	- 377,393	- 434,002	- 499,103	- 549,013	- 603,914	- 664,305	- 710,807
517002501 - Works - Application fee	- 1,013	- 2,927	- 308	- 308	- 318	- 325	- 333	- 341	- 349	- 360
517005101 - Recoveries - General	- 4,660	- 10,371	- 6,168	- 6,168	- 6,378	- 6,512	- 6,661	- 6,835	- 6,992	- 7,202
517007101 - Dividend - SC Power	- 774	- 713	- 770	- 770	- 796	- 813	- 832	- 853	- 873	- 899
517007305 - Internal Interest	- 18,854	- 17,400	-	-	-	-	-	-	-	-
5170081 - Capital Contributions - Water	- 2,609	- 11,779	- 617	- 617	- 638	- 651	- 666	- 684	- 699	- 720
Total Operating Expenditure	**332,236**	**370,758**	**470,037**	**532,871**	**588,672**	**606,607**	**612,153**	**619,017**	**638,315**	**641,716**
5170322 - Advertising and Notices	-	34	206	206	213	217	222	228	234	241
5170333 - General Expenses	221	17,792	1,285	1,285	1,329	1,357	1,388	1,424	1,457	1,500
5170336 - LAPP Disaster Fund	2,680	3,385	3,723	4,320	4,467	4,561	4,666	4,787	4,897	5,044
5170347 - Publications	70	-	-	-	-	-	-	-	-	-
5170349 - Repairs and Maintenance	-	-	360	360	372	380	389	399	408	420
5170356 - Telephone expenses	4,529	4,191	4,800	4,400	4,550	4,645	4,752	4,876	4,988	5,137
5170357 - Utilities charges	62,212	70,824	56,540	86,497	89,438	91,315	93,417	95,847	98,053	100,994
5170401 - Bad & Doubtful Debts	2,516	-	-	-	-	-	-	-	-	-
517040303 - Depreciation - Plant & Machinery	70	63	56	51	46	41	37	33	30	27
517040313 - Depreciation	52,346	54,314	144,968	159,983	159,983	172,782	172,782	172,782	186,604	186,604

Waikakahi - 5170	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
517040405 - Internal Interest Expense	806	1,320	43,390	33,595	78,720	78,942	77,240	73,857	69,516	63,635
5170405 - Insurance	3,019	3,854	3,561	4,106	4,246	4,335	4,434	4,550	4,655	4,794
5170422 - Electricity	65,975	70,756	61,000	70,800	73,207	74,744	76,464	78,453	80,259	82,666
517042201 - Electricity - Hurst Tank 17 Supply	-	-	540	540	558	570	583	598	612	631
517042405 - Internal Rent	4,320	4,452	4,761	8,624	8,856	9,118	9,485	9,682	9,891	10,162
5170425 - Rates	2,471	1,660	1,770	1,864	1,927	1,968	2,013	2,066	2,113	2,176
5170501 - Asset Mgt Plan	1,359	4,080	12,082	8,082	8,357	8,532	8,729	8,956	9,162	9,437
5170504 - Consultants	-	-	1,028	1,028	1,063	1,085	1,110	1,139	1,165	1,200
5170506 - Contractor - Other	600	274	2,056	2,056	2,126	2,171	2,220	2,278	2,331	2,401
5170508 - Line Maintenance	-	335	1,500	1,500	1,551	1,584	1,620	1,662	1,700	1,751
5170510 - Operational Maintenance	-	-	1,500	1,500	1,551	1,584	1,620	1,662	1,700	1,751
5170511 - Pump Maintenance	-	160	500	500	517	528	540	554	567	584
5170512 - Water Testing	3,205	4,064	3,900	4,600	4,343	4,434	4,536	4,654	5,215	4,904
5170514 - Water purchases	57,925	53,553	40,000	58,000	59,972	61,231	62,640	64,270	65,749	67,721
5170520 - Source / Headworks	-	-	1,928	1,928	1,994	2,035	2,082	2,136	2,186	2,251
5170601 - HR Costs - 8125	1,773	1,576	1,930	1,061	1,298	1,323	1,350	1,372	1,395	1,420
517060101 - 8126 - Health & Safety O/H Recoveries	4,156	4,192	3,416	2,409	2,479	2,517	2,560	2,610	2,666	2,725
5170602 - Corporate Services Costs - 8120	14,955	17,482	18,650	17,078	17,663	17,794	18,247	18,679	18,898	19,266
5170604 - Utilities Costs - 8140	15,801	21,473	21,060	23,189	22,571	20,711	20,589	22,599	23,827	23,756
5170606 - Asset Management Unit Costs - 8160	8,554	9,207	9,769	11,828	12,350	12,490	12,616	12,779	13,006	13,208
5170608 - Network Costs	8,292	7,912	9,329	9,025	8,997	9,252	9,229	9,171	9,771	9,738

Waikakahi - 5170	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
5170609 - CEO & Finance Costs - 8110	12,851	12,252	12,925	10,578	11,142	11,546	11,737	11,938	12,165	12,425
5170611 - Support - Asset Manager	1,529	1,555	1,504	1,880	2,788	2,818	2,858	2,975	3,098	3,145
Capital Projects										
517076001 - Waikakahi - Renewals	174,696	5,170	5,279	5,400	5,541	5,668	5,838	6,031	6,230	6,398
517076003 - Waikakahi - Drinking Water Intake/Plant Compliance Upgrade	1,439,000	-	-	-	-	-	-	-	-	-
517076006 - Waikakahi - Mehrtens/Cameron 700m 32 OD	-	4,343	-	-	-	-	-	-	-	-
517076007 - Waikakahi - Harrison B/T 1.5km 63 OD	-	11,374	-	-	-	-	-	-	-	-
517076008 - Waikakahi - McKay/ Francis 1.3km 40 OD	-	-	11,613	-	-	-	-	-	-	-
517076010 - Waikakahi - LW WK Booster PH - Pump 4	-	-	-	-	14,405	-	-	-	-	-
517076011 - Waikakahi - Dog Kennel Road PH - Pump 1	-	-	-	-	-	19,838	-	-	-	-
517076015 - Waikakahi - Telemetry - Waikakahi Reservoir	-	-	-	-	-	-	9,341	-	-	-
517076017 - Waikakahi - Flow meter renewals	1,600	-	-	-	1,773	-	-	-	-	-
Capex Total	**1,615,296**	**20,887**	**16,891**	**5,400**	**21,719**	**25,506**	**15,179**	**6,031**	**6,230**	**6,398**

Table 8.11: Detailed Maintenance & Operational Expenditure: Waimate Urban (figures are inflated)

Waimate Urban - 5310	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Grand Total	**- 18,241 +**	**- 12,133**	**74,273**	**35,757**	**- 793**	**- 17,706**	**- 24,222**	**- 30,718**	**- 16,001**	**- 19,277**
Total Operating Revenue	**- 778,742**	**- 851,259**	**- 865,812**	**- 944,312**	**- 1,017,049**	**- 1,094,824**	**- 1,122,149**	**- 1,150,104**	**- 1,178,736**	**- 1,205,723**
531001505 - Targeted Rate - Water	- 720,543	- 773,417	- 808,182	- 889,000	- 960,120	- 1,036,930	- 1,062,853	- 1,089,424	- 1,116,660	- 1,141,785
531002501 - Works - Application fee	- 1,013	- 822	- 1,028	- 1,028	- 1,063	- 1,085	- 1,110	- 1,139	- 1,165	- 1,200
531002503 - Works - Metered Supply Charges	- 14,075	- 18,647	- 15,420	- 15,420	- 15,944	- 16,279	- 16,654	- 17,087	- 17,480	- 18,004
531005101 - Recoveries - General	- 593	- 19,901	-	-	-	-	-	-	-	-
531007101 - Dividend - SC Power	- 1,418	- 1,305	- 1,420	- 1,420	- 1,468	- 1,499	- 1,534	- 1,574	- 1,610	- 1,658
531007305 - Internal Interest Income	- 958	- 8,248	- 4,870	- 553	- 307	- 83	- 155	-	-	-
5310081 - Capital Contributions - Water	- 22,822	- 5,783	- 11,312	- 11,312	- 11,697	- 11,942	- 12,217	- 12,535	- 12,823	- 13,208
5310102 - Internal Water Recoveries	- 18,051	- 23,528	- 24,000	- 26,000	- 26,884	- 27,448	- 28,080	- 28,811	- 29,474	- 30,358
531041202 - Rates Remissions	731	391	420	420	434	443	454	465	476	490
Total Operating Expenditure	**760,501**	**839,125**	**940,085**	**980,069**	**1,016,256**	**1,077,118**	**1,097,927**	**1,119,386**	**1,162,735**	**1,186,446**
5310304 - Conferences, Seminars and Training	612	922	-	-	-	-	-	-	-	-
5310322 - Advertising and Notices	591	169	514	514	531	543	555	570	583	600
531033103 - Computer Support	-	-	-	-	2,895	2,956	3,024	3,103	3,174	3,269
5310333 - General Expenses	3,325	1,618	4,108	4,108	4,248	4,337	4,437	4,552	4,657	4,797
5310336 - LAPP Disaster Fund	5,670	5,858	6,444	7,477	7,731	7,893	8,075	8,285	8,476	8,730
5310349 - Repairs and Maintenance	105	64	1,542	1,542	1,594	1,628	1,665	1,709	1,748	1,800
5310356 - Telephone expenses	1,712	1,806	1,789	2,100	2,171	2,217	2,268	2,327	2,381	2,452

Waimate Urban - 5310	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
5310357 - Utilities Charges	151,212	130,281	128,500	186,789	193,140	197,193	201,732	206,981	211,744	218,095
5310398 - Vehicle Recoveries	-	- 700	-	-	-	-	-	-	-	-
5310401 - Bad / doubtful debts	-	810	-	-	-	-	-	-	-	-
531040302 - Depreciation - Buildings	59	59	59	165	165	165	181	181	181	200
531040303 - Depreciation - Plant & Machinery	1,906	1,715	1,607	1,650	1,458	1,291	1,147	1,017	905	808
531040305 - Depn - Office Equipment	582	535	535	2,272	1,817	1,454	1,163	930	744	596
531040313 - Depreciation	210,321	236,805	283,475	276,712	294,830	326,666	326,666	326,666	352,799	361,070
531040319 - Amorisation on intangible assets	-	-	- 1	-	4,841	3,901	3,149	2,547	2,066	1,681
531040405 - Internal Interest	2,726	456	11,580	-	-	-	-	5,382	7,621	9,815
531040406 - Waimate Urban Water - Internal Loan interest	63,122	102,620	120,500	98,173	117,073	141,373	152,173	150,973	149,773	148,573
5310405 - Insurance	5,522	7,401	6,355	7,378	7,629	7,789	7,968	8,176	8,364	8,615
5310407 - Loss on Assets	-	760	-	-	-	-	-	-	-	-
5310422 - Electricity	104,712	110,751	112,000	115,500	119,427	121,933	124,740	127,986	130,931	134,858
5310423 - Grounds maintenance - Jobcosted Labour & Plant	-	- 1	700	714	728	742	756	769	782	
531042405 - Internal Rent	6,480	6,672	7,124	12,893	13,242	13,633	14,181	14,478	14,790	15,196
5310425 - Rates	7,112	9,553	10,190	10,730	11,095	11,328	11,588	11,890	12,164	12,528
5310501 - Asset Mgt Plan	-	3,635	14,849	9,249	9,563	9,764	9,989	10,249	10,485	10,799
5310504 - Consultants	450	2,695	2,500	32,500	2,585	2,639	2,700	2,770	2,834	2,919
5310506 - Contractors	2,217	2,108	4,000	4,000	4,136	4,223	4,320	4,432	4,534	4,670
5310510 - Operational Maintenance	3,450	3,411	6,000	6,000	6,204	6,334	6,480	6,649	6,802	7,006
5310511 - Pump Maintenance	45	30	500	500	517	528	540	554	567	584
5310512 - Water Testing	6,003	7,723	6,500	9,650	9,978	10,188	10,422	10,693	10,939	11,267

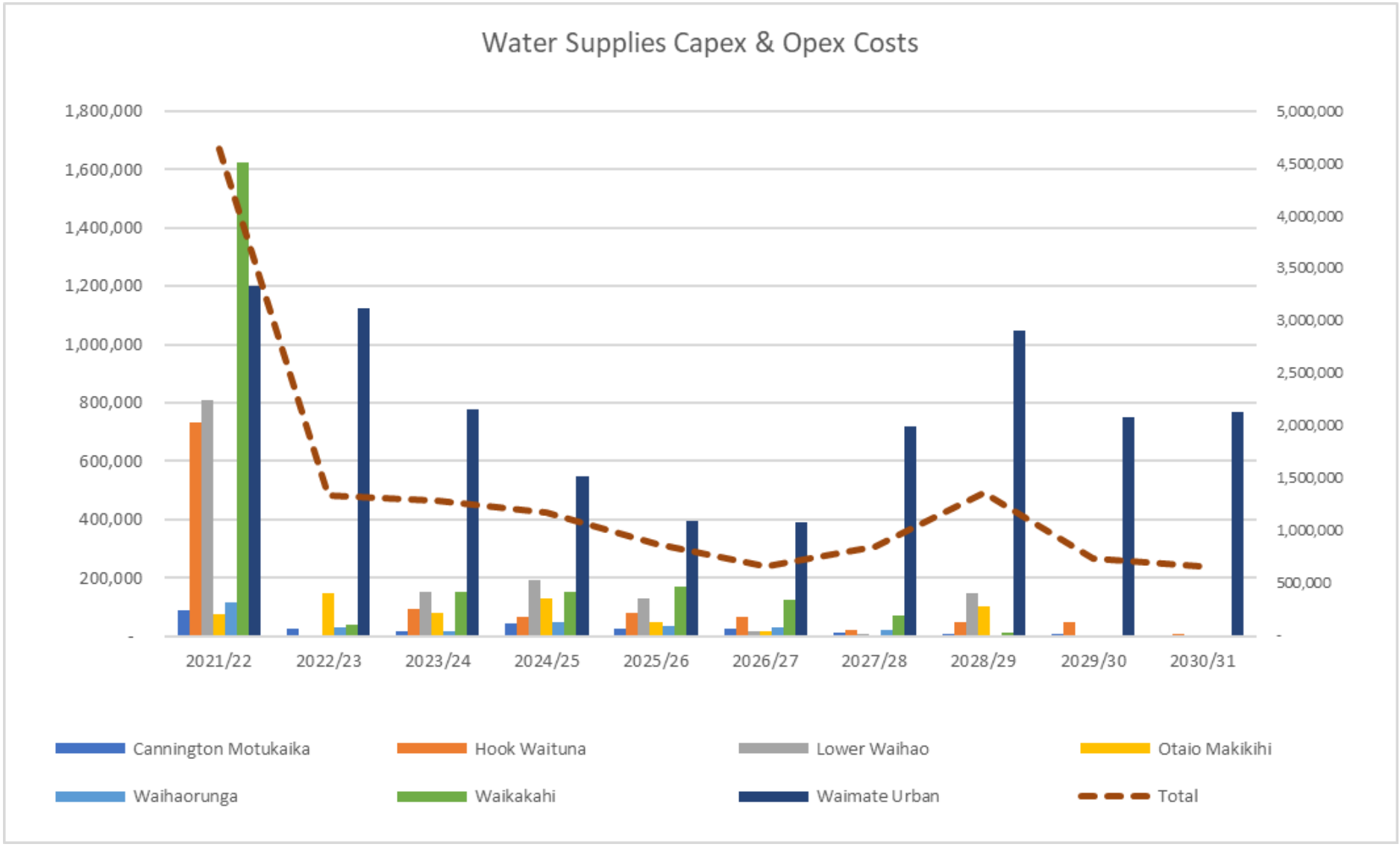
Waimate Urban - 5310	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
5310601 - HR Costs - 8125	4,409	3,918	4,800	2,664	3,258	3,321	3,388	3,445	3,503	3,566
531060101 - 8126 - Health & Safety O/H Recoveries	10,334	10,426	8,495	6,047	6,223	6,319	6,426	6,553	6,693	6,842
5310602 - Corporate Services Costs - 8120	37,193	43,480	46,387	29,189	30,188	30,411	31,186	31,925	32,298	32,928
5310604 - Utilities Costs - 8140	33,390	45,376	44,504	58,068	56,522	51,864	51,557	56,592	59,665	59,489
5310606 - Asset Management Unit Costs - 8160	33,961	36,435	38,658	39,321	41,056	41,523	41,940	42,482	43,238	43,911
5310608 - Network Costs	20,622	19,680	23,202	22,954	22,883	23,533	23,475	23,326	24,852	24,769
5310609 - CEO & Finance Costs - 8110	31,961	30,472	32,147	18,078	19,042	19,733	20,059	20,404	20,792	21,236
5310611 - Support - Asset Manager	10,699	10,879	10,521	13,146	19,498	19,709	19,989	20,807	21,665	21,996
Capital Projects										
531071501 - Urban Water - General plant and equipment	6,300	-	-	-	-	-	-	-	-	-
531076001 - Urban Water - Bond Street Subdivision	74,895	-	-	-	-	-	-	-	-	-
531076002 - Urban Water - Lateral Renewals	96,000	62,040	63,342	64,800	66,486	68,016	70,056	127,847	132,065	135,627
531076003 - Urban Water - AC Water Main Renewals	210,987	113,740	116,127	118,800	121,891	124,696	128,436	191,046	197,351	202,673
531076004 - Urban Water - CI Water Main Renewals	160,000	165,440	168,912	172,800	177,296	181,376	186,816	387,882	400,681	411,487
531076008 - Urban Water - Timaru Road pump renewals	68,081	25,850	-	-	-	-	-	-	-	-
531076016 - Urban Water - Waimate Reservoir Wash Down Pump	-	-	-	-	-	-	-	-	-	-
531076018 - Urban Water - Telemetry - Timaru Rd Plant	-	-	-	8,640	-	-	-	-	-	-
531076019 - Urban Water - Telemetry - Manchesters Bore	-	-	-	8,100	-	-	-	-	-	-
531076021 - Urban Water - Waimate Reservoir Cover Replacement	-	-	-	108,000	-	-	-	-	-	-
531076023 - Urban Water - Main line valve renewals	28,000	28,952	29,560	30,240	31,027	31,741	32,693	33,771	34,885	35,826
531076024 - Urban Water - Booster Bakers/Court/Hunts/Fitzmaurice Roads	20,000	-	295,596	-	-	-	-	-	-	-

Waimate Urban - 5310	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
531076025 - Urban Water - Extension Bakers/Court/Hunts/Fitzmaurice Roads	-	-	-	-	-	-	326,928	337,708	-	-
531076026 - Urban Water - Booster Manchesters Standby Pump 2	-	29,986	-	-	-	-	-	-	-	-
531076027 - Urban Water - Water Meters	472,045	-	-	-	-	-	-	-	-	-
531076028 - Urban Water - Te Kiteroa Main, Booster and Reservoir	83,085	686,147	30,468	-	-	-	-	-	-	-
531078001 - Urban Water - Meter reader software	-	24,205	-	-	-	-	-	-	-	-
Capex Total	**1,219,393**	**1,136,360**	**704,004**	**511,380**	**396,700**	**405,829**	**744,929**	**1,078,253**	**764,983**	**785,613**

Table 8.12: Summary of Expenses (Capex & Opex)

Summary of Expenses (Capex & Opex)	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Cannington Motukaika	$205,628	$147,364	$130,401	$138,124	$122,399	$130,314	$127,476	$129,834	$134,834	$138,432
Hook Waituna	$1,078,016	$409,638	$430,674	$457,826	$469,230	$482,052	$451,805	$491,639	$508,888	$484,673
Lower Waihao	$1,210,172	$420,005	$493,727	$601,149	$542,826	$461,375	$466,097	$614,813	$488,080	$497,860
Otaio Makikihi	$373,103	$484,059	$372,526	$433,367	$368,040	$359,941	$368,380	$489,131	$390,163	$403,324
Waihaorunga	$290,994	$209,868	$192,984	$200,558	$198,346	$205,200	$214,311	$211,870	$220,491	$232,596
Waikakahi	$2,148,167	$609,559	$623,498	$617,553	$640,736	$663,821	$656,895	$649,269	$666,716	$670,337
Waimate Urban	$2,199,462	$2,152,616	$1,781,122	$1,609,307	$1,516,086	$1,568,564	$1,931,375	$2,295,780	$2,050,390	$2,108,941
Total	$7,505,542	$4,433,109	$4,024,932	$4,057,884	$3,857,663	$3,871,267	$4,216,339	$4,882,336	$4,459,562	$4,536,163

Figure 8-5: Summary of Annual Expenditure



8.6.3 Utilities (Water, Wastewater & Stormwater) Renewals and Capital Summary

The following details the summary of new capital and renewals for all three services for the 10 year period.

Table 8.13: Utilities (Water, Wastewater & Stormwater) Renewals and Capital Summary

3Waters	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Renewals	2,240,127	876,212	876,231	1,222,776	1,066,103	869,811	855,851	1,916,372	1,716,352	1,737,177
Levels of Service	3,660,143	156,557	57,008	5,400	-	5,668	-	-	-	-
Growth	490,080	716,133	326,064	-	-	-	326,928	337,708	-	-
Total	**6,390,350**	**1,748,901**	**1,259,302**	**1,228,176**	**1,066,103**	**875,479**	**1,182,779**	**2,254,080**	**1,716,352**	**1,737,177**

Figure 8-6: 3Waters Renewals and Capital Projects

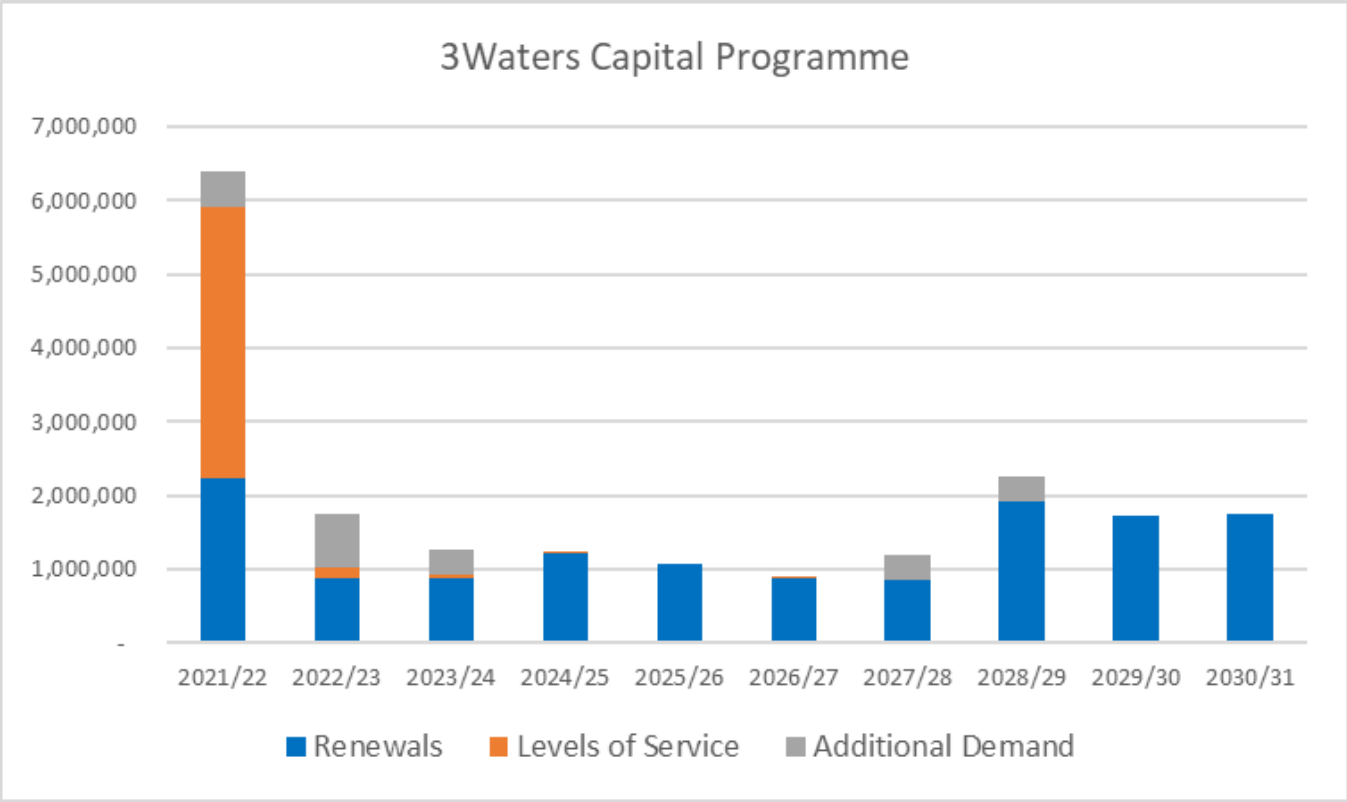
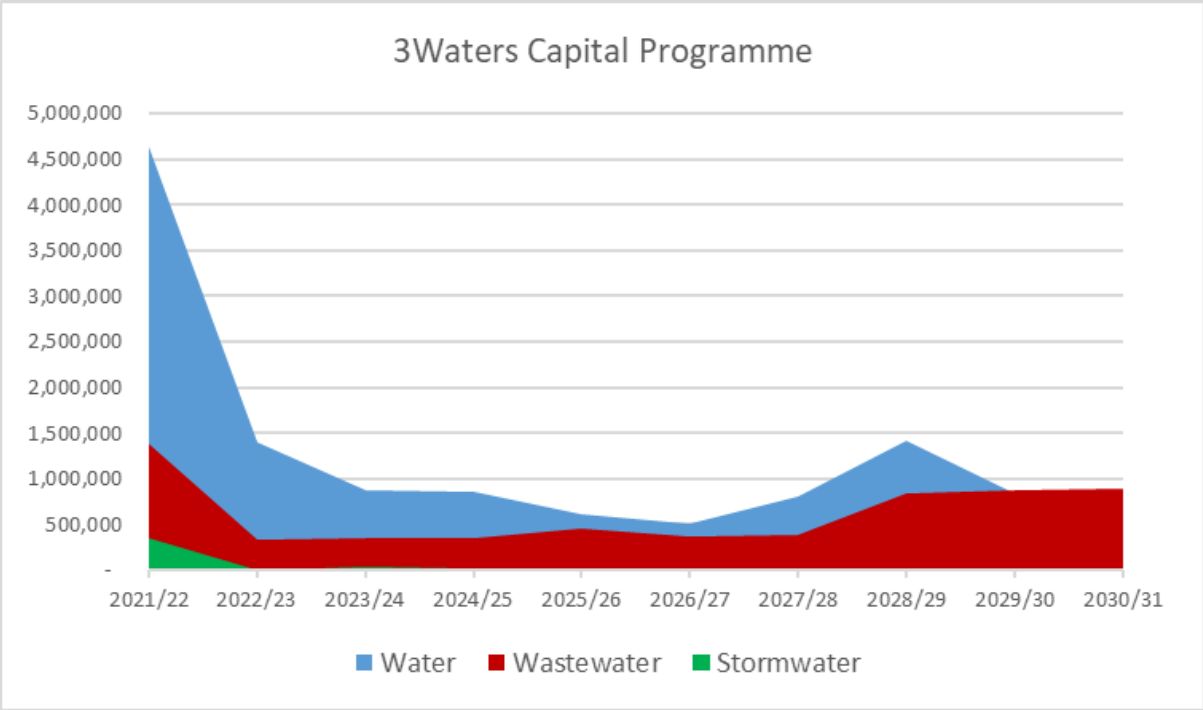


Table 8.14: 3Waters Capital Programme

Utility	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Water	4,643,522	1,403,545	875,555	866,376	607,682	506,492	803,309	1,418,856	848,458	845,877
Wastewater	1,388,196	340,186	343,630	351,000	452,659	363,319	379,470	835,224	867,894	891,300
Stormwater	358,632	5,170	40,117	10,800	5,762	5,668	-	-	-	-
Total	**6,390,350**	**1,748,901**	**1,259,302**	**1,228,176**	**1,066,103**	**875,479**	**1,182,779**	**2,254,080**	**1,716,352**	**1,737,177**

Figure 8-7: 3Waters Capital Programme



8.7 Key Financial Forecasts Assumptions and Uncertainties

8.7.1 Overview

Forecasting assumptions and uncertainties are essential in the operation of Council's assets to indicate the levels of risks associated with those assumptions. Where necessary additional strategies can be implemented to reduce the risk.

The LGA 2002 - Schedule 10, Part 1 (11) requires the Council to clearly define all the significant forecasting assumptions and risks that underlie the financial estimates, assumptions concerning the useful life of significant assets and an estimate of the potential effects of the uncertainty on the financial estimates provided.

Appendix C details the significant forecasting assumptions for the utilities.

8.7.2 Financial Forecast

The following table provide an assessment of the confidence in, and the accuracy of the 20-year financial forecast and supporting asset data. Table 8.16 and Table 8.17 detail the general meaning of the grades:

Table 8.15: Financial Forecast Confidence Level

Activity	Confidence Grade	Accuracy
Operations/Maintenance	B	2
Depreciation	B	2
Overheads		2
Funding Costs	C	3
Capital Expenditure	B	3
Debt Repayment	C	3
Overall	B	3

The overall confidence level is 'B' or reliable. Data is based on sound records, procedures, investigations and analysis which is documented but has some shortcomings and gaps that may impact on the confidence of long term financial forecasts.

The overall accuracy is 3 indicating that the accuracy of the financial forecasts is +/- 20%.

Table 8.16: Confidence Grades

Confidence Grade	General Meaning
A	**Highly Reliable** Data based on sound records, procedures, investigations and analysis, which is properly documented and recognised as the best method of assessment
B	**Reliable** Data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings for example the data is old, some documentation is missing and reliance is placed on unconfirmed reports or some extrapolation
C	**Uncertain** Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolation from a limited sample for which grade A or B is available
D	**Very Uncertain** Data is based on unconfirmed verbal reports and/or cursory inspection and analysis

Accuracy ratings are made using the criteria outlined in:

Table 8.17: Accuracy Ratings

Grade	Description	Accuracy
1	Accurate	100%
2	Minor inaccuracies	+ / - 5%
3	50% estimated	+ / - 20%
4	Significant data estimated	+ / - 30%
5	All data estimated	+ / - 40%

9.0 PROCESSES AND ASSET MANAGEMENT PRACTICES

This section outlines the information available on the assets, information systems used and process used to make decisions on how the asset will be managed. It also provides details on planning for monitoring the performance of the AMP.

9.1 Organisation Structure

Figure 9-1: Council Management Structure

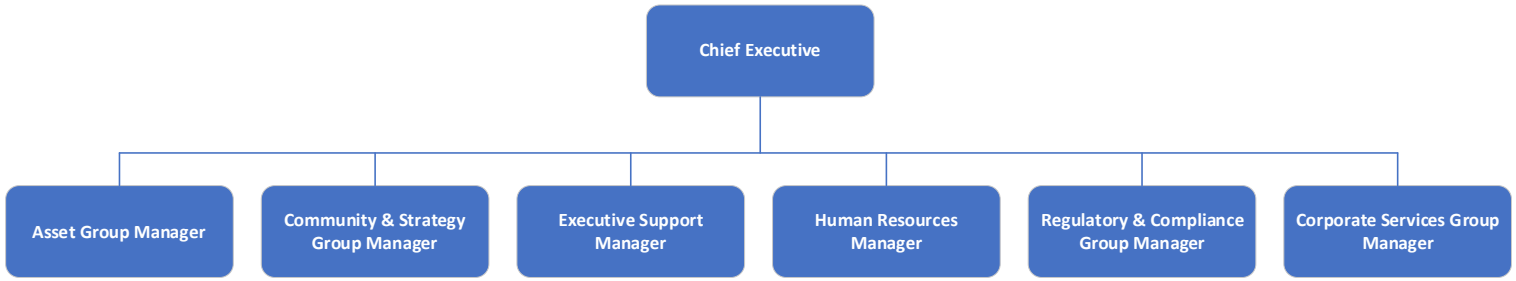
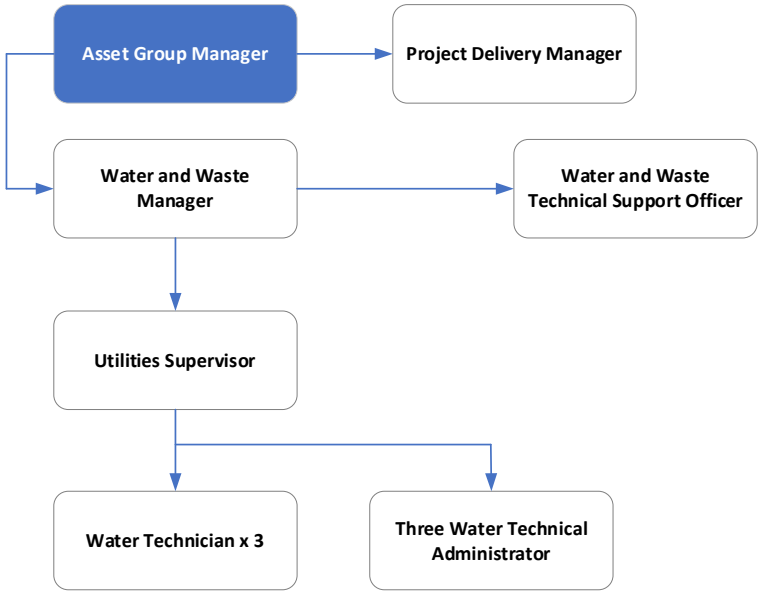


Figure 9-2: Water and Waste Unit Structure



9.2 AMP Review and Monitoring

9.2.1 Monitoring Approach

Council has developed this AMP based on its current knowledge of customer requirements, the configuration of the existing and future network to meet customer requirements, current asset information and the strategies to achieve customer requirements.

To further develop a meaningful AMP, including supporting processes, systems and data, Council recognise the need for a more structured approach. This approach includes:

- Council's firm commitment to implement and develop the AMP.
- Incorporate this AMP as a tactical plan within Council's planning framework.
- Review of the AMPs by internal staff and suitably qualified external consultants.
- Aiming to produce an AMP that meets the requirements of the community.
- Benchmarking key performance indicators against similar external TLAs.
- A corporate commitment to implementing and maintaining suitable Asset Management information systems.
- Adopting a team approach to the preparation of future AMPs in order to maximise the buy-in of internal staff and sharing of specialised knowledge.

9.2.2 Timetable for Audit and Review

The programme for future Asset Management reviews of this AMP is in Table 9.1.

Table 9.1: Timetable for Audit and Review

Activity	Target Date
Improvement Plan reviewed annually by all staff directly involved and focusing on key business issues	30 June each year
Report on Improvement Plan	30 June each year
AMP updates involving members of staff involved in preparing specific aspects of the AMP	30 June each year
Internal AMP peer review by staff not directly involved in preparation of AMP	30 June each year
Adoption of AMP by Council	30 June every 3 years
External benchmarking by internal staff	Annually
Audit NZ external audit	As required by Audit NZ

9.2.3 Utilisation of AMPs

Historically AMPs have been carried out for regulatory requirements and not used on an on-going basis. Table 9.2 below details the methodologies for the on-going implementation and updating of AMPs within Council to ensure the Three Waters AMPs are used to their full potential.

Table 9.2: Methodologies for the On-going Implementation and Updating of AMPs

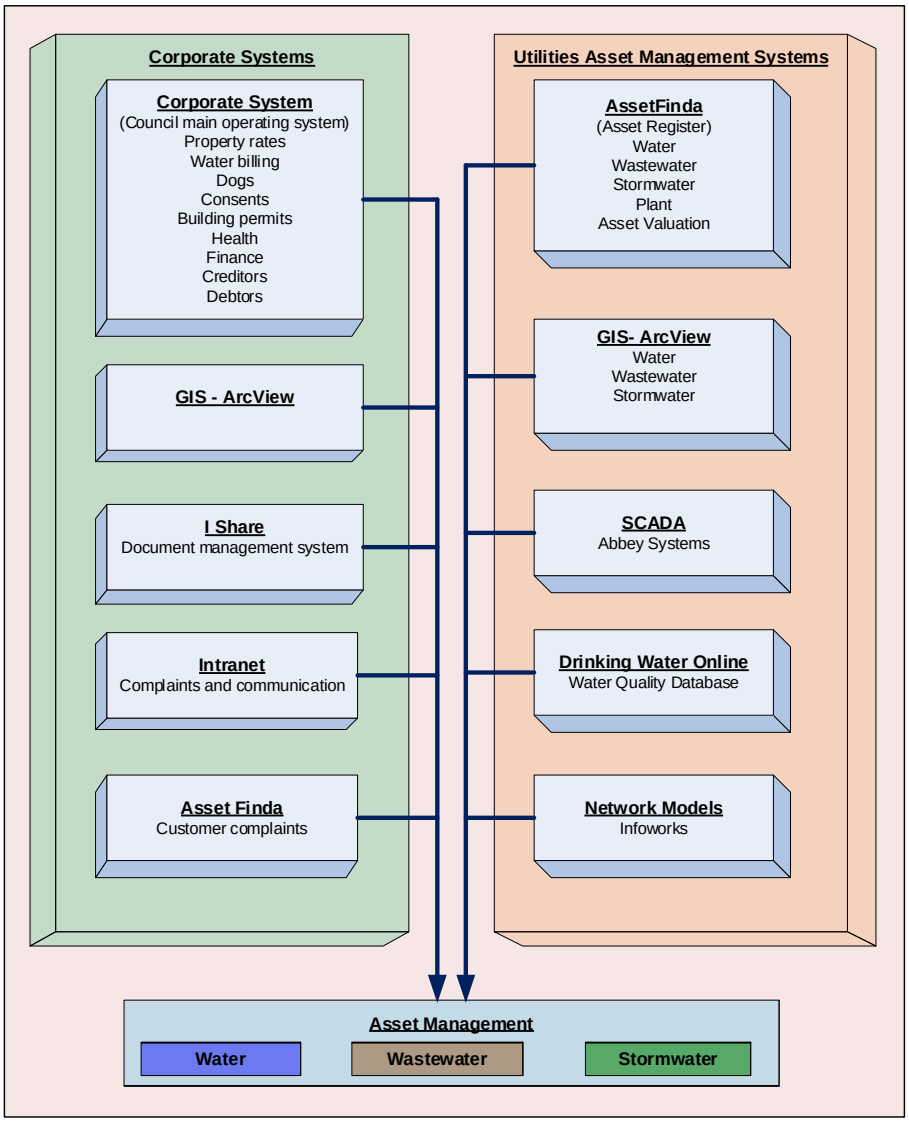
Methodologies	Output
Continuation of the organisational culture of asset management	The asset management culture needs be supported by the Chief Executive and senior managers in conjunction with the elected Council. Effective stewardship and management of Council major investment (assets) will not occur in the long term without a culture of asset management.
Resourcing of Asset Management Programmes	Asset management programmes must be adequately resourced.
Roles and Responsibilities of Council Staff	The roles and responsibilities of Council staff as they relate to the AMPs implementation need to be defined in respect to the ongoing use of the plans as

Methodologies	Output
	this will assist the AMP to remain relevant and current. To enable this to occur the following is required. - The AMPs adopted/accepted by staff down to a defined level. - Council Staff to know what's in the plans and how it could affect their day to day Work. - Council Staff to understand the reasons for the AMP and the implications for the long-term use of them. - Understand all the reporting requirements for Levels of Service and Internal Benchmarking. - Training required in the use of the AMP (what's in it, how work is done, on-going requirements for monitoring, review and updating). - Instigation of processes to encourage Council Staff to use the AMP.

9.3 Business Processes

Figure 9-3 below details the data systems that are presently used within Council and their relationship with other systems.

Figure 9-3: Council Data Systems



9.3.1 AssetFinda

Council uses the AssetFinda Asset Management system for its Asset Information System. AssetFinda have been used since 2005 and is a web/GIS based asset management system. This has greatly improved the information on the scheme assets and enhance the future AMP and Asset Valuations. Some of the outputs from AssetFinda includes:

- Complete asset register for the scheme.
- Completion of asset valuations.
- Maintenance can be entered into the database. Cumulative costs of maintenance on each asset can be assessed.
- Predictive analysis to indicate when assets should be replaced.
- Condition monitoring of assets.
- Complete "what if" scenarios to determine the optimal time to replace assets.

AssetFinda was selected for the following reasons:

- Ease of use
- Simple functionality
- Low initial fee structure
- Low on-going fee structure

Table 9.3: AssetFinda Functionality and Utilisation by Council

Register Functions	Utilisation
Water	Water lines, points and plant details
Wastewater	Wastewater lines, points and plant details
Stormwater	Stormwater lines, points and plant details
Maintenance History	Cumulative maintenance costs of an asset. Maintenance history is also linked to the asset in GIS
Valuation	Used on an annual basis
Criticality	To be populated
Condition & Performance	Scores held in register

Data will be collected continually throughout the year and entered into AssetFinda.

Metadata Standards

A Central Government funded project is the 'Metadata Standards' which sets national metadata standards for the 3-waters (potable, waste and storm) network, and for residential and light commercial buildings. This is to ensure the correct asset data is collected and in the correct manner. The roll out of these data standards is expected to start mid 2017.
Going forward Council will align its data collection and recording with the Metadata Standards. However, the existing data will be held and only aligned with the standards over time as more current information is captured.

9.3.2 GIS

Plans for reticulation and facilities for the three utilities are entered onto ArcMap as they are received. Where information is received from contractors on the utilities services then ArcView is updated. Council does not have a robust system of ensuring that all subdivision plans are of the required standard prior to importing into ArcView.

Asset Data

The majority of asset quantity, location and pipe size data are held in the GIS system. There are a number of quality assurance processes are used to ensure the reliability of the data recorded. These processes include:

Table 9.4: GIS Data

Item	Details
Sampling of assets contained in the GIS / AMS	Using field tests to check the reliability of pipe capture, pipe quantities and pipe size within the GIS/AMS
Coverage testing	Checks by Asset Managers that assets captured in particular areas reconcile with the services known to be provided
Continuity checks	These are carried out in GIS to identify breaks in the piping networks and gaps in the data
Historical and new data	GIS capture of historical data has been derived from professional engineering and survey plans, from Council record sheets or Council staff knowledge. The on-going capture of asset data is derived from engineering as-built plans. All As-built plans received by Council are required to comply with strict specifications and all data entered into the GIS/AMS is the subject of quality assurance processes

Recent staff changes have impacted greatly on the quality of data within the AssetFinda/GIS systems. It is proposed as part of future improvements in the management programme section of this AMP to develop and implement formal quality assurance systems for existing and new GIS data.

9.3.3 Network Modelling

Computer models (InfoWorks) of the water schemes exist. This enables Council to:

- Determine accurately the existing capacity of the schemes
- Identify inadequate sections of the schemes
- Operate the system in the most efficient manner
- Determine the impact of further development on the schemes
- Identify system upgrading requirements
- Compare options for upgrading the water schemes

The network models are operated and maintained by Opus International Consultants Ltd.

9.3.4 Complaints Database

The Council operates a complaints database through a 'Request for Service System' via AssetFinda. This records all complaints associated with the Three Waters, Roading activities and Parks and Reserves and provides useful information for trending and analysis of system performance and highlights issues.

The database has now been updated such that service requests can now be analysed by relevant performance measures (Levels of Service) and priority response times included within AssetFinda. Further development of the system is required to allow retrospective entry of after-hours information and also escalation. Council is working with the developer of the system to develop this.

9.3.5 SCADA System

Background

Council operates an Abbey Systems Telemetry or SCADA (Supervisory Control and Data Acquisition) system. The system is used to monitor & control critical aspects of treatment plants and pump stations, 17 sites are presently monitored that include:

- 1 WWTPs
- 2 Wastewater pump stations
- 7 Water intakes and treatment plants (WTP)
- 5 Reservoirs
- 3 Water pump stations

SCADA is available to the Waimate Urban water scheme and Lower Waihao, Otaio, Hook Waituna, and Waikakahi rural water schemes. Upgrades to all the rural water supplies in the near future will result in SCADA being available to all water schemes.

Two of the sites in Otaio-Makikhi are presently inactive, as the sites are not used in the present supply configuration. The sites are Otaio Gorge Plant and Otaio Reservoir.

Table 9.5: Scheme SCADA Details

SCHEME	FACILITY	METER	SCADA REPORT														ALARMING	
			Pump Start/Stop	Pump Hours	Level	Flow & Volume	Turbidity	FAC Residual	Cl_2 Dose	pH	Conductivity	Temperature	UV Transmittance	UV Dose	Pressure	Intruder/ Operator	Outgoing alarms	Flashing Light
Waimate Urban	Manchester Rd Bore		✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	✓	
	Timaru Rd Bore		✓	✓	✓	✓	✓	✓		✓		✓	✓		✓		✓	
	Mill Rd Reservoir				✓	✓		✓									✓	
Cannington Motukaika	Cannington Plant				✓	✓	✓	✓		✓		✓			✓		✓	
	Pratts Pump Station																	✓
	Pratts (Lambs) Reservoir																	
Hook Waituna	Hook Intake Treatment Plant		✓	✓		✓	✓	✓		✓			✓	✓	✓		✓	
	Simmons Pump Station																	✓
	Simmons Reservoir																	
	Brownleas Pump Station																	
	O'Donnells Pump Station																	
	O'Donnells Reservoir																	
	Garlands Rd (Tekit) Pump Station																	✓

SCHEME	FACILITY	METER	SCADA REPORT														ALARMING	
			Pump Start/Stop	Pump Hours	Level	Flow & Volume	Turbidity	FAC Residual	Cl_2 Dose	pH	Conductivity	Temperature	UV Transmittance	UV Dose	Pressure	Intruder/ Operator	Outgoing alarms	Flashing Light
	Garlands Rd (Tekit) Reservoir																	
Lower Waihao	Lower Waihao Intake & Plant		✓	✓		✓	✓	✓	✓	✓			✓				✓	
	Pykes Rd Pump Station		✓	✓		✓											✓	
	Lower Waihao Reservoir				✓												✓	
Otaio Makikihi	Otaio Gorge Rd Intake & Plant		A	A		A		A		A							A	
	Otaio Reservoir				A												A	
	Tavistock Bore & Plant		✓	✓	✓	✓	✓	✓		✓	✓			✓	✓		✓	
	Campbell Forrest Pump Station		✓	✓	✓	✓											✓	
Waihaorunga	Main Intake & Plant		✓	✓		✓	✓	✓		✓					✓		✓	
	Main Reservoir																	
	Melford Pump Station																	
	Melford Reservoir																	
	Takitu Pump Station																	

SCHEME	FACILITY	METER	SCADA REPORT														ALARMING	
			Pump Start/Stop	Pump Hours	Level	Flow & Volume	Turbidity	FAC Residual	Cl_2 Dose	pH	Conductivity	Temperature	UV Transmittance	UV Dose	Pressure	Intruder/ Operator	Outgoing alarms	Flashing Light
Waikakahi	Takitu Reservoir																	
	Tavendales Plant					✓	✓	✓		✓		✓			✓		✓	✓
	Tavendales Reservoir																	
	Waikakahi (Stonewall) Intake & Plant		✓	✓		✓	✓	✓	✓	✓		✓					✓	
	Waikakahi Reservoir				✓												✓	
	Claytons Pump Station																	
	Dog Kennel Pump Station		✓	✓		✓											✓	
	Calytons Reservoir				✓												✓	

A = Available but not in use

The system is used for:

- Monitoring the operation of sites.
- Reporting, trending and analysing historical data.
- Alarm monitoring (operators are informed of alarms via text messages to mobile phones).
- Some control functions.

Monitoring of Water and Wastewater schemes by the Council's SCADA system has grown to the point that without the current SCADA system, maintaining the existing Levels of Service would be difficult. SCADA has given the ability for Council to ascertain faults and instigate repairs without affecting the service to the consumer has significantly increased efficiency and reliability of the utility schemes.

The SCADA system is a critical system in Council's operation and service delivery.

In late 2016 the SCADA system was reviewed and the automated pump "start/stop's" controls were removed from the Master and Backup PC's, and programmed into the individual remote SCADA PLC's (RTU's) on site. This has improved the resilience and reliability of the system, by having the associated pumps and reservoirs talking directly to each other, to initiate starts and stops, without the dependency on the Master or Backup PC's.

Future Strategy for Council's SCADA

Council's strategy for the on-going use of SCADA is:

- Maintain SCADA system at a high level to ensure system reliability and on-going reporting ability.
- Increase availability of information to the Engineering staff in a format that will enable increased efficiencies in operation and management.
- Develop the reporting functions of the system.
- Develop further use of the system to control treatment plants.

10.0 IMPROVEMENT PLAN

This section details the improvements to Asset Management systems that will increase the level of confidence in the AMP.

10.1 Asset Management Improvement Process

Background

Council is committed to on-going improvement in the quality of its Water Services management practices. This is reflected in the implementation of asset management systems and associated data collection and maintenance requirements.

This Improvement Plan is integral to that approach, quantifying current business practice and measuring progress toward an identified future position. The Improvement Plan is focused on the key areas of:

- Information Management
- Scheme Knowledge
- Renewals and Risk assessments

Purpose of the Improvement Plan

The purpose of the Improvement Plan is to:

- Identify, develop and implement Asset Management planning processes.
- Identify and prioritise ways to cost-effectively improve the quality of the AMP.
- Identify indicative time-scales, priorities, and human and financial resources required to achieve Asset Management planning objectives.

The Improvement Plan is subject to constant reappraisal and change. While reappraisal is an on-going process, the Improvement Plan will form the basis of the Water Services annual business planning.

10.2 Improvement Programme

Council is committed to on-going improvement in the quality of its asset management practices until appropriate practice levels are achieved. This is reflected in the current improvement programme for the period 2018-2021 and the achievements made in the period 2015 to 2018.

Table 10.1 presents the current status of the 3 Waters Improvement Programme as at January 2018.

Improvement Priority

The improvement priority was carried out using the key areas of:

- Legislative requirements
- Level of Service achievement
- Where the assessed risk was considered high

Table 10.1: Achievement of 2015-2018 Programme and Proposed 2021-2024 Programme

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
All	Level of Service (LOS)	1	Improvements to Council's Request for Service System via AssetFinda, to enable interrogation of service request system to analyse customer complaints and identification of problem area	2012-2013	Y	Service requests can now be analysed by relevant performance measure and priority response times included within the AssetFinda set-up.	Further development of the system is required to allow retrospective entry of after hour's information and also escalation. Council working with the developer to facilitate this. 2015-16. Completed – AssetFinda is now configurable to allow retrospective entry of Service Requests	-	-	2012-2013
W, WW & SW		2	Once National LOS are available, evaluating LOS Options by investigating the effects of varied LOS (financial, environmental etc.) and consult LOS options with the community (for inclusion of amended LOS into the 2015 LTP)	2014	N	Levels of service to be reviewed and included in 2015-25 LTP.	2014/15 - Implemented Non-Financial Performance Measures but no indication as yet to National Level of Service for three waters.	Monitoring	Monitoring	2014

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
SW		3	Stormwater Management Plan - develop, submit and obtain approval	2013-2015	N	Alignment required with proposed Global Consent timing	Carry Over – Draft Stormwater Management Plan completed. Consent application is currently being drafted and affected landowners have been consulted. Application will be lodged in early 2018.	Consent application lodged 2017/18. Implementation 2018/19 to 2023/24	Consent application lodged 2017/18. Awaiting feedback from affected parties. Implementation 2018/19 to 2023/24	2017/18
All	Demand	4	Review if increased demand (population/demographics effects etc.) can be provided by existing infrastructure or addition assets/upgrades required (a watching brief)	2012/13	N	As new population figures / demographics / development information becomes available, Council is actively reviewing existing infrastructure / services to ensure LOS are met.	On-going	On-going	On-going	2020/21
Water	Growth	5	Continue to implement demand management programme in-conjunction with the leak detection program	On-going	N	Demand management will be achieved by a combination of pressure management and	No formal policy on demand management but achieved through processes such as water conservation	Develop policy in relation to demand management and provide pressure management	On-going	2019/20

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
						developing policy in relation	messages as required.			
All		6	Continue to develop the existing population projections process that is Council approved and used across all areas of council	2012/13	Y	Process in place (yet to be formally adopted by Council).	Process developed for 2018/28 Long Term Plan.	Process developed for 2018/28 Long Term Plan.	Process developed for 2021/31 Long Term Plan.	-
Water		7	Leak detection in Waimate urban reticulation every three years	2012 2015 2018	N	Not completed in 2012. Programmed for 2015. Council has a watching brief on Midnight flow.	On-going – Last completed June / July 2015	On-going – Programmed for 2018 /19. However, Pipe replacement reduced water loss significantly, so no leak detection took place in the period. Council continues to watch Midnight flow and monitor water loss (Performance Measure).	On-going – leak detection is planned for 2021/22. Water loss monitoring will Continue. Other forms of leak detection/water loss will be implemented in 2021/22 such as consumer service meters (RF).	2018/19 2021/22 2024/25
~~Water~~		~~8~~	~~Develop Water Demand Management Plan/Strategy to formalise, improve and guide existing demand management initiatives~~	~~2013/14~~	~~N~~	~~Re-programme for 2015– 2025 LTP~~	~~Carry Over~~	See IP 5	See IP 5	-

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
All	Sustainability	9	Assess staffing levels to ensure sufficient resources to meet demand	2011/12	N	Council is currently in the process of creating the new role of "Group Asset Manager". It is envisaged that this role will become operational in early 2015 and is created to assume a more strategic role to free up existing managers.	Extend to include staff succession planning for unplanned staff absences, resignations or retirements 2015-2018 – Additional staff member allocated to support the Asset Management Business Unit. Additional Water Treatment Plant Operator allocated to meet additional workload once plants are upgraded to meet Extend to include staff succession planning for unplanned staff absences, resignations or retirements 2015-2018	Next major assessment programmed for 2021/31 LTP	Currently there are major changes in water legislation, regulation and potentially standards and solutions. These changes will impact the way 3 water services are managed and operated their supplies and networks. Increase compliance and greater expectations around levels of service will mean reviewing staffing levels on a regular basis until July 2024, to be assured of meeting legislation, regulation requirements.	2020/21 Onwards

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
All	Risk	10	A Council wide risk policy to be developed	2012/13	N	Risks have been identified in a methodical manner through the Audit Committee.	Carry Over	Carry Over	Carry Over	2018/19
All		11	A critical assets study to be undertaken to identify critical assets and identify and adopt risk mitigation strategies for the operation, maintenance and renewal of all critical assets. The critical assets to be shown in AssetFinda	2012/13	Y	-	Carry Over	Completed 2017/18.	-	-
Water		12	*New 2014:* Implementation of Water Safety Plans	2014 Onwards	N	Currently approved water safety plans for Waimate Urban, Cannington-Motukaika, Waihaorunga, Waikakahi Submitted Hook-Waituna, Lower Waihao Under development, Otaio Makikihi	Carry Over	All water safety plans were approved and being implemented. Some capital works proposed in the 2018-28 LTP were subject to approval. Implementation and review on five year cycle.	Water safety plans are either being implemented (4) or undergoing review (1) and assessment (2) currently. Some capital works proposed in the 2021-31 LTP are still subject to approval. Implementation and review on five year cycle.	On-going

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
All		13	Develop Business Continuity and Emergency Management Plan (for rapid and structured response to emergency failures and significant hazards) and ensure review control process is carried out	2013/14	N	Major developments in communication of significant issues have been made.	Carry Over	On-going	On-going	2018/19 Onwards
W & WW	Lifecycle	14	To better understand the different AC pipe life a programme of assessing the condition of the pipes in all the schemes that contain AC pipe will occur	2012-2015	N	A number of samples taken	Carry Over	On-going. A number of pipe samples have been recovered and assessed from both the rural and urban schemes. Results of these assessment will continue to inform the renewal programme.	On-going	2018/19 Onwards
Water		15	To better understand the different “old PE pipe” life, a programme of assessing the condition of the pipes in all the schemes that contain Old PE pipe will occur.	2012-2015	N	-	2015-2018	Develop programme to retain and assess samples to better inform rural renewal programmes	On-going	2018/19 Onwards

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
Water		16	The location and extent of Garnite PVC pipes are required to be found and the information shown in both AssetFinda and GIS. This will allow greater understanding of the future renewals programme for this type of pipe.	On-going	-	As these are encountered the asset database is updated	On-going	On-going	On going	On-going
		17	*New 2014*: Continue condition assessment of plant assets to better understand future renewals programme for above ground assets	-	N	Condition assessments to be carried out	2015-2018	Condition and Criticality assessments to be completed.	On-going	2018/21
WW		18	CCTV of the condition 4 & 5 grade pipes are required to be carried out again to ascertain the decrease in condition and assist in the renewal programme	2012-2015	N	CCTV is utilised as a maintenance activity currently. Information yielded from these surveys, and future surveys will inform the renewal programme.	On-going	On-going CCTV inspections were utilised to ensure programmed renewals are both required and cost effective.	On-going	2018/21

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
All		19	Develop a Condition Assessment Strategy			To identify which, where and when condition assessments will be performed in consideration of criticality, LoS, asset records, Council engineers visual assessment of failures and specialists assessments as required.		Develop and implement prior to 2020/21 review of # Waters AMP's	On-going – Staff training has occurred in condition assessment.	2018/21
All		20	Develop a comprehensive renewal programmes based on analysis of condition and capacity once condition assessments have been carried out	2012-2015	N	Condition assessments to be carried out as part of the improvement of data quality	On-going	Condition assessments to be implemented concurrently once strategy in IP 19 is developed	On-going – Staff training has occurred in condition assessment..	2012-2015
All		21	Review and document operations and maintenance strategies based on criticality and risk	2013/14	N	-	2015-2018	Review Lifecycle sections of Amp's once criticality and risk assessments are progressed	On-going	2020/21
All		22	Formalise and update the existing maintenance schedules and procedures quality procedures, contingency and operation and maintenance manuals	2012-2015	N	Utilisation of AssetFinda to Schedule maintenance alongside formalising by	2015-2018	Implement scheduled maintenance of key assets within AssetFinda Version 4	Carry over – issues with implementation of AssetFinda Version 4. Schedule still to be	2018/19

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
						means of manuals is required				
All	Financial	23	Review asset materials codes and size ranges to see if there is scope for rationalising the information, both to assist with valuation and for general asset management purposes	2012/13	Y	Completed this year	-	-	-	-
All		24	Continue to keep good records of construction costs, especially for rural pipelines, to provide better information for future valuation updates.	On-going	Y	-	On-going	On-going	On-going	On-going
All		25	Updating asset inventory to reflect changes resulting from capital works and continue to do so.	On-going	Y	-	On-going	On-going	On-going	On-going

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
All	AM Practices	26	It is proposed as part of future improvements in the management of AssetFinda/GIS - to ensure sufficient resources are available (both internal and external) to enable the full use of AssetFinda/GIS for the operation, management and administration of the utility services	2011/12	Y	Occurred during the 2014 / 15 Financial Year	-	-	-	-
All		27	Council continue to maintain the AssetFinda asset database and improve accuracy of data through review and modification of collection, storage, and auditing with prioritising on criticality including the development of Data management standard	On-going	-	-	On-going	On-going	On-going	On-going
All		28	Complete data capture and update records for underground assets - to the asset management systems and ensure adequate resources are available for data entry and on-going data maintenance	On-going	-	-	On-going	On-going	On-going	On-going

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
All		29	Continue to and complete data capture and update records for all facilities assets - to asset management systems	On-going	-	-	On-going	On-going	On-going	On-going
All	Improvement Programme	30	Develop long term improvement programme to achieve the Council's appropriate practice policy	2014/15	-	Not currently documented	Yes	Asset Management sophistication and Maturity Index assessments need to be completed.	Asset Management sophistication and Maturity Index assessments need to be completed prior to next generation 2024	2018/19
All	Lifecycle	31	Align the asset data in AssetFinda with the criticality assessment ratings					Import criticality ratings post implementation of AssetFinda Version 4. Provide a high level list of critical assets for ease of identification	Carry over – Complete with urgency to enable comparison of age predicted model with condition and performance weightings.	2018/19
		32	Consider and implement recommendations from criticality assessment					On-going	On-going	2018/19 Onwards
		33	Revisit criticality assessment			The Havelock North Water Enquiry and 3Waters review may require a review of the		Maintain a watching brief on recommendations and legislation to ensure criticality	Maintain a watching brief on recommendations and legislation to ensure criticality	TBC

Service	AM Area	No	2012-2014 Improvement Item	Year(s)	Completed	Comment	2015-2018 Improvement Plan and Comments	2018-2021 Improvement Plan and Comments	2021-2024 Improvement Plan	Year(s)
						criticality assessment to ensure the focus remains correct.		assessments remain pertinent.	assessments remain pertinent.	
All	Lifecycle	34	N/A	2021-24		Systematically assess 3W's data reliability and present in a table			Complete systematic reliability analysis for 3W's assets. Once established utilise predictive modelling with condition and performance weightings to better understand longer term renewal requirements.	2021-24

10.2.1 Monitoring Approach

Council has developed this AMP based on an integrated asset management planning approach that includes:

- The configuration of networks to meet customer requirements, now and in the future.
- Current asset information.
- Well-developed strategies to achieve customer requirements.

The further development of Council's asset management approach including supporting processes, systems and data will be needed to meet the appropriate level of asset management practice as set out in Council's Asset Management Policy. This Policy will be reviewed periodically to take into account legislative and other national practice changes.

10.2.2 Timetable for Audit and Review

The programme for future AM reviews of this plan is presented in Table 10.2.

Table 10.2: Timetable for Audit and Review

Activity	Target Date
Improvement Plan reviewed annually by all staff directly involved and focusing on key business issues	30 June each year
Report on Improvement Plan	30 June each year
AMP updates involving members of staff involved in preparing specific aspects of the AMP	30 June each year
Adoption of AMP by Council	30 June every 3 years
Audit NZ external audit	As required by Audit NZ

Appendix A Individual System Description & Overview

Water Quality Compliance DWSNZ

Since 2004 the water supply of most Local Authorities have not been graded due to the change in Drinking water standards and its agreed status, the amendment to the Water section within the Health Act has now made DWSNZ 2005 (amended 2018) compulsory.

The Waimate Urban and Hook Waituna schemes are the only schemes which have a current Public Health grading, with the remainder of the schemes are ungraded.

Appendix Table 1: Waimate Water Supplies Public Health Grading

NZ Community Drinking Water Supplies Health Grading						
Waimate Urban	Cannington Motukaika	Hook Waituna	Lower Waihao	Otaio Makikihi	Waihaorunga	Waikakahi
Ab	u	Ed	u	u	u	u

The Public Health grading is based on the following criteria.

Appendix Table 2: Public Health Grading

Source & Plant Grading		Distribution Zone Grading	
Grade	Explanation	Grade	Explanation
A1	Completely satisfactory, negligible level of risk, demonstrably high quality	a1	Completely satisfactory, negligible level of risk, demonstrably high quality
A	Completely satisfactory, extremely low level of risk	a	Completely satisfactory, extremely low level of risk
B	Satisfactory, very low level of risk when the water leaves the treatment plant	b	Satisfactory, very low level of risk
C	Marginally satisfactory, low level of microbiological risk when the water leaves the treatment plant, but may not be satisfactory chemically	c	Marginally satisfactory, moderately low level of risk
D	Unsatisfactory level of risk	d	Unsatisfactory level of risk
E	Unacceptable level of risk	e	Unacceptable level of risk
u	Ungraded	u	Not yet graded (not required f less than 500 people)

The sampling results for the water supplies over the past two years are tabled below:

A.1 Waimate Urban Scheme

Overview

The reticulation network is supplied from two groundwater bores with one reservoir that supplies 24 hours emergency supply capacity. Manchester Road bore, drilled in 1972, is the predominantly used bore and treatment involves chlorine dosing. Timaru Road bore, commissioned in 2000, originally only used during times of peak water demand during the summer months and treatment includes; chlorine dosing, lime dosing (when required) and an automatic valveless gravity filter to remove iron. However, since the implementation of pressure management both bores operate permanently.

The approximate length for the reticulation network is 67.3 km. A total of 58% of the pipe reticulation network will reach the end of its expected economic lives within the next 30 years.

Approximately 8.8 km of AC and 14km of CI will reach the end of its expected economic lives within the first ten years of this plan.

History

After much consideration by the Council in the early years the nineteenth century, a High Pressure water Supply system was eventually installed in 1906. The scheme has grown progressively since that date with major additions between 1950 and 1970.

The source of this supply was the Waimate Stream, which rises in a large valley on the eastern side of the Hunter Hills some 762 metres high. The point selected for the Intake was in Kelcy's Bush, some eight kilometres from and 183 metres above the town and just opposite the present car park area, but an exceptionally heavy rainfall event damaged the head-works during the period of construction. Therefore, the intake was moved another 60 metres approx. further upstream to the current picnic area. It is important to also note that not only was the original head works damaged in the heavy rain event, but also the then new pipe line to town, at Garland's Bridge.

The old concrete head works remains are still visible at both of these sites. At the second site at the current picnic area, there is a junction pit and from there a 225 millimetre tile pipe and in places steel runs to the top of the hill in Atwill Park just near the bend in the road. From this point a 150 millimetre, cast iron main went down to the old Reservoir, which had a capacity of 2,273 cubic metres and was 68 metres above the town. It is recorded that the Reservoir held sufficient for three days' supply, which would give a demand of approximately 758 cubic metres per day.

From the old Reservoir a 150 millimetre, cast iron main went down to a point in Mill Road just opposite the Belt Street intersection where it is reduced to 100 millimetres and continued down Mill Road to Queen Street. 100 millimetre distribution mains branch off at the intersections of Belt, Rhodes, Harris, Shearman and Queen Streets and three inch pipes supply Opie Street and the Streets to the west of Mill Road. From these primary distribution mains, the water was carried to as far as Uretane (Mrs. Ruddenklau's property - 1937). In the South, Timaru Road (Mr. Cottee's – 1937). In the east, Parsonage Road (Mr. Barclay's – 1937). In the north, High Street (Mr. Hunt's in the north-west - 1937), as well as all the area lying in between these widely separated points.

A report states that the pipes were capable of delivering 2455 cubic metres per day to town, or approximately 1.6 cubic metres per minute (26.5 litres per second). The pressure when tested in town after completion was: Opie Street 565 kPa, Queen Street 737 kPa, and Lower High Street 910 kPa.
A lot of the original cast iron main from 1906 is still in operation today around the Waimate Township.

On 8 December 1914, owing to the shortage of water, the question of procuring additional supplies was considered by the Council. Two proposals were discussed, one to take a pipe from Sanders Falls Creek and the other to obtain supplies from Hayes Creek near the Reservoir. On January 26. 1915 it was decided to lay a pipeline to Sanders Falls.

On 18 January 1924, it was decided to measure the flow of water in the stream. The point selected was the Rook Pool. The reported result were a flow of 663.7 litres per minute (11.1 litres per second) or 956 cubic metres per day.

A recommendation from a report in 1928, written by Mr. Fletcher Roberts, a Civil Engineer from Dunedin, was that the intake be moved 1046 metres upstream to the Rock Pool, and that an additional 200 millimetre pipeline be laid from the Reservoir to town via Allen Street and High Street to Queen Street. Also that a flow meter be installed at the new Intake in order to obtain some accurate data on the flow of the stream.

On 26 August 1930, the Council decided to proceed with the first mentioned recommendation, which was the shifting of the Intake to the Rock Pool. Works started that year and by November 1931 completed.

At this time, the worldwide economic depression became felt in New Zealand, and unfortunately, the additional 200 millimetre pipe recommendation was held in abeyance. Later in 1935, a 225 millimetre cast iron main was installed from the old Reservoir to township to improve flow.
The Rock Pool Intake was still in use and maintained until 1999, and the old Waimate Reservoir until the year 2000.

In the early 1970's a number of bores were drilled by A M Bisley & Co Ltd. One of those bores was the Number 3 bore, also known as Manchesters Road Bore, which was drilled in February 1972. When commissioned it jointly supplied Waimate Urban Supply.

In 1998, the Waimate District Council bought Tony Halbraken's farm (Timaru Road) and subdivided off the new bore that had been drilled on the property, including an easement for access, and then sold the rest of the farm. The bore was drilled by Washington's Drilling in February 1997 and was only partially developed (31.5 hours), 21 March 1998. The Council got Washington's Drilling back on the 22 May 1998, to continue developing the bore for another 20 hours. The Timaru Road bore was commissioned in 1999.

When Timaru Rd Bore was commissioned, the process was similar to Manchesters Road Bore, where abstraction and distribution were the same process with chlorination added as it left the plant.
At this point, the Rock Pool and Saunders Fall were abandoned by the Council. Local farmers on Mill Road, with consent, took on the old Kelcy bush intakes for stock water (only).

In year 2,000 a 2,600 m3 capacity lined and covered, earth pond type reservoir was constructed to replace the original concrete and masonry reservoir that had served Waimate for approximately 90 years.

By 2002 widespread consumer complaints about the staining of laundry and white ware became a significant issue. This was due to the raw water quality coming out of the Timaru Road Bore. From an analyses carried out in 1999 the manganese content was 0.7mg/l, and the dissolved iron content at 0.25mg/L. The elevated levels of manganese and dissolved iron was the cause of the issue, and was exacerbated by gas chlorination creating precipitate.

This led to a decision by Council to upgrade the Timaru Road Bore site with a new treatment plant to remove the manganese and dissolved iron.

The plant was upgraded and commissioned in June 2002. It included chlorine as the oxidizer for the removal of manganese and dissolved iron, an Automatic Valve-less Gravity (AVG) Filter, pH correction lime dosing unit, 2 times 30,000 litre balance tanks, a wet well with two submersible reticulation pumps, upgraded block building and back wash pond.

By 14 January 2003, problems began. A 100mm of fine bore sand was found on top of filter bed media. This build up caused premature and multiple backwashing. The sand was scraped off and removed. The blinding of the filter bed occurred another five times and 6.7m3 approximately, of bore sand in total was removed.

Because of the bore sand in the Timaru Road Bore the filter bed from 2009 is annually checked and scraped. The depth of the bore sand currently found on the filter bed media ranges around 20 to 30 mm.

In 2005 due to the AVG filter bed being blinded with bore sand, two new soak holes are bored to drain away the excess backwash effluent/supernatant.

About this time in 2005, Waimate consumers began lodging taste and odour complaints when the plant was running.

In 2006 lime dosing for pH correction stopped. It is not understood why it was stopped. With current pH levels for raw water around 7.7 and treated 7.4, plus the naturally occurring alkalinity (117 g/m3) in the raw water, there is no need for lime dosing to correct pH.

In addition, staff in 2006 stopped using Timaru Road Bore and Treatment Plant as the duty/main source and supply for Waimate because of taste and odour complaints. When the plant was running the chlorine residual ranged between 0.2 to 0.4 mg/l leaving the plant.

From 2003 written records on site about process became vague and by 2006 non-existent.
In 2007 and 2008, there were major staff changes. A new Supervisor and two new water operators, and at the end of 2008, a returning Engineer. Work was started on getting the Timaru Road Bore and Treatment Plant functioning properly again.

At this time the Timaru Road Bore and Treatment Plant was suffering from:

- Multiple backwashes (3x a day).
- Incorrect flow rate through filter (169m3/hr).
- Bore sand, causing the clogging filter bed.
- Smell of Hydrogen Sulphide off the raw water from bore.
- Dark black/brown coloured backwashes.
- Taste and odour compliant when the bore and plant was operational.
- No maintenance program being actioned.
- Water main breakages in township.

Each of these issues were investigated and corrected by:

- Correcting the flow rate to a maximum of 150m3/hour reduced the number of backwashing actions from per day to per week.
- Annual cleaning the filter bed stopped the blinding of the bed and contributed to reducing the number of backwashing actions from per day to per week.

- By recognizing the hydrogen sulphide in the raw water, it lead to the discovery of the causes of the taste and odour complaints, and the thick dark black/brown coloured backwashes.
  Because of the low chlorine dose and lack of use, the filter bowl started to breed sulphide/sulphate eating bacteria, which lead to a thick dark black/brown coloured backwashes and taste and odour complaints. There is also may have been a possibility of poor oxidization of the manganese and dissolved iron in the raw water, which also creates taste and odour issues.
  This lead to upping the chlorine dose so that there was a chlorine residual of 0.7 to 0.8 mg/l at the underdrain of the filter bowl (post treatment), and setting up the plant to run daily. This meant that the manganese, dissolved iron and hydrogen sulphide were oxidized properly and prevented any growth in the filter bowl, plus the running the plant daily also prevented the growth of the bacteria. After these actions, the taste and odour issues were significantly reduced.
- Regular weekly visits and maintenance as required, plus the introduction of regular manual backwashes to keep the filter bed healthy. All Staff are now trained in the new plant procedure.
- Reducing the reticulation pump outgoing set-point pressure from12 Bar, which was too high for the aging infrastructure, to 10.3 Bar. This lead to a significant reduction in water main breakages in township.

During 2013 to 2018 About 4.3 km's of new 200mm PVC rising main has been installed from High Street and Queen Street intersection up High Street to Allan Street and along, then from Mill Road and Allan Street intersection, under the Waimate Creek Bridge to the Waimate Reservoir. This has been done to improve flow up to the Mill Road Reservoir, and part of the process to improve pressure management in the Waimate Urban supply.

Since 2016 Council have been renewing water mains pipe, laterals and Tobies (point of supply) in the Waimate urban area. To date, about 4 km of old cast iron and AC pipe have been renewed with 100 millimetre PVC pipe. All tobies and laterals have also been replaced with 20 millimetre MDPE OD pipe and Acuflo manifold units (dual check) with flow meters.

On the 21 December 2014 the Manchester Bore plant building caught on fire, damaging the electrics and interrupting delivery and chlorination. A temporary building to house new equipment was erected on 22 December 2014 and became operational on 23 December 2014. The cause was electrical and could have been either a fault or excessive heat generation of electrical control equipment.

After reapplying for full "Secure Bore" status after five years in 2017, Manchesters Bore was unable to fulfil criterion 2 of the DWSNZ 2005 revised 2018). This was because of the age of the bore, plus no construction details when A.M.Bisley & Co. Ltd. drilled the bore in 1973. The full "Secure Bore" status was revoked on the 23 November 2017.

With loosing "Secure Bore" status it was decicded not to retry for bore security again, but to put in a multiple barrier approach to treatment, to assure secure and safe drinking water supply for the Waimate town community. This deciosn not to try for "Secure Bore" status was due to the Havelock North event in 2016, and the fact that "Secure Bore" status is not good science, and very hard to prove satisfactorily.

First stage was to replace the old Manachester Bore (J40/0022) with a new 300mm bore (CA19/0055), 3 meteres east of the existing bore on the railway embankment, which was commissioned September 2018. The new bore tapped into the same aquifer with the screen set between 79.1 to 83.1 metres.

As part of that process a retaining wall was then built on the north side of the old railway embankment to increase space for a new treatment plant on the embankment. This was completed March 2019.

The contract for the new treatment plant soon followed with the new treatment plant being constructed at the end of 2019. The plant was completed and commissioned 5 December 2019.

The new Plant relies on a secure borehead, Ultraviolet (UV) irradiation of microbiological organisms (protozoa & bacteria) and disinfection of treated water to the distribution

Manchester Bore Treatment Plant December 2019

The plant has been operational since completion in December 2019 with some minor operational compliance functions that need to be completed by council staff to achieve full compliance (manual monitoring of UVT, Secure Borehead report).

As the Council had decided to move away from "Secure Bore" status as a barrier, work started in late 2020 on Timaru Road bore to upgrade the treatment process to Ultraviolet (UV) irradiation for microbiological treatment. And will also seek to meet criterion 2 (Borehead Security), DWSNZ 2005 (revised 2018) as a barrier.

8. System Description

Source and Catchment:

Manchesters Bore

The new Manchesters Bore (2018) is a 300mm diameter bore at 83.1 metre deep with the screen set at 79.1 – 83.1m, and is sited on the old railroad embankment, 850 metres off Manchesters Road, Waimate. This new bore (CA19/0055) was installed in 2018, and replaces the older bore (J40/0022) drilled in 1973, which was aging and its integrity and security were questionable.

The new bore was drilled to meet the compliance requirements of the DWSNZ 2005 (revised 2018), and the NZS4411:2001 Drilling Standards, plus grout sealed to 11 metres (Australian Standard [5-10m]) below the ground level to prevent ingress. "Secure Bore" status has not been sought after for this bore, as it is a questionable methodology to prove that the water drawn from it is safe. Instead Council will seek to meet criterion 2 (Borehead Security) DWSNZ 2005 (revised 2018) and provide treatment at the Plant for bacterial and protozoal compliance.

The wider catchment around Manchesters bore is made up of arable cropping, life style blocks (septic tanks), sheep and dairy farming (septic tanks and secondary sewage treatment), plus the urban community of Waimate with a population of 3000, which is 3 km to the West of the bore. The Regional Council's "Community Drinking Water Protection Zone", which is a protection zone of 100m radius

around bore, totaling 3.1 hectares of land, is an exclusion zone protecting the source. Inside the protection zone, the only activities that occur insde the "Community Drinking Water Protection Zone" are arable cropping and intermittent grazing of sheep (>50), which pose no risk. The bore and plant are fenced off from livestock access. Manchesters Bore, old and new, has maintained E.coli compliance since 2009, with no E.coli transgressions. However, there were four events of total coliforms (1 MPN/100ml and 2 MPN/100ml in 2013, then again 1 MPN/100ml and 200 MPN/100ml in 2018) from the old bore (J40/0022) with no reason why? Plus one event of total coliforms found in the commisoning sample at >5 MPN/100ml from the new bore (CA19/0055), which could be put down to the activity of drill and developing.

From geological and hydrological reports put out by Environment Canterbury (Regional Council) evidence it indicates that the Manchesters Bore draws water from the Upper Kowai Formation in the Cannington Gravels. The recharge zone is difficult to identify and quantify for the Kowai Formation. Due to its limited outcrop area, it is suspected that the majority of recharge for the Kowai Formation infiltrates from the shallow groundwater system. The ground water from the bore has a mean age of >171 years, and less than 0.005% water less than a year old. This would indicate that Manchesters Bore is not directly influenced by surface activities *(See "Waimate Urban Water Supply Bore Hydrology Report – November 2017")*.

The overall assessment of the Manchesters Bore catchment, plus the impact from human and agricultural activities has no known impacts.

Timaru Road Bore

Timaru Road Bore is a 250mm diameter bore at 110m metre deep with a screen at 105 – 110m, and is sited at 383 Timaru Road, Waimate. The wider catchment is made up of arable cropping, life style blocks (septic tanks), sheep and dairy farming (septic tanks and secondary sewage treatment), plus the urban community of Waimate with a population of 3000, which is 4 km to the Southwest of the bore. The Regional Council's "Community Drinking Water Protection Zone", which is a protection zone of 100m radius around bore, totaling 3.1 hectares of land, is an exclusion zone protecting the source. Inside the protection zone the only activities that occur are arable cropping and intermittent grazing of sheep (>50) and beef cattle (>50), which pose no risk. The bore and plant are fenced off from livestock access. Timaru Road Bore has maintained E.coli compliance since 2009, with no E.coli transgressions.

From geological and hydrological reports put out by Environment Canterbury (Regional Council) evidence it indicates that the Timaru Road Bore draws water from the Lower Kowai Formation in the Cannington Gravels. For the Lower Kowai Formation the recharge zone is unknown. At present, record lengths are not long enough to determine any long-term trends to identify area of infiltration and recharge. The ground water from the bore has a mean age of >180 years, and less than 0.005% water less than a year old. This would indicate that Timaru Road Bore is not directly influenced by surface activities *(See "Waimate Urban Water Supply Bore Hydrology Report – November 2017")*.

The overall assessment of the Timaru Road Bore catchment, plus the impact from human and agricultural activities indicates no known impacts, and the bore meets all three current criteria requirement for "Secure Bore" status in providing safe, compliant drinking water to the consumers on Waimate Urban Supply. However the Waimate District Council will not be reappling for "Secure Bore" status in the future

<u>Abstraction:</u>

Manchesters Bore
An 11 kW submersible pump abstracts the source water from Manchesters Bore and is controlled by a variable frequency drive (VFD). A maximum / minimum flow rate set points have been set for the protection of the pump and the medium pressure UV reactor. On the bore head, there is Reduced Pressure Zone (RPZ) backflow preventer.

The Manchesters Bore submersible pump is intiated by demand and level transducer in the balance tank.

Timaru Road
A 30 kW submersible pump abstracts source water from Timaru Road Bore. The flow from the bore is currently throttled by valve on the bore head to 44 L/sec, which is the maximum flow rate for the Automatic Valveless Gravity (AVG) Filter. On the bore head there is a Reduced Pressure Zone (RPZ) backflow preventer, plus an air gap at the top of the AVG filter for back flow prevention.

The Timaru Road Bore submersible pump is also intiated by demand and level transducer in one of the two balance tanks.

Treatment Plants:

Manchesters Bore
The new Manchesters Bore Treatment Plant is next to the bore head. Next to the plant is a concrete chlorine gas store and dose shed, and a balance tank. The Treatment Plant houses the the medium pressure UV reactor, electrical distribution and control panels, analysers and SCADA.

Once the source water has passed through the RPZ backflow preventer, it enters the building and flows into the medium pressure UV reactor and out to the balance tank. When the treated water is drawn by the 30kW duty reticulation pump, the chlorine gas dose water solution is injected in before the pumps to aid mixing. The dose pump rate is automatically controlled to maintain a Free Available Chlorine (FAC) set-point level as measured and monitored by the chlorine analyser (automated closed loop process controller). The chlorination system operates whenever the reticulation pump is running.

The reticulation pump is initiated by level setpoints on the Mill Road Reservoir. The onsite SCADA PLC's at Mill Road Reservoir and Manchesters Bore provide the control function between the two remote units (RTU) to switch the pump on and off as required to fill the reservoir. This pump control includes Timaru Road Bore Treatment Plant. Manchesters Bore will always turn on first, and off last. If the plant faults, Timaru Road Bore Treatment Plant will continue to supply Waimate Urban.

The present treatment plant has no protozoal treatment barriers or "Secure Bore" status for the bore. To be protozoal compliant under the Drinking Water Standard for New Zealand 2005 (revised 2018), the plant needs log three (3) or four (4) treatment processes to be in place.

Timaru Road
The Timaru Road Bore is protozoal compliant with the current "Secure Bore" status with chlorine disinfection. Timaru Road Bore treatment plant is on the same site as the bore and consists of the bore headworks, an Automatic Valveless Gravity (AVG) Filter for soluble iron removal, two 30,000 Litre storage tanks, concrete high lift pump chamber with two 92 kW submersible pumps for reticulation delivery. Onsite also is the treatment plant building that houses electrical distribution and control, SCADA plus valving and chlorine treatment equipment (chlorine gas – 1 tonne + 100kg cylinders) for the oxidation of soluble iron and residual chlorine (FAC) for disinfection.

Currently (2021) the plant is being upgraded with UV reactor for protozoal treatment, so the plant does not have to rely on "Secure Bore" status. The new UV reactor will be operational by the end of 2021.

Chlorination at Timaru Road has two functions. One, oxidise the soluble iron into iron precipitate to be filtered out in the AVG filter, and two, residual chlorine (FAC) for disinfection. The chlorine dose is manually set to allow for enough chlorine to oxidise of the soluble iron and residual chlorine (FAC) for disinfection.

After the RPZ backflow preventer on the bore head the source water is dosed with a gas chlorine solution after the check valve. There is enough contact time and mixing before the AVG filter bed to produce iron oxide precipitate to be remove by the filter. As the filtrate enters the under drain at the base of the AVG filter, the chlorine residual is routinely manually monitored for the ideal FAC residual of 0.7 - 0.8 mg/L. The treated water pass up through the unit into the clear water backwash tank in the AVG filter, and then out into the two 30,000 Litre storage tanks. Level sensors in one of the storage tank indicates state and also linked to control setpoints for the 30 kW bore pump to start and stop. Treated water is drawn from the storage tanks into the concrete high lift pump chamber by the duty 92 kW submersible reticulation pump. The reticulation pump is controlled by a variable frequency drive (VFD). A maximum pressure, plus maximum flow rate set points have been set for the protection the reticulation and alarming for faults.

The duty reticulation pump is initiated by level setpoints on the Mill Road Reservoir. The onsite SCADA PLC's at Mill Road Reservoir and Timaru Road Bore Treatment Plant provide the control function between the two remote units (RTU) to switch the pump on and off as required to fill the reservoir. This pump control includes Manchesters Bore Treatment. Timaru Road Bore Treatment Plant will always turn on second, and off first. If the plant faults, Manchesters Bore will continue to supply Waimate Urban.

Distribution:

As mentioned in "Treatment", distribution is initiated by level setpoints on the Mill Road Reservoir and controlled by onsite SCADA PLC's remote units (RTU) at the reservoir and two intake plants.
Distribution in Waimate Urban supply, directly pumps into the supply reticulation with the residual volume overflowing into the Mill Road Reservoir. This requires pressure and flow control at both intakes to protect the reticulation. Manchesters Bore reticulation pump is set at 10.3 Bar, and Timaru Road Bore reticulation pump is also set at 10.2 Bar.

A separate rising main runs from each treatment plant and feeds into the reticulation. Manchesters Rd rising main is a DN200 asbestos cement pipe installed in 1973. Timaru Rd rising main is a DN200 PVC-M pipe installed in 1999.

The Mill Road Reservoir is elevated above the town at 120 metres above sea level on Mill Rd. The reservoir is a lined and covered earth reservoir approximately 4 metres deep with an approximate capacity of 2,600 cubic metres. This storage volume has the potential to supply the township for 36hrs, at a restricted demand, in the event of an emergency. The reservoir lining and roof consist of sections of polyethylene sheets welded to form a water tight seal. The roof and lining are joined together to form a sealed reservoir. There is a separate inlet (high level) and outlet (low level) system to allow cycling of the water in the reservoir. Chlorine FAC residual is also now monitored at this point in the distribution.

The Waimate Urban water supply network and the Hook Waituna network cross at numerous locations. At two such points the supplies are connected at Manchesters Road and Mill Road. Since 2018 the Waimate Urban supply permanently augments the Hook Waituna Rural Water Supply from

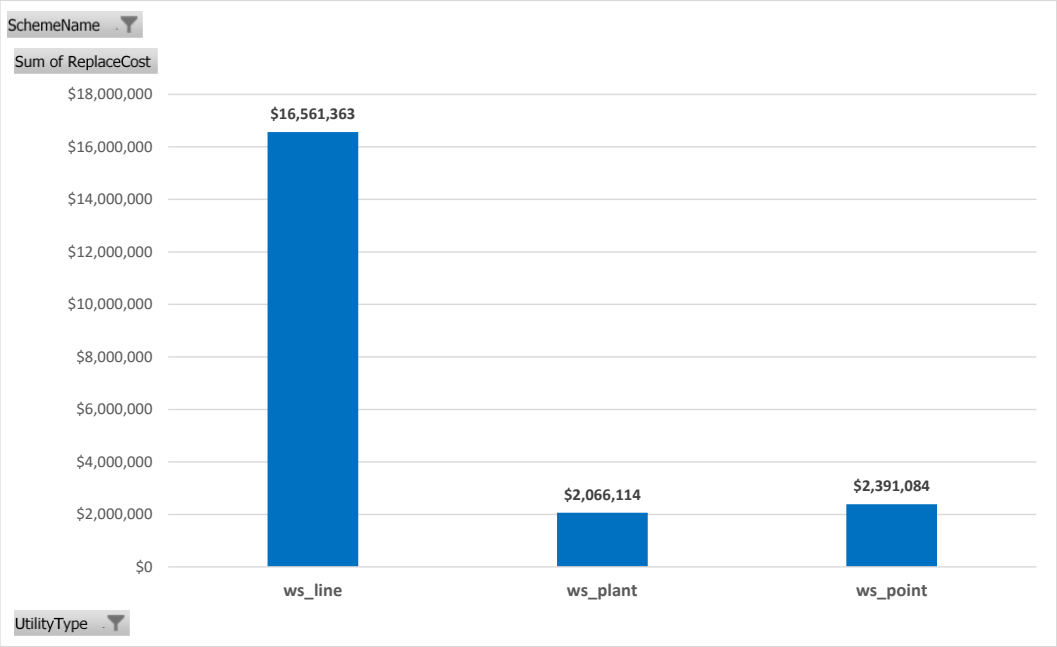
these two points. This has the effect of boosting the supply into the rural water scheme network. Non-return valves prevent backflow from the rural scheme back into the Waimate Urban supply. The areas augmented are known as Willowbridge and Garlands. Augmentation is required now because the Hook Water Supply under normal demand can not provide enough treated water to all parts of the Hook Waituna reticulation.

Management and Operation:
The scheme is administered at the main council offices in Queen Street, Waimate and operated and managed by the Council's Utilities Business Unit (UBU) based at Michael Street nearby. Five qualified field staff operate and maintain the rural water scheme plant, fixing leaks etc as generally advised by the public. Water samples are sent to MedLab laboratories for bacteriological testing.

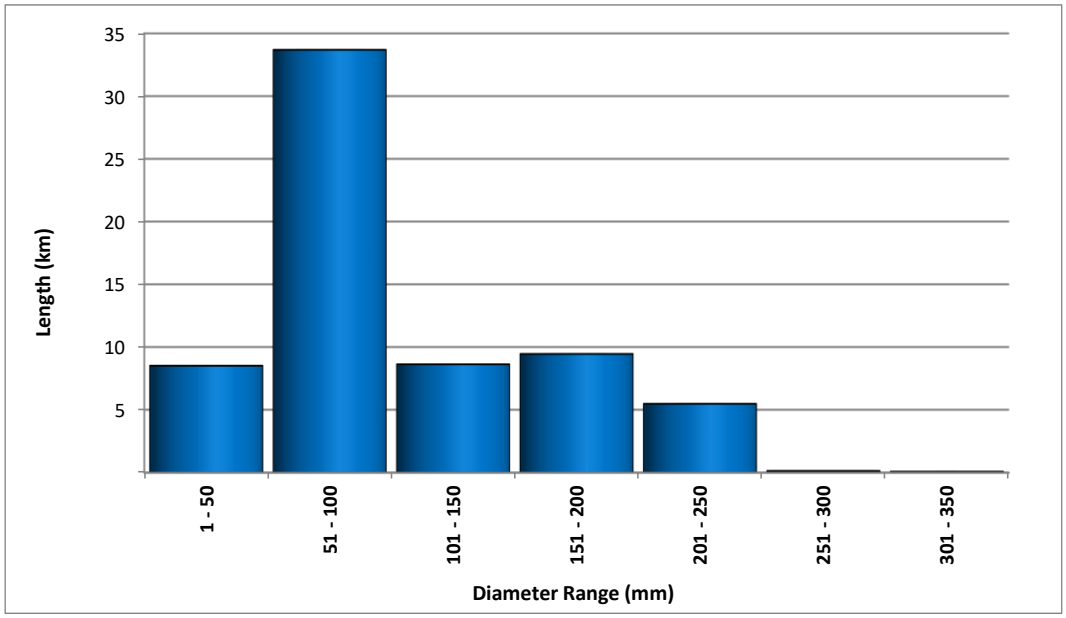
System Information

System Information – Waimate Urban			
Properties Connected	1,985	**Treated Storage (Reservoir)**	
- Metered unrestricted	-	Mill Rd	
- Metered restricted	-	Built (yr)	2000
- Unmetered Residential	-	Capacity	2,600 m^3
		Material	
Water Sources	(Consent volumes)	**Treatment**	
Manchester Road bore	2,160 m^3/day	Chlorine	
Timaru Rd bore	3,456 m^3/day	Filtration & Chlorine	
Resource Consents	Expiry date	To	
CRC000234	19/11/2034	Discharge backwash	Mill Rd
CRC020225	11/09/2036	Discharge backwash	Timaru Rd
CRC992171.1	14/06/2034	Take water	Manchester Rd & Timaru Rd
Replacement Cost	$21.1 m	Reticulation length	66 km

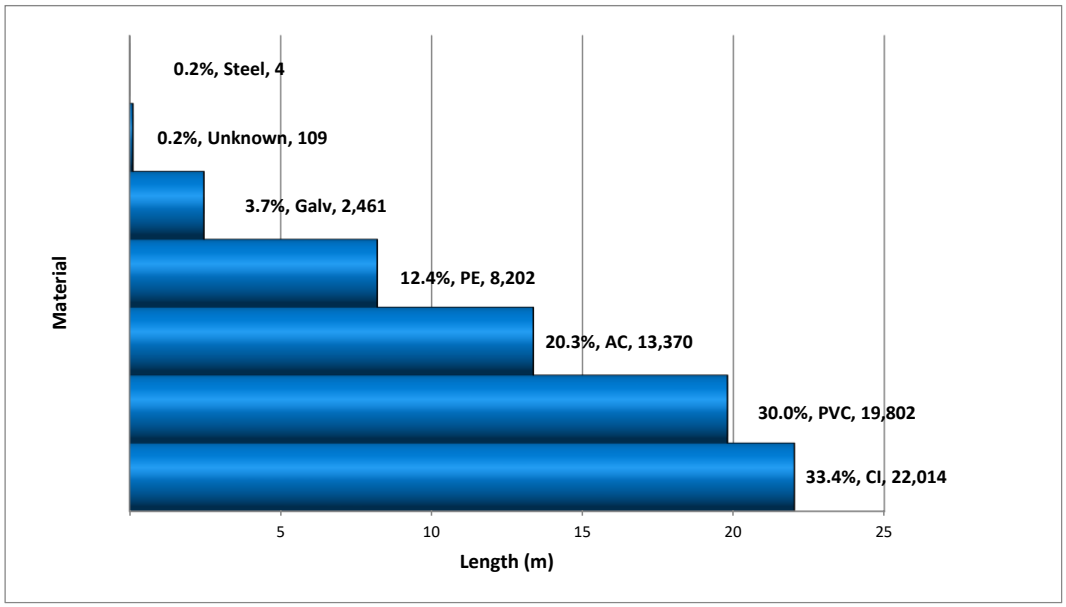
Appendix Figure 1: Scheme Components



Appendix Figure 2: Water Mains Diameter Range

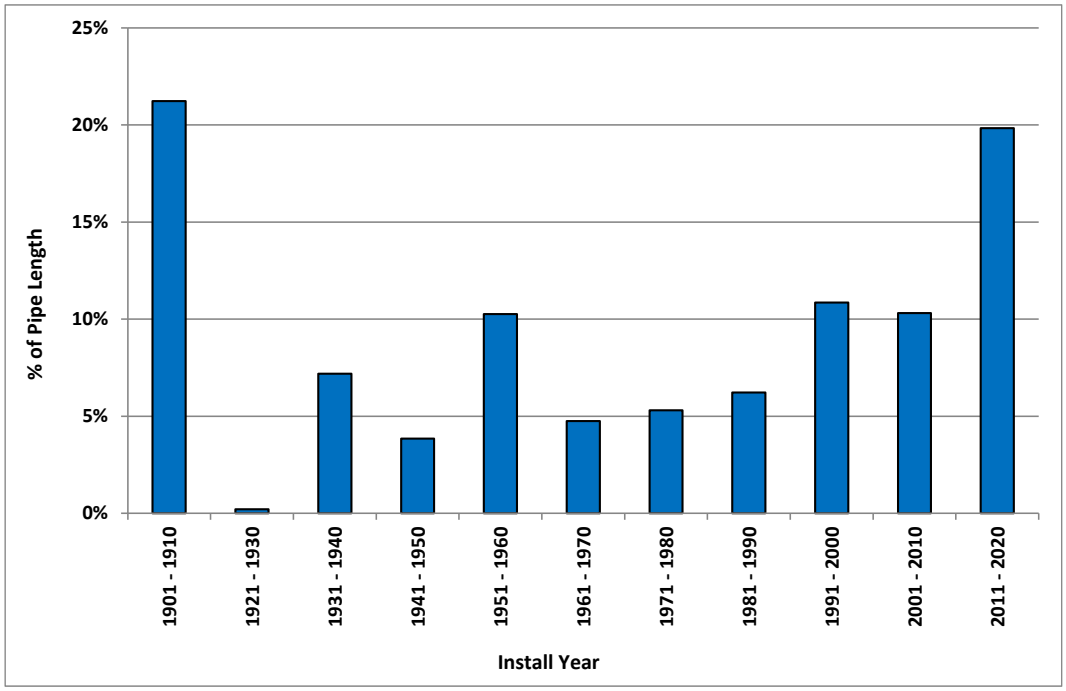


Appendix Figure 3: Water Mains Material Length

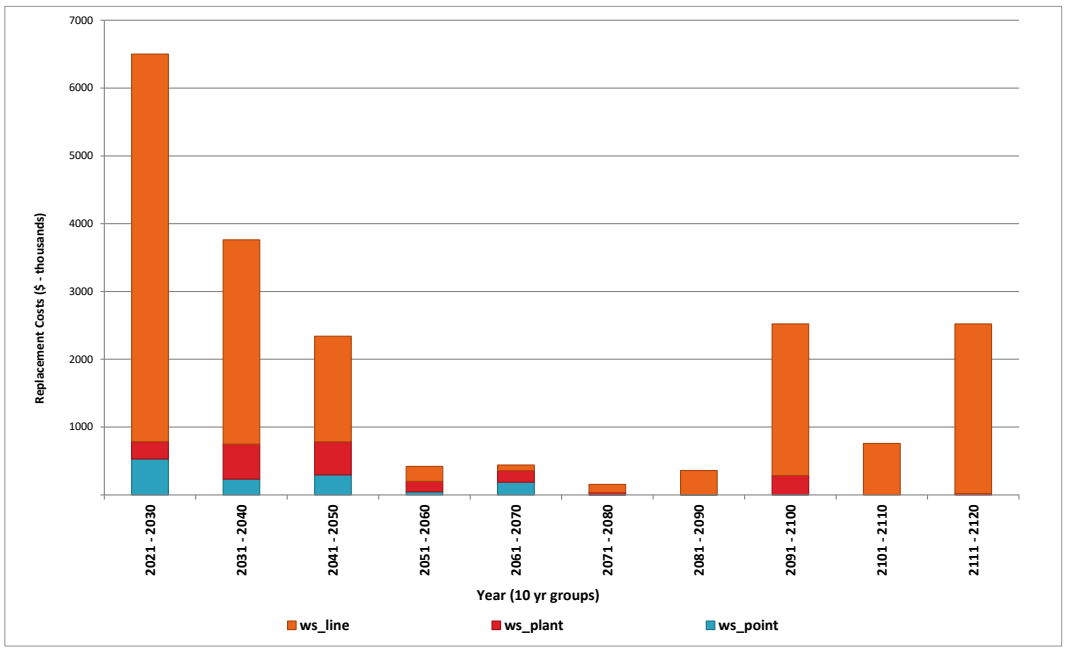


Approximately 21% of the Waimate Urban water supply reticulation was installed during 1906 and are 114 years old. The remaining 79% have been installed since 1921 and are aged between 1-99 years. The reticulation consists mainly of CI (33%), PVC (30%), AC (20%), PE (12%) and Galv (4%). There is 4m of steel which will be pipes from bore to surface pump stations.

Appendix Figure 4: Water Mains Install Year

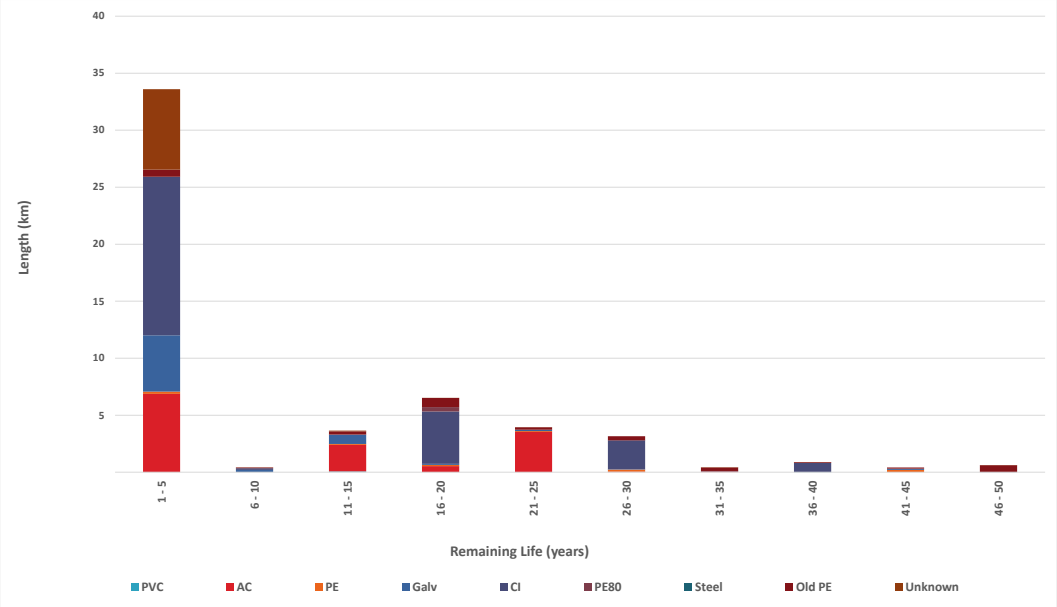


Appendix Figure 5: Remaining Life of all Assets – Long Term

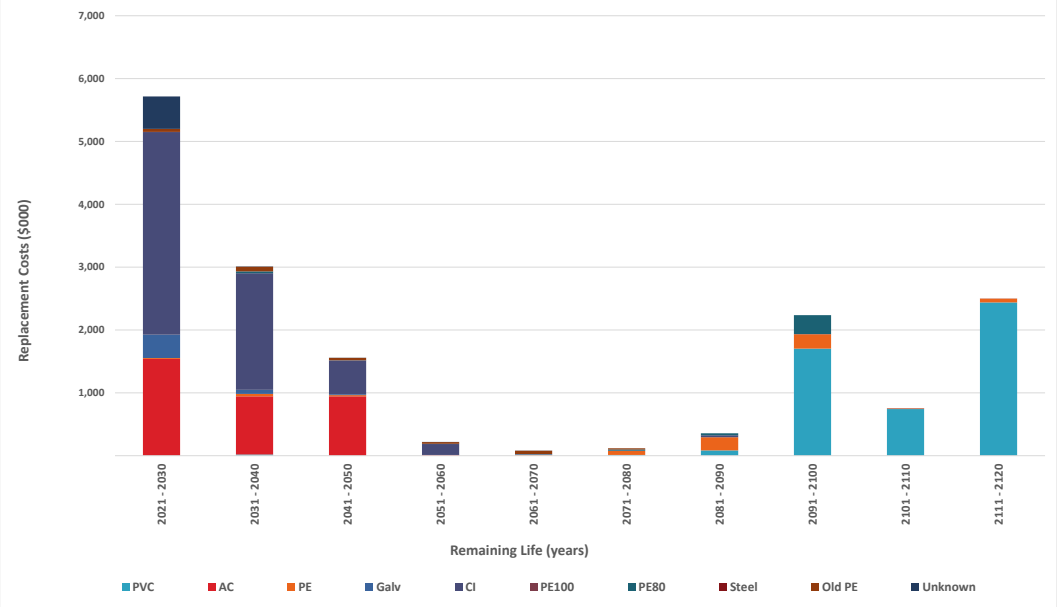


At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined by determining evidence-based useful lives using a combination of condition and performance data.

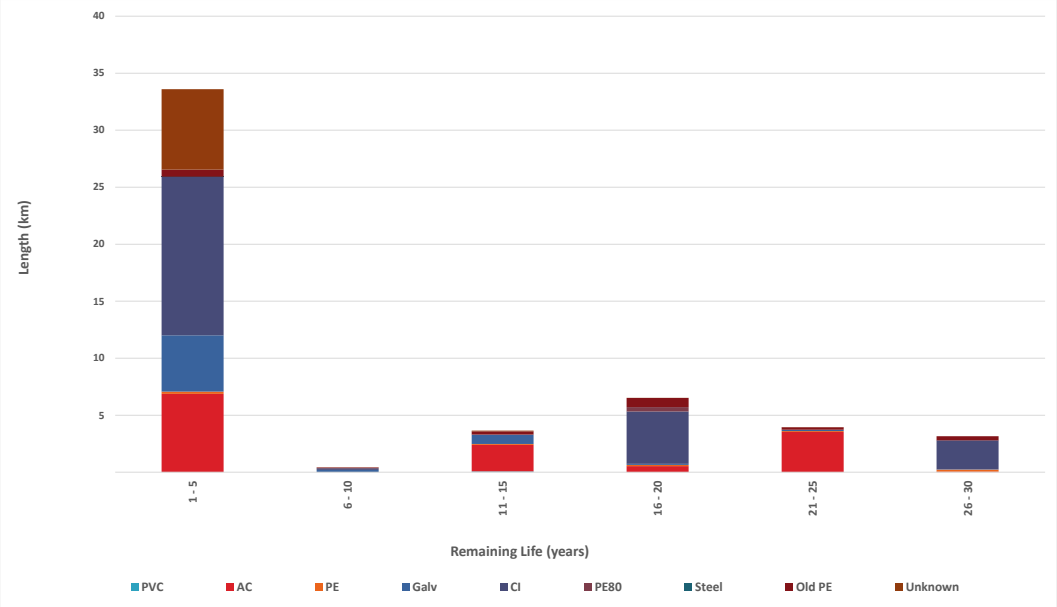
Appendix Figure 6: Water Mains Replacement (Length) – Long Term



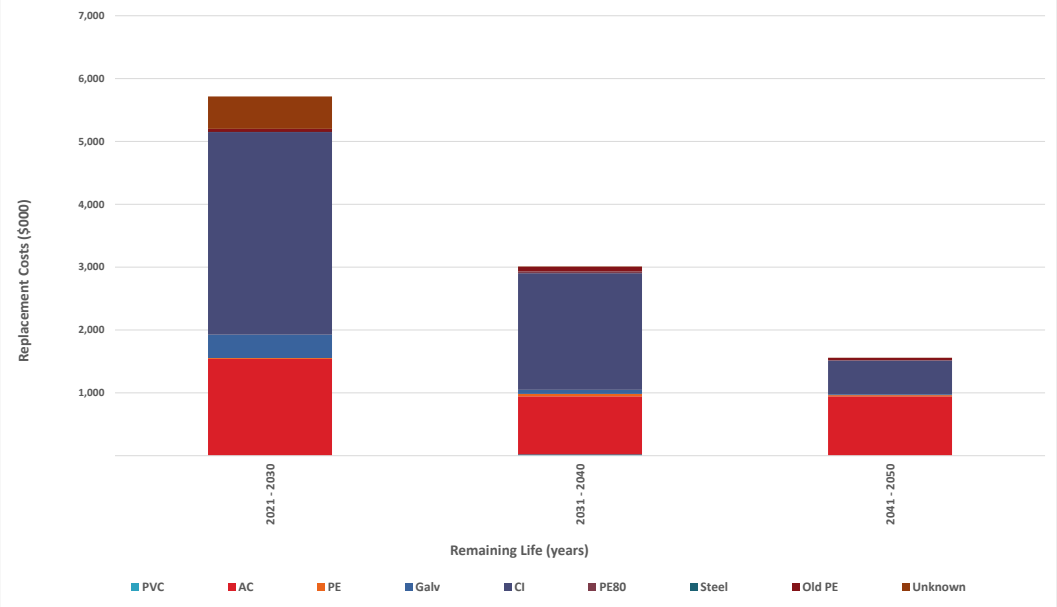
Appendix Figure 7: Water Main Replacement Value – Long Term



Appendix Figure 8: Water Main Replacement (Length) - 1 to 30 Years



Appendix Figure 9: Water Main Replacement Value 1 to 30 Years

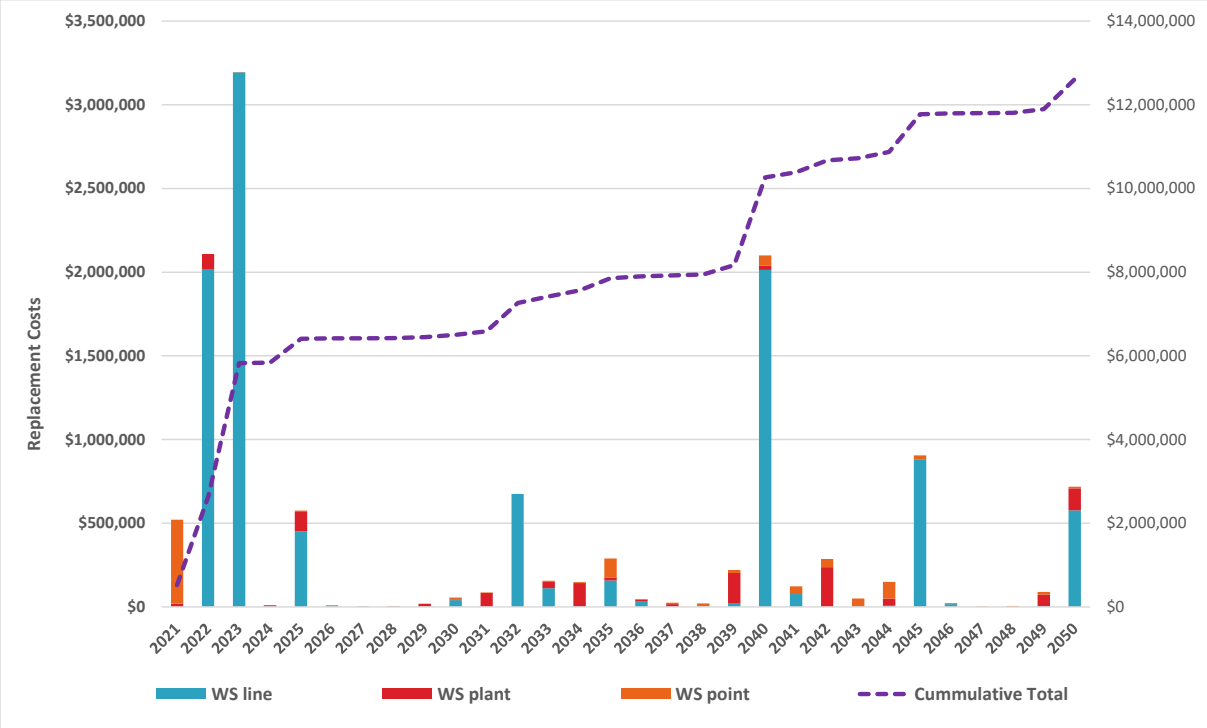


Appendix Table 3: Plant Replacement Value 1 to 30 Years

Asset Group	Remaining Useful Life (5 year groups)						
	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Abstraction						61,480	61,480
Chlorine	26,721		44,541	12,420			83,682
Control	50,151	1,037	21,072	77,320	434		150,014
Digital I/O	435		803	3,623			4,861
Distribution			3,341	13,339		6,874	23,554

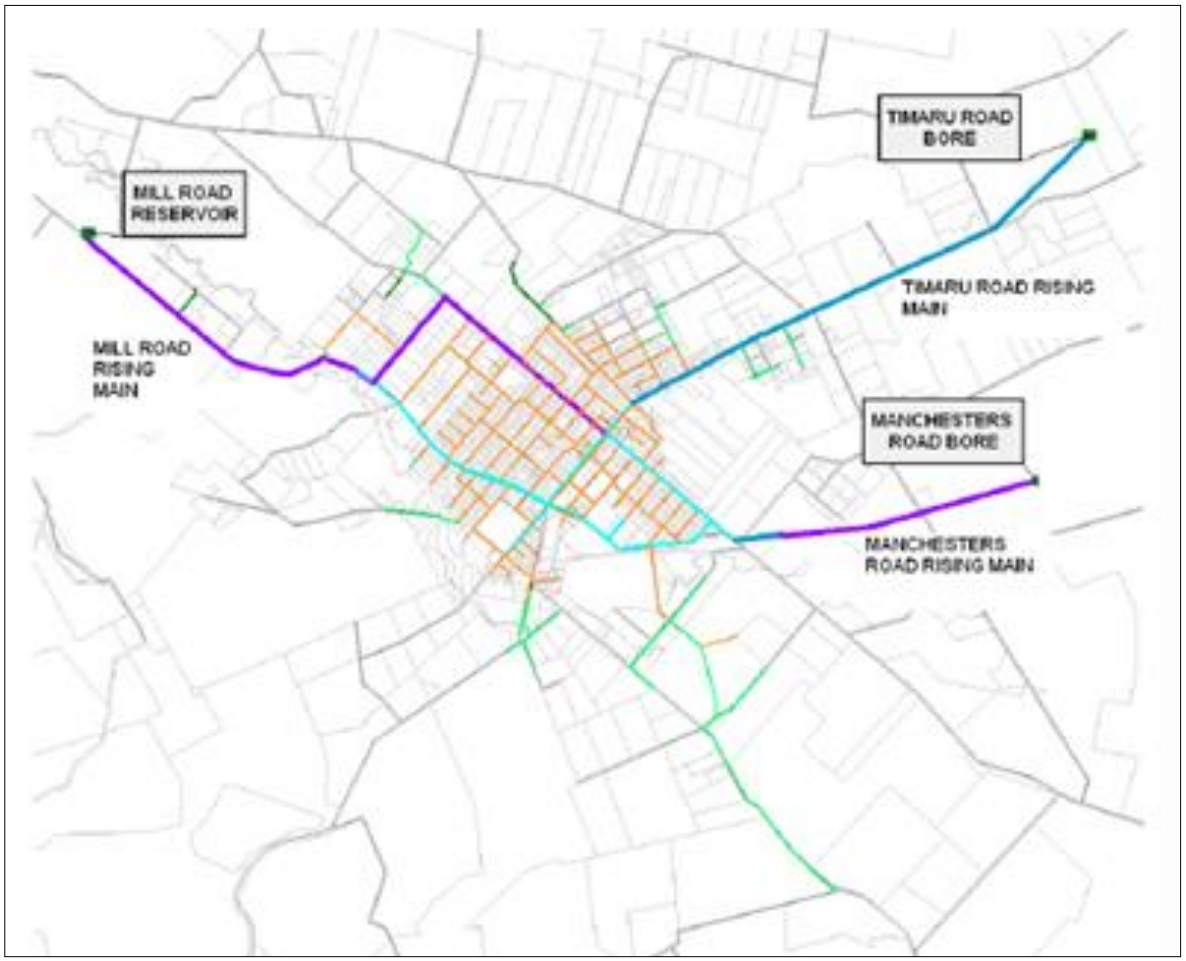
Asset Group	Remaining Useful Life (5 year groups)						
	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
FAC Remote			13,616				13,616
Filtration			82,279		233,580		315,859
Hand	347						347
Land						26,978	26,978
Lime					42046		42046
Measurement	4,685	580	43,200	11,162	1,414		61,041
Pipe				6,100		8,621	14,721
Process		504					504
Reservoir	104,637			20,120		91557	216314
SCADA	8,101		8,894	20,607		524	38,126
Security				5,971			5,971
Sodium Hypochlorite			544				544
Submersible	36,005	14,148	36,819	26,735			113,707
Surface	3,301			28,256			31,557
Transmission						4,690	4,690
UV			26,227				26,227
Valve	3,385	204	6,88	8,680	4,519		17,476
Vessel						1178	1,178
Grand Total	**237,768**	**16,473**	**282,024**	**234,333**	**281,993**	**201,902**	**1,254,493**

Appendix Figure 10: 30 Year Renewal Programme



The above figure shows the theoretical replacement programme based on asset expected useful lives.

Appendix Figure 11: Waimate Urban Water Scheme



A.2 Cannington Motukaika Water Scheme

Overview

The Cannington-Motukaika rural water supply scheme is a "small drinking water supply" that supplies water to 50 connections with a total population of about 120. The Waimate District Council target rates 31 properties for the supply of water in this scheme. Some scheme consumers have more than one point of supply connection on their rated property. Each point of supply connection is required to have water storage for 96 hours (four days) in case of interruption of the water supply.

The intake is located in the Mt Nimrod Stream which gravity feds to a balance/contact tank where chlorine disinfection is undertaken. The treatment plant does not have any protozoal treatment barriers, only a roughing filter and chlorine disinfection. A majority of the reticulation network is gravity fed from this balance/contact tank. Midway in the reticulation a booster pump supplies a reservoir, and reticulation network, in the southwest part of the scheme.

The length of the Cannington-Motukaika reticulation network is approximately 57km over an area of 83 km². The majority of pipe network was installed in 1973 and is 45 years old.

A large proportion of the water produced for the supply is consumed for the purposes of commercial agriculture. About 37 habitable dwellings have access to the water supply. This equates to 14% human consumption of the sold volume (based on 1500L/day/dwelling).

History

The Cannington Motukaika water supply scheme assets were installed in 1973 and the majority of scheme reticulation is 44 years old. Very infrastructure have been installed since 1973. A schematic diagram of the scheme follows.

System Description

Source and Catchment:

Raw water is sourced from the Mt Nimrod Stream, which is fed from the surrounding 543 hectare hill catchment. The majority of the catchment is made up of upland pasture, with 71 hectares of native bush and forest above the intake.

The whole 543 hectares of the catchment is protected under the Waimate District Council District Plan "Water Supply Protection Area". Around the intake weir there is 21.9 hectares of Regional Council "Community Drinking Water Protection Zone", which is partial overlapped the "Protection Area".

The upland pasture is made up of pastoral grasses and tussocks. Livestock such as sheep (<100) and beef cattle (<40) intermittently graze in the catchment. There are also small numbers of feral animals like pig, deer and goats in in the area. Wallabies are also present and the population can get up to 80 animals. There are regular culling programmes to keep wallaby numbers down.

There are also low volume farm tracks in the upland pastoral area for access. These farm tracks are maintained by the landowner, and grassed to reduce exposed soil.

The native bush and forest above the intake, and around the intake is managed by the Department of Conservation (DoC). This area is known as the Mt Nimrod Reserve. Recreational activities in the Mt Nimrod Reserve are controlled by DoC.

In the reserve, there are day walk tracks up around through the bush, with a camping ground 400m below the intake. The track is to the intake weir is not a part of the DoC walking tracks.

In the reserve there is "river canyoning" on Mt Nimrod Stream, which is inside the "Water Supply Protection Area" and "Protection Zone". DoC have granted Big Rock Adventures Ltd from Geraldine concession for 10 years to run this activity in the reserve, which commenced 1 May 2011, and expires 30 April 2021.

Big Rock Adventures Ltd have procedures in place around toileting and protection of the environment that they and their clients must follow. These procedures have been viewed by the Waimate District Council, and are satisfied that any associated risks of contamination are controlled. This is a summertime activity and not all year round, therefore poses minimal risks.

The overall assessment of the catchment, plus the impact from human and agricultural activities, equates to a 4 Log treatment process requirement to provide wholesome, compliant drinking water to the consumers on the Cannington-Motukaika Rural Water Supply.

Abstraction:
The raw water is abstracted from Mt Nimrod Stream by an instream weir that diverts water over a roughing filter adjacent to the stream. Surplus flow is diverted back to the stream below the weir.

Maximum consented take is 5.5 L/sec and total volume of 3,325 m^3 per week.

Transmission:
Water flows via a 150mm AC gravity pipeline, approximately 1.3km east, to the treatment plants balance / contact tank. Flow into the tank is controlled by a ballcock valve, and is activated by outflow demand.

Treatment Plant:
The treatment plant consist of a balance / contact tank that is equipped with an ballcock valve, inline stainless steel mesh filter at the tank inlet, solar electrical system, dose pump and a chlorine solution shed.

Raw water passes through the course inline filter before entering the tank. A flow switch on the inlet pipe detects flow and controls chlorine dosing. When initiated by flow the chlorine pump injects a chlorine solution at an operator input set rate. The ballcock setup is designed to allow for a full flow when open, therefore either on or off. This aids chlorination dosing by keeping the flow relatively constant and free available chlorine (FAC) levels consistent.

The tank also serves as a contact tank for chlorination. At an average outflow of 2.8L/sec, contact time is around an hour to two hours. Minimum contact time is around 30 minutes, at maximum outflow of 5.5L/sec.

Power for the chlorine dose pump is generated by four solar panels, and is stored in four large 12-volt deep cycle batteries. The batteries are for nighttime use and low sun days due to cloud or bad weather.

The present treatment plant has no protozoal treatment barriers. For the plant to be protozoal compliant under the Drinking Water Standard for New Zealand 2005 (revised 2018), the plant needs log four (4) treatment processes to be in place.

Two monitoring samples taken at the treatment plant (during October 2020) showed bacterial transgressions greater than 10 E.coli per 100ml in each sample. This was related to chlorine dosing equipment failure. A permanent boil water notice has been in place since March 2013, mainly due to a lack of digital connectivity, and the ability to monitor changes in the scheme remotely in real-time.

Mains power, monitoring and control, telemetry (SCADA), and a building (to house monitoring, telemetry [SCADA] equipment) have been recently installed at the Cannington Treatment Plant site in 2021. This was installed as a part of an agreement with The Ministry of Health, instead of full upgrade of the treatment plant, to allow for potential changes in legislation and standards (Acceptable Solutions), for rural agriculrual water supplies.

Distribution:
The majority of the scheme is gravity supplied from the balance / contact tank. Flow out of the tank is determined by demand.

At the south end of the supply a booster pump station is required. It is known as Pratts pump station, and is situated at the end of Pratts Road. The pump station pumps to a reservoir known as Lambs Reservoir at the west end of Howells Road, and supplies the high level properties in the south west of the supply. The Cannington-Motukaika water supply services an area of approximately 83 km². The supply is the most remote of the six rural water supplies administered by Waimate District Council.

Management and Operation:
The scheme is administered at the main council offices in Queen Street, Waimate and operated and managed by the Council's Utilities Business Unit (UBU) based at Michael Street nearby. Five qualified field staff operate and maintain the rural water scheme plant, fixing leaks etc as generally advised by the public. Water samples are sent to MedLab laboratories for bacteriological testing.

With the age and size of the rural water supply there is limited availability of on-site standby plant within the system. Essential spare equipment is kept at the Councils Michael street Yard for maintenance and replacement. There is also currently no electronic supervision or control of the system (SCADA).

Even though the Cannington Motukaika is a small and remote water supply, it has a cooperative and pro-active water scheme committee, who participate in the governance of the Cannington Motukaika rural water supply scheme. Under their own initiative they have set up a communication system via phone and email between Council, committee and the community, to aid in notification of issues and events. They have also organised surveys to help in future planning for the scheme.

Currently the Cannington Motukaika rural water supply has a "Permanent Boiled Water Notice". The notice was issued with the agreement of the Drinking water Assessor in September 2014. The notification is regularly advertised in local papers, Waimate District Council's website and Facebook page, along with Rural Delivery mail drops. The local water committee also reminds locals on request. In recent times organisations such as the local Mobile Kindy have helped advertise the "Permanent Boil Water Notice".

A large proportion of the water produced for the supply is consumed for the purposes of commercial agriculture, and the supply could potentially qualify as a rural agricultural drinking water supply. Waimate District Council had previously considered the option of point of use treatment on the rural supplies, and discounted the option at that time because of cost and maintenance issues. The option of "point of use treatment" was looked at again with the release of

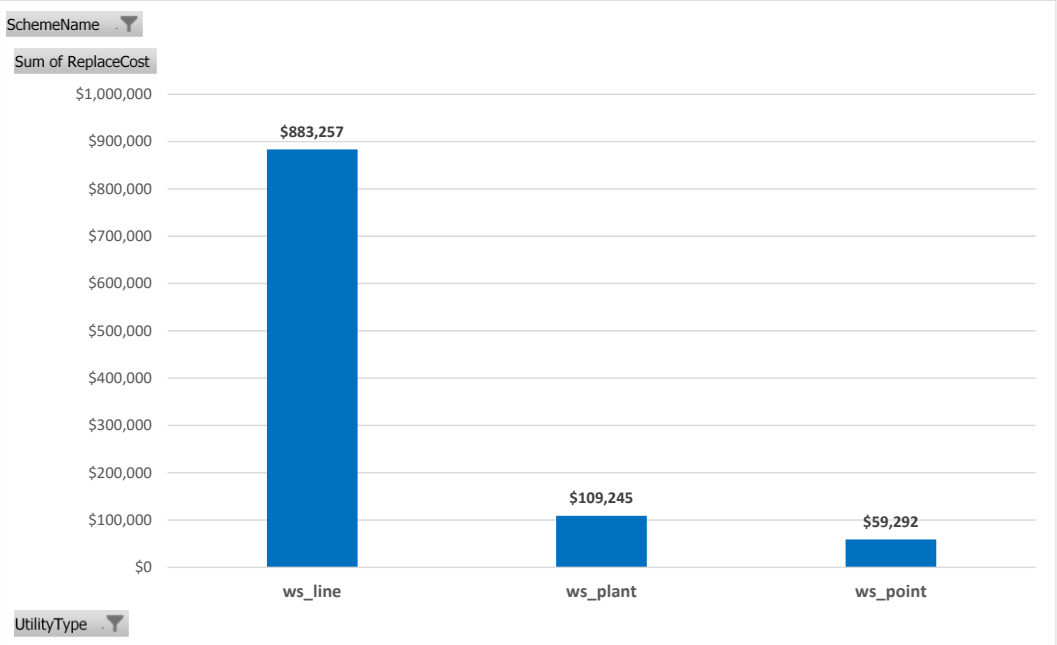
the Rural Agricultural Drinking Water Supply Guidelines (RADWS) in March 2015. Some questions were raised again about actual cost, pre-treatment, maintenance, responsibility issues and liability. Those questions were investigated by exploring successful examples of private “point of entry treatment” supplies under the RADWS in the Waitaki District Council. However, after the Havelock North Stage 1 Enquiry, the issues and risks of such a system make the RADWS not a viable option.

Coucil has lobbied Government to review the current legistlation and standards for Rural Agricultral Water Supplies. Since then the Department of Internal Affairs (DIA) and the new regulator Taumata Arowai have been, and still currently working on an Acceptable Solution option, using point of use (PoE) treatment, which could be used in rural argicultral water supplies.

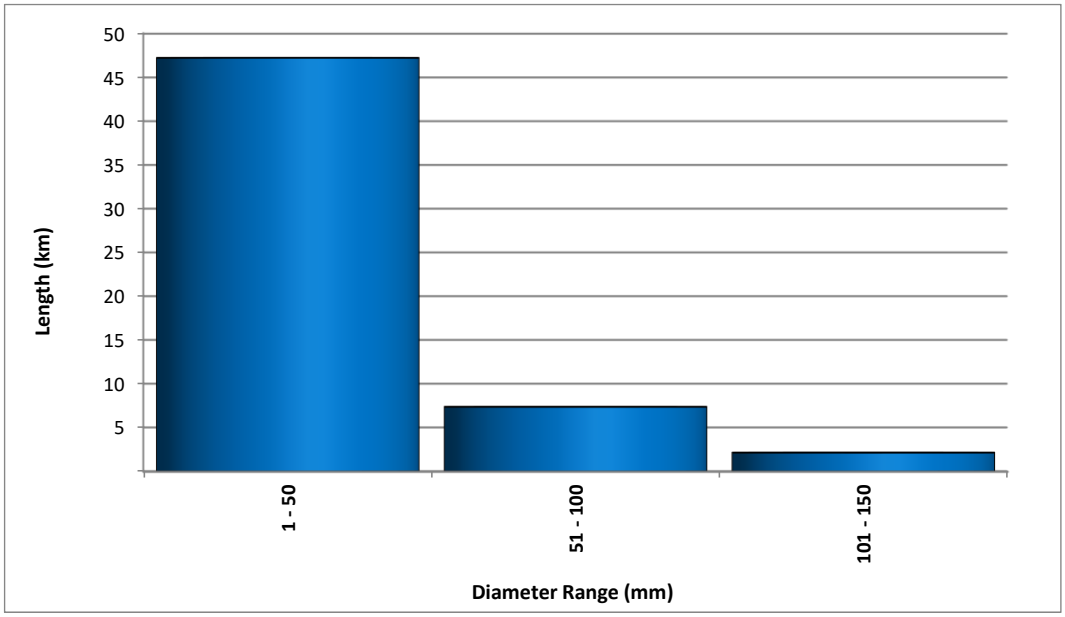
System Information

System Information – Cannington Motukaika			
Connections	46	**Treated Water Storage (Reservoir)**	
- Metered unrestricted	-	Backline Rd	
- Metered restricted	46	Built (yr)	1973
- Unmetered Residential	-	Capacity	25 m^3
		Material	
Water Sources	(Consent volumes)	**Treatment**	
Mt Nimrod Stream	475 m^3/day	Screen	
		Chlorine	
Resource Consent	Expiry date	To	
CRC092155	1/10/2044	Take water	
Replacement Cost		**Reticulation length**	
Total Scheme	$1.05m	56.7 km	

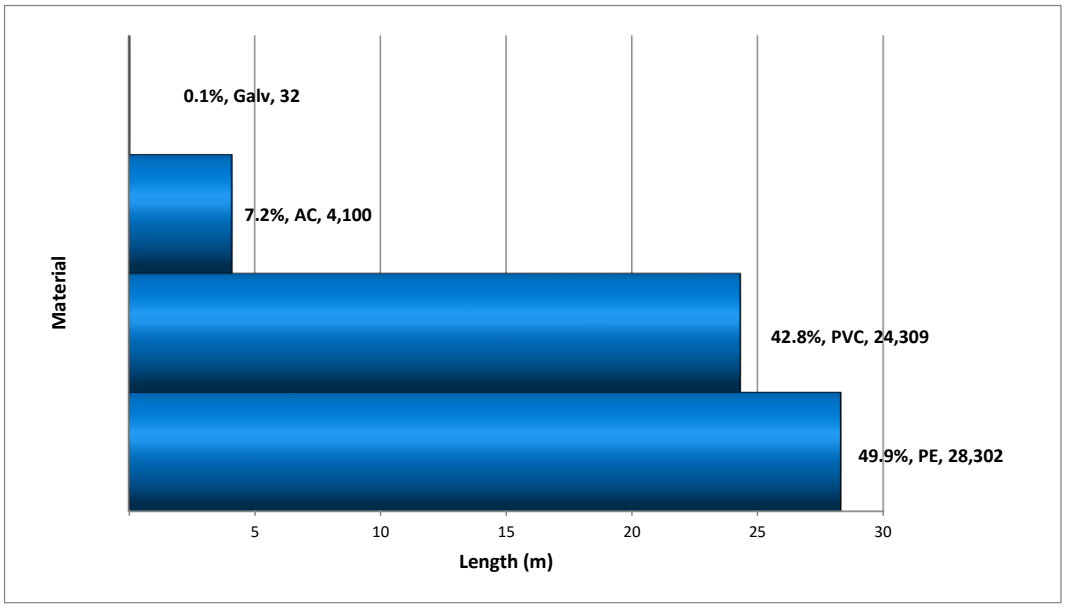
Appendix Figure 12: Scheme Components



Appendix Figure 13: Water Mains Diameter Range

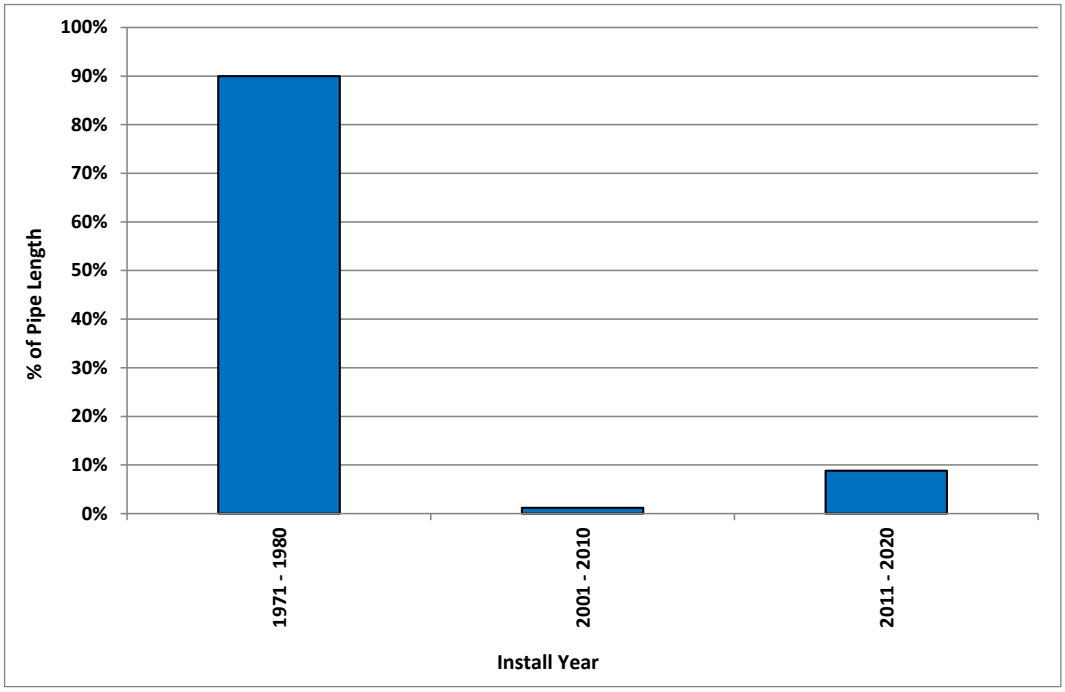


Appendix Figure 14: Water Mains Length and Material

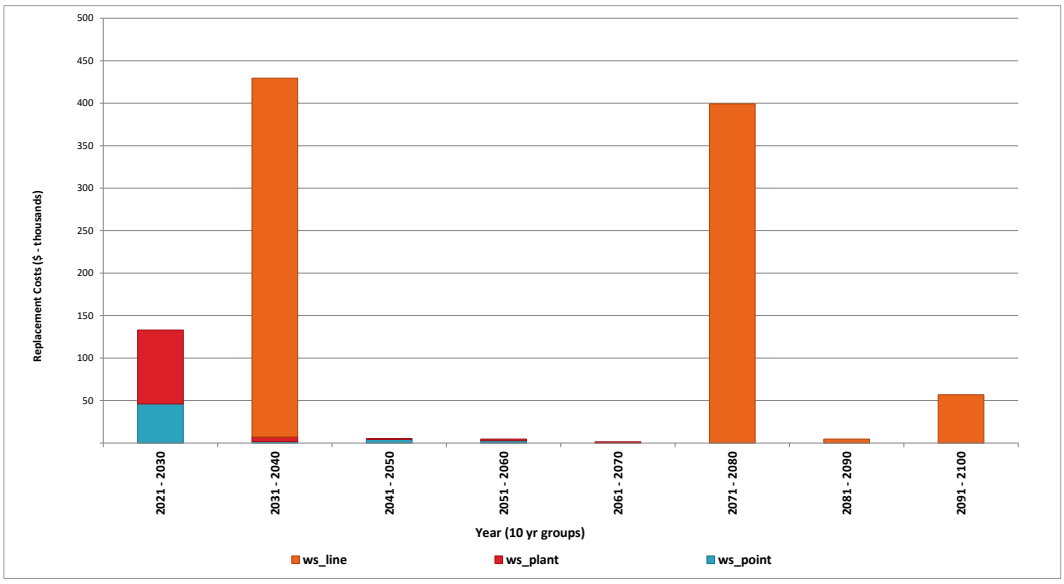


Approximately 90% of the Cannington Motukaika water supply scheme reticulation were installed during 1973 and are 47 years old. The remaining 10% have been installed since 2001 and are aged between 1-20 years. The reticulation consists mainly of PE (50%) and PVC (43%).

Appendix Figure 15: Water Mains Install Year (10 Year Groups)

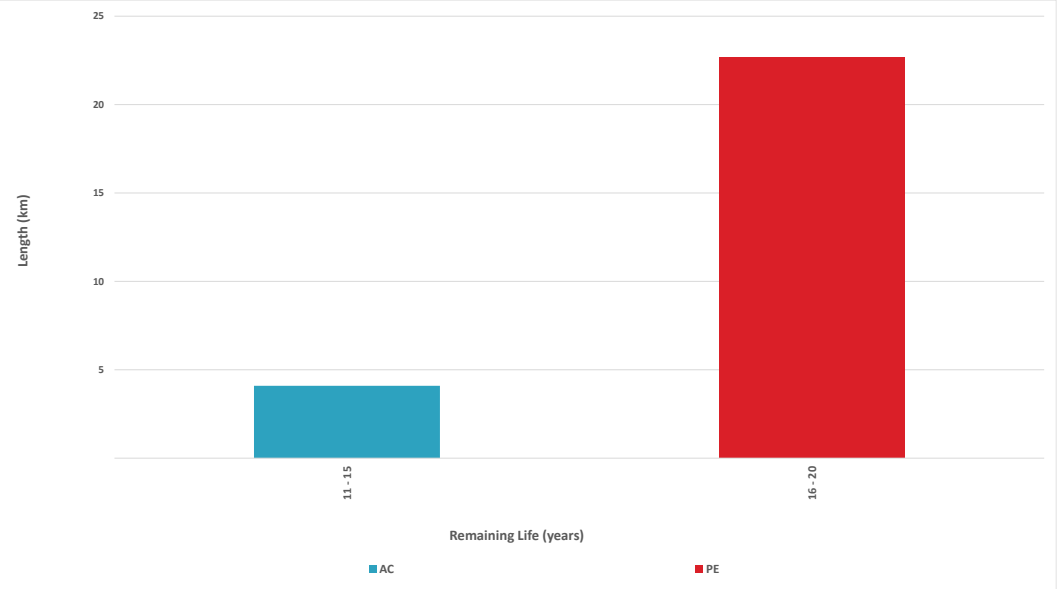


Appendix Figure 16: Remaining Life of all Assets – Long Term

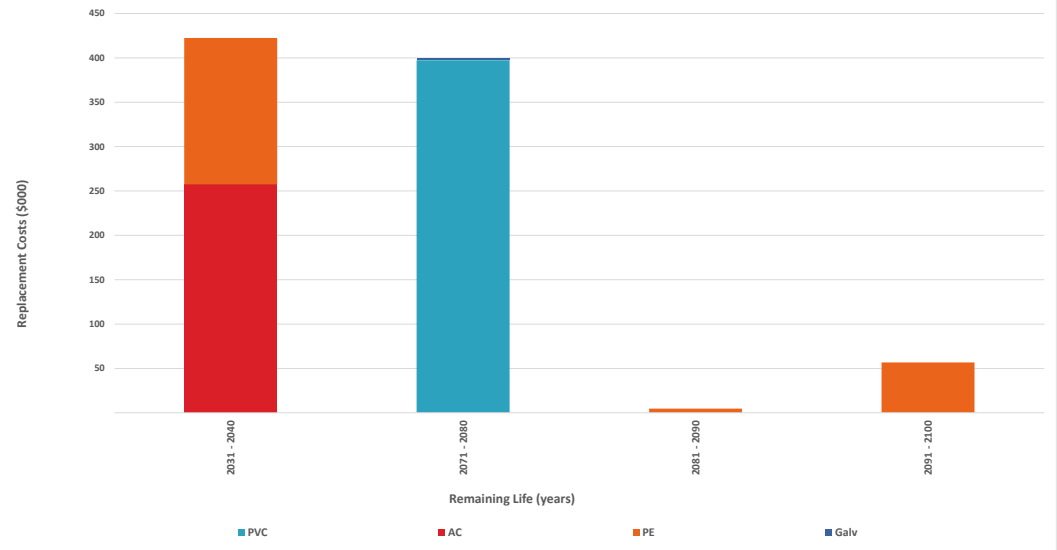


At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined by determining evidence-based useful lives using a combination of condition and performance data.

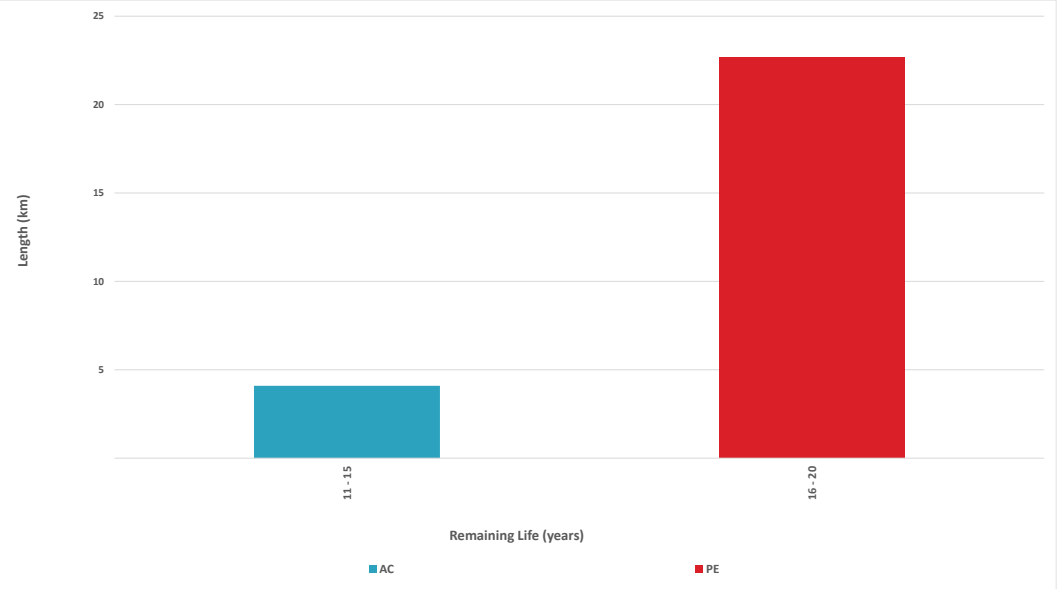
Appendix Figure 17: Water Mains Replacement (Length) – Long Term



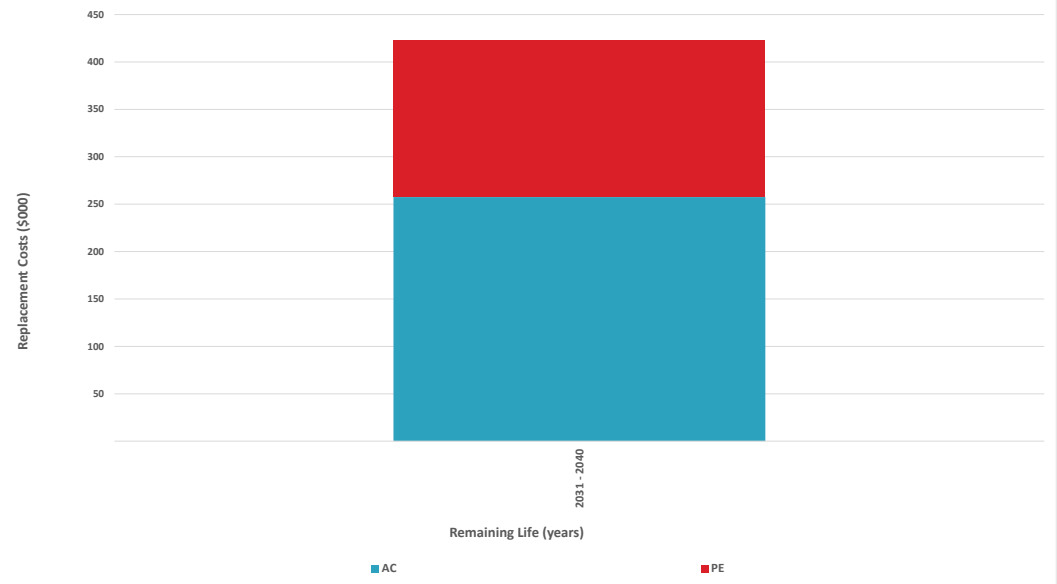
Appendix Figure 18: Water Main Replacement Value – Long Term



Appendix Figure 19: Water Main Replacement (Length) - 1 to 30 Years



Appendix Figure 20: Water Main Replacement Value - 1 to 30 Years

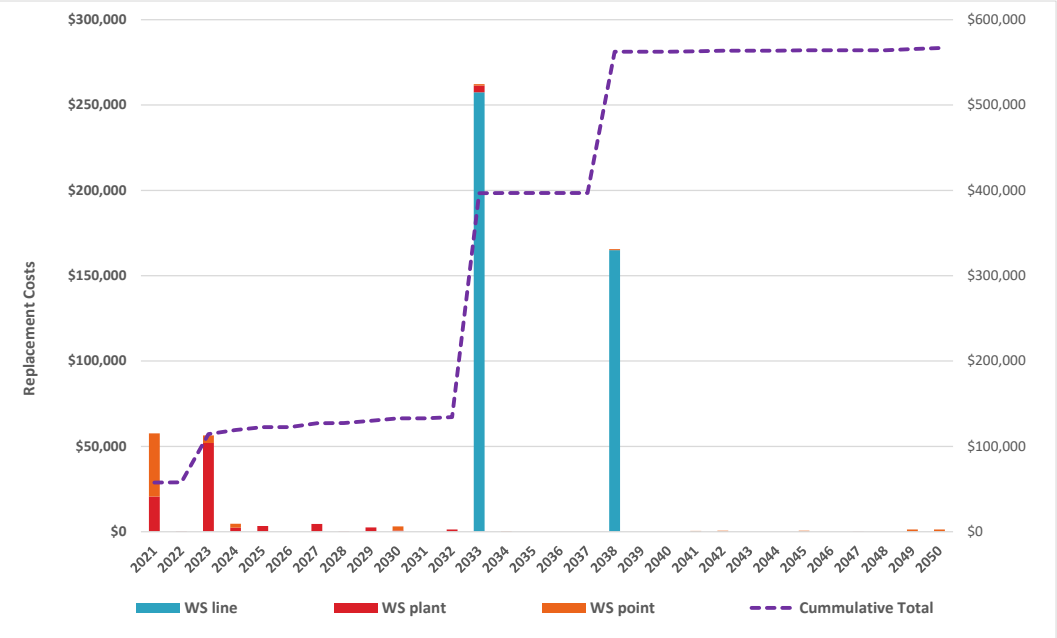


Appendix Table 4: Plant Replacement Value 1 to 30 Years

Asset Group	Remaining Useful Life (5 year groups)					
	1 - 5	6 - 10	11 - 15	16 - 20	26 - 30	Grand Total
Abstraction	12,882					12,882
Building	11,978					11,978
Cabinet			1,162			1,162
Control	1,962					1,962
Digital I/O	1,356	301				1,657

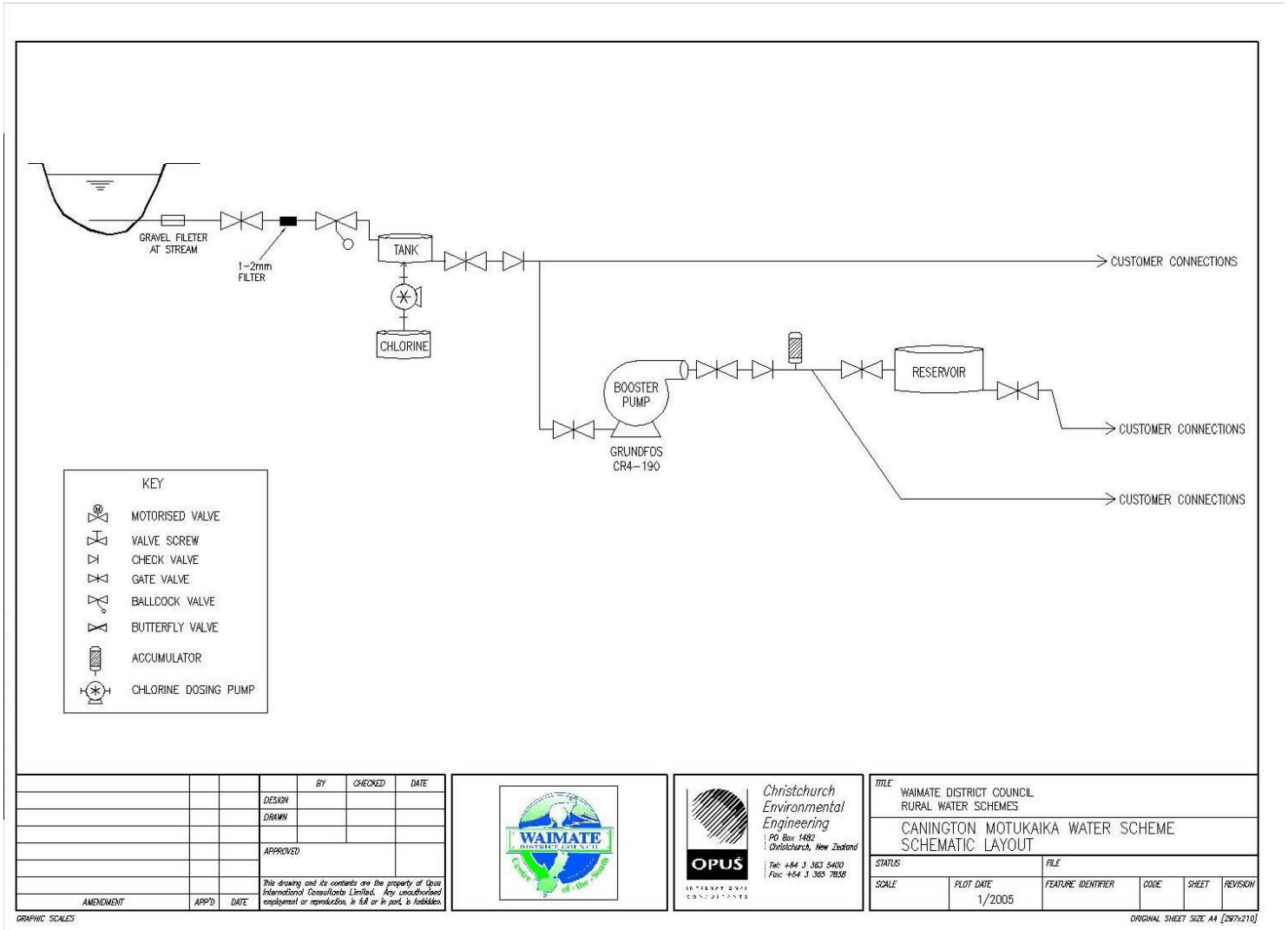
Asset Group	Remaining Useful Life (5 year groups)					
	1 - 5	6 - 10	11 - 15	16 - 20	26 - 30	Grand Total
Distribution	3,437					3,437
Measurement		3,263				3,263
Pipe	2,419					2,419
Reservoir	7,058					7,058
Screening	6,520					6,520
Sodium Hypochlorite	2,345	544				2,889
Solar	2,428					2,428
Surface		4,012	4,012			8,024
Transmission	18,095					18,095
Valve	5,502		167	71		5,740
Vessel	2,795					2,795
Grand Total	**78,777**	**8,120**	**5,341**	**71**		**92,309**

Appendix Figure 21: 10 Year Renewal Programme

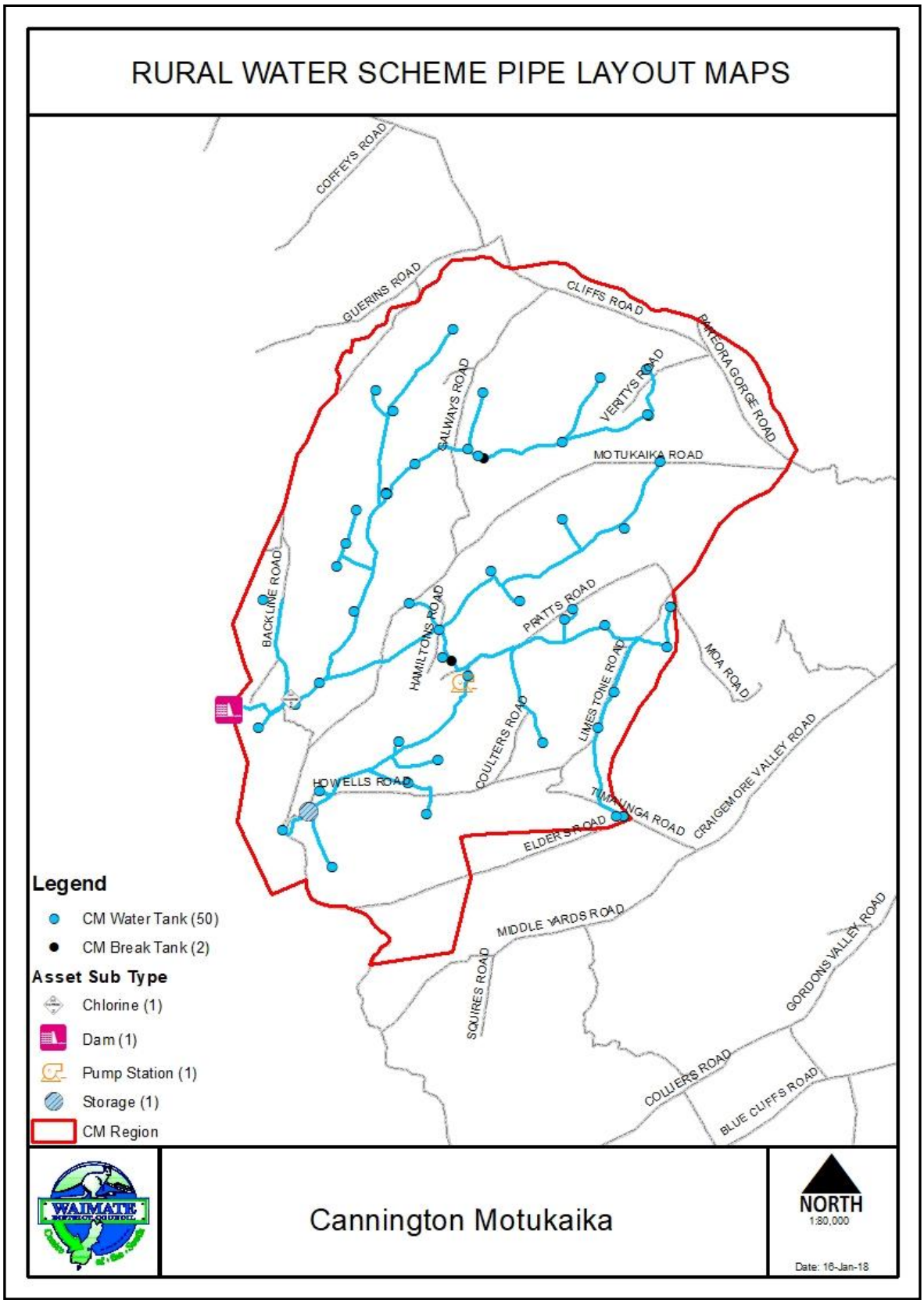


The above figure shows the theoretical replacement programme based on asset expected useful lives.

Appendix Figure 22: Cannington Motukaika Schematic



Appendix Figure 23: Cannington Motukaika Scheme Plan



A.3 Hook Waituna Water Scheme

Overview

The Hook Waituna water supply scheme is a “minor drinking water supply” and supplies water to 513 connections with a total population of about 1,350. Out of those figures there are 54 connections, with a population of 97 on the Hook Water Supply Scheme known as the Willowbridge area. This area is augmented with treated water from Waimate Urban Water Supply (WINZ Code: WAI033, Grading Ab). The Waimate District Council target rate 431 properties for the supply of water in this scheme. Some scheme consumers have more than one point of supply connection on their rated property. Each point of supply connection is required to have water storage for 96 hours (four days) in case of interruption of the water supply.

Water is sourced from an intake on the Hook River approximately 300m upstream of the Upper Hook Road Bridge. The raw water gravitates 220m to the Hook Treatment Plant which was upgraded 2013/14. Due to fine particulate found later in the raw water, the plant does not have any functioning protozoal treatment barriers, only chlorine disinfection. Duty/standby pumps deliver chlorinated water into the reticulation. There are four booster pump stations in the supply distribution.

The length of the Hook-Waituna reticulation network is approximately 252km over an area of 152 km². The majority of pipe network was installed in 1973 and is 45 years old.

There are conditions and issues that limit the options for treatment to treat the fine particulate. Those conditions and issues range from noise, visual impact, use of chemicals, sludge discharge, capital and operational costs, plus consenting of discharge. An option that has the most potential is un-validated membrane filters. Investigation and trailing started in 2017. This form of treatment so far meets the requirements for capital and operational costs, space, visual impact, chemical free, sludge discharge.

History

The Hook Waituna water supply scheme was established in 1973 and the majority of the scheme reticulation dates from this time. In 1997 a booster pump was installed at the intake site to resolve an air-locking problem in the reticulation going away from the plant. In later years the booster pump was used to boost pressure in the scheme during peak demand times.

Two supply connections from the Waimate urban supply were completed in 2001, to provide better pressure and flow in the lower supply catchment. One connection is at Mill Rd and can supply Garlands Road, down to Uretane Road if required. The second connection is on Manchesters Road and can supply the area around Manchesters Road, up to Timaru and Maytown Road intersection, and around Molloys Road down to Studholme. It also supplies Mitchells Road down to Hannaton Road.

Later an extension was constructed to service the Willowbridge Community in 2003. This second connection is now known as the Willowbridge line and is permanently on below Molloys Road to Willowbridge and Nukuroa Hall on Hannatons Road.

The intake gallery intake has been washed out a number of times over the years, with the last time in June 2013

In late 2013 with the aid of the Capital Assistance Programme (CAP) funding the Hook Intake Plant was upgraded to comply with the Drinking Water Standards for New Zealand. The plant could not be fully commissioned in early 2014, due to the discovery of fine particulate in the raw water source. The fine particulate affected the filtering processes and rendered the UV reactor inoperable. At present the plant is operating in a reduced state where there is only chlorination.

System Description

Source and Catchment:

Hook Waituna Rural Water Supply sources its raw water from an intake on the Hook River approximately 300m upstream of the Upper Hook Road Ford.

Raw water sourced from the Hook River is fed from the surrounding 1,071 hectare hill catchment. Just over half of the catchment at 550 hectares is made up of bush and forest, with the remaining 521 hectares upland pasture and tussock above the intake.

The geology of the soil make up around the Hook River clay and rock. This clay is believed to be the source of the fine particulate that affects the present filtration process.

The whole 1,071 hectares of the catchment is protected under the Waimate District Council District Plan "Water Supply Protection Area". Around the intake gallery and weir there is 12.1 hectares of Regional Council "Community Drinking Water Protection Zone", which is overlapped by the "Protection Area".

The upland pasture is made up of pastoral grasses and tussocks. Livestock such as sheep (≤500) and intermittently graze in the catchment. There are also small numbers of feral animals like pig (≤25), deer and goats (≤25) in the area. Wallabies are also present and there are regular culling programmes to keep wallaby numbers down.

Human impact is minimal, but there are three domestic sewerage systems just inside the protection area. Two are secondary treatment process and the third below the intake, and is an older style septic tank system. There also a fourth domestic sewerage systems just outside the "Protection Area".

The overall assessment of the catchment, plus the impact from human and agricultural activities, equates to a four (4) Log treatment process requirement to provide wholesome, compliant drinking water to the consumers on the Hook-Waituna Rural Water Supply.

Abstraction

The intake is an infiltration gallery which comprises a pair of 150mm PVC, slotted (2mm slots) pipes (total length 10m) laid in the river bed behind a weir constructed of rock filled gabion baskets.

Transmisson:

The raw water flows by gravity through the infiltration gallery, into a 150mm AC pipeline (240m), and down to the treatment plant.

Treatment Plant:

The treatment plant consists of pump operation, pre-screening, cartridge filtration, UV irradiation, and chlorination.

At the treatment Plant the raw water quality is monitored for inlet turbidity (NTU). There are set-points for maximum critical turbidity, if reached will shut down the plant, open a bypass to discharge to waste (allowing for continued turbidity monitoring), and initiate an alarm.

When the turbidity is in working range, the raw water is pumped up to a set-point working pressure by two of three inline (duty/standby) VFD controlled centrifugal pumps, for the filters and distribution to function.

The first part of treatment is filtration, starting with 50 micron a pre-screen self-cleaning strainer to remove larger particulate. The raw water proceeds through a cartridge filter in a single housing unit with 3x 1 micron cartridges. The pre-screen strainer and cartridge filter are monitored by a pre and post pressure gauge on each unit to monitor pressure head-increase. A PLC controls the monitored pressure with set-points to protect the filters, and warn of replacement. To protect filters if high pressure differential across the filter housings are reached, the PLC can stop pumps, shut down the plant and discharge to waste, and initiate an alarm.

The post filtered water is continuously sampled for turbidity and transmittance (UVT). Set-points on both analysers control plant operations via PLC, and if critical; shut down the plant, discharge to waste, and initiate an alarm.

When turbidity (NTU) and transmittance (UVT) levels are in working range, the filtered water enters the UV reactor, and is irradiated to disinfect for protozoa.

The filtered/UV irradiated water is then chlorinated to a set-point. Chlorine dose is controlled by the analyser by monitoring flow, Cl2 residual (set-point) and pH. After chlorination, water enters the distribution system.

Council's SCADA system monitors the Hook treatment plant, recording daily water usage, pump hours, NTU, pressure differential, UVT, chlorine dosage, temperature, pH and outgoing pressure. When parameters are breeched in some of the above and other functions, the SCADA can also send out alarms via txt/sms to all operators. The SCADA system also provides a control function to switch pumps on and off as required.

The maximum output the plant can do is 20 L/sec, and is throttled by an orifice to govern it, so it cannot exceed 20 L/sec.

At present the filtration and UV process is not functioning due to a fine particulate issue in the raw water source. This fine particulate blinds and causes damage to the plant filters and rendered the UV reactor inoperable, by clogging the turbidity meters and UV analyser. Therefore the plant does not have any operable protozoal treatment barriers, only chorine disinfection at present.

Because of the fine particulate issue, the old plant has not been dismantled. This is so it can be used if required due to a failure, and or during the proposed stage two upgrade of the new plant.

Therefore, the raw source water can still flow into the old Hook Plant control tank when required, which is controlled by a ballcock valve. Flow out of the tank is determined by demand. A stainless steel mesh filter is installed at the tank inlet.

The tank serves as a contact tank for chlorination as well as a holding/balancing tank. Chlorine is injected only when flows enter the tank, controlled by a flow switch on the intake. When running, the chlorine pump injects chlorine at an operator input set rate irrespective of the actual flow into the tank.

During peak demand, a pump (fixed speed, controlled by tank level measurement and timer [on/off]) located immediately downstream of the tank can be manually operated to boost supplies but the success of this operation is limited by the small capacity (25 m^3) of the tank. This pump is also used to clear airlocks in the reticulation and restart the supply.

Distribution

Four booster pump stations operate on pressure switch and timer control process in the supply distribution. They are located at Brownleas Rd (not in use), Triangle Rd, Waituna School Rd and Garlands Rd.

The Hook Waituna scheme extends to Willowbridge settlement, some 20 km away (as the crow flies) and also encircles urban Waimate. The urban water supply network and the Hook Waituna network cross at numerous locations. At two such points the supplies are connected at Manchesters Road and Mill Road. This has the effect of boosting the supply into the rural water scheme network. Non-return valves prevent backflow from the rural scheme into the urban supply.

The area known as Willowbridge at present is permanently supplied by the Waimate Urban water Supply from the Manchesters Road connection. This is because the Hook Water Supply under normal demand cannot provide enough treated water via the reticulation. In peak high demand periods the Waimate Urban Water Supply can also supply the Studholme and Bathgates Road Area from the Manchesters Road connection. Also Garlands to Uretane Road Area from the Mill Road Connection. The Waimate Water Supply (WINZ Code: WAI033, Grading Ab) has a current Water Safety Plan (Waimate Water Supply Water Safety Plan, Version 2.0 February 2014).

Management and Operation:

The scheme is administered at the main council offices in Queen Street, Waimate and operated and managed by the Council's Utilities Services Unit (USU) based at Wilkin Street nearby. Five qualified field staff are appointed to operate and maintain the rural water scheme plant, fixing leaks etc. as generally advised by the public. Water samples are sent to MedLab laboratories for bacteriological testing.

The issue at the time of writing this WSP has been submicron particulate in the raw source water, which has been causing the blinding and damage of the 50 micron screen, and blinding of the 1 micron filter. This has meant that the 50 micron screen, the 1 micron filter and UV reactor are offline due to the submicron particulate issue. The only process still functioning is chlorine disinfection.

Council recognises that the way the treatment plant is functioning does not comply with protozoal compliance under the NZDWS 2005 (rev 2018). Attempts have been made to rectify, such as the aggressive flushing of the transmission line from the intake to the treatment plant with no improvement. The next was the rebuilding of the intake gallery, which was also unsuccessful in the attempt of stopping the submicron particulate entering the treatment process.

A particulate analysis was done to identify the percentage of particulate size and quantity, and from those results it was recognise that it was the submicron particulate that was cause of the blinding and damage issues. It was also recognised because of its size it couldn't be easily stopped from entering the abstraction and treatment process.

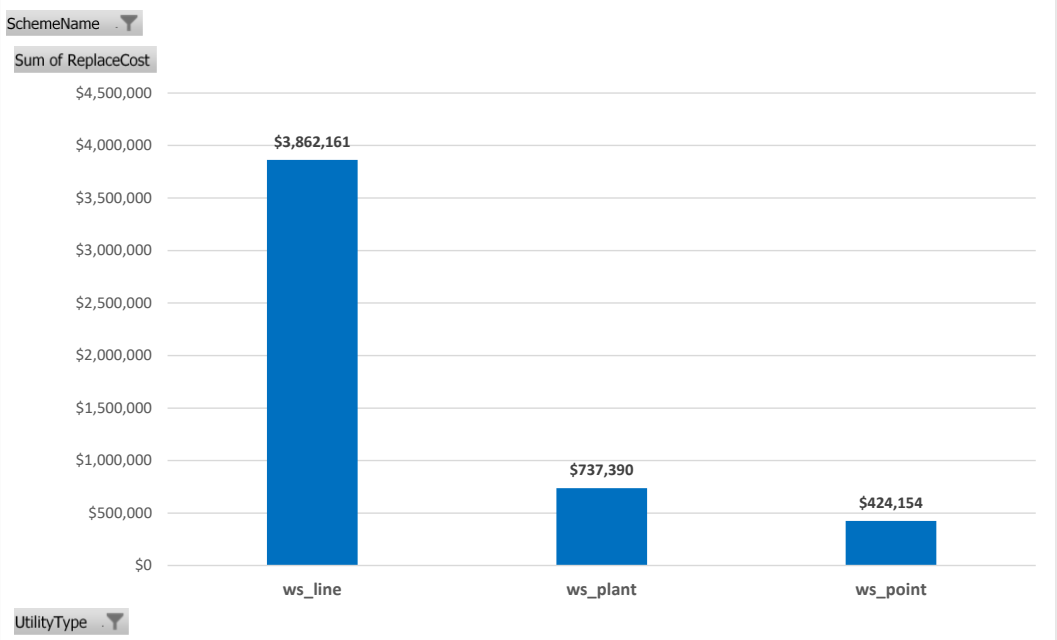
The Waimate District Council currently (2021) is putting a request for proposal (RFP) together, using the earlier contractor involvement procurement method for a build design contract. This RFP will also include the DWSNZ 2005 (Revised 2018) upgrade for Lower Waihao. This method of procurement and design build gives greater assurity in achieveing functional, reliable and DWSNZ

2005 (Revised 2018) compliant plants that produce safe drinking water for consumers. Both plants historically have had a fine particulate issue. There is also some costing saving beneifits where some equipment from Hook Treatment Plant can be used at the upgraded Lower Treatment Plant.

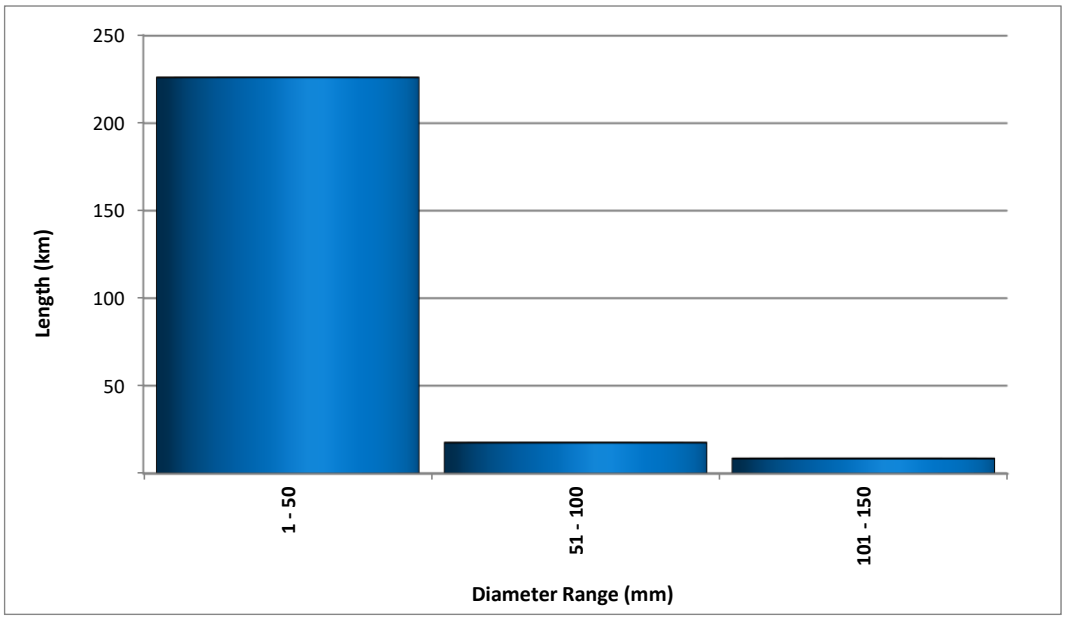
System Information

System Information – Hook Waituna			
Connections	502	**Treated Water Storage (Reservoir)**	
- Metered unrestricted	-	**Upper Hook Rd**	
- Metered restricted	502	Built (yr)	1974
- Unmetered Residential	-	Capacity	25 m^3
		Material	Concrete
Water Sources	(Consent volumes)	**Treatment**	
Hook River	1,728 m^3/day	Screen	
		Chlorine	
Resource Consent	**Expiry date**	**To**	
CRC980385	21/05/2034	Construct a rock weir	
CRC980386	21/05/2034	Take water	
Replacement Cost		**Reticulation length**	
Total Scheme	$5.02m	252 km	

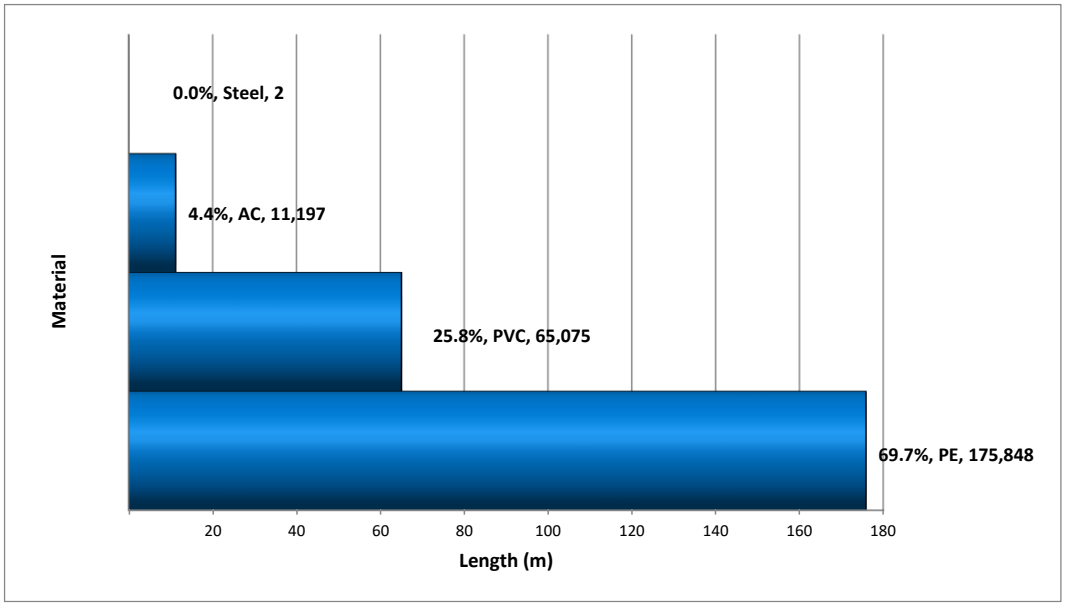
Appendix Figure 24: Scheme Components



Appendix Figure 25: Water Mains Diameter Range

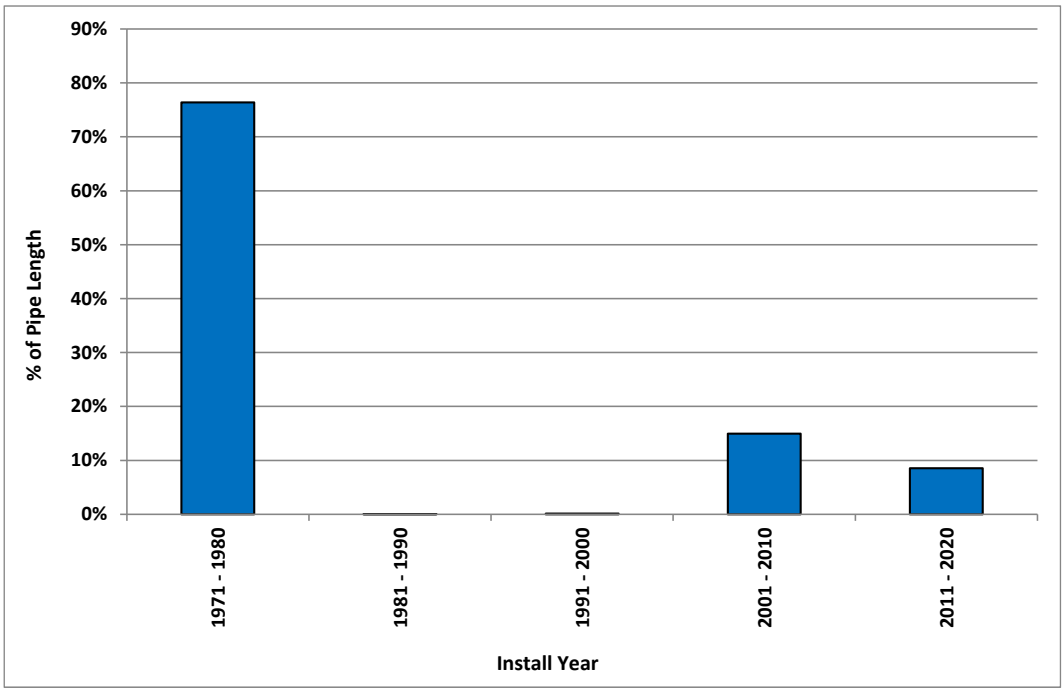


Appendix Figure 26: Water Mains Material Length



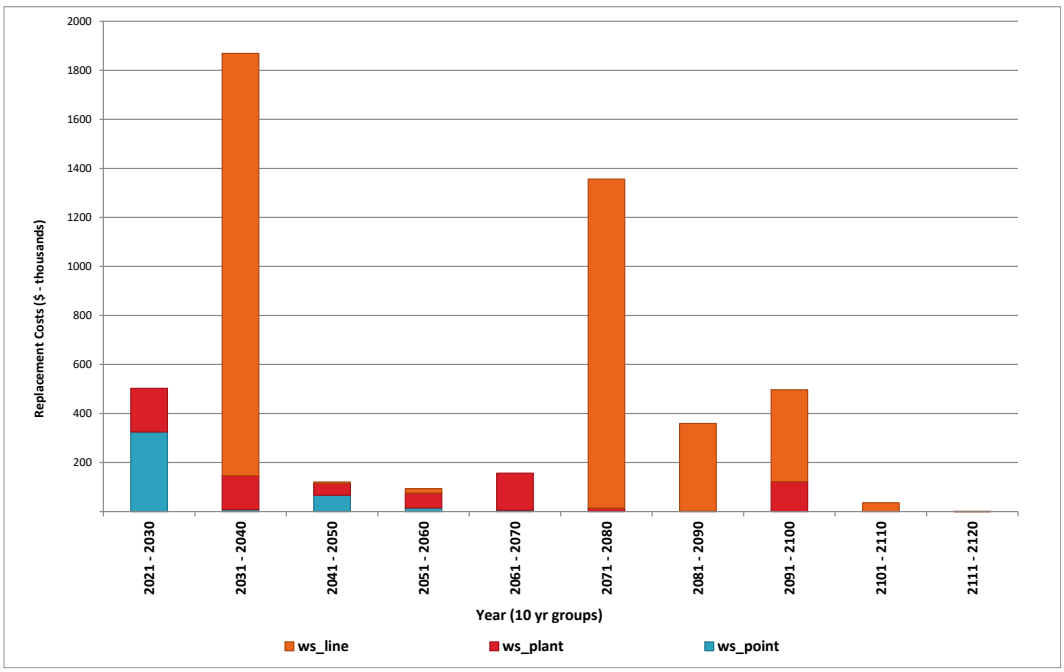
Approximately 70% (176km) of the reticulation is PE, of which 120km of pipe will reach its expected economic useful life within 18-32-year window. The remainder of the network consists mainly of PVC (26%) and AC (4%). There is 2m of steel which will be pipes from bore to surface pump.

Appendix Figure 27: Water Mains Install Year (10 Year Groups)



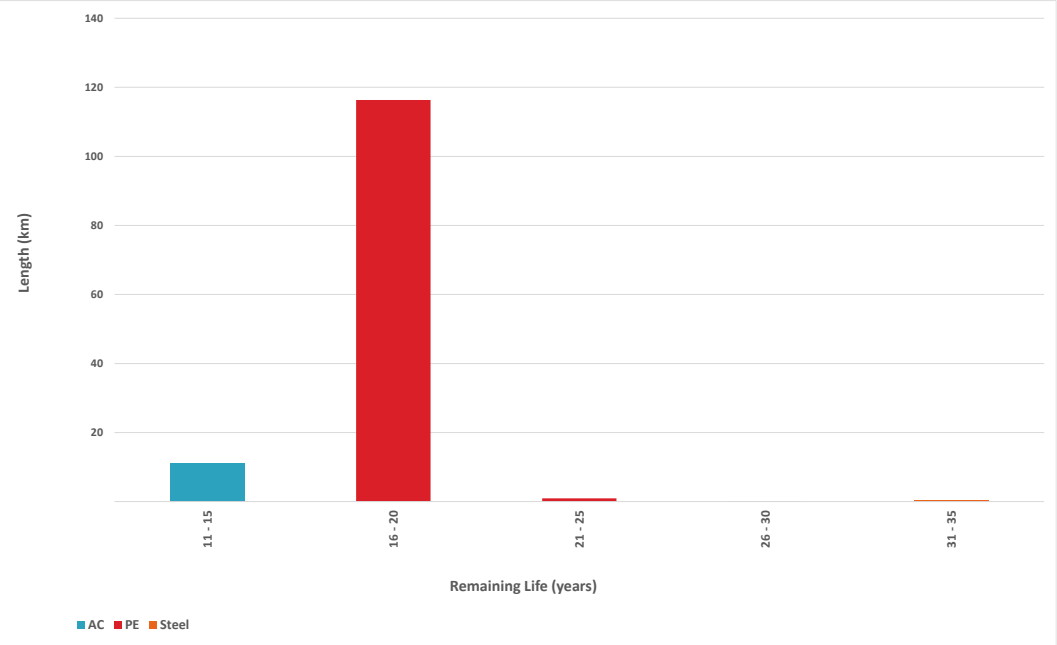
Approximately 76% of the Hook Waituna water supply scheme assets were installed in 1973 and are 47 years old. The remaining 24% have been installed since 2001 and are aged between 1 – 19 years.

Appendix Figure 28: Remaining Life of all Assets – Long Term

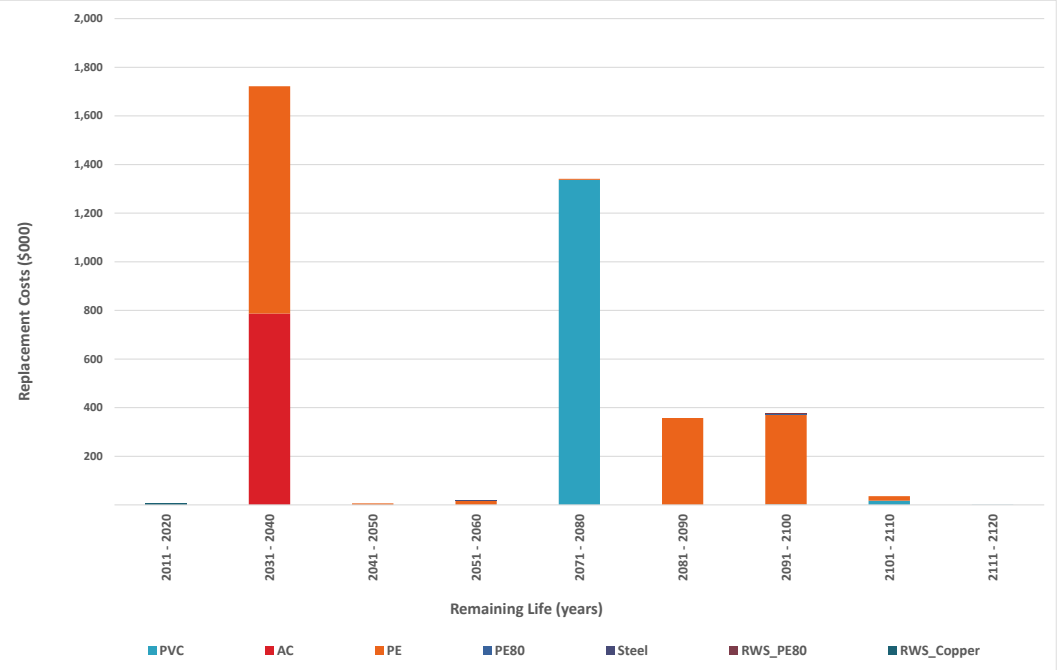


At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined by determining evidence-based useful lives using a combination of condition and performance data.

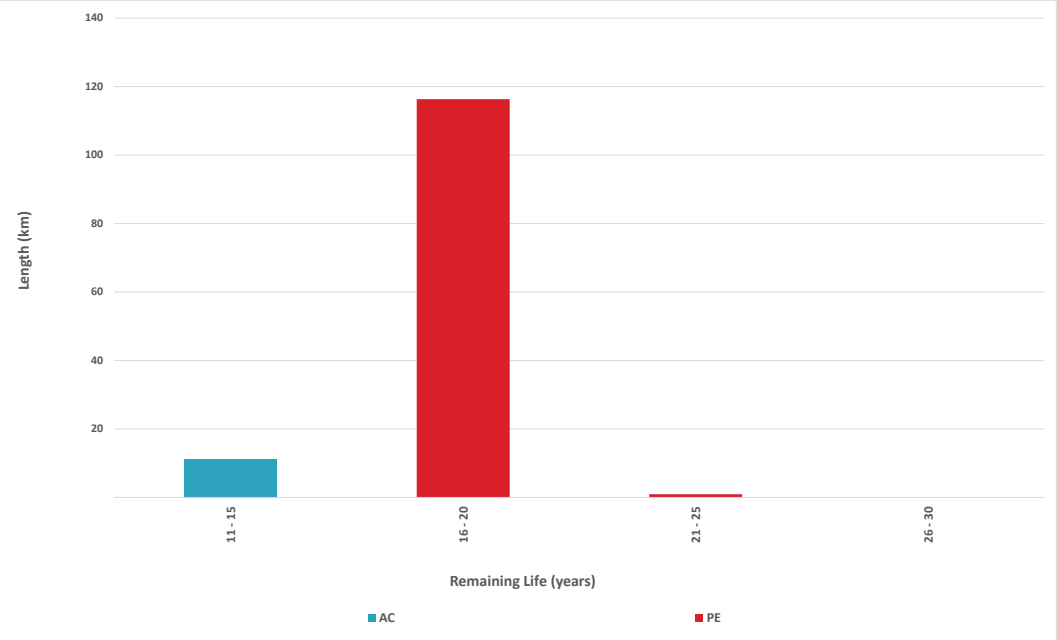
Appendix Figure 29: Water Mains Replacement (Length) – Long Term



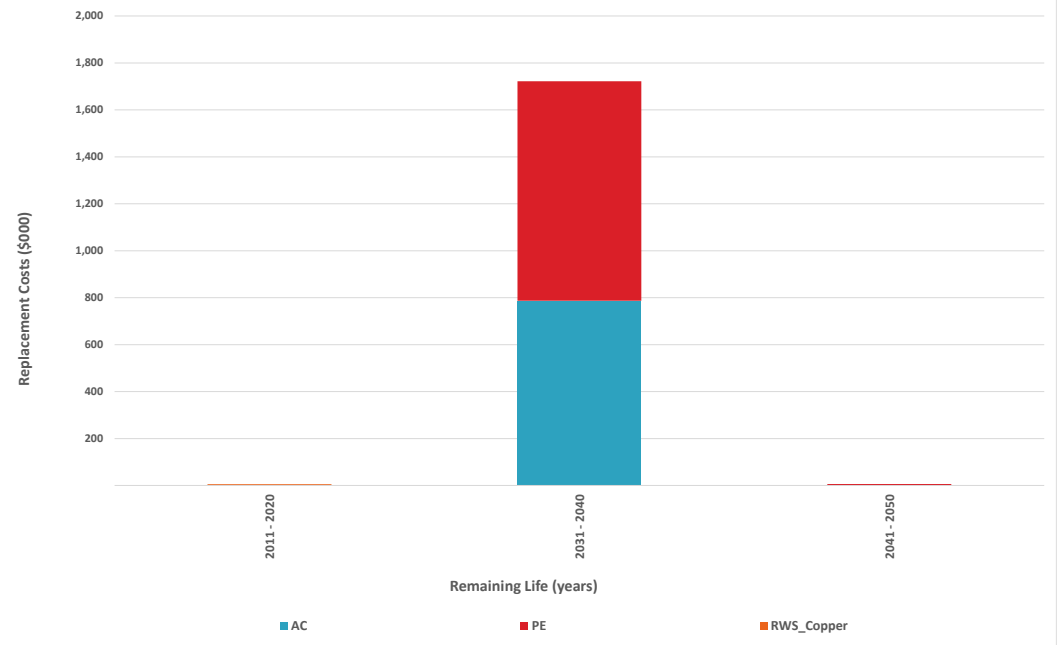
Appendix Figure 30: Water Main Replacement Value – Long Term



Appendix Figure 31: Water Main Replacement (Length) - 1 to 30 Years



Appendix Figure 32: Water Main Replacement Value 1 to 30 Years

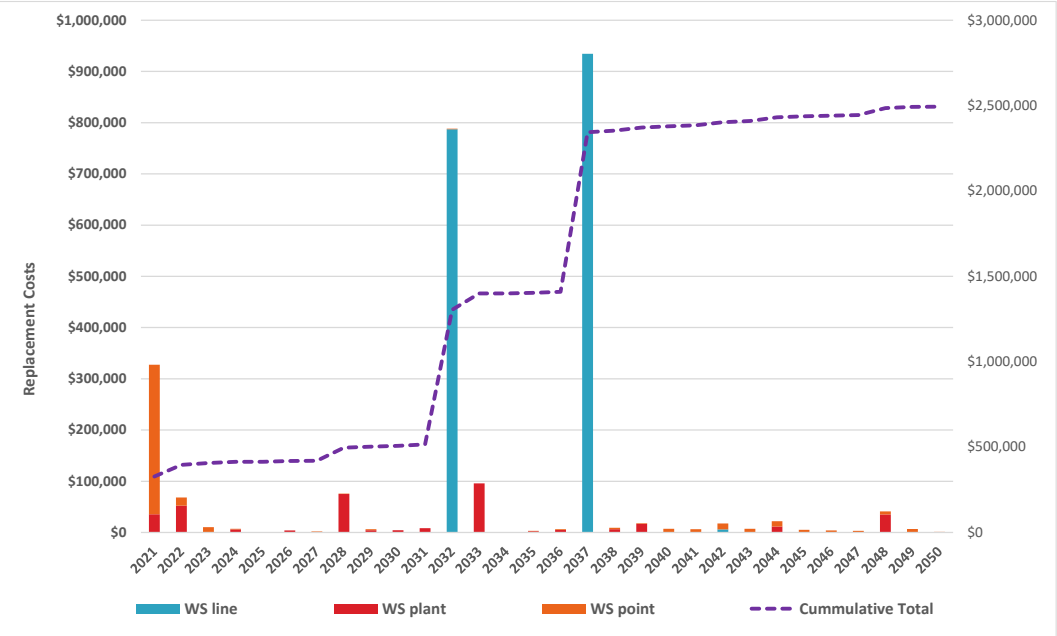


Appendix Table 5: Plant Replacement Value 1 to 30 Years

Asset Group	Remaining Useful Life (5 year groups)						
AssetType	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Abstraction		15,874					15,874
Building	17,967			8,390	5,395		31,752
Cabinet	1,153					651	1,804
Chlorine		20,274	10,843				31,117

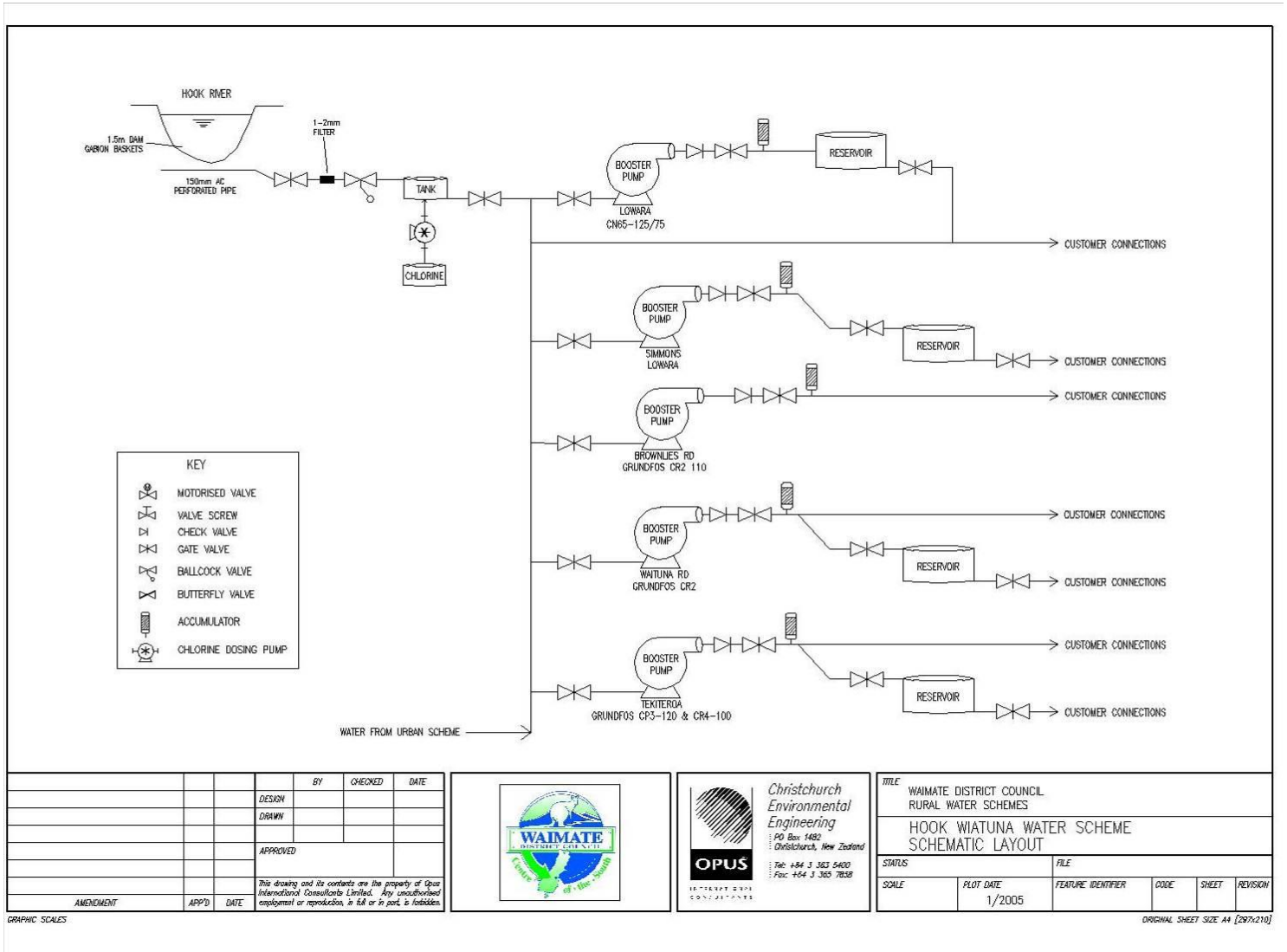
Asset Group	Remaining Useful Life (5 year groups)						
AssetType	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Control	9,480	4,927	39,882	504		10,889	65,682
DC Supply		93					93
Digital I/O	2,110	312					2,422
Distribution	10,023	3,341				21,772	35,136
FAC Remote			768				768
Measurement	1,082	26,812	5,410		63		33,367
Pipe	2,703			28	3,028		5,759
Process	504						504
Reservoir	12,925		3,166				16,091
SCADA		7,349	4,061				11,410
Screening	6,520						6,520
Sodium Hypochlorite	3,433						3,433
Surface	6,952	4,012	31,531	10,877			53,372
Transmission	1,899			1,347	1,386		4,632
Valve	11,306	503	12,984	5,929	1,684	3,027	35,433
Vessel	6,220			3,110			9,330
Grand Total	**94,277**	**83,497**	**108,645**	**30,185**	**11,556**	**36,339**	**364,499**

Appendix Figure 33: 30 Renewal Programme

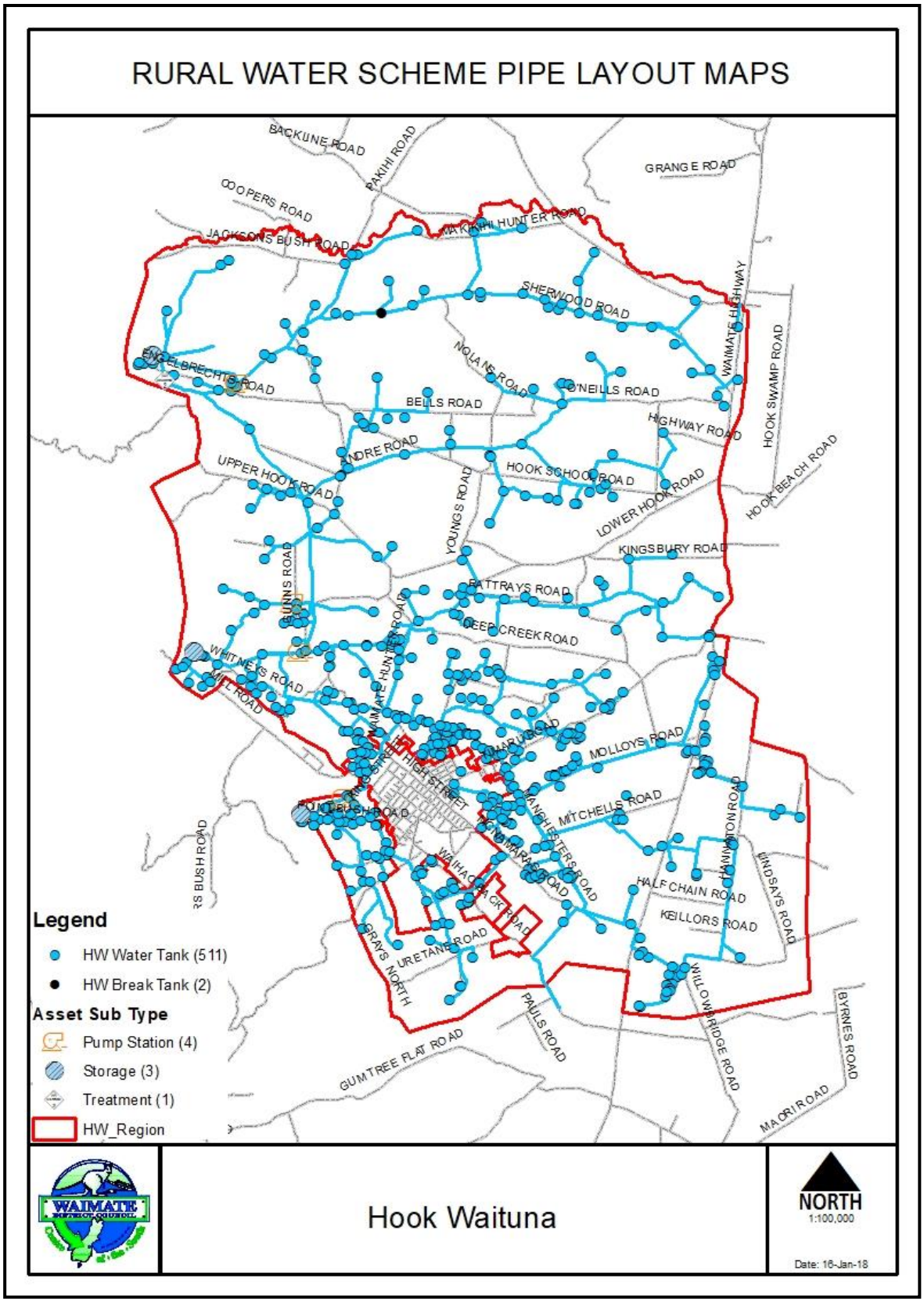


The above figure shows the theoretical replacement programme based on asset expected useful lives.

Appendix Figure 34: Hook Waituna Schematic



Appendix Figure 35: Hook Waituna Scheme Plan



A.4 Lower Waihao Water Scheme

Overview

The Lower Waihao water supply scheme is a “minor drinking water supply” that supplies water to 235 Lower Waihao Rural Water Scheme connections with a population of about 483. It also supplements 72 Waikakahi Rural Water Scheme connections in the Waikakahi East area, with a population of about 132. This makes a total population of about 615 served by the Lower Waihao water supply scheme. The Waimate District Council target rate 233 properties for the supply of water in this scheme. Some scheme consumers have more than one point of supply connection on their rated property. Each point of supply connection is required to have water storage for 96 hours (four days) in case of interruption of the water supply.

The Lower Waihao sources it water from a shallow 14m bore in the road reserve on Ferry Road, Glenavy, near the Waitaki River. This bore suffers from a fine particulate issue. A submersible pump pumps the water into a balance tank. The treatment plant does not have any protozoal treatment barriers, only chlorine disinfection. The raw water is chlorinated and boosted to a booster pump station, then onto a reservoir located some 4.5 km away at Pikes Point corner. The Lower Waihao augments Waikakahi East via two booster pumps that supply a reservoir in the Waikakahi Scheme

The length of the Lower Waihao reticulation network is approximately 125km over an area of 176 km². The majority of pipe network was installed in 1978 and is 42 years old.

History

Approximately 95% of the Lower Waihao water supply scheme assets were installed in 1978 and are 42 years old. The remaining 5% have been installed between 1999 and 2002 and are aged between 15 and 18 years.

The Lower Waihao water supply scheme was established in 1978 and the majority of the scheme reticulation dates from this time.

The original shallow bore was found to run dry during Project Aqua low flow regime trials in 2001/02. A new, deeper well was constructed adjacent to the existing well.

Approximately 3.2 km of asbestos-cement pipes was replaced in 2006 (with PVC-U pipe) due to repeated failures occurring in this section.

In 2007 a replacement supply source from the lower Waihao RWS was connected to the Clayton Reservoir serving the eastern portion of the Waikakahi RWS. This effectively joins this supply area to the Lower Waihao scheme. The Clayton Reservoir is no longer supplied from the Waikakahi source.

With the changes in environment, technology and legislation, the upgrading of the Lower Waihao Intake was deemed to be necessary.

Three attempts were made to find a secure bore source. Bores were drilled on Ross Road, Ferry Road and Pikes Point Road. The raw water quality at Ross Road and Ferry Road suffered from fine sand particulate, and raw water quantities (Litres per second) were insufficient. At Pikes Point Road the raw water quality suffered from high hardness (250mg/L), and the cost of treatment made it prohibitive.

The existing site was re-looked at, and the mitigation of the observed risks. It was noted that since the installation of pivot irrigators on the adjacent land owner's property, and the lining of the stream that passes the intake, favourable effects on the raw water quality at the Intake had been observed.

Owners of the properties inside the Lower Waihao Intake Group or Community Drinking-water Protection Zone (Environment Canterbury) and Water Supply Protection Area (Waimate District Council) were informed of Councils intentions to remain at the existing intake. The two landowners directly affected, where invited to a meeting on the 2 July 2015. Present were Dan Mitchell (WDC Asset Group Manager), Paul Roberts (WDC Water & Waste), Gerardus Vant'Klooster, Joy Burke and her consultant. From that discussion it was agreed that a Water Safety Plan would be drafted to look at the risks for the new plant, and how to mitigate those risks, and then proceed.

On the 7 August 2015 a new shallow bore was drilled and established for the construction of a new treatment plant. The bore is a shallow bore at 14m's deep, with a 273mm diameter 304 stainless steel casing, and a stainless steel wedge wire screen set a 5 - 7m below ground level. The bore is situated approximately 220m from the Waitaki River (on the road reserve of Ferry Road, Glenavy).

After the discovery on 30 March 2016 of a significant groundwater level reduction by 1.7 metres in the two existing wells, and with no signs of recovery. A new submersible pump was installed in the recently established 14m shallow bore, plus a variable speed drive, level switches, balance tank where installed and commissioned on the 14 April 2016, by council staff and contractors. This was successful in ensuring that the scheme continued to meet consumers' expectations. The setup will remain in operation until the Ministry of Health Subsidy Upgrade, where the assets purchased will be re-used in the upgrade.

The Lower Waihao Intake was due in 2015/16 to be upgraded with the aid of the Capital Assistance Programme (CAP) funding to comply with the Drinking Water Standards for New Zealand. Work was put on hold due to the discovery of fine particulate in the raw water source in the new bore. Testing on a 1-micron filter indicated that the fine particulate would cause issue, after blinding and breaking through the 1-micron filter in 5 days. As the fine particulate issue is similar to the Hook Treatment Plant Intake, the option of an un-validated membrane is a possible solution. The Trailing of a small un-validated membrane unit is planned for early 2018.

System Description

Source and Catchment:

The lower Waihao sources it water from a shallow 14m bore in the road reserve on Ferry Road, Glenavy, near the Waitaki River. Around the bore the land is almost entirely low land pasture used for dairy farming under private ownership. The wider catchment above the Lower Waihao Water Supply the catchment is extensive, and it includes the Waitaki River that extends over 150 km inland to the Main Divide, taking in a wide range of land use activities, including the Waitaki hydroelectric power schemes. Part of that catchment includes the flat terraced land from the Stonewall (SH 82) to Ferry Road. In this area, there is predominantly dairy farming and irrigation used. This equates overall to >7615 hectares of wider catchment.

The nearby catchment around the bore is protected under the Waimate District Council District Plan "Water Supply Protection Area", which runs approximately 2 km north and west of the supply bore. The "Protection Area" is divided into two areas, "Inner" at 83 hectares, and the "Outer" at 330 hectares. The Regional Councils "Community Drinking Water Protection Zone" partially over laps the "Protection Area" and extends into the Waitaki River at 332 hectares.

Inside the “Inner Protection Area” there is agricultural activity such as dairy farm grazing, irrigation and three silage pits. There is also a consented diverted lined stream that runs down the west side of Ferry Road and across from the shallow bore. In the “Outer Protection Area” there is human and agricultural activates that include dairy farming, irrigation, a dairy shed with effluent pond, wintering over barn, and two dwellings with septic tanks.

In the wider catchment in the low land pasture made up of pastoral grasses, with livestock such as sheep (>100), beef cattle (>100) and dairy cows (>1000) that graze in the catchment. There is also estimated 50 secondary-treated sewage systems, 70 septic tanks, and 8 dairy effluent ponds.

The overall assessment of the catchment, plus the impact from human and agricultural activities, equates to a four (5) Log treatment process requirement to provide wholesome, compliant drinking water to the consumers on the Hook-Waituna Rural Water Supply.

Abstraction:
Water is sourced from a single 14m shallow bore in a 273mm diameter, 304 stainless steel casing and with a stainless steel wedge wire screen set a 5 - 7m below ground level. The bore is situated approximately 220m from the Waitaki River in the road reserve of Ferry Road, Glenavy. A VFD controlled submersible pump set at 10 meters below ground level, pumps according to demand, to keep the pre-treatment balance tank to a set point level.

The other two onsite wells for the Lower Waihao Intake plant are unable to produce sufficient quantities of raw water to be useable.

Treatment Plant:
The Lower Waihao Intake plant does not have any protozoal treatment barriers, only chorine disinfection. From the pre-treatment balance tank a single duty 37 kW delivery pump draws off the raw water. Disinfection is by way of chlorine gas injection directly into the suction side of the reticulation delivery pump, on the rising main. The chlorinator dose rate is automatically controlled to maintain a Free Available Chlorine (FAC) set-point level as measured and monitored by a chlorine analyser (automated closed loop process controller). The chlorination system operates whenever the reticulation delivery duty pump is running.

Council’s SCADA system monitors the intake and reservoirs recording daily water usage, pump hours, chlorine dosage, and reservoir levels. The onsite SCADA PLC’s also provides a control function between the remote units (RTU) at the intake and reservoir to switch pumps on and off as required.

Distribution:
The Lower Waihao Intake plant duty pump on Ferry Road, delivers water at a constant rate to a reservoir located some 4.5 km away at 110m above sea level. To boost the supply a single in-line booster pump is installed at the Pikes Point Road pump house approximate 4km from the main pump house but prior to the final 50m of lift to the reservoir. The pumping system is controlled by sensors located within the reservoir. The control system is linked to SCADA.

Water gravitates from the reservoir into the distribution network. A portion of the distribution zone is served from direct connections to the pumped rising main. This means that when the pump is running water is pumped directly to these connections. When the pump is off water gravitates back down the rising main to maintain supply.

The Lower Waihao supply is connected to the Waikakahi Rural supply (WINZ Community Code WAI032). Two booster pumps (Pikes Point Road and Dog Kennel Road) elevate water to Dog Kennel Hill reservoir, serving East Waikakahi connections. An average of 180m^3/day is supplied.

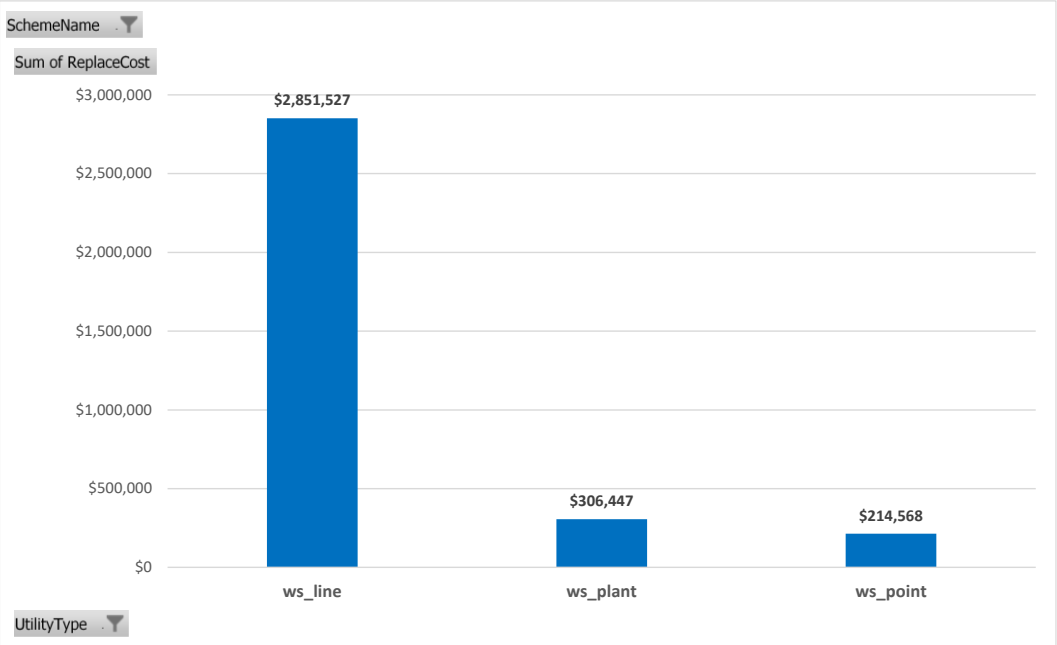
Management and Operation:
The scheme is administered at the main council offices in Queen Street, Waimate and operated and managed by the Council's Utilities Services Unit (USU) based at Wilkin Street nearby. Five qualified field staff are appointed to operate and maintain the rural water scheme plant, fixing leaks etc as generally advised by the public. Water samples are sent to MedLab laboratories for bacteriological testing.

The Waimate District Council currently (2021) is putting a request for proposal (RFP) together, using the earlier contractor involvement procurement method, for a build design contract. This RFP will also include upgrade for Hook Treatment Plant. This method of procurement and design build, gives greater assurity in achieveing functional, reliable and DWSNZ 2005 (Revised 2018) compliant plants that produce safe drinking water for consumers. Both plants historically have had a fine particulate issue. There is also some costing saving beneifits where some equipment from Hook Treatment Plant can be used at the upgraded Lower Treatment Plant.

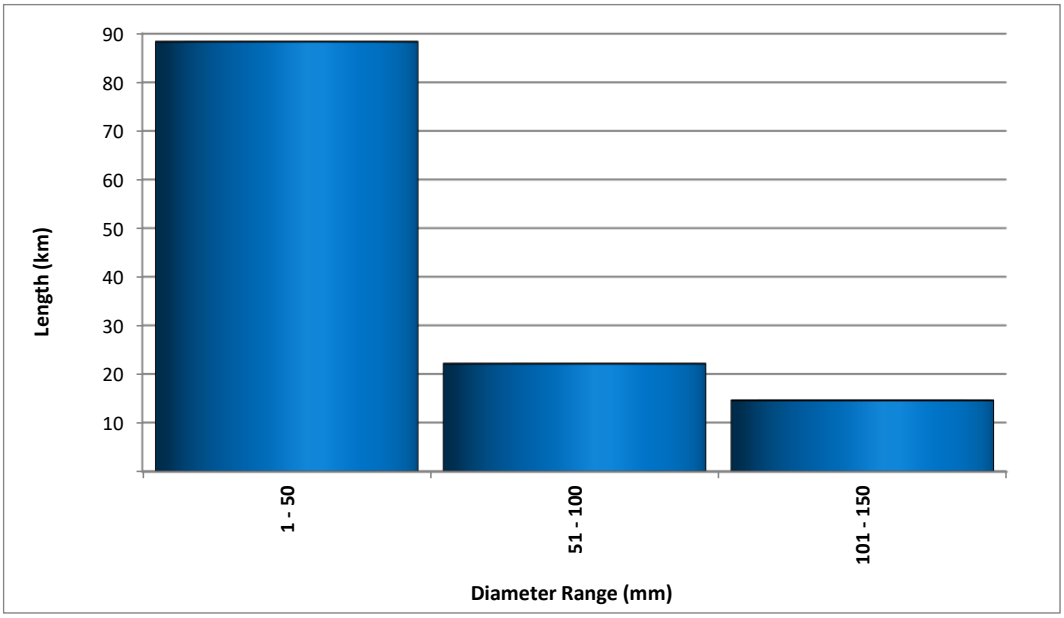
System Information

System Information – Lower Waihao			
Connections	223	**Treated Water Storage (Reservoir)**	
- Metered unrestricted	-	**Ferry Rd**	
- Metered restricted	-	Built (yr)	1978
- Unmetered Residential	-	Capacity	350 m^3
		Material	
Water Sources	(Consent volumes)	**Treatment**	
Waitaki River (bore)	1,633m^3/day	Chlorine	
Resource Consent	**Expiry date**	**To**	
CRC940846	23/02/2029	Take groundwater	
Replacement Cost		**Reticulation length**	
Total Scheme	$3.37m	125.1 km	

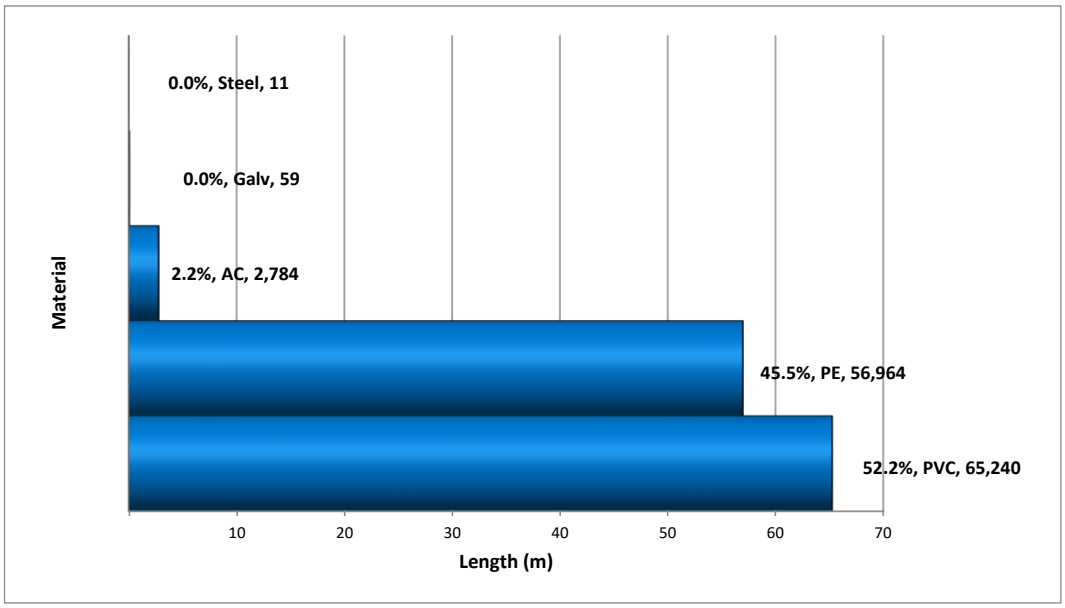
Appendix Figure 36: Scheme Components



Appendix Figure 37: Water Mains Diameter Range

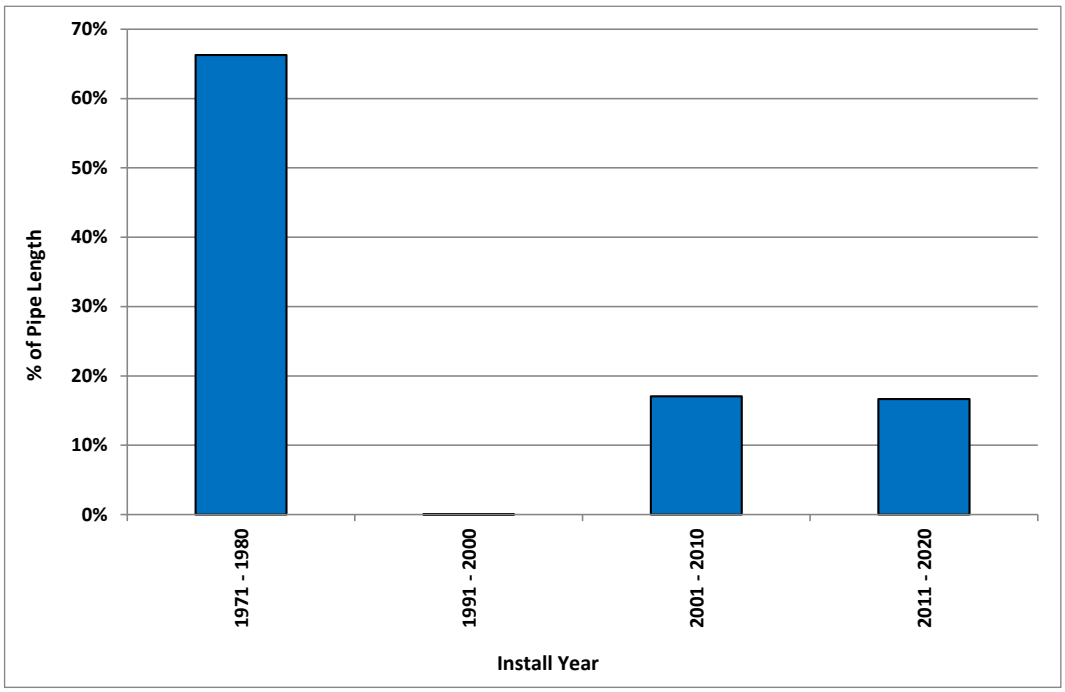


Appendix Figure 38: Water Mains Material Length

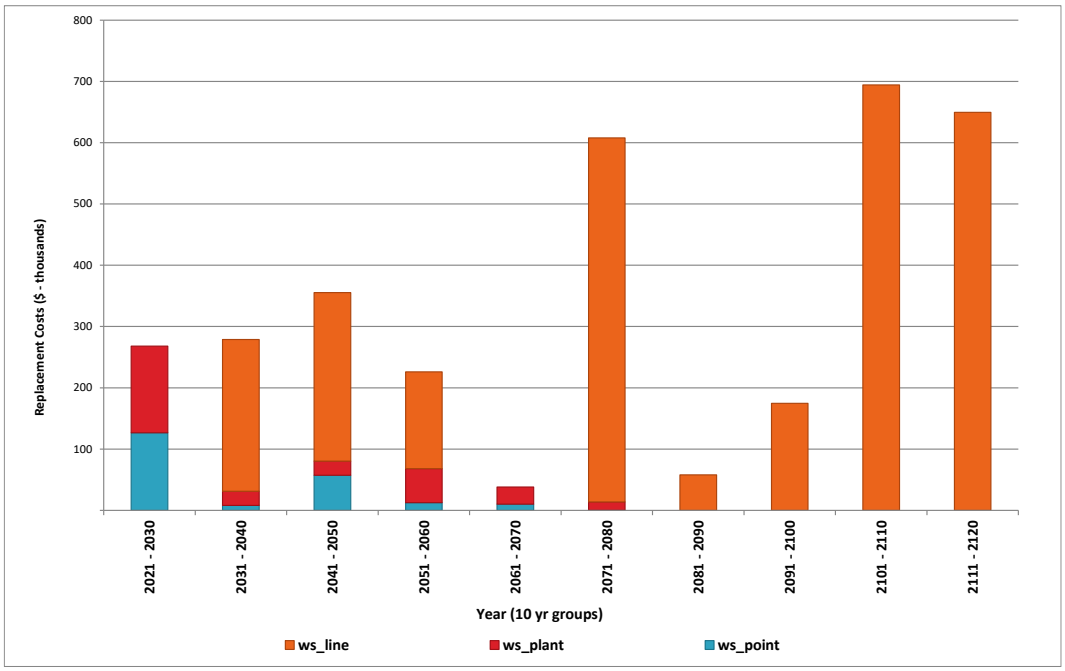


Approximately 66% of the Lower Waihao water supply scheme reticulation were installed during 1978 and are 42 years old. The remaining 34% have been installed since 2001 and are aged between 1-19 years. The reticulation consists mainly of PVC (52%) and PE (46%).

Appendix Figure 39: Water Mains Install Year (10 Year Groups)

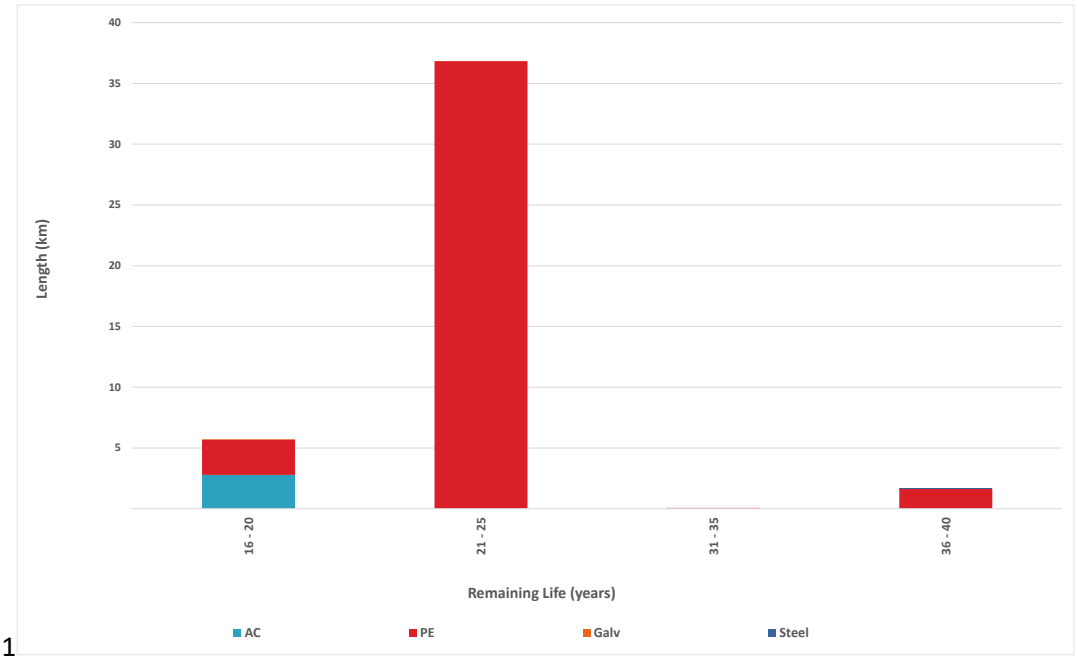


Appendix Figure 40: Remaining Life of all Assets – Long Term



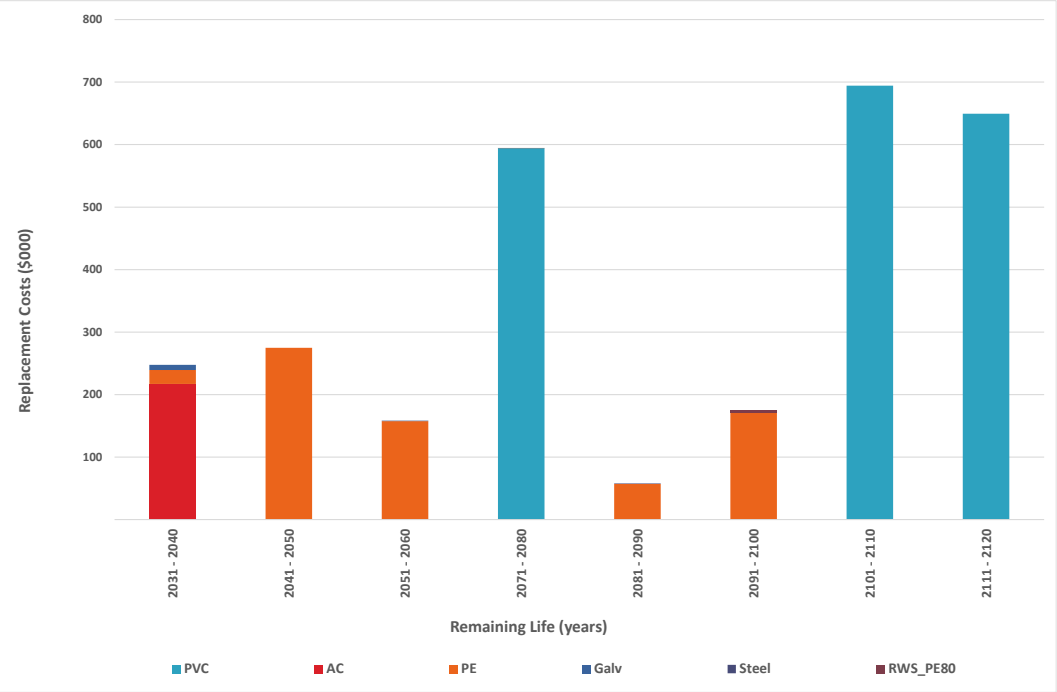
At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined by determining evidence-based useful lives using a combination of condition and performance data.

Appendix Figure 41: Water Mains Replacement (Length) – Long Term

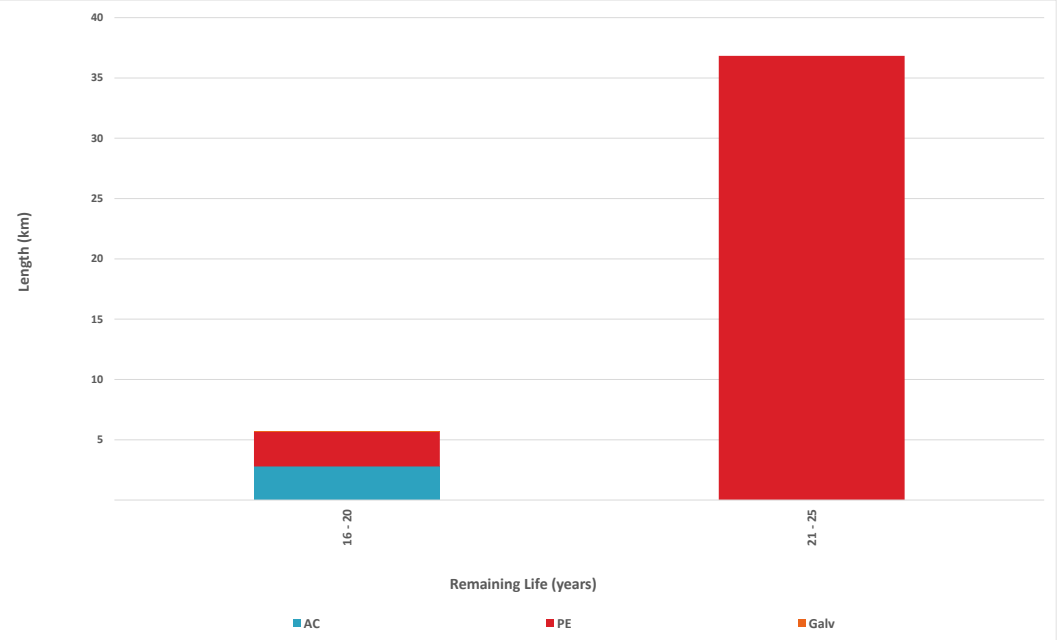


1

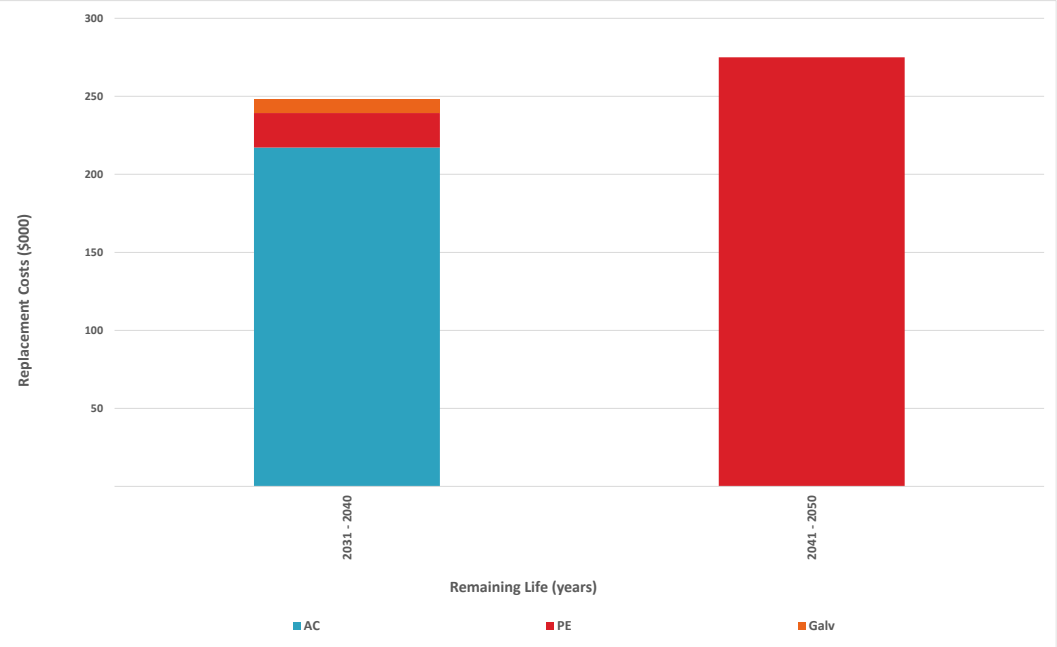
Appendix Figure 42: Water Main Replacement Value – Long Term



Appendix Figure 43: Water Main Replacement (Length) – 1 to 30 Years



Appendix Figure 44: Water Main Replacement Value 1 to 30 Years

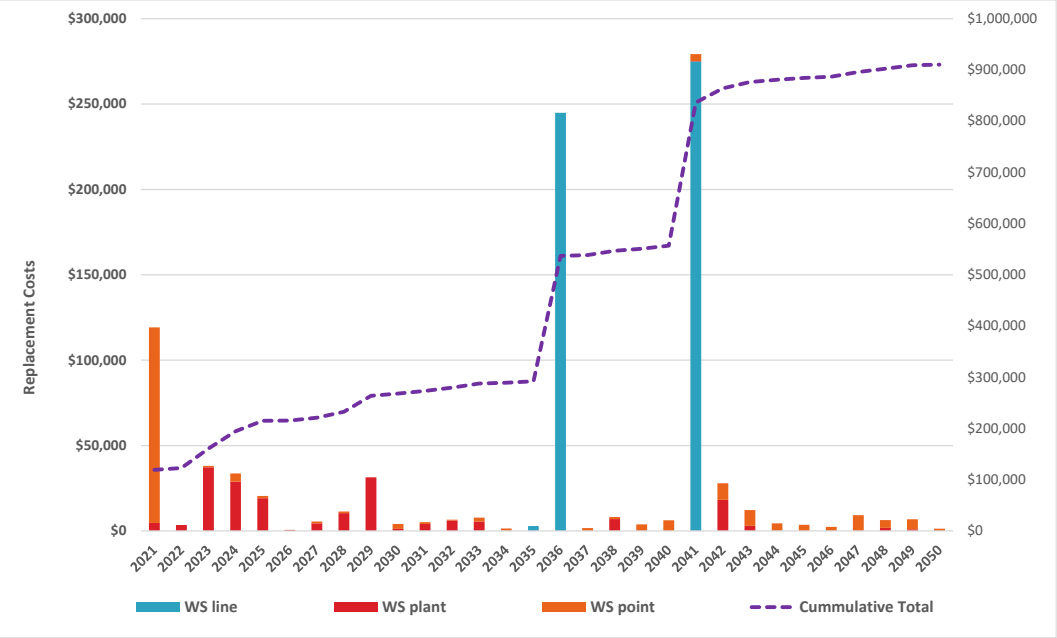


Appendix Table 6: Lower Waihao Plant Replacement Value 1 to 30 Years

Asset Group	Remaining Useful Life (5 year groups) ($)						
	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Abstraction	3,230						3,230
Building	18,945						18,945
Cabinet	1,004						1,004
Chlorine	16,406	10,843					27,249
Control	8,615	5,611		291			14,517
Distribution				3,341	18,168	96	21,605
Measurement	580	3,766	9,664	3,618			17,628
Pipe	5,696		6,089				11,785
SCADA	16,750						16,750
Security	1,936	595					2,531
Solar		1,754					1,754
Surface	14,038	24,903					38,941

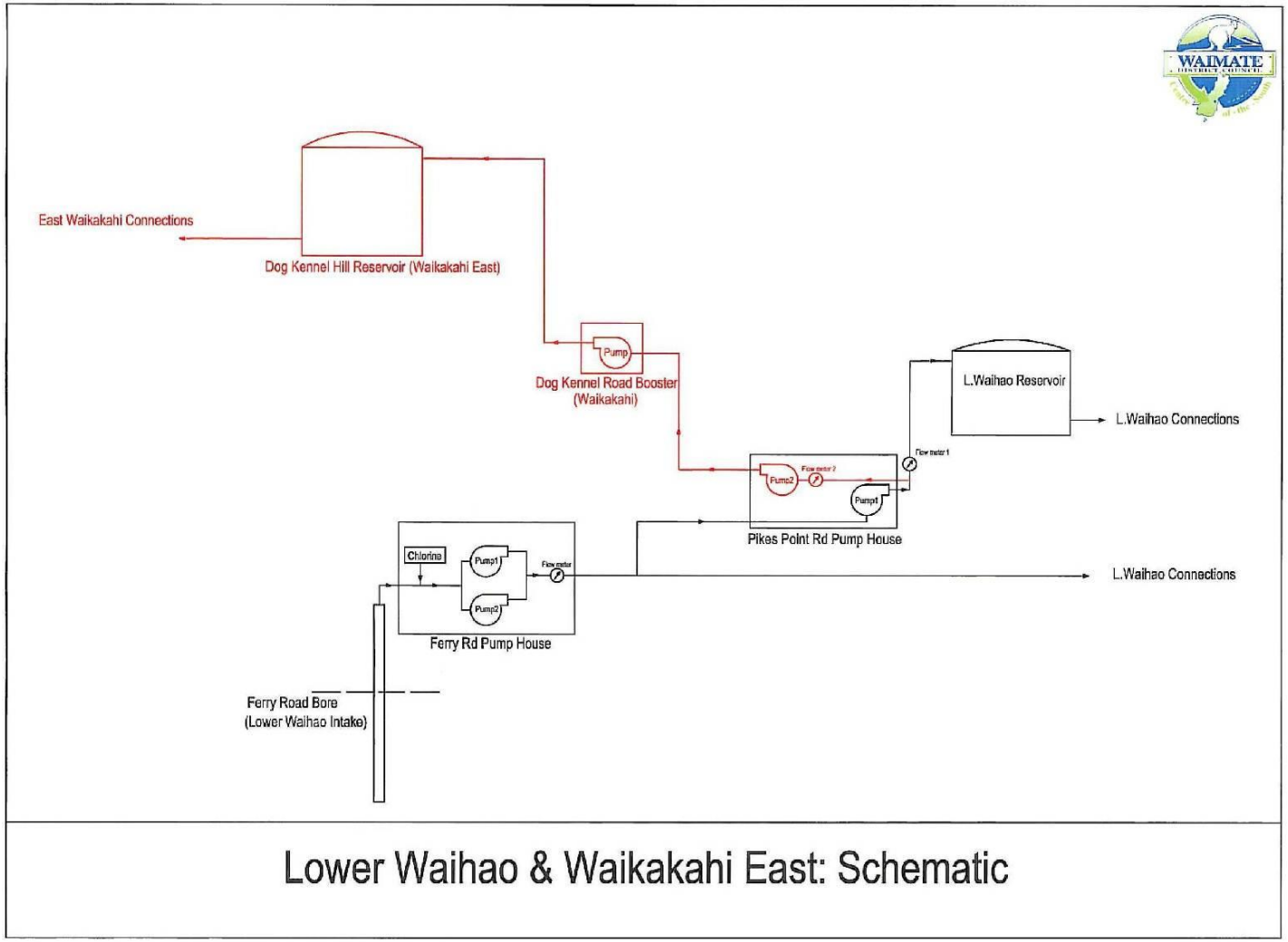
Valve	6,323	465			3,187	1,756	11,731
Vessel		141					141
Grand Total	**93,523**	**48,078**	**15,753**	**7,250**	**21,355**	**1,852**	**187,811**

Appendix Figure 45: 30 Year Replacement Programme

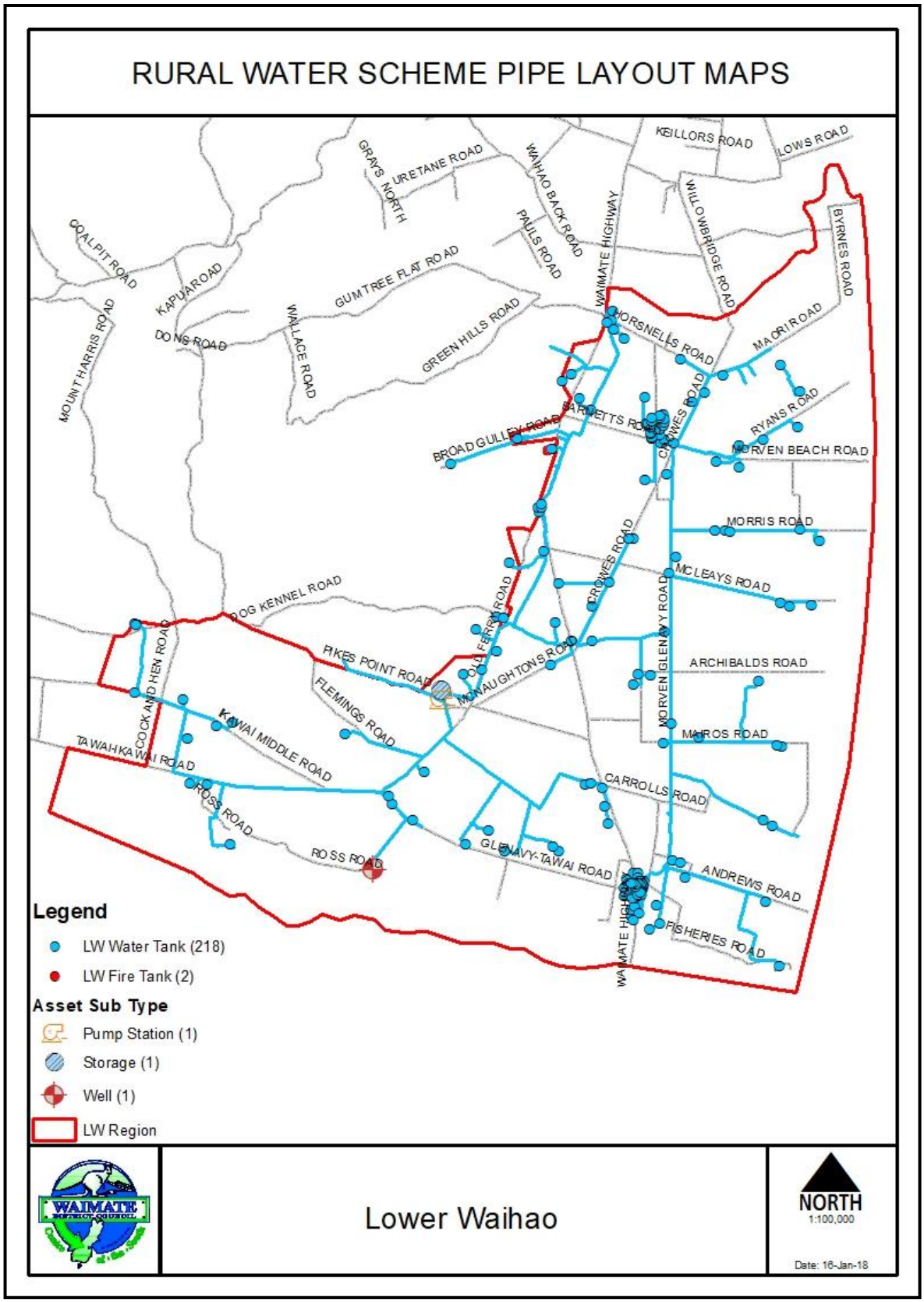


The above figure shows the theoretical replacement programme based on asset expected useful lives.

Appendix Figure 46: Lower Waihao Schematic



Appendix Figure 47: Lower Waihao Scheme Plan



A.5 Otaio Makikihi Water Scheme

Overview

The Otaio Makikihi water supply scheme is a “small drinking water supply” that supplies water to 213 tank connections (170 different owners) with an estimated population of 430. The Waimate District Council target rates 162 properties for the supply of water in this scheme. Some scheme consumers have more than one point of supply connection on their rated property. Each point of supply connection is required to have water storage for 96 hours (four days) in case of interruption of the water supply, and is a requirement of the Rural Water Scheme Policy.

The Otaio-Makikihi rural water supply’s primary source of raw water is from the Tavistock Bore. Currently the bore is “Provisionally Secure” and is protozoal compliant. Ground water is drawn from the bore, chlorinated and pumped into the reticulation. A booster pump station up on Esk Valley Road boost water up towards the old Otaio Reservoir, and back towards to Pakihi Road. There is a second surface water take for the supply that is not used. This source is not protozoal compliant or readily operable due to damage of the gallery from a weather event, but could be made operational if needed.

The approximate length for the reticulation network is 155 km.

History

The Otaio-Makikihi water supply scheme was established in 1969 and the majority of the scheme reticulation dates from this time. The intake and pumping equipment was upgraded and relocated in 1999. A 10km supply loop upgrade was commissioned in 2004. Treatment control improvements (automatic dosing, chorine analyser, pH monitoring) and SCADA were completed in 2008.

In December 2013 Tavistock Bore and Campbell Forrest Booster were commissioned. Tavistock Bore Intake became the main duty intake as of that time. The Otaio Gorge Intake is now a standby system. The Otaio Gorge Intake is isolated form the distribution network by two valves at the Otaio Reservoir.

The upgrading of Otaio-Makikihi Intake to the new Tavistock Bore came about through the Governments TAP and CAP (Technical Assistance Programme and Capital Assistance Programme, to help communities comply with DWSNZ 2005 [revised 2018], and provide safe drinking water) funding, plus the finding/drilling of a suitable bore on Tavistock Road.

In the winter of 2015 a heavy rain event washed away the Otaio Gorge Intake gallery infiltration bed and wedge wire screen, along with a short section of rising main to the Otaio Reservoir.

On 26 October 2016 >1 E.coli was found in a monthly monitoring sample of raw ground water at Tavistock Bore. The bore lost its “Secure Bore” status and became “Provisionally Secure”. 12months of monitoring started immediately to achieve compliance again with criterion 3 of the DWSNZ 2005(revised 2018) for bore water security. The first three months of weekly monitoring were clear and so was the remaining 9 months of monthly monitoring.

System Description

Source and Catchment:

Raw water for the Otaio-Makikihi rural water supply can be sourced from two intakes. The primary source is a ground water take called Tavistock Bore on Tavistock Road, and the second/standby source is a surface water take on the Otaio River, called Otaio Gorge Intake.

Tavistock Bore is in road reserve on Tavistock Road near the Sodwall/Horseshoe Bend Road, which is on top of a hill ridge amongst rolling hill country. The surrounding country land use is a mixture of arable cropping, pastoral grasses, sheep and dairy farming. With the bore being 156.3 m deep, it is not directly influenced by the near land use activities. The Regional Council "Community Drinking Water Protection Zone" is a 100m radius circle around the bore at 3.1 hectares. The precise location of the catchment is unknown. It could be somewhere in either the Cannington basin or the upper South Coastal Canterbury area. From bore the logs it would indicate that the bore is drilled in what is known as the Cannington gravels, and most likely drawing from the Lower Kowai Formation. The ground water from the bore has a mean age of 134 years, and less than 0.005% water less than a year old.

The overall assessment of the Tavistock Bore catchment, plus the impact from human and agricultural activities has no known impacts.

Otaio Gorge is the secondary backup source for raw water and not used unless required. The wider catchment around the Otaio Gorge Intake is approximately 4830 hectares. The wider catchment is made up largely of upland pasture grasses and tussock. There are small pockets of bush and forests in the upland area as well. Nearer to the intake there is small proportion of lowland pastures. In the catchment there can be around 200 beef cattle grazing intermittently, and seasonal grazing of about 1000 sheep. In the upland hill catchments there are small numbers of feral pigs, deer, goats and wallabies.

In the catchment only 16% of it is protected. The Waimate District Council District Plan "Water Supply Protection Area" is only 780 hectares and completely overlaps the Regional Council "Community Drinking Water Protection Zone" of 18.2 hectares. In the "Protection Area and Zone", there are at least two if not three septic tanks. One is at the Department of Conservation Camp ground beside the river. The other one or two around the Otaio Gorge Station Homestead and buildings.

The overall assessment of the Otaio Gorge catchment, plus the impact from human and agricultural activities, equates to a four (4) Log treatment process requirement to provide wholesome, compliant drinking water to the consumers on the Otaio-Makikihi Rural Water Supply.

Abstraction:

Tavistock Bore

The raw water for Tavistock Bore is drawn from a 200mm Ø steel cased bore at 156.3m, with 3m stainless steel screen set between 153.6 and 156.3m. A 30 kW submersible pump is set at 132m below ground level to abstract the ground water. Static ground water level is 104m below ground level. The bore is currently is "Provisionally Secure" and is protozoal compliant.

"Secure Bore" status has not been sought after for this bore, as it is a questionable methodology to prove that the water drawn from it is safe. Instead Council will seek to meet criterion 2 (Borehead Security) DWSNZ 2005 (revised 2018) and use treatment at the Plant for bacterial and protozoal compliance.

Otaio Gorge
The Otaio Gorge Intake raw water was sourced from an infiltration gallery consisting of a single 175mm Ø, 9m Stainless Steel wedge wire screen (1mm gaps) located in the bed of the Otaio River. From the gallery the water would enter a shallow well on the north bank of the river. In the shallow well there are two submersible pumps housed within shrouds. However, in the winter of 2015 the gallery infiltration bed and wedge wire screen were washed away, along with a short section of rising main to the Otaio Reservoir. The intake in its current state is inoperable, but could be temporally made operational if required.

Treatment Plant:

Tavistock Bore
The raw water enters the Tavistock treatment plant and passes through a UV reactor, to treat for protozoa and flows through into a balance tank. A chlorine gas solution is dropped into the balance tank. The chlorine solution is made with chlorine gas via a venturi on the dose water line to the balance tank. The dose is controlled by chlorine analyser monitoring flow, Cl2 residual (setpoint) and pH.

Otiao Gorge
The Otaio Gorge plant does not have any protozoal treatment barriers, only course filtration and chorine disinfection. If required a dose pump can pump a chlorine solution (sodium hypochlorite) directly into the rising main at the top of the submersible pump riser when the duty pump was running. The chlorinator dose rate was automatically controlled to maintain a Free Available Chlorine (FAC) set-point level as measured and monitored by a chlorine analyser (automated closed loop process controller). The chlorination system operates whenever the submersible duty pump is running.

Note, this plant is only a back up if there was ever a failure at Tavistock Bore Treatment Plant, and it could not produce water for supply.

Distribution:
Tavistock Bore and treatment plant is the primary and current source of water for the Otaio Makikihi supply. Distribution of compliant chlorinated water is drawn from the balance tank, and pumped around the scheme by four VFD surface pumps (duty/standby setup) working to a setpoint line pressure. It is also boosted at Campbell and Forrest Road at the Campbell Forrest Booster. Note the old reservoir is not used in this distribution setup.

If required as a second source of supply, the Otaio Gorge Intake and its submersible pump can deliver water back across the river (if temporally repaired) at a constant rate to the Otaio Reservoir located some 5.5 km away at 220m above sea level. From there water would gravitate into the distribution network. Booster pumps are not required when the Otaio Gorge Intake is operating. The pump is controlled by sensors located within the reservoir. The control system is linked to SCADA and all inputs are powered by mains electricity. Low level protection for the main pump is provided. As mentioned this is only a back up option if it was required.

Council's SCADA system monitors both intakes and reservoir recording daily water usage, pump hours, chlorine dosage, temperature, pH and reservoir levels. When parameters are breeched in some of the above and other functions, the SCADA can also send out alarms via txt/sms to all operators. The SCADA system also provides a control function to switch pumps on and off as required.

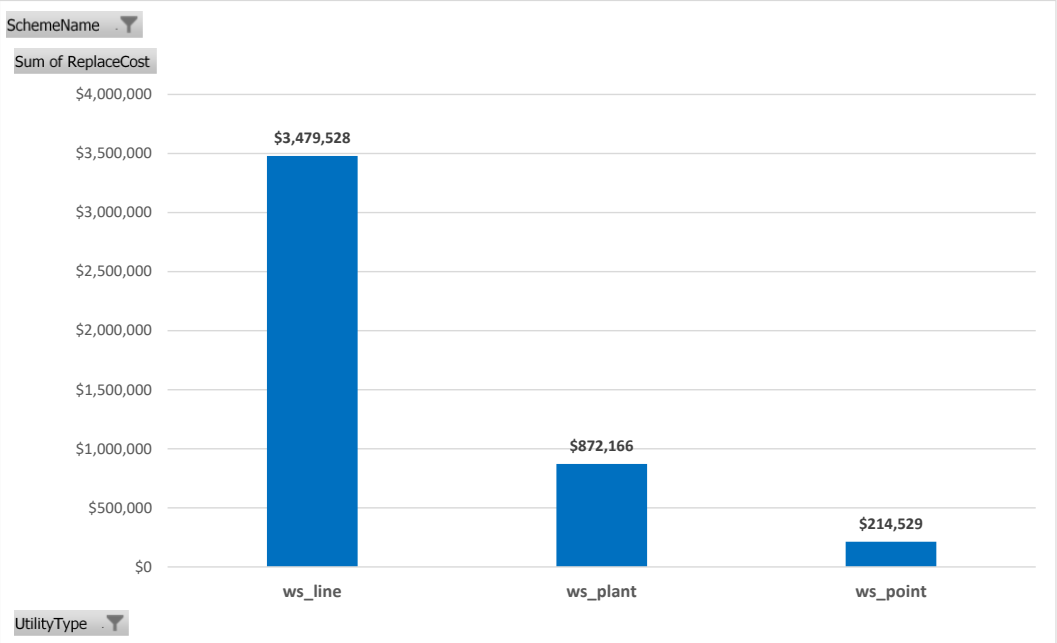
Management and Operation:

The scheme is administered at the main council offices in Queen Street, Waimate and operated and managed by the Council's Utilities Services Unit (USU) based at Michael Street nearby. Five qualified field staff are appointed to operate and maintain the rural water scheme plant, fixing leaks etc as generally advised by the public. Water samples are sent to MedLab laboratories for bacteriological testing weekly, with results being entered into WINZ database.

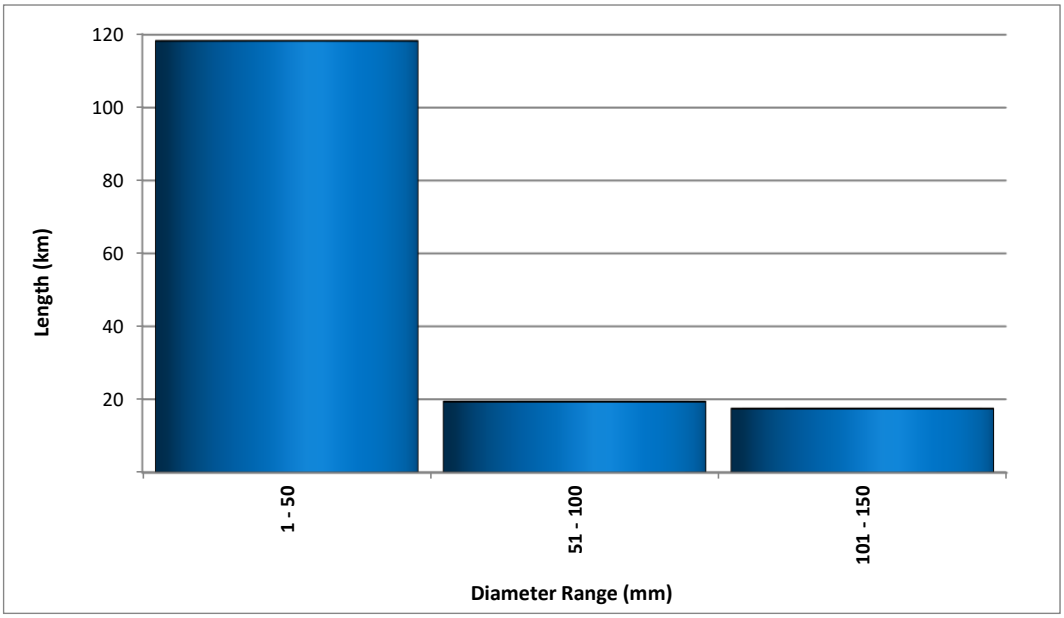
System Information

System Information – Otaio Makikihi			
Connections	206	**Treated Water Storage (Reservoir)**	
- Metered unrestricted	-	Colliers Rd	
- Metered restricted	206	Built (yr)	1969
- Unmetered Residential	-	Capacity	360m^3
		Material	
Water Sources	(Consent volumes)	**Treatment**	
Otaio River	929m^3/day	Chlorine	
Resource Consent	Expiry date	To	
CRC981876.1	22/04/2034	Take surface water	
CRC992050	22/04/2034	Install & maintain intake	
Replacement Cost		**Reticulation length**	
Total Scheme	$4.57m	155.1 km	

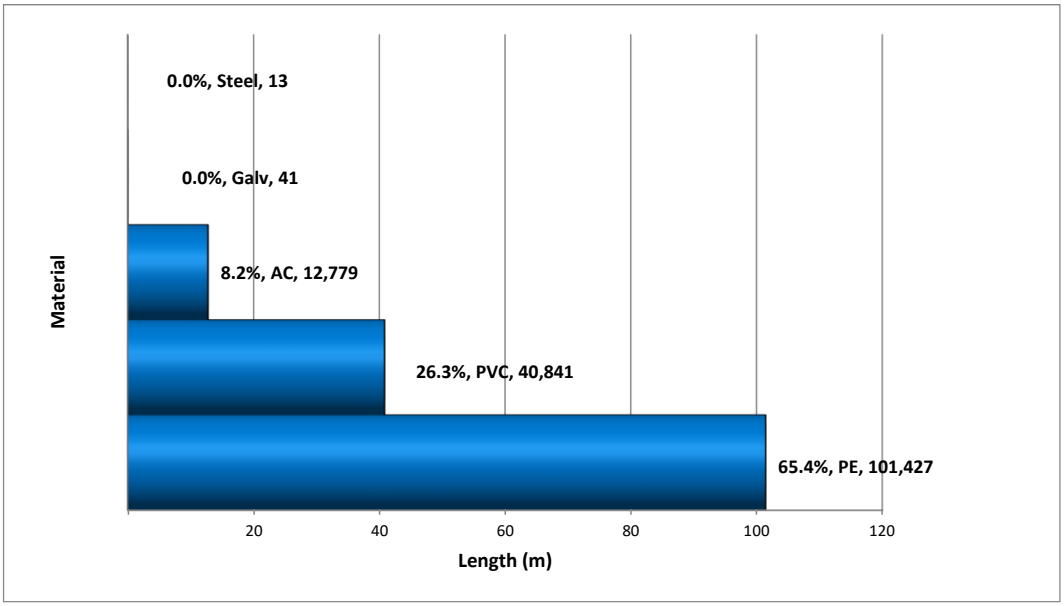
Appendix Figure 48: Scheme Components



Appendix Figure 49: Water Mains Diameter Range

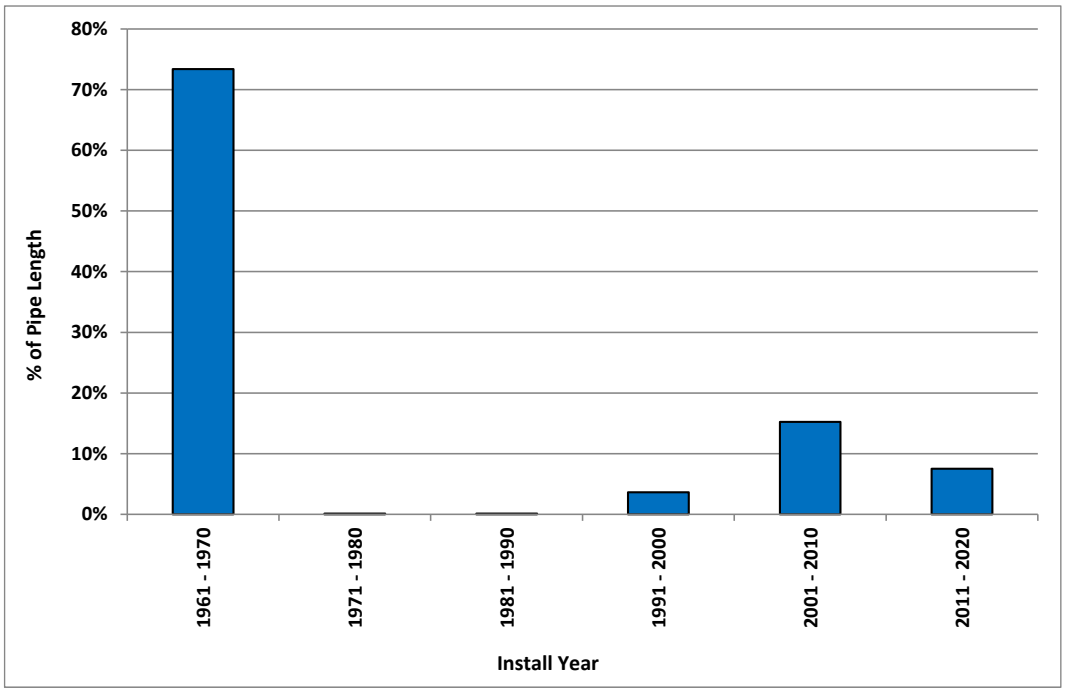


Appendix Figure 50: Water Mains Material Length

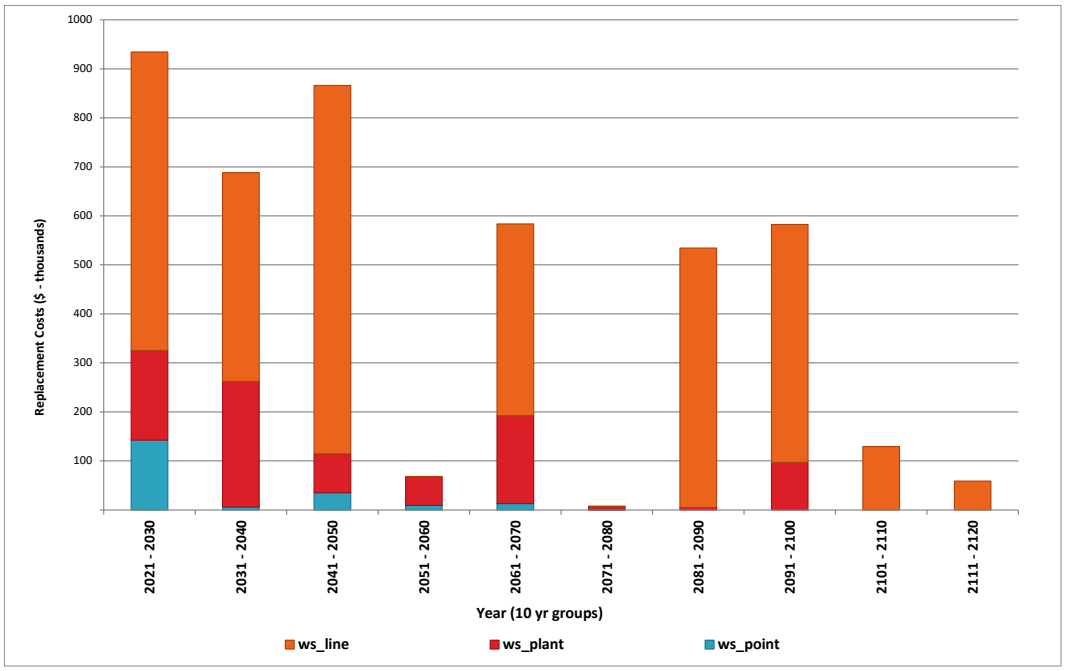


Approximately 73% of the Otaio Makikihi water supply scheme reticulation were installed during 1969 and are 51 years old. The remaining 27% have been installed since 1971 and are aged between 1-49 years. The reticulation consists mainly of PE (65%) and PVC (26%).

Appendix Figure 51: Water Mains Install Year (10 Year Groups)

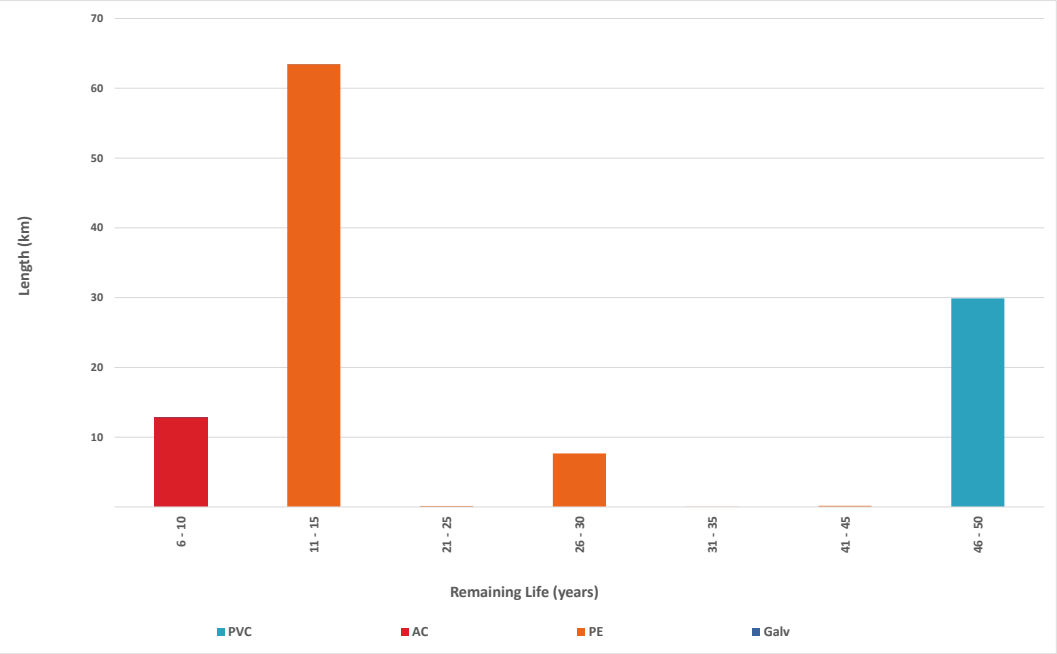


Appendix Figure 52: Remaining Life of all Assets – Long Term

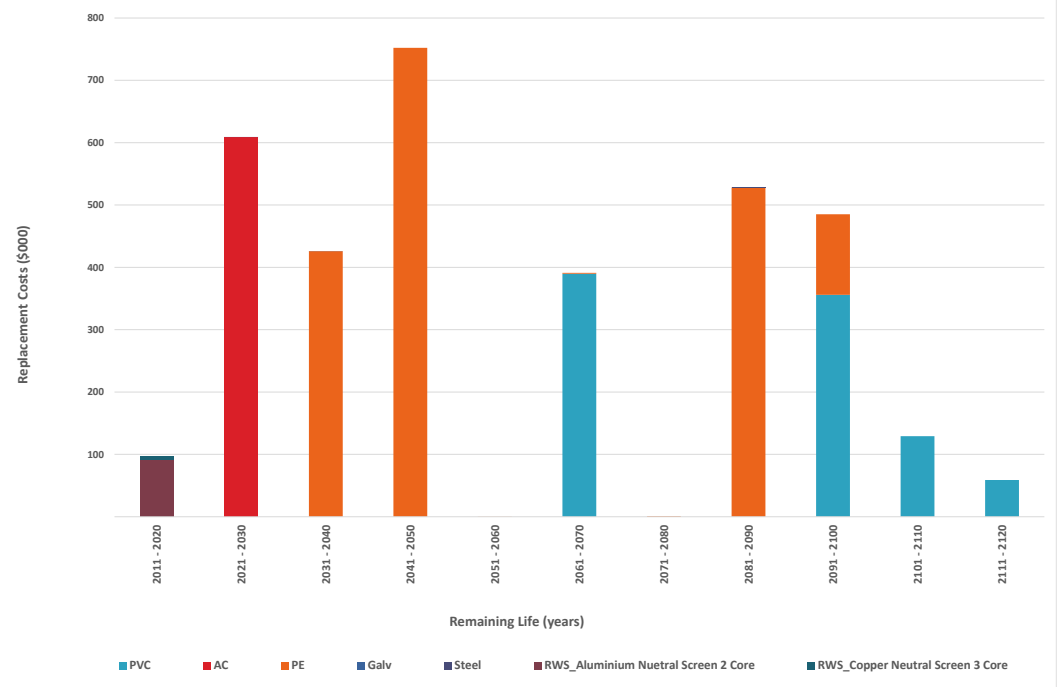


At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined by determining evidence-based useful lives using a combination of condition and performance data.

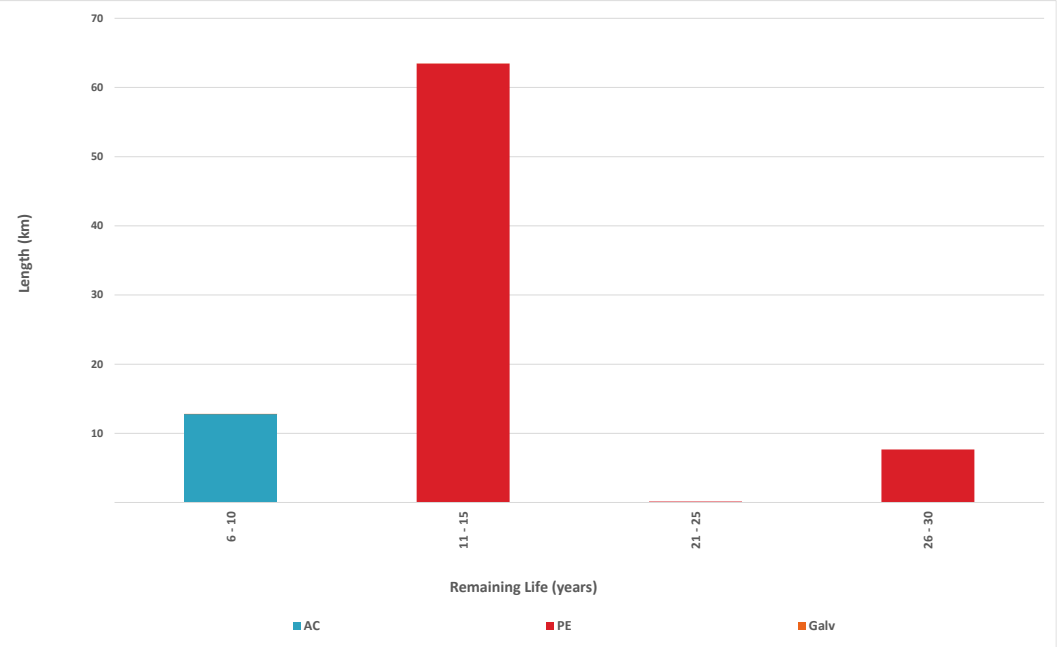
Appendix Figure 53: Water Mains Replacement (Length) – Long Term



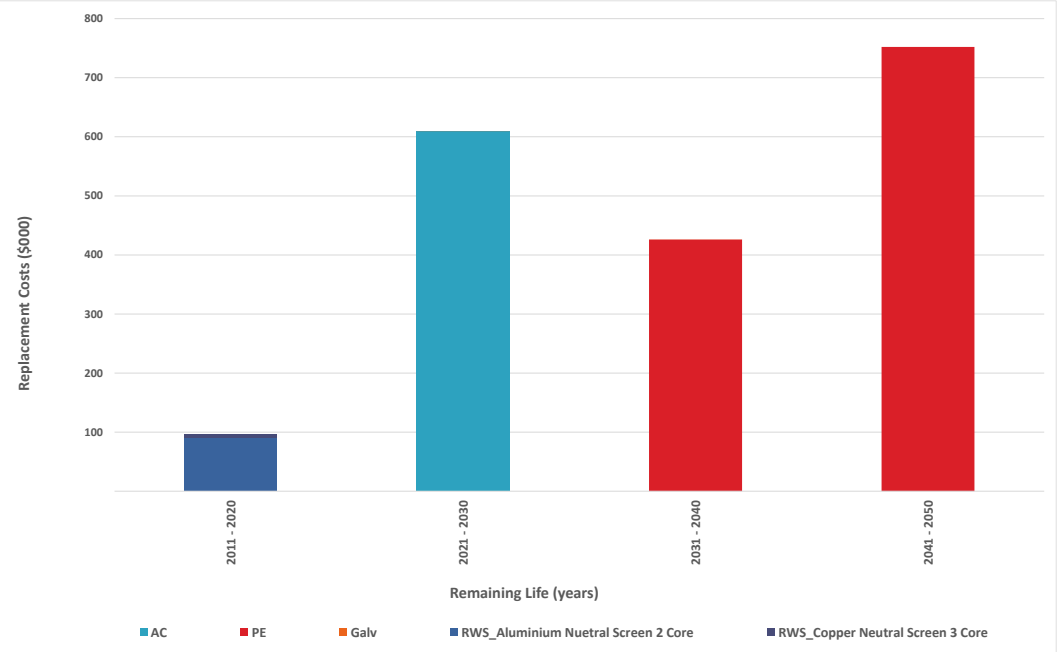
Appendix Figure 54: Water Main Replacement Value – Long Term



Appendix Figure 55: Water Main Replacement (Length) - 1 to 30 Years



Appendix Figure 56: Water Main Replacement Value 1 to 30 Years

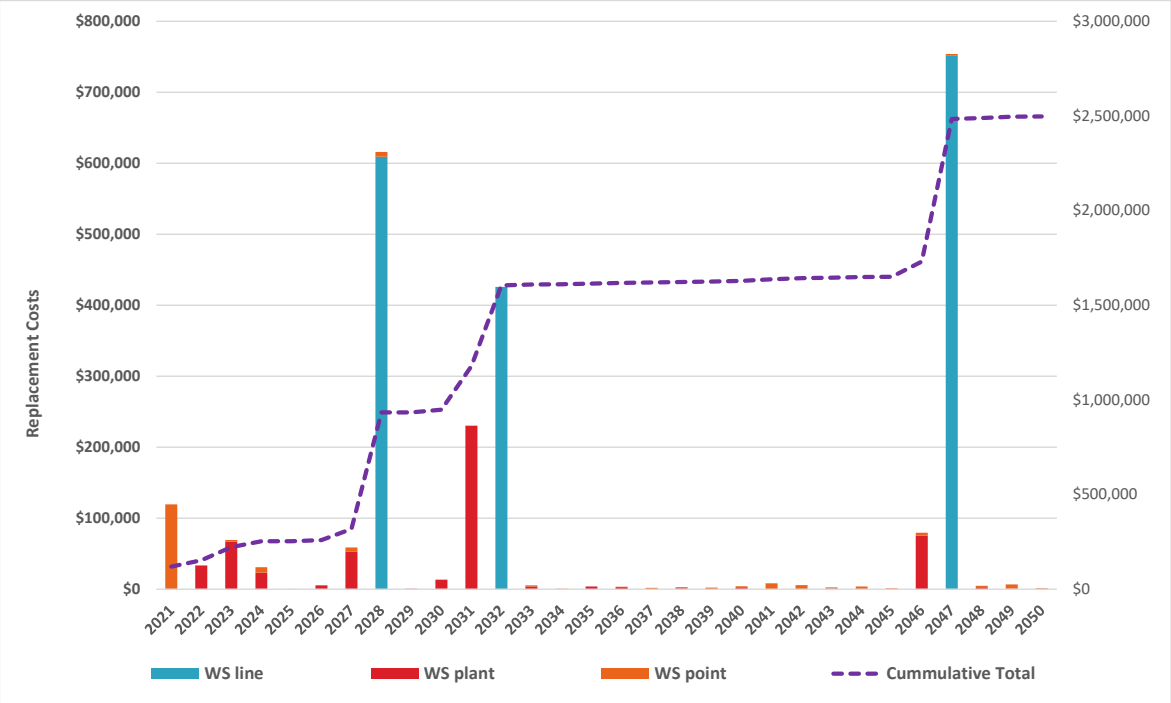


Appendix Table 7: Otaio Makikihi Plant Replacement Value 1 to 30 Years

Asset Group	Remaining Useful Life (5 year groups)						
	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Abstraction						11,397	11,397
Building						4,534	4,534
Cabinet		781					781

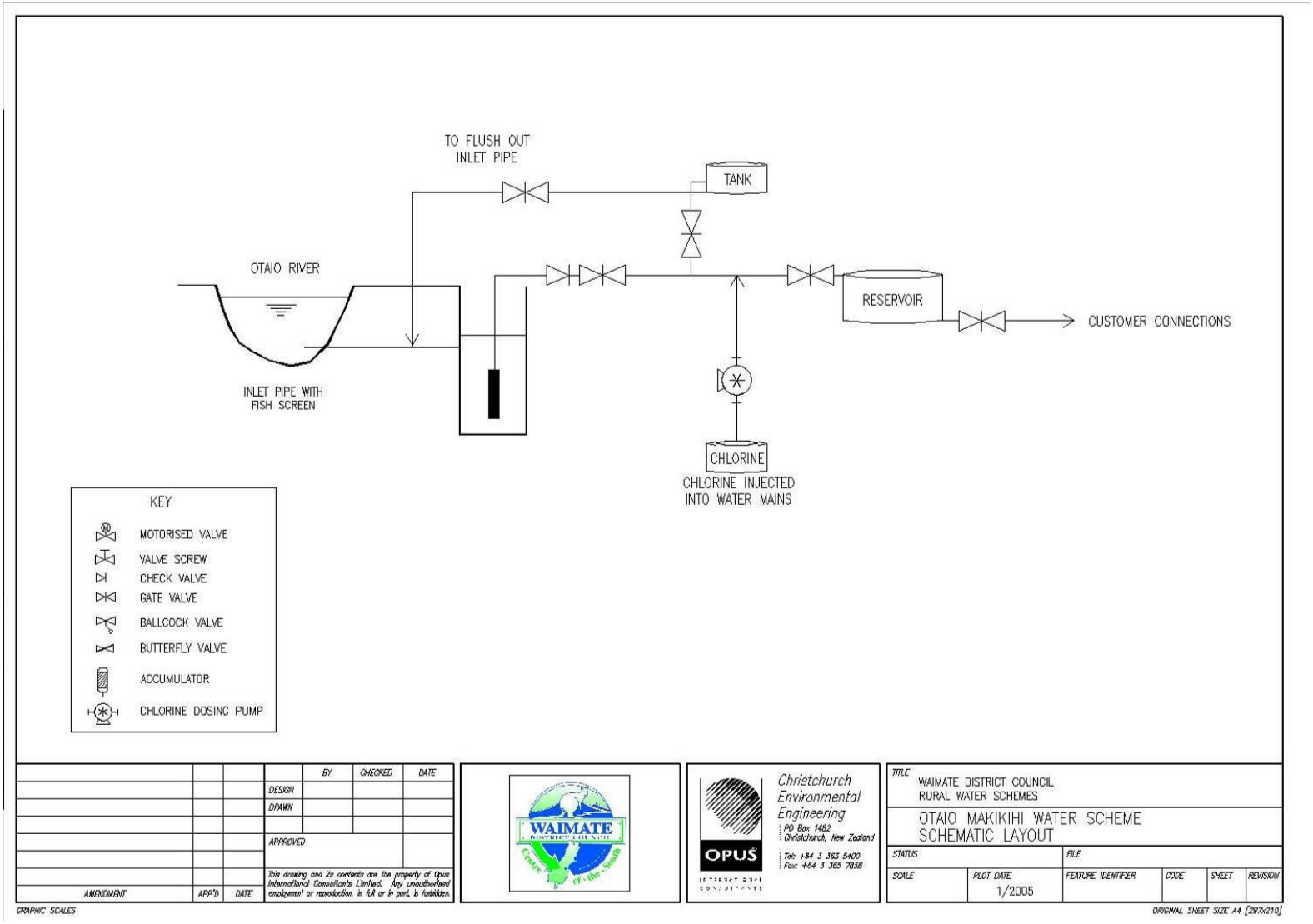
Asset Group	Remaining Useful Life (5 year groups)						
	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Chamber	1,369						1,369
Chlorine		20,274	10,843				31,117
Control	1,671	14,845	87,439	939		19,069	123,963
Digital I/O		882	435				1,317
Distribution			3,341	3,341		39,230	45,912
Measurement	2,097	5,262	35,797				43,156
Pipe	929		13,332				14,261
Process	504						504
Reservoir	58,391						58,391
SCADA	10,882	14,698					25,580
Security				1,330			1,330
Sodium Hypochlorite	15,836	2,345					18,181
Solar	579			413			992
Submersible	28,870		50,204				79,074
Surface			46,027				46,027
Transmission						1,617	1,617
Valve	2,749		324	2,744	1,866	1,288	8,971
Grand Total	**123,877**	**59,087**	**247,742**	**8,767**	**1,866**	**77,135**	**518,474**

Appendix Figure 57: 30 Year Replacement Programme

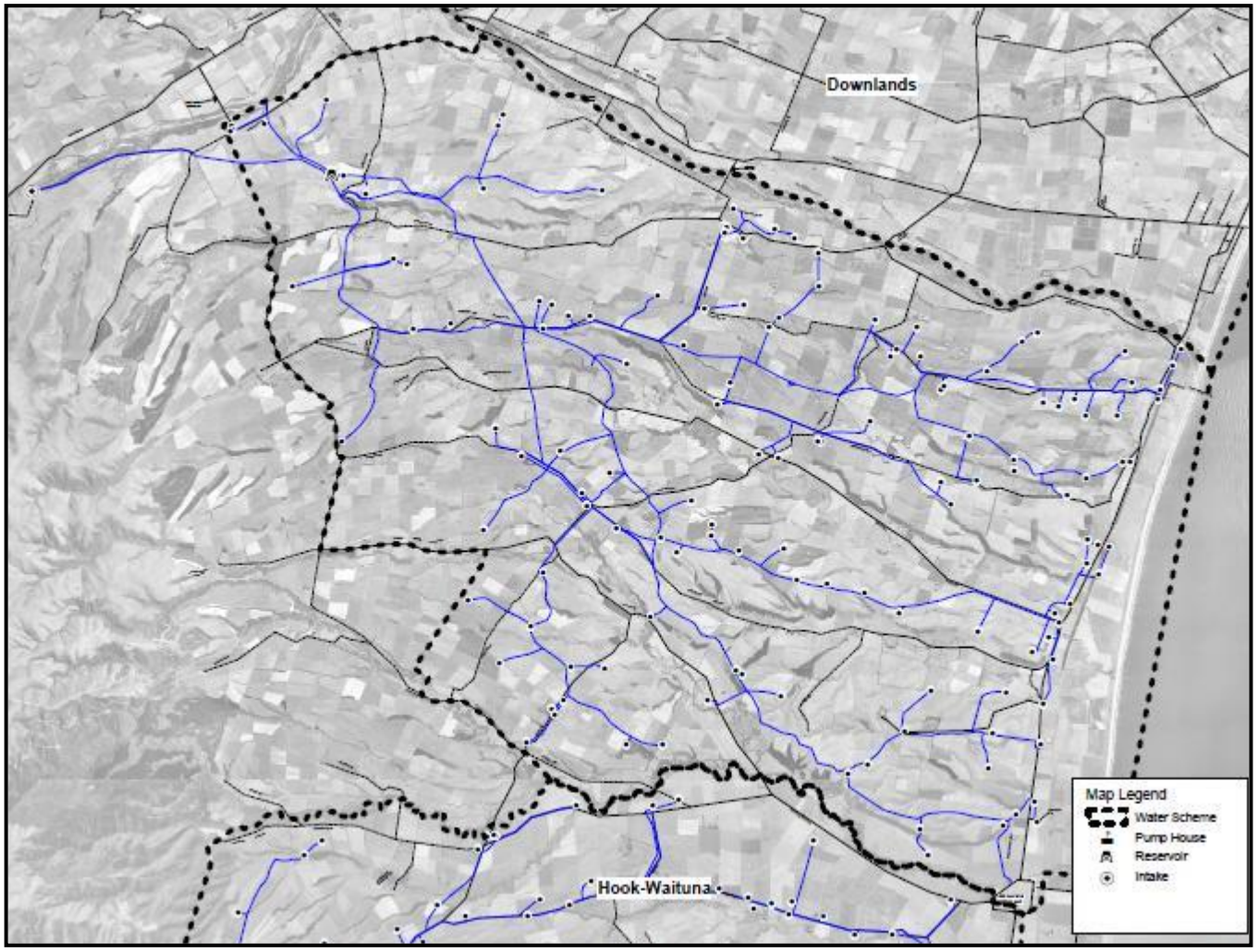


The above figure shows the theoretical replacement programme based on asset expected useful lives.

Appendix Figure 58: Otaio Makikihi Schematic



Appendix Figure 59: Otaio Makikihi Scheme Plan



A.6 Waihaorunga Water Scheme

Overview

The Waihaorunga rural water supply scheme is a "small drinking water supply" and supplies water to 47 connections with a total population of about 141 *(WINZ data)*. The scheme supplies an area of 105 square km on the north bank of the Waitaki River and to the west of the Waikakahi water supply. The Waimate District Council target rates 30 properties for the supply of water in this scheme. Some scheme consumers have more than one point of supply connection on their rated property. Each point of supply connection is required to have water storage for 96 hours (four day) in case of interruption of the water supply.

The supply has two raw water sources from surface takes. Both sources take water from separate streams via galleries. The Main Intake does not have any protozoal treatment barriers, only chlorine disinfection before pumping up to the Main Reservoir, and into the distribution network. Tavendale also does not have any protozoal treatment barriers, only a pre-treatment roughing filter with chlorine disinfection, then supplies water by a combination of gravity and pumping into the distribution network.

Although the Waihaorunga water supply scheme operates in two separate zones each with separate intakes and treatment, the main pump intake can supply the total scheme area.

The approximate length for the reticulation network is 67km.

A large proportion of the water produced for the supply is consumed for the purposes of commercial agriculture. About 41 habitable dwellings have access to the water supply. This equates to 19% human consumption of the sold volume (based on 1500L/day/dwelling).

History

The Waihaorunga water supply scheme assets were installed in 1977 and the majority of scheme components are 40 years old. A second gravity source was installed in 1993 and the main pump station was refitted in 2000.

System Description

Sources and Catchment:

Waihaorunga Main

The Waihaorunga water supply has two raw water sources. The Waihaorunga Main from an infiltration gallery in Waihaorunga Creek, and Tavendale from a shallow gallery in a tributary to Waihaorunga Creek.

Around the Main Intake, the wider catchment is predominately upland pasture with some lowland pasture around the intake, totalling 1519 hectares approximately. 29.9 hectares of that catchment is "Water Supply Protection Area" under the Waimate District Council District Plan, which overlaps the 28.9 hectare Regional Council "Community Drinking Water Protection Zone". There is some riparian management around the Waihaorunga Creek, upstream from the gallery that is fenced off from stock. The land in the wider catchment is dry stock country and mainly sheep at approximately 1.6 sheep per hectare in the wider catchment. This can mean up to 3000 sheep can be area, or part of rotating through. There are also about 150 beef cattle in the area too, along with pest animals such as wallabies (150 approx.). There are regular culling programmes to reduce wallaby numbers. Also in the wider catchment there are three dwellings with septic tanks, two woolsheds, and a small

irrigation dam on one of the tributaries of the Waihaorunga Creek, as well as a dual silage pit that are outside of the "Protection Area" and "Zone".

Tavendales
The Tavendale Intake has a much larger catchment of 115 hectares. The District Plan "Water Supply Protection Area" covers the whole area that is the physical catchment for Tavendale, and over laps the Regional Council "Community Drinking Water Protection Zone", which is only 17 hectares inside the catchment. This catchment is also predominately upland pasture with some tussock and scrub. Again it is dry stock land with up to 500 head of sheep and 100 beef cattle on and off through the year. This catchment also suffers from pests such as wallabies (100 approx.) 600 square metres approximately has been fenced off around the gallery itself. This protects the gallery and has allowed native scrub to establish itself around the stream, giving it some riparian protection.

The overall assessment of both catchments plus the impact from human and agricultural activities, equates to a four (4) Log treatment process requirement at both sites to provide wholesome, compliant drinking water to the consumers on the Waihaorunga Rural Water Supply.
Abstraction:

Waihaorunga Main
The Waihaorunga Main draws raw water from the infiltration gallery in Waihaorunga Creek. There is about 1 -1.5 metres cover over a perforated pipe. The perforated pipe takes the infiltrate by gravity from the creek to a stilling chamber. Two submersible pumps (duty/standby) in the stilling chamber, pump water into the distribution zone and to the Main Reservoir.

Tavendales
Tavendale intake shallow gallery has a perforated pipe under a shallow bed of rock and gravels in a gabion mat. The raw water infiltrate enters the perforated pipe and flows away by gravity from the creek to the treatment plant site at the end of Tavendale Road.

Transmission:

Waihaorunga Main
There is no extensive transmission at Waihaorunga Main Treatment Plant as the intake gallery and Treatment Plant are within 30m of each other.

Tavendales
Tavendale has 1.81 km, 40mm PVC pipeline from the Waihaorunga tributary stream intake gallery to the Tavendale Treatment Plant. The raw water flows under gravity from the stream intake gallery to the Plant.

Treatment:

Waihaorunga Main
Both sources of water for the supply are chlorinated. At the Waihaorunga Main source, the gallery stilling chamber serves as a contact tank for chlorination. Chlorine (sodium hypochlorite solution) is only dosed when the pumps are operating. When running, the chlorine dose pump injects chlorine at an operator set input rate.

Tavendales
The Tavendale Treatment Plant consists of a small cartridge roughing filter and chlorine disinfection (sodium hypochlorite solution). Water flows into the plant, through the roughing filter, and then chlorine is injected at rate of demand generated by a pulse out of the water meter. The amount

injected by the dose pump is manual set by the operator. The flow rate of water supplied is dictated by the demand from the distribution zone, which is gravity and pump fed.

The present treatment plant has no protozoal treatment barriers. For the plant to be protozoal compliant under the Drinking Water Standard for New Zealand 2005 (revised 2018), the plant needs log four (4) treatment processes to be in place.

Monitoring and control, plus telemetry (SCADA), have been recently installed at the Waihaorunga and Tavendales Treatment Plant sites in 2020 and 2021. This equipment was installed as a part of an agreement with The Ministry of Health, instead of full upgrades of the treatment plants, to allow for potential changes in legislation and standards (Acceptable Solutions), for rural agriculrual water supplies.

Distribution:
The disinfected water is distributed from both Treatment Plants. They can supply two separate portions of the scheme, or can be linked by valving to augment the other if required.

Waihaorunga Main Intake supplies to the majority of consumer. Two submersible pumps in the gallery stilling chamber pump water into the distribution zone and to the Main Reservoir. From the reservoir a series of pump stations and reservoirs are used to supply the areas at a higher elevation than the Main Reservoir. The Melford pump is located downstream of the Waihaorunga Main reservoir and pumps to the Melford reservoir. The Takitu pump is located downstream of the Melford reservoir and pumps to the Takitu reservoir.

Tavendale Treatment Plant delivers water to the smaller northern portion of the supply around Tavendale Road. The majority of this northern portion is gravity feed from Tavendale Treatment Plant. A booster pump at Tavendale Treatment Plant supplies only two consumer “points of supply” and the Tavendale Reservoir.

There has been in the past limited availability of standby plant within the system. This is being progressively resolved with budgeted capital expenditure, and the purchasing of spare replacement pumps for Takitu and Tavendale pump stations. The Main Intake has always had a duty and standby pump available, and a duty and standby pump at the Melford pump station. Currently there is no electronic supervision or control of the system (SCADA).

Management and Operation:
The scheme is administered at the main council offices in Queen Street, Waimate and operated and managed by the Council’s Utilities Business Unit (UBU) based at Michael Street nearby. Five qualified field staff operate and maintain the rural water scheme plant, fixing leaks etc as generally advised by the public. Water samples are sent to MedLab laboratories for bacteriological testing. Currently the Waihaorunga rural water supply has a “Permanent Boil Water Notice”. The notice was issued with the agreement of the Drinking water Assessor in September 2014. The notification is regularly advertised in local papers, Waimate District Council’s website and Facebook page, along with Rural Delivery mail drops. The local water committee also reminds locals on request. In recent times organisations such as the local school and Mobile Kindy have helped advertise the “Permanent Boil Water Notice”.

A large proportion of the water produced for the supply is consumed for the purposes of commercial agriculture, and the supply could potentially qualify as a rural agricultural drinking water supply. Waimate District Council had previously considered the option of point of use treatment on the rural supplies, and discounted the option at that time because of cost and maintenance issues. The option of “point of use treatment” was looked at again with the release of

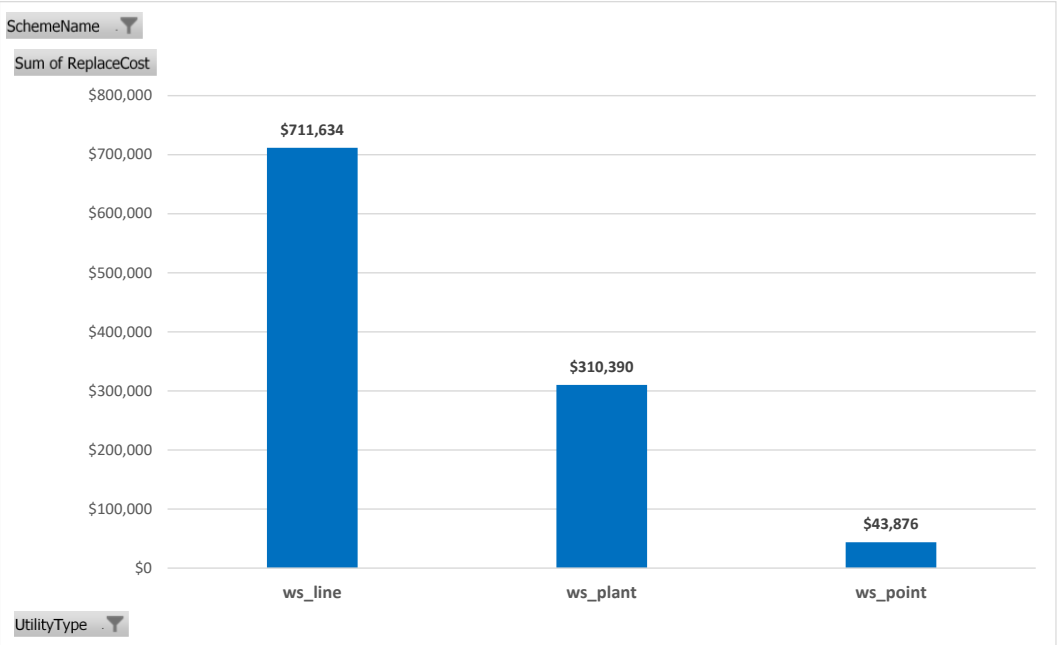
the Rural Agricultural Drinking Water Supply Guidelines (RADWS) in March 2015. Some questions were raised again about actual cost, pre-treatment, maintenance, responsibility issues and liability. Those questions were investigated by exploring successful examples of private "point of entry treatment" supplies under the RADWS in the Waitaki District Council. However, after the Havelock North Stage 1 Enquiry, the issues and risks of such a system make the RADWS not a viable option.

Coucil has lobbied Government to review the current legistlation and standards for Rural Agricultral Water Supplies. Since then the Department of Internal Affairs (DIA) and the new regulator Taumata Arowai have been, and still currently working on an Acceptable Solution option, using point of use (PoE) treatment, which could be used in rural argicultral water supplies.

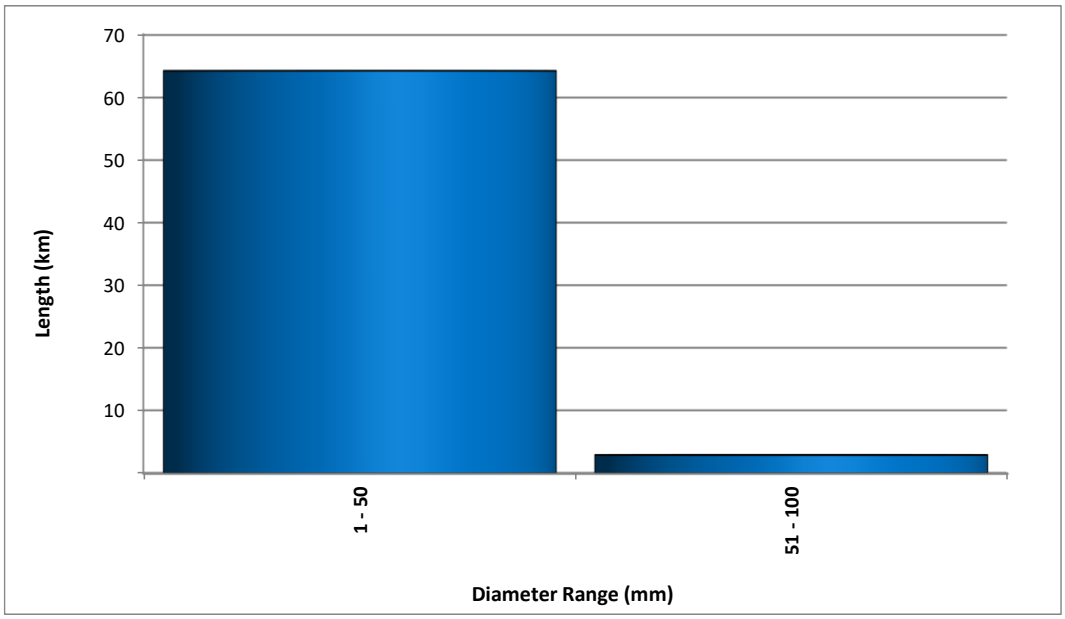
System Information

System Information – Waihaorunga			
Connections	**50**	**Treated Water Storage (Reservoir)**	
- Metered unrestricted	-	**Colliers Rd**	
- Metered restricted	50	Built (yr)	1977
- Unmetered Residential	-	Capacity	150 m^3
		Material	
Water Sources	(Consent volumes)	**Treatment**	
Waihaorunga Creek	455 m^3/day	Chlorine	
Tributary of Waihaorunga Creek	121 m^3/day		
Resource Consent	**Expiry date**	**To**	
CRC084608	17/12/2043	Take surface water	
CRC084606	16/12/2043	Take surface water	
Replacement Cost		**Reticulation length**	
Total Scheme	$1.07m	67 km	

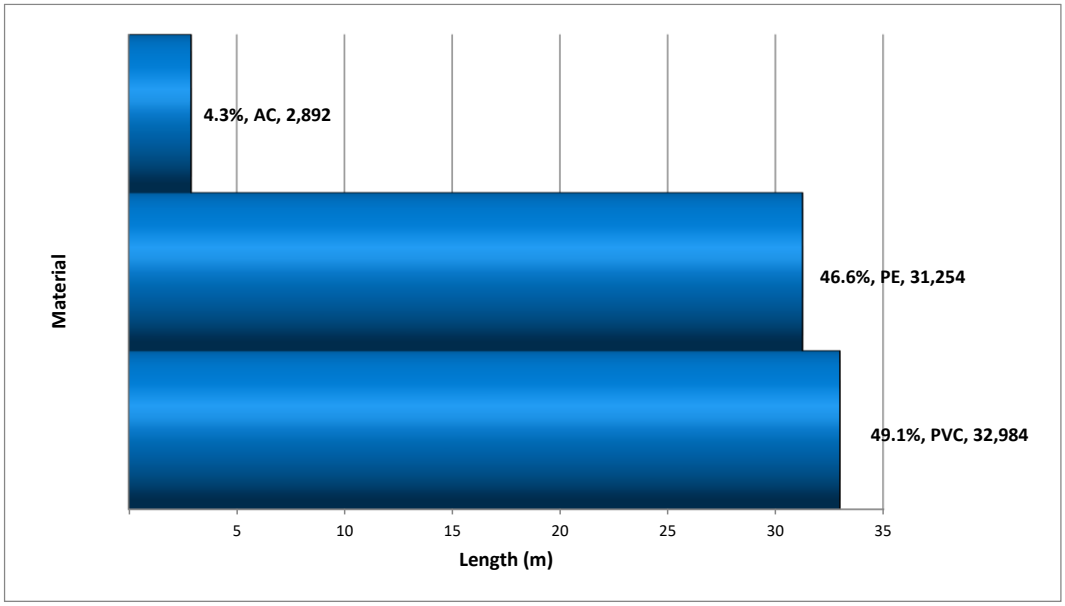
Appendix Figure 60: Scheme Components



Appendix Figure 61: Water Mains Diameter Range

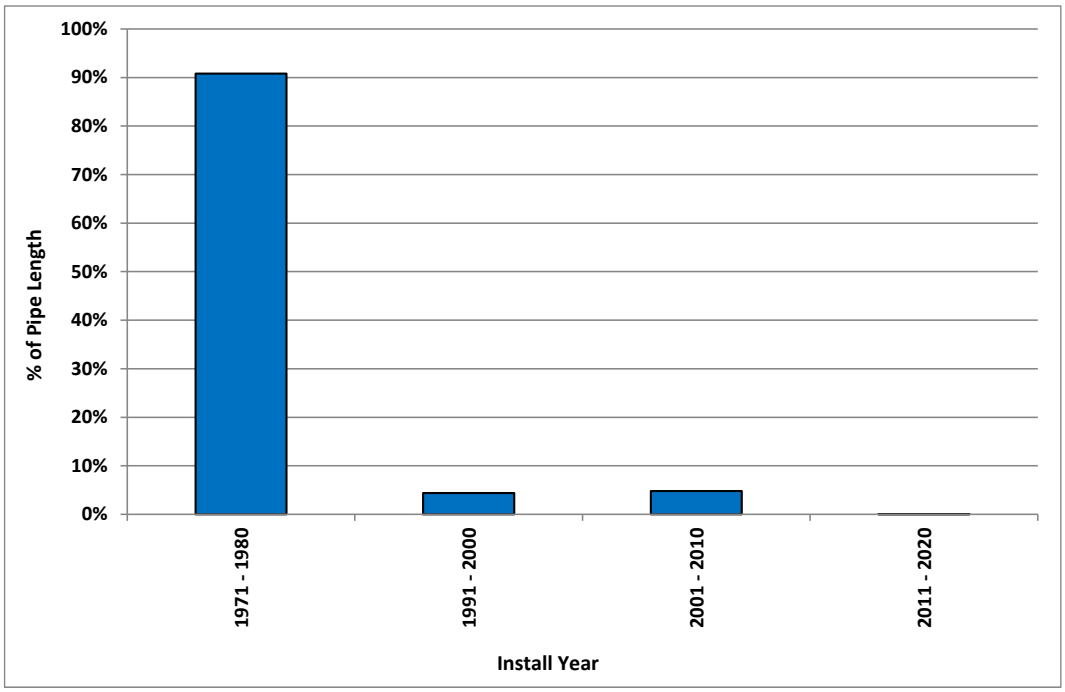


Appendix Figure 62: Water Mains Material Length

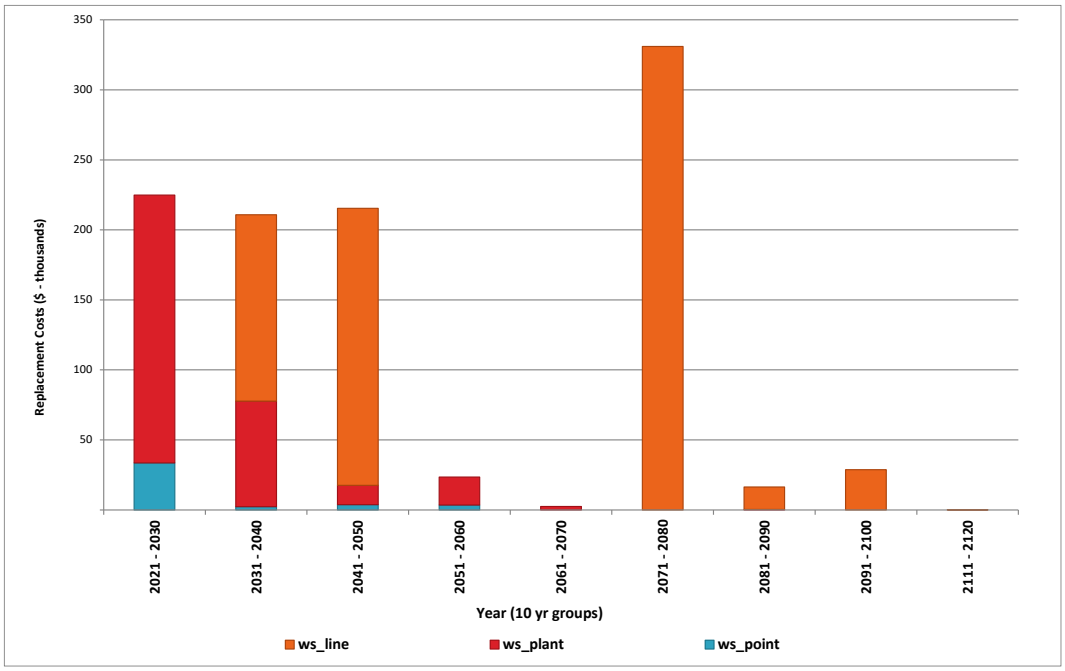


Approximately 91% of the Waihaorunga water supply scheme reticulation were installed during 1977 and are 43 years old. The remaining 9% have been installed since 1991 and are aged between 1-29 years. The reticulation consists mainly of PVC (49%) and PE (47%).

Appendix Figure 63: Water Mains Install Year (10 Year Groups)

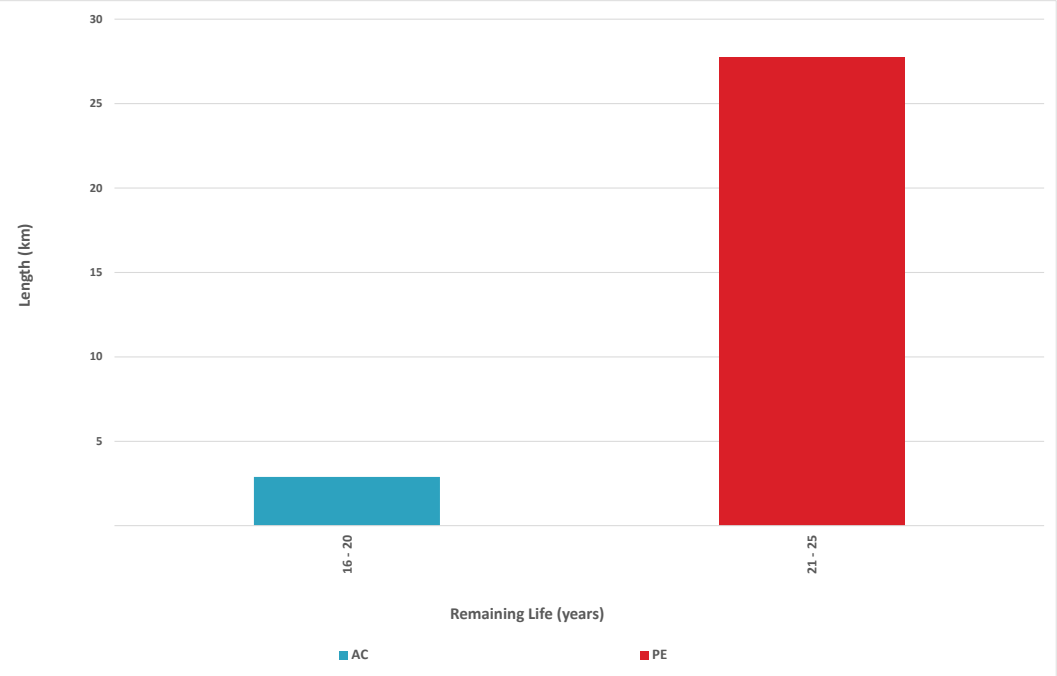


Appendix Figure 64: Remaining Life of all Assets – Long Term

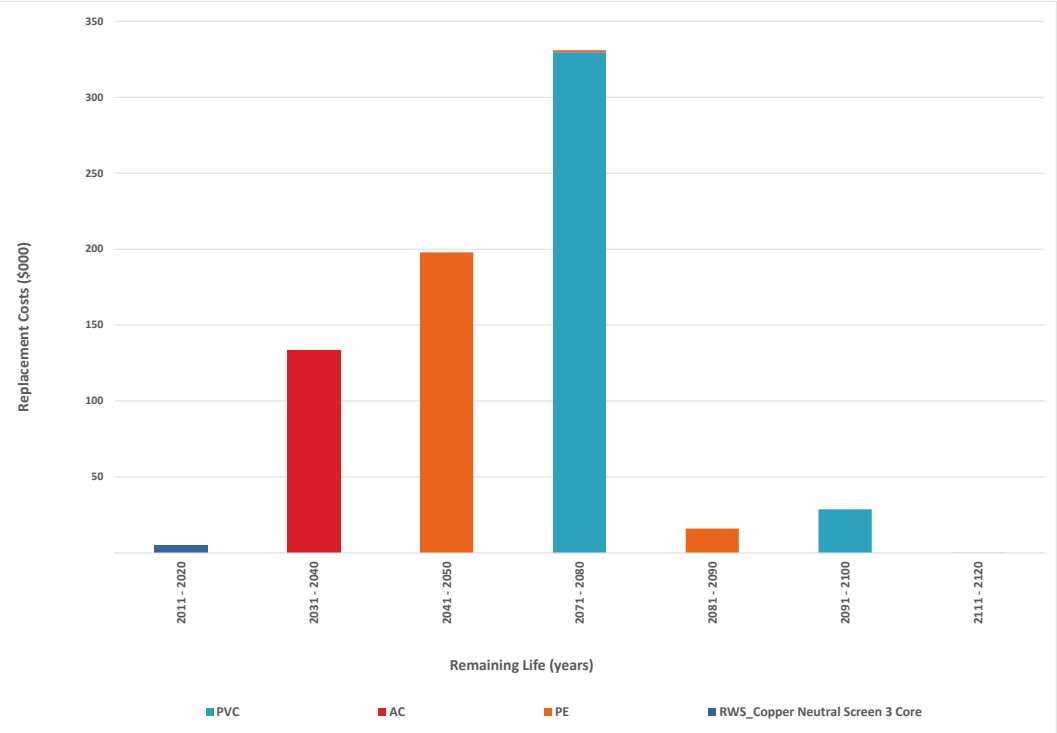


At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined by determining evidence-based useful lives using a combination of condition and performance data.

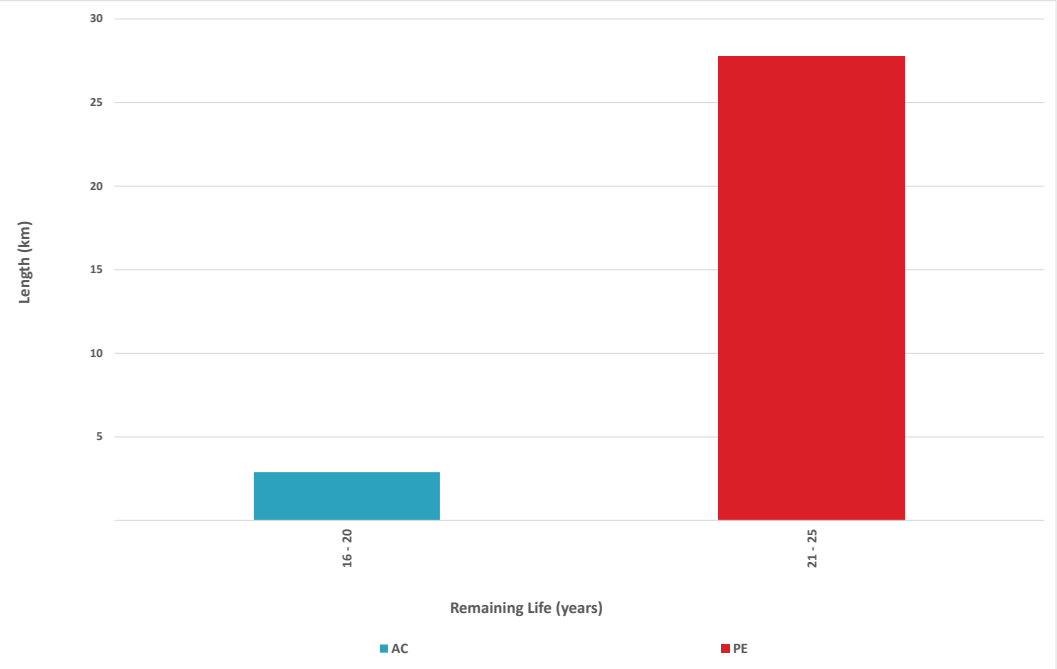
Appendix Figure 65: Water Mains Replacement (Length) – Long Term



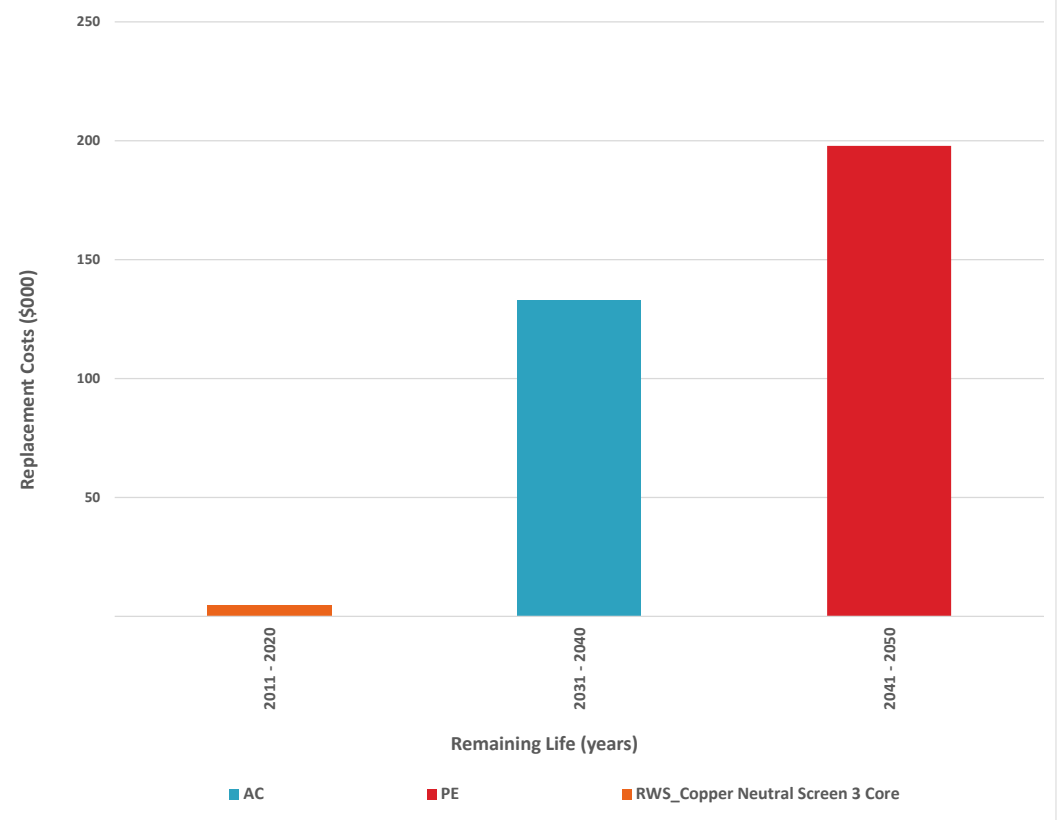
Appendix Figure 66: Water Main Replacement Value – Long Term



Appendix Figure 67: Water Main Replacement (Length) - 1 to 30 Years



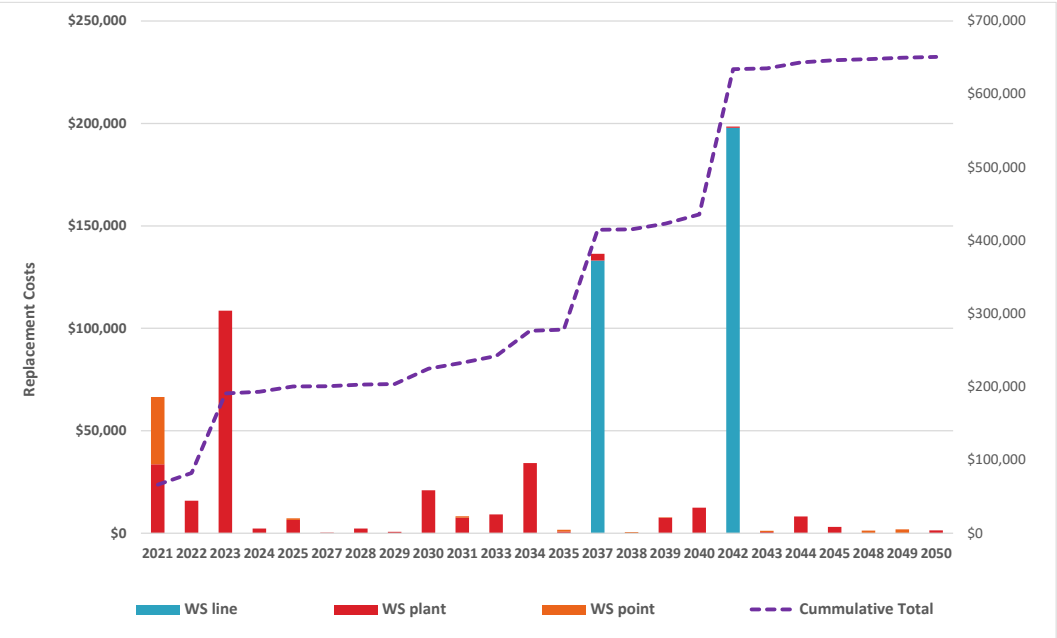
Appendix Figure 68: Water Main Replacement Value 1 to 30 Years



Appendix Table 8: Waihaorunga Plant Replacement Value 1 to 30 Years

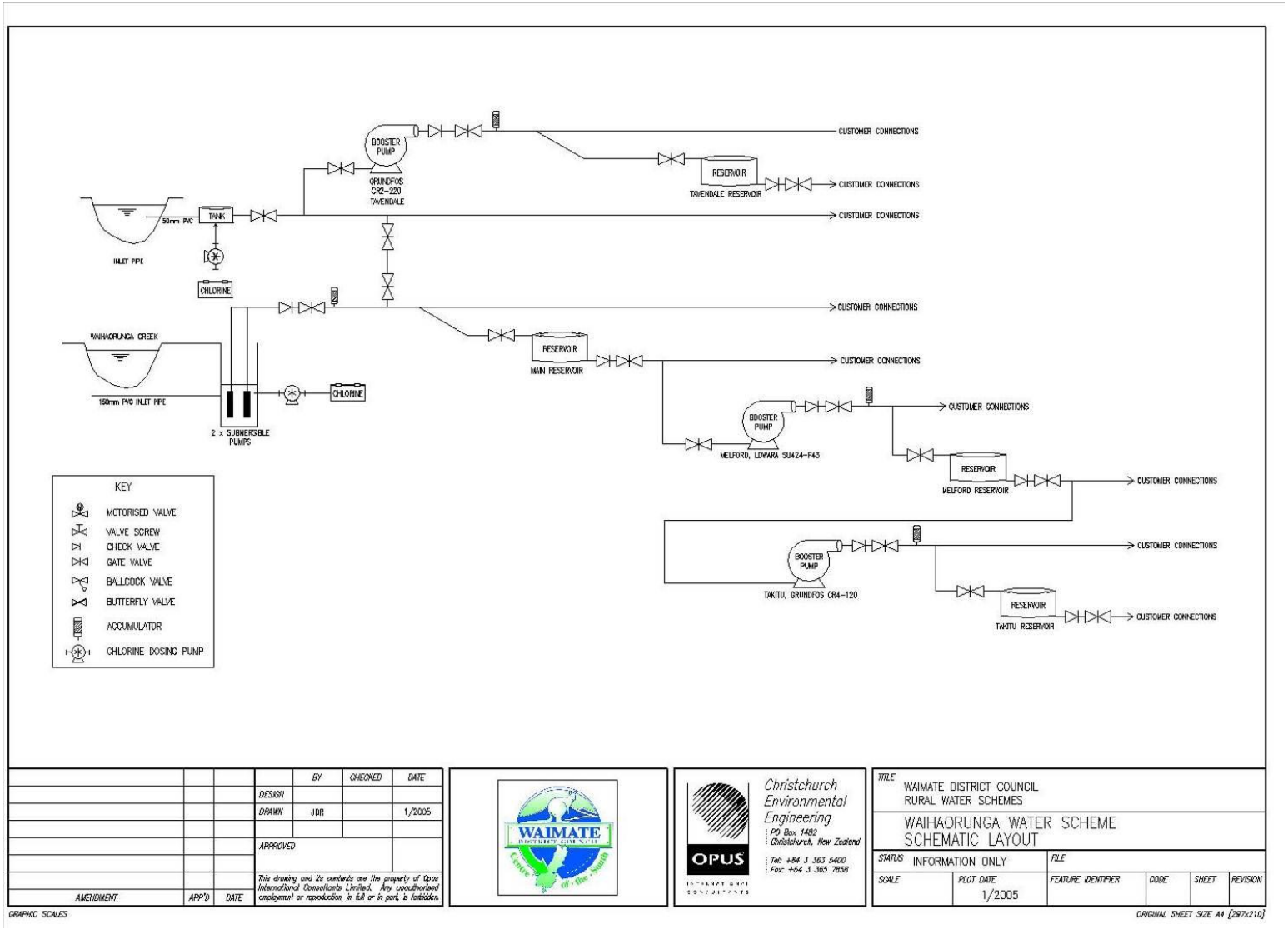
Asset Group	Remaining Useful Life (5 year groups)						
AssetType	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Abstraction	3,205						3,205
Building	23,956				2,995		26,951
Control	7,519	5,330	7,631				20,480
Digital I/O	2,110						2,110
Distribution	10,023			3,341			13,364
Measurement	2,427	717	10,618		4,587	189	18,538
Pipe	4039		4015				8,054
Reservoir	41,113						41,113
SCADA			8,101				8,101
Screening					613		613
Security	1,804						1,804
Sodium Hypochlorite	3,357	2,345	10,089	3,890			19,681
Submersible	12,419		11,240	13,130			36,789
Surface	13,072	15,230		2,949			31,251
Transmission	26,632						26,632
Valve	8,423	734	264	40	4,281	1,186	14,928
Vessel	6,850						6,850
Grand Total	**166,949**	**24,356**	**51,958**	**23,350**	**12,476**	**1,375**	**280,464**

Appendix Figure 69: 30 Year Replacement programme

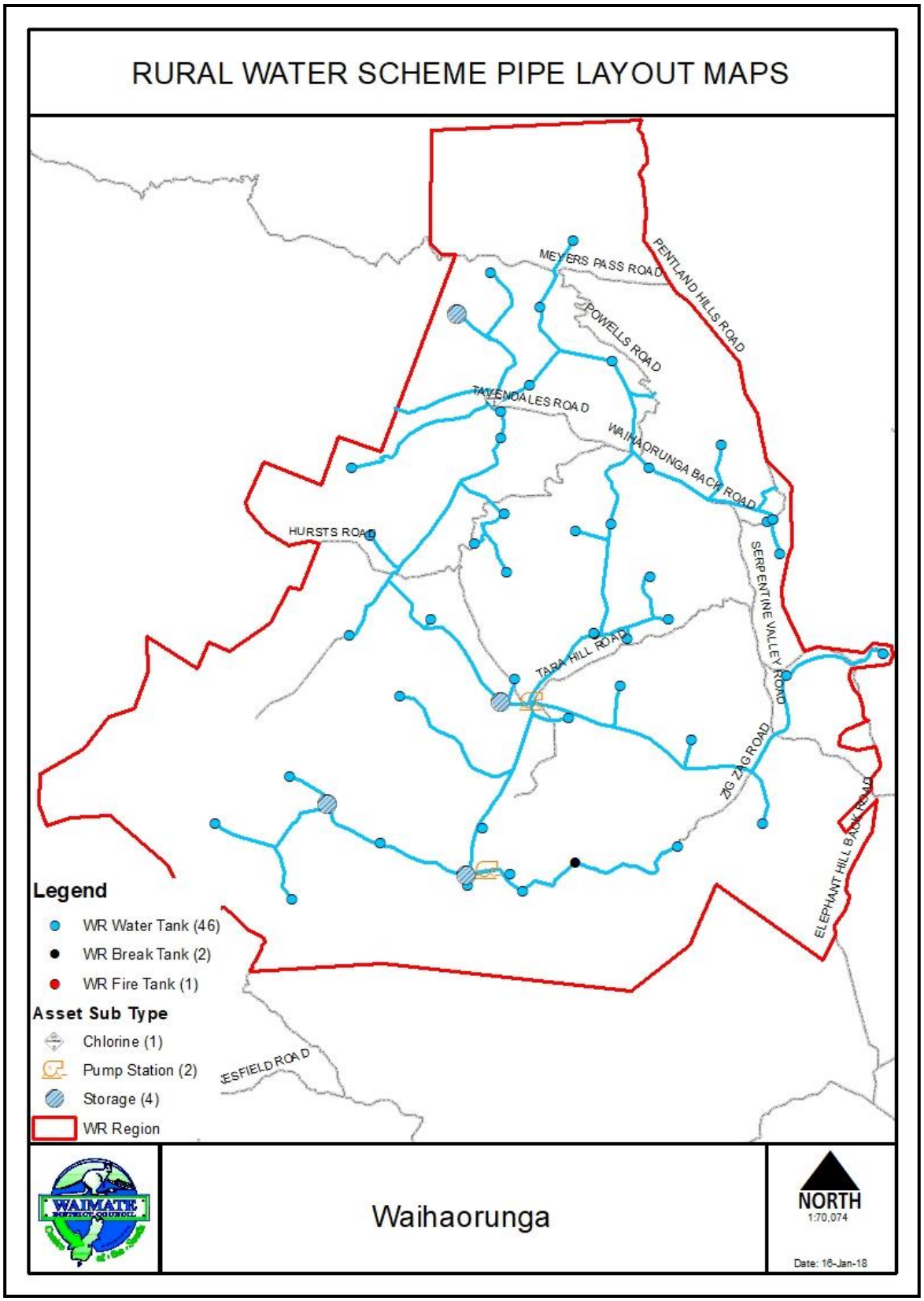


The above figure shows the theoretical replacement programme based on asset expected useful lives.

Appendix Figure 70: Waihaorunga Schematic



Appendix Figure 71: Waihaorunga Scheme Plan



A.7 Waikakahi Water Scheme

Overview

The Waikakahi rural water supply scheme supplies water to 173 connections with a total population of about 360. Of those 173 connections, 57 are in the Waikakahi East area, with a population of about 132. This area is augmented with water from the Lower Waihao rural water supply (WINZ Code: LOW002). The Waimate District Council target rates 121 properties for the supply of water in this scheme. Some scheme consumers have more than one point of supply connection on their rated property. Each point of supply connection is required to have water storage for 96 hours (four days) in case of interruption of the water supply.

The source for the reticulation network is a tributary of the Waitaki River known as the Clear Stream. The intake does not have any protozoal treatment barriers, only pre-treatment roughing filters and chlorine disinfection. Duty/standby pumps deliver chlorinated water to a reservoir 3km away. The reservoir gravity feeds the reticulation network to the west and central part of the scheme. A reservoir that supplies the eastern part of the scheme is supplied via a new rising main from the Lower Waihao Intake via two new booster pumps. This reservoir now receives approximately 180m3 water per day from the Lower Waihao intake.

The approximate length for the reticulation network is 176km.

A large proportion of the water produced for the supply is consumed for the purposes of commercial agriculture. About 136 habitable dwellings have access to the water supply. This equates to 18% human consumption of the sold volume (based on 1500L/day/dwelling).

History

The Waikakahi water supply scheme was established in 1973 and the majority of the scheme reticulation dates from this time. Replacements of the larger diameter PVC pipes were carried out in 1980. A connection to the Lower Waihao scheme was completed in 2005 to supply the Waikakahi East area.

System Description

Source and Catchment:

Water is sourced from an intake in a stream originating on the terrace adjacent to the Waitaki River, at the Stonewall site near Ikawai. The stream is known as Clear Stream and the catchment area includes surrounding farmland and the Waitaki River (1562 Ha approx.).

The land use in the catchment around the Waikakahi Intake is mostly upland pasture, with a small percentage of arable cropping, lowland pasture, and riverbed, The activity in the land catchment is predominately dairy, with approximately 1200 dairy cows in the catchment. There is also a small amount of cropping, and bailage. It is important to note that the Waitaki River is also a part of the catchment, and can influence the intake in peak flood times, making the overall catchment very large.

202 hectares of the catchment is protected under the District Plan “Water Supply Protection Area” for Waikakahi rural water supply. This “Area” is mainly in the Waitaki River bed and is overlapped by the Regional Council “Community Drinking Water Protection Zone” (155.5 hectares), with 63.5 hectares inside the “Protection Area”, and the other 92 hectares of the “Zone” covers the Waitaki

River bed. Inside both the “Protection Area” and “Zone” there is one pre-existing septic tank for a dwelling. Outside the “Protection Area” and “Zone” there are another two known septic tanks for dwellings/buildings in the wider catchment.

In weather events, the tributaries that come off the surrounding farmland and hills can influence Clear Stream. In these conditions, the stream becomes very turbid with debris and organics. With the recent development of farmland to dairying in the catchment, there has been a negative impact on the water quality in the stream. This has led to silt and nutrient loading, which encourages waterweed growth in Clear Stream. A recent Total Organic Carbon (TOC) analyses (May 2017) found 2.1 g/m3 TOC present in the raw water.

The Waitaki River at high flows can also infiltrate and influence Clear Stream, but has less negative impacts on the Clear Stream source.

Natural occurring iron in the clay, in the catchment area does affect Clear Stream’s chemical content in the form of soluble iron. Levels of iron in the raw water are around Guideline Values (GV) for iron. Because of the iron, it has also been identified that in warm conditions, a species of algae will flourish feeding on the iron. This was identified about 2009 and confirmed by ECan.

The overall assessment of the catchment, plus the impact from human and agricultural activities for the existing source site, equates to a 5 Log treatment process requirement to provide wholesome, compliant drinking water to the consumer on the Waikakahi Rural Water Supply.

Abstraction:
The intake comprises a fish screened pipe laid into the stream. Water flows by gravity into the short pipeline and passes through into a roughing filter chamber to remove debris.

Pre-treatment:
The roughing filter consist of a 5.7 cubic meter concrete chamber with two course screens

Transmission:
From the roughing filter chamber, the pre-treated raw water travels 55 metres via a 200mm PVC pipe to a stilling well inside the Waikakahi (Stonewall) Intake treatment plant.

Treatment Plant:
The pre-treated raw water is drawn out of the stilling well by the duty high-lift distribution pump. A gas chlorine solution is dosed into the suction pipe rising out of the stilling well. Chlorine is dosed only when the high-lift distribution pumps are running, and is controlled by a flow switch on the delivery main. When the duty pump is running, chlorine is dosed at a rate controlled by a chlorine analyser at the pump station. At present the chlorine dose is run manually due to the poor raw water quality fouling the chlorine probe.

Because of the iron content in the raw water and the oxidising effect of chlorine, iron precipitate forms during the chlorination process and settles out in the rising main to the reservoir. The rising main is flushed bi-monthly to remove the iron precipitate. It has been observed that the iron precipitate does not appear to go beyond the reservoir.

Due to the algae that feeds on the naturally occurring iron, plus the use of chlorine for disinfection, a disinfection by-products (DBP) for trihalomethanes (THM’s) analyses was done about 2012, and found that DBP levels were negligible and well below MAV. The DBP analyses was redone in July 2017 with the Sum of THM MAV ratios at less than one at 0.065, but the Sum of HAA MAV ratios was 1.5.

The present treatment plant has no protozoal treatment barriers. For the plant to be protozoal compliant under the Drinking Water Standard for New Zealand 2005 (revised 2018), the plant needs log five (5) treatment processes to be in place. Or chose another site with four (4) log treatment processes requirement.

Turbidity monitoring and control has been installed at the Waikakahi Treatment Plant site in 2019. This equipment was installed as a part of an agreement with The Ministry of Health, instead of full upgrades of the treatment plants, to allow for potential changes in legislation and standards (Acceptable Solutions), for rural agriculrual water supplies.

Distribution:

Two high-lift pumps elevate the treated water to the reservoir, which supplies consumers by gravity. Either pump is capable of providing the full flow required by the water supply, and only one pump operates at a time. The onsite SCADA PLC's at the intake and reservoir provide a control function between the two remote units (RTU) to switch pumps on and off as required to fill the reservoir.

The Waikakahi scheme supplies much of the area on the north side of the Waitaki River between the Lower Waihao and Waihaorunga schemes.

A second pumping station, at Claytons Rd, can supply the Waikakahi East area. This pump is no longer in use, as the Waikakahi East area is now supplied from the adjacent Lower Waihao water supply. Two booster pumps, Waikakahi Booster and Dog Kennel Booster stations pump water from the Lower Waihao supply up to the Clayton Reservoir, to supply Waikakahi East. In an emergency the Claytons Rd pump would be able to be used to supply the Waikakahi East area.

Management and Operation:

The scheme is administered at the main council offices in Queen Street, Waimate and operated and managed by the Council's Utilities Business Unit (UBU) based at Michael Street nearby. Five qualified field staff operate and maintain the rural water scheme plant, fixing leaks etc as generally advised by the public. Water samples are sent to MedLab laboratories for bacteriological testing.

The main pump station is linked to WDC's SCADA system, which monitors FAC, pH and the flow from the pump station.

A large proportion of the water produced for the supply is consumed for the purposes of commercial agriculture, and the supply could potentially qualify as a rural agricultural drinking water supply. Waimate District Council had previously considered the option of point of use treatment on the rural supplies, and discounted the option at that time because of cost and maintenance issues.

The option of "point of use treatment" was looked at again with the release of the Rural Agricultural Drinking Water Supply Guidelines (RADWS) in March 2015. Some questions were raised again about actual cost, pre-treatment, maintenance, responsibility issues and liability. Those questions were investigated by exploring successful examples of private "point of entry treatment" supplies under the RADWS in the Waitaki District Council. However, after the Havelock North Stage 1 Enquiry, the issues and risks of such a system make the RADWS not a viable option at that time.

Coucil has lobbied Government to review the current legistlation and standards for Rural Agricultral Water Supplies. Since then the Department of Internal Affairs (DIA) and the new regulator Taumata Arowai have been, and still currently working on an Acceptable Solution option, using point of use (PoE) treatment, which could be used in rural argicultral water supplies.

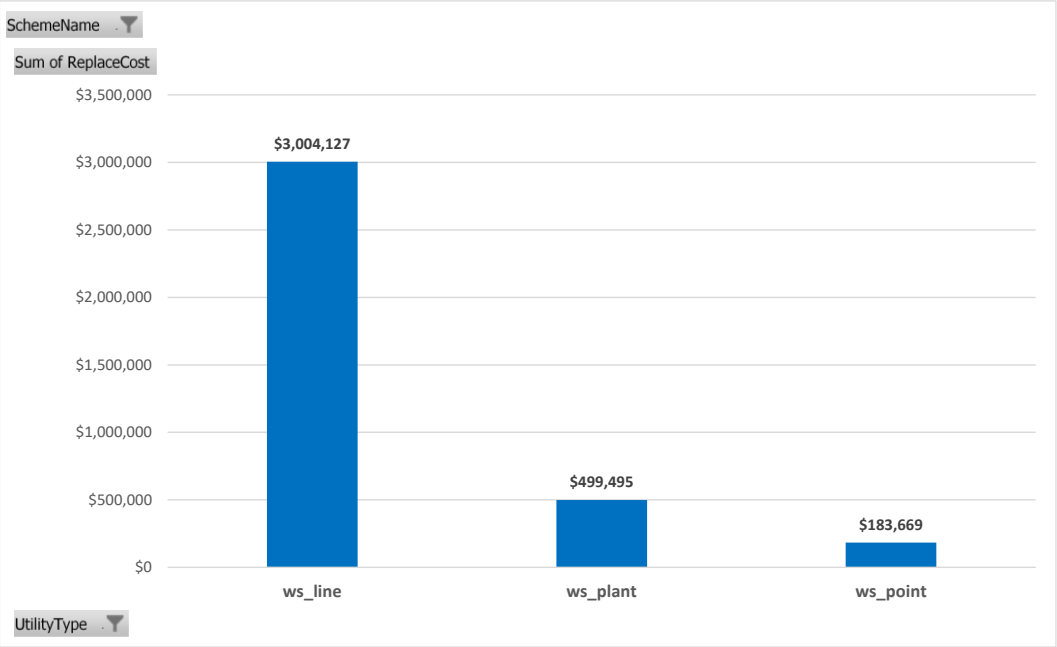
Currently the Waikakahi rural water supply has a "Permanent Boiled Water Notice". The notice was issued with the agreement of the Drinking water Assessor in November 2016. The notification is regularly advertised in local papers, Waimate District Council's website and Facebook page, along with Rural Delivery mail drops. The local water committee also reminds locals on request. In recent times organisations such as the local school and Mobile Kindy have helped advertise the "Permanent Boil Water Notice".

In the last WSP (Public Health Risk Management Plan V 1.0 [PHRMP], December 2009), Meridian Energy were in the process of preparatory work on the North Bank Tunnel project for extra power generation. This project would have affected the Waikakahi Intake (Stonewall) site, and it was expected that Meridian Energy were going to pay for the costs for moving intake and plant. But Since the 2010 earthquakes affecting Christchurch, and other economic factors, the project has now been indefinitely postponed. This means the option of a new source of water, and upgraded plant been put back to the reviewing and planning phase.

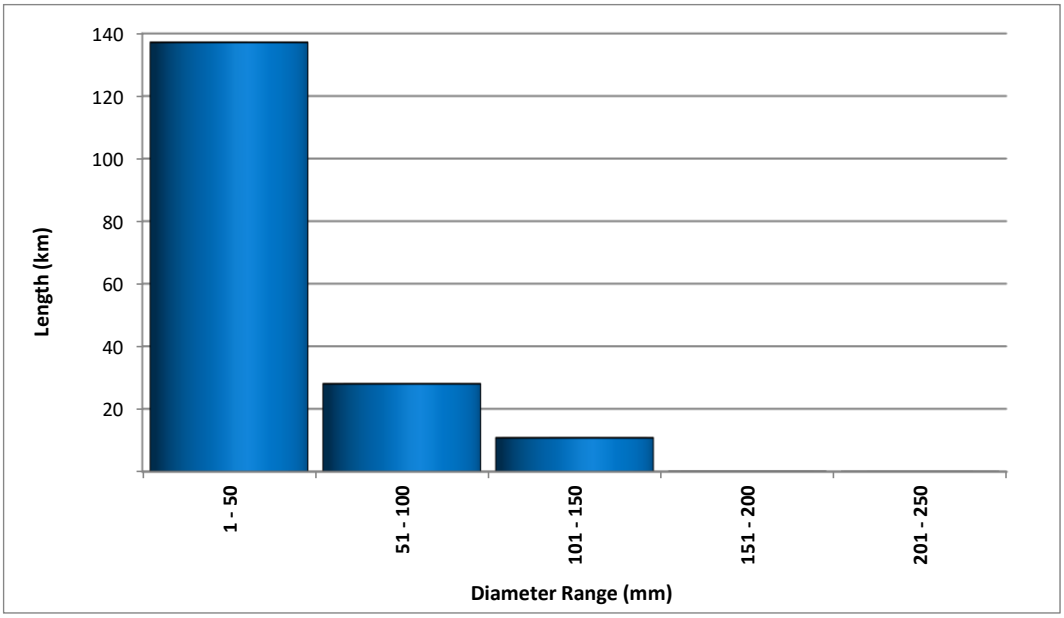
System Information

System Information – Waikakahi			
Connections	**177**	**Treated Water Storage (Reservoir)**	
- Metered unrestricted	-	**Hakataramea Ikawai Highway**	
- Metered restricted	177	Built (yr)	1973
- Unmetered Residential	-	Capacity	450m^3
		Material	
Water Sources	(Consent volumes)	**Treatment**	
Waitaki River	1,469m^3/day	Chlorine	
Resource Consent	**Expiry date**	**To**	
CRC96254.1	29/05/2031	Take water	
CRC970320	29/05/2031	Maintain a weir	
CRC970321	29/05/2031	Dam water	
Replacement Cost		**Reticulation length**	
Total Scheme	$3.7m	176km	

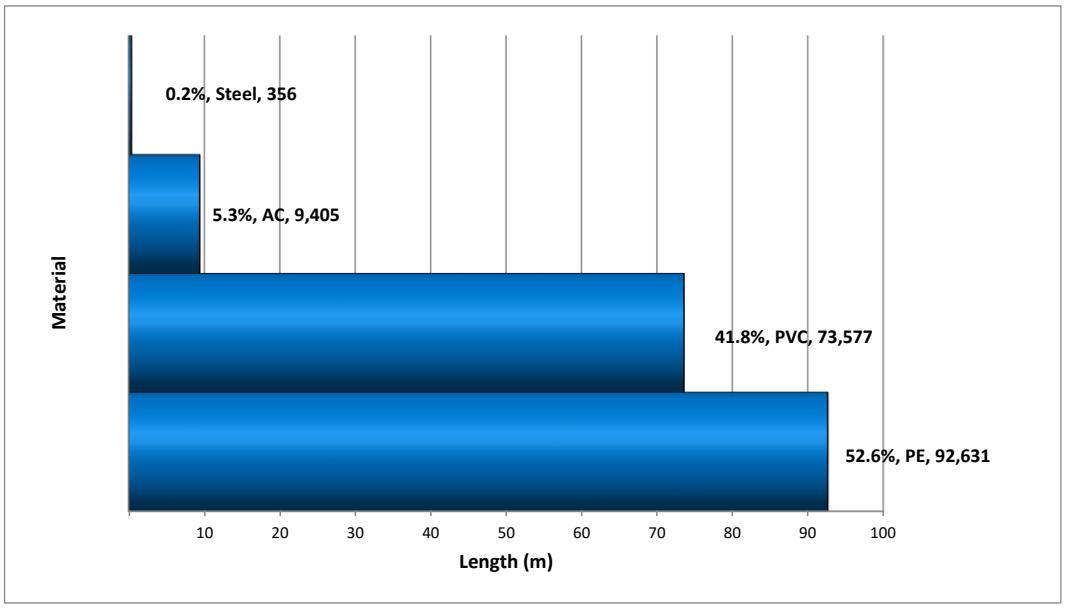
Appendix Figure 72: Scheme Components



Appendix Figure 73: Water Mains Diameter Range

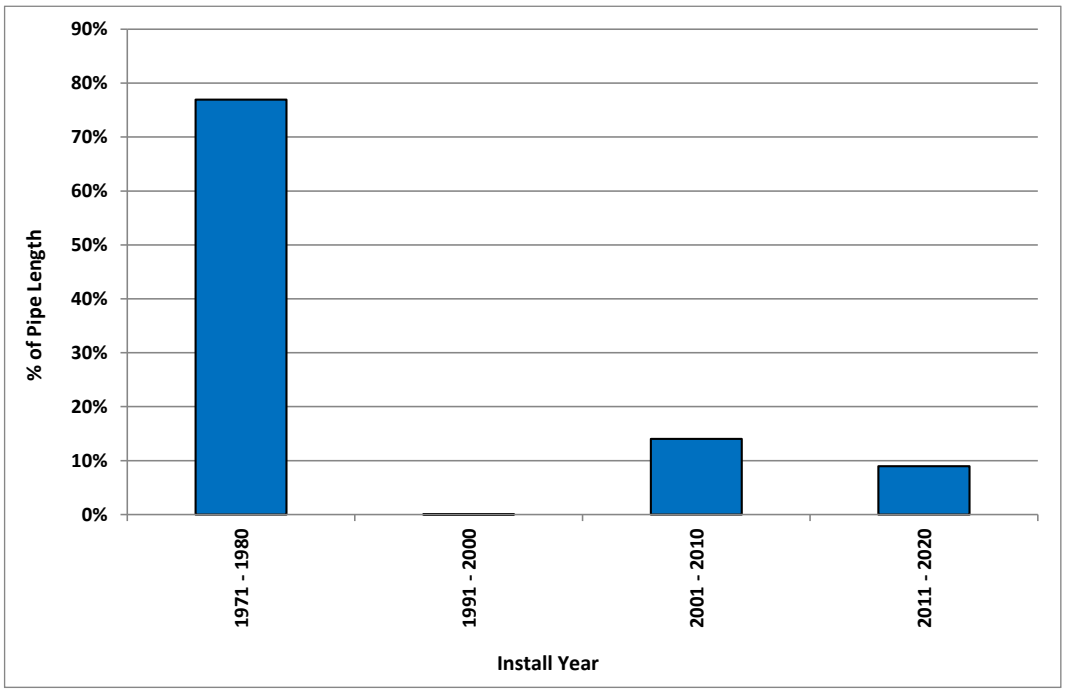


Appendix Figure 74: Water Mains Material Length

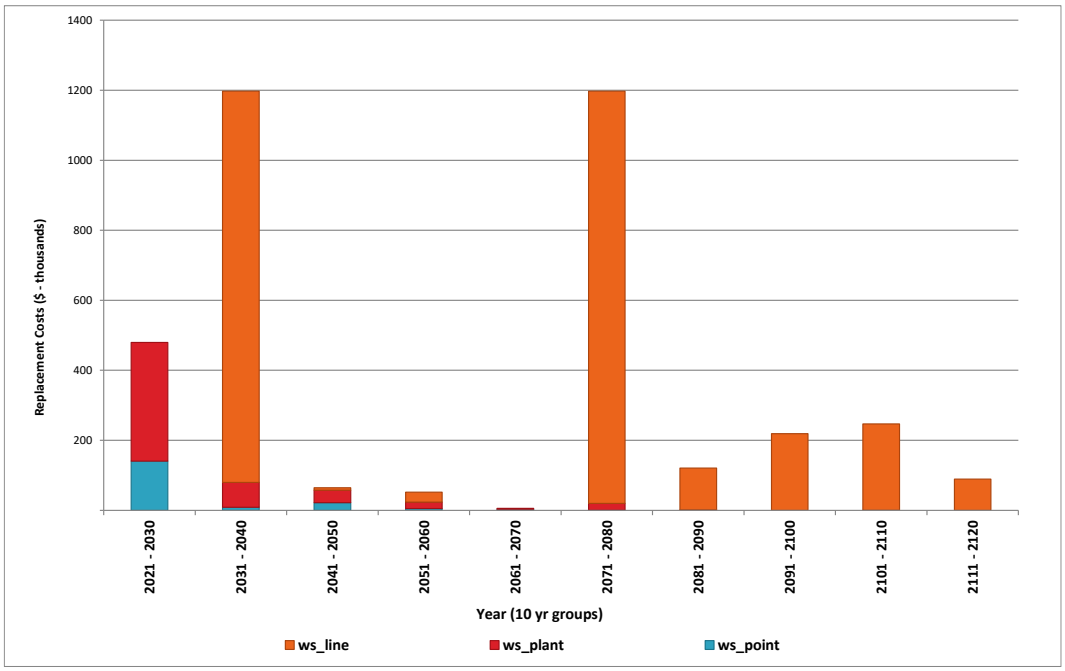


Approximately 78% of the Waikakahi water supply scheme reticulation were installed during 1973 and are 47 years old. The remaining 22% have been installed since 2001 and are aged between 1-19 years. The reticulation consists mainly of PE (53%) and PVC (42%).

Appendix Figure 75: Water Mains Install Year (10 Year Groups)

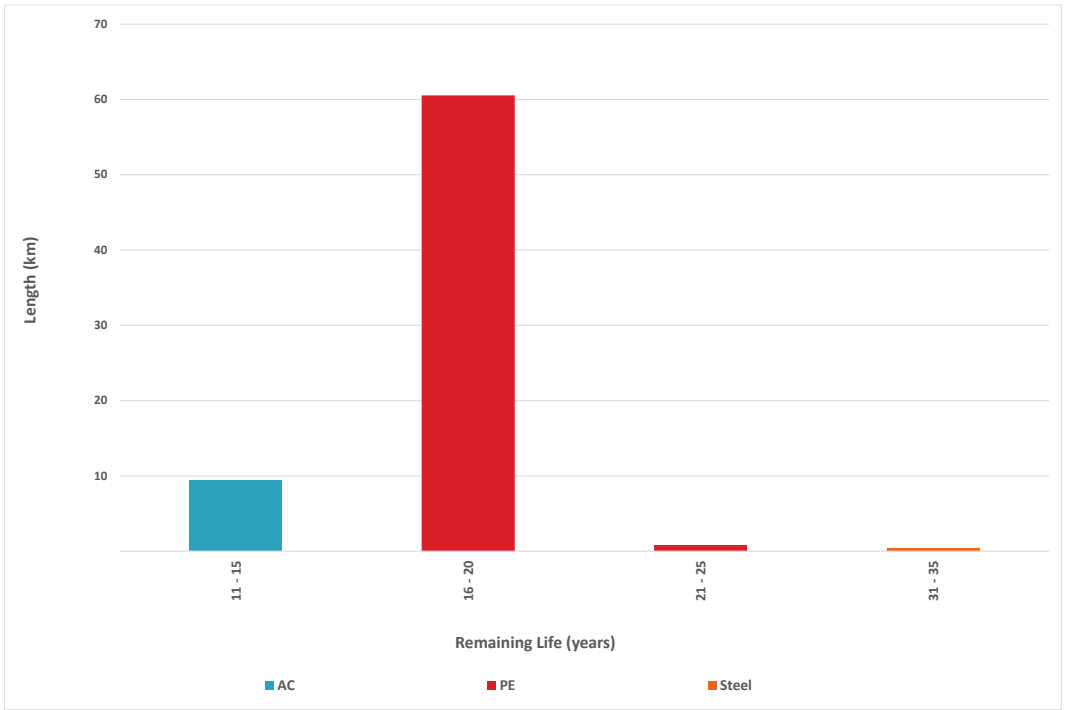


Appendix Figure 76: Remaining Life of all Assets – Long Term

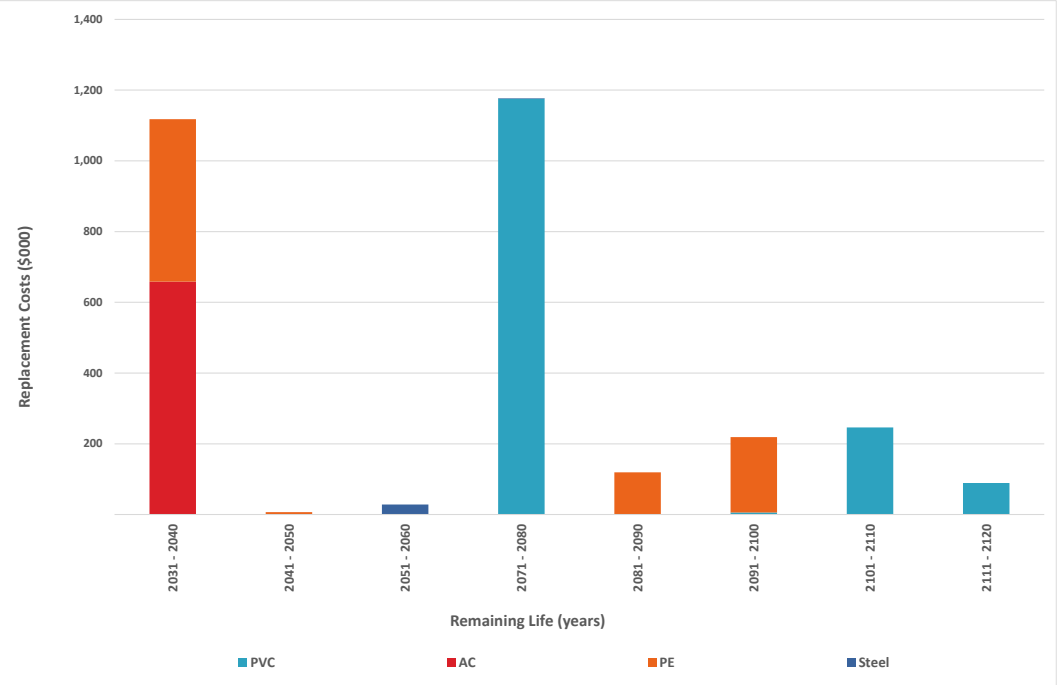


At present asset useful lives are based primarily on book values with some adjustment for known risk factors. These will be refined by determining evidence-based useful lives using a combination of condition and performance data.

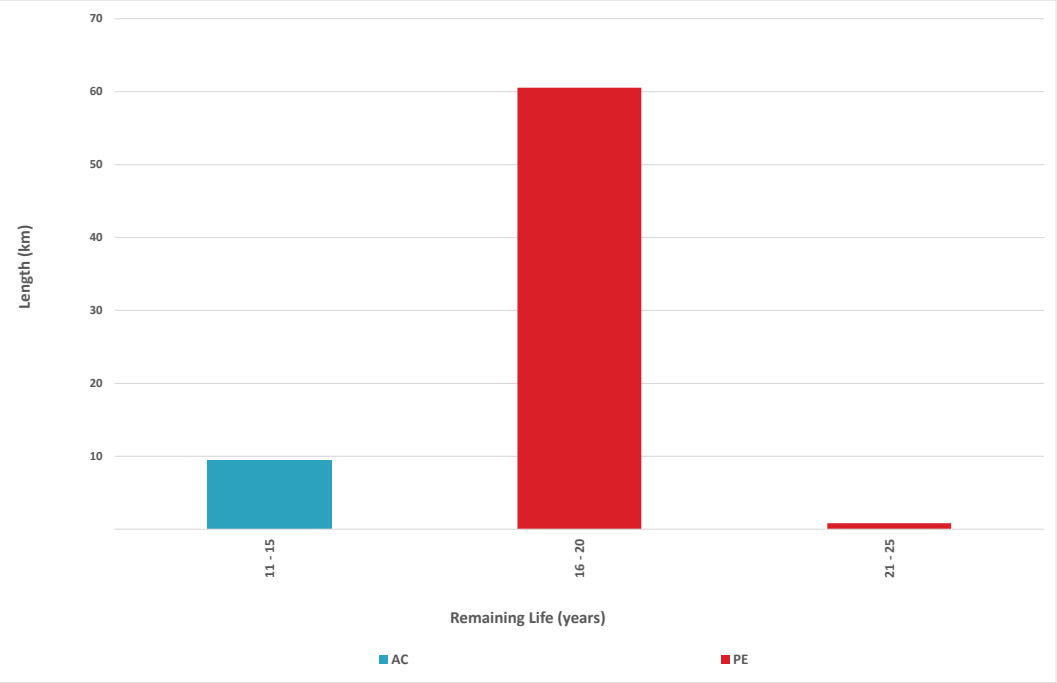
Appendix Figure 77: Water Mains Replacement (Length) – Long Term



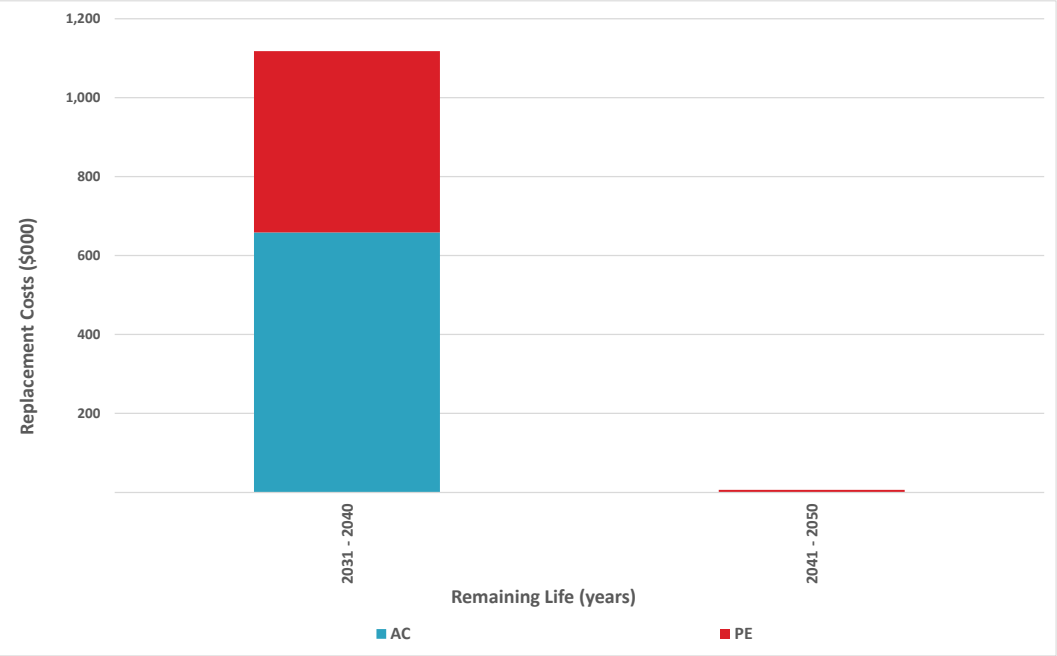
Appendix Figure 78: Water Main Replacement Value – Long Term



Appendix Figure 79: Water Main Replacement (Length) - 1 to 30 Years



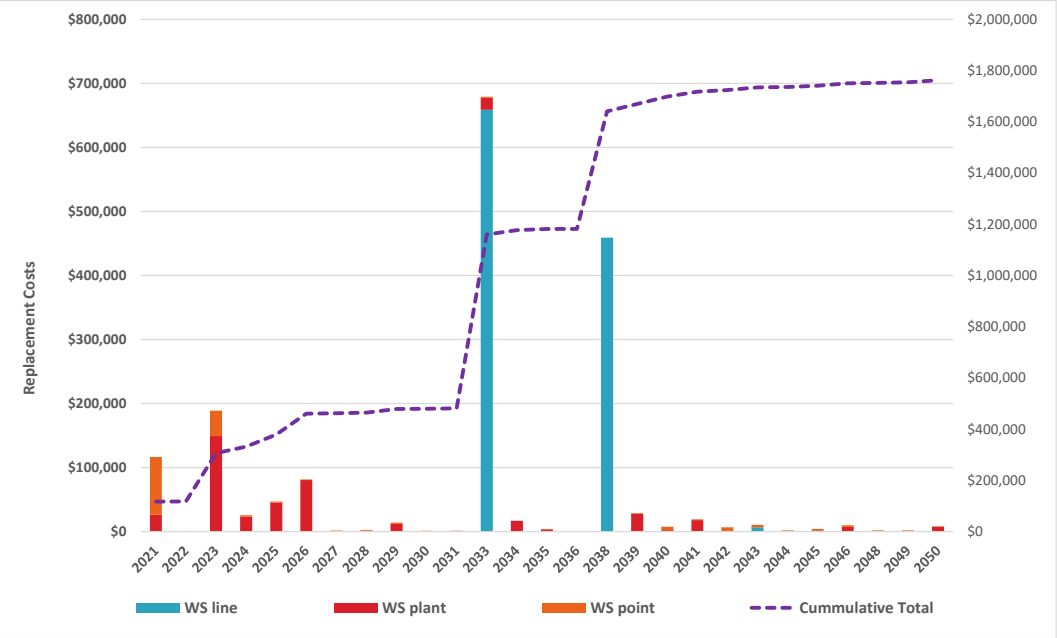
Appendix Figure 80: Water Main Replacement Value 1 to 30 Years



Appendix Table 9: Waikakahi Plant Replacement Value 1 to 30 Years

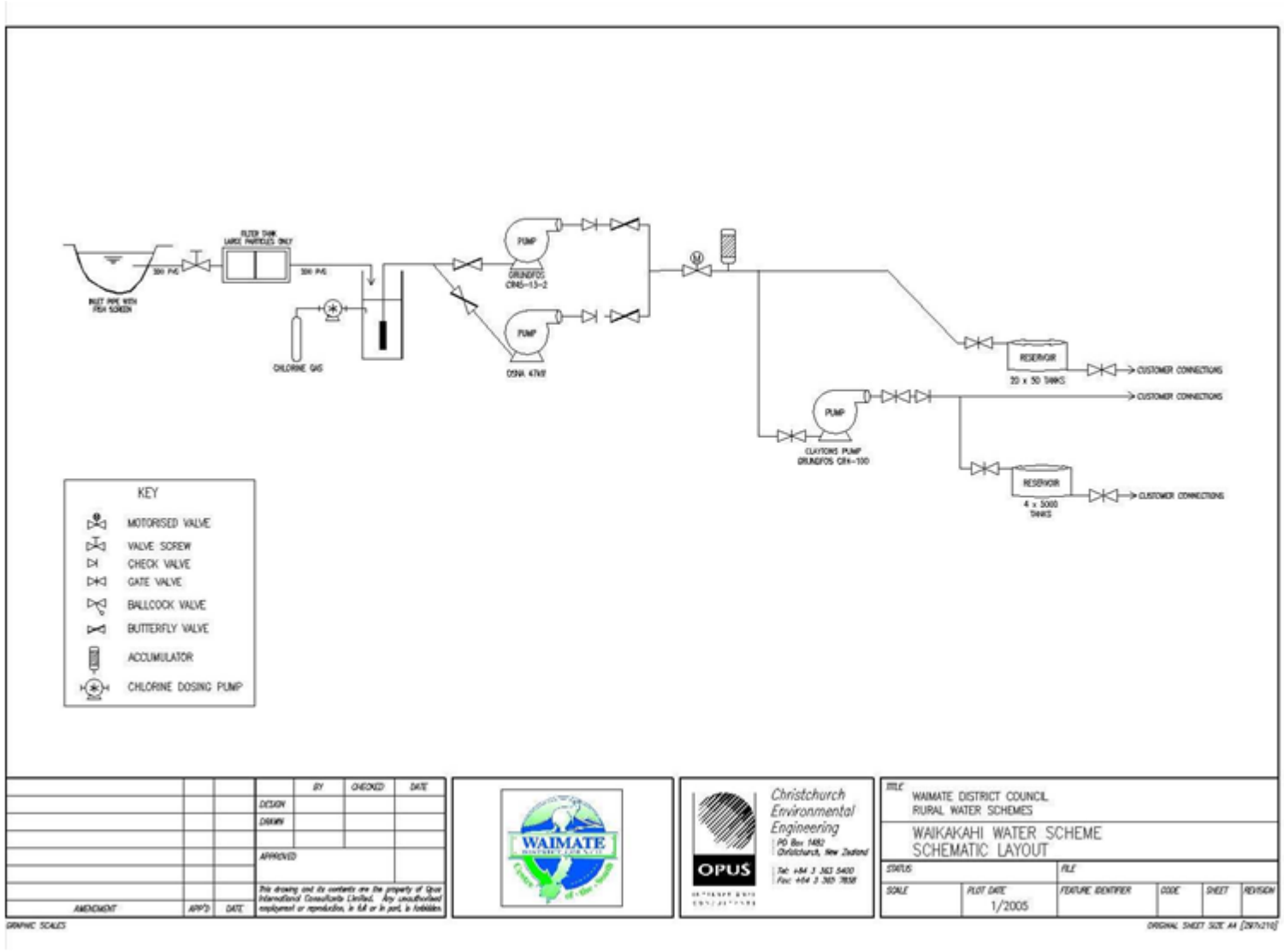
Asset Group	Remaining Useful Life (5 year groups)						
AssetType	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	Grand Total
Abstraction	5,701			1,329		6,902	13,932
Box		697				663	1,360
Building	50,846						50,846
Chlorine	16,406	10,843					27,249
Control	4,769	54,586	1,161				60,516
Digital I/O	1,958						1,958
Distribution	3,341				17,406	4,199	24,946
Measurement	6,105	4,346	4,524				14,975
Pipe	2,468		9,952		60		12,480
Reservoir	80,829		3,388				84,217
SCADA	8,164	266	12,543				20,973
Security	2,331						2,331
Solar	1,158	2,599	613				4,370
Submersible				660			660
Surface	45,954	21,353	8,395	27,419			103,121
Transmission	2037						2,037
Valve	11,177	167	32	844	2,371	4,049	18,640
Vessel	1,178						1,178
Grand Total	**244,423**	**94,857**	**40,608**	**30,252**	**19,837**	**15,813**	**445,790**

Appendix Figure 81: 30 Year Replacement Programme

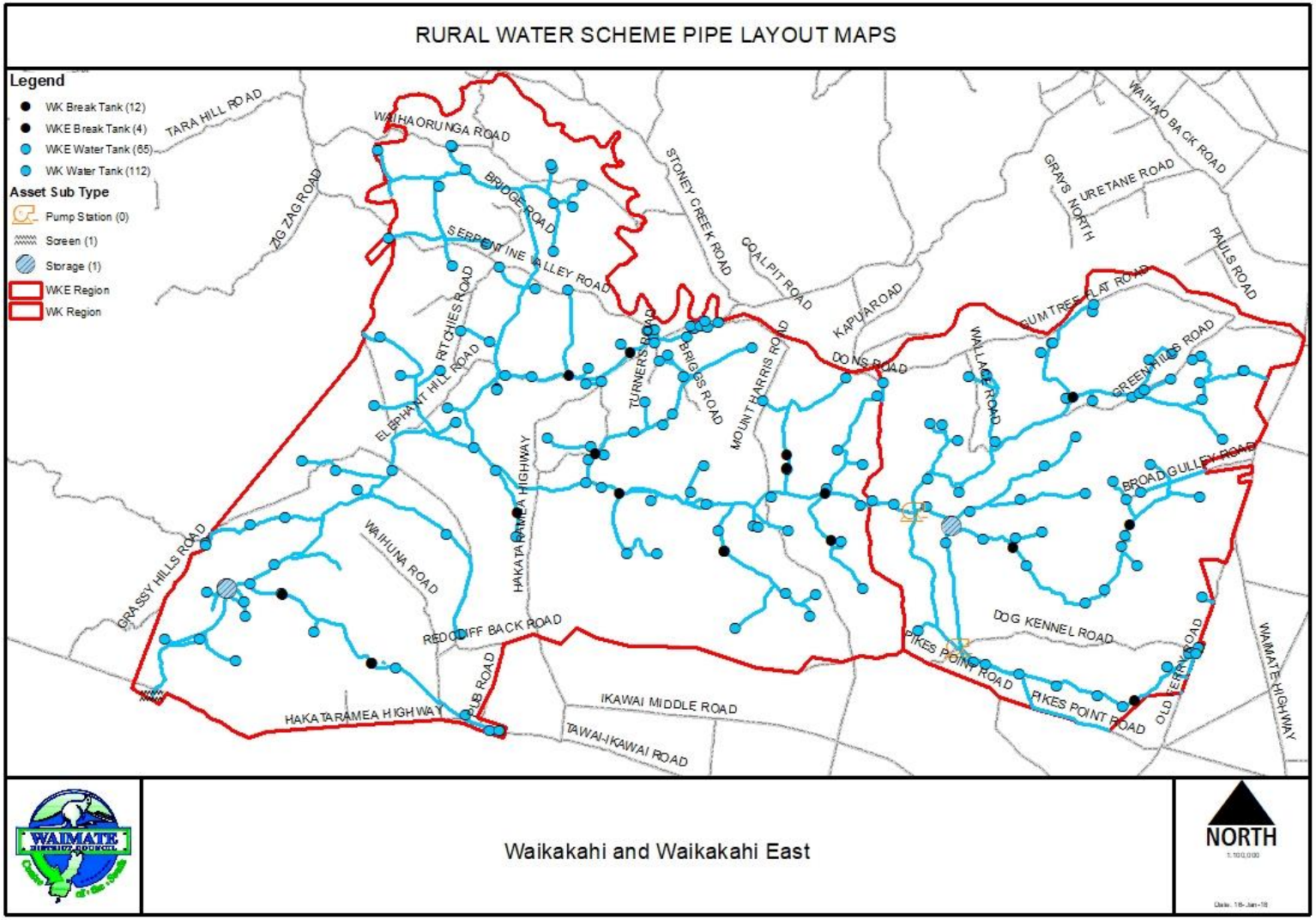


The above figure shows the theoretical replacement programme based on asset expected useful lives.

Appendix Figure 82: Waikakahi Schematic



Appendix Figure 83: Waikakahi Scheme Plan



Appendix B WSP: Minor Projects and Operational Improvements

The following details the Minor Projects and Operational Improvements that are shown in the current and submitted Waimate District rural and urban Water Safety Plans.

Current and submitted Water Safety Plans (WSP).

- Cannington-Motukaika Water Supply Water Safety Plan *Version 2.1 January 2019 (approved)*
- Hook-Waituna Water Supply Water Safety Plan *Version 3.0 November 2020 (submitted)*
- Lower Waihao Water Supply Water Safety Plan *Version 3.0 November 2020 (submitted)*
- Otaio-Makikihi Water Supply Water Safety Plan *Version 3.0 (under development)*
- Waihaorunga Water Supply Water Safety Plan *Version 2.2 December 2019 (approved)*
- Waikakahi Water Supply Water Safety Plan *Version 2.1 December 2019 (approved)*
- Waimate Water Supply Water Safety Plan *Version 3.0 January 2019 (approved)*

Appendix Table 10: Scheme Improvement Schedule - Minor Projects and Operational Improvements

Cannington-Motukaika Rural Water Supply Improvement Schedule *Cannington-Motukaika Water Supply Water Safety Plan Version 2.1 January 2019 (approved)*					**Part II: Minor Projects and Operational Improvements**		
Priority	**Risk Level**	**Water Supply Area**	**Reference to Risk Table**	**Details of Proposed Works**	**Person Responsible**	**Expected Cost**	**Intended date of Completion**
1	Extreme	Source	S1.1	Ongoing liaison with landowners in the water supply catchment to raise/maintain awareness of catchment protection. Encourage best practice agricultural activities and riparian management.	WWM	Staff time	Annual Ongoing
1	Extreme	Distribution	D2.1, D2.2, D2.3	Develop and implement lifecycle management plan for pipe maintenance and renewals to minimise breakages and potential for contamination and/or loss of supply.	WWM	$5000 + staff time	2020/21
1	Extreme	Treatment	P11	Implement and use Assetfinda (Asset Management System [AMS]) for programming for WSP reviews, manuals and procedures.	WWM	Staff time	2018/19
2	High	Treatment	P7.1	Install chlorine equipment monitoring device with cellular phone link to monitor chlorine dosing.	WWM	$500 + Staff time	2017/18
2	High	Distribution	D2.2, D2.3	Undertake a criticality analysis of the network to assist renewals planning.	WWM	Staff time	2015/18 ***In process***
2	High	Distribution	D2.2, D2.3	Undertake condition assessment of AC mains.	WWM	$2000 + staff time	2015/18 ***In process***
2	High	Distribution	D2.1, D2.2, D2.3	Undertake a reservoir condition assessment and plan maintenance/replacement as appropriate.	WWM & UTL	Staff time	2020/21
2	High	Distribution	D2.2, D2.3	Internal audit of flushing points.	WWM & UTL	Staff time	2020/21
2	High	Pre-Treatment	P4.1	Cyanobacteria Monitoring training. Create a Cyanobacteria management plan to be used in an event of a bloom.	WWM	Operational + staff time	2018/21
2	High	Treatment	P7.1	Monitor raw water pH at plant and log	UTL	Staff time	2017/18
3	Moderate	Other	G1	Prepare Operation and Maintenance Manual including routine operation procedures, preventative maintenance task, inspections, monitoring, record keeping, and instrument calibration.	WWM	Staff time	2020/21
3	Moderate	Other	G1	Implement and use Assetfinda (Asset Management System [AMS]) for programming and monitoring regular maintenance and inspection/ monitoring tasks	WWM	Staff time	2017/18 & onwards

Cannington-Motukaika Rural Water Supply Improvement Schedule *Cannington-Motukaika Water Supply Water Safety Plan Version 2.1 January 2019 (approved)*				**Part II: Minor Projects and Operational Improvements**			
Priority	**Risk Level**	**Water Supply Area**	**Reference to Risk Table**	**Details of Proposed Works**	**Person Responsible**	**Expected Cost**	**Intended date of Completion**
3	Moderate	Other	G1	Ensure all plant records – including manuals, drawings, procedure instructions and emergency response plan are available at the plant.	WWM	Staff time	2020/21
3	Moderate	Other	P11	Formalise hygiene procedures for maintenance works. Implement refresher training for hygiene and disinfection procedures	UTL	Staff time	2018/19
3	Moderate	Distribution	D1	Audit reservoir and break tank roof drainage and security. Investigate option of drainage preventable, lockable lids for reservoirs/break tanks.	WWM & UTL	Staff time	2018/19
3	Moderate	Distribution	D2.3	Internal audit of Cannington Motukaika water supply of what areas that need a cleaning programme, e.g. scouring, pigging or flushing for low flow dead end areas.	WWM & UTL	Staff time	2019/20
3	Moderate	Treatment, Distribution	P11, D1, D2.3	Formalise hygiene procedures for maintenance works. Implement refresher training for hygiene and disinfection procedures.	WWM & UTL	Staff time	2018/19
4	Low	Abstraction	P1.1	Contact Department of Conservation to improve signage on walking track to keep walkers on the main track and away from intake.	WWM	Staff time	2018/19
4	Low	Source, Treatment, Distribution	S1.2, P7.1, D2.1, D2.3	Review Priority 2a, 2b and 2c Determinands, which will include heavy metals and plumbosolvency.	WWM	Operational + staff time	2018/19
4	Low	Treatment, Distribution	P1.1, P.2, D1	Promote 96 hour (4 days) point of supply storage policy.	WWM	Staff time	2017/18 & onwards
4	Low	Treatment, Distribution	P7.1, P11, D1	Review generator use, transport and procedures over all the schemes. Create register of generator hire companies.	WWM & UTL	Staff time	2018/19
4	Low	Distribution	D2.4	Backflow Register	UTL	Staff time	2018/19
4	Low	Treatment	P11	Make use of shared digital resources for recording information i.e. pump hours, events, maintenance, etc., via IPads/tablets, Sharepoint.	WWM	$10,000 + Operational + staff time	2018/19 & onwards
4	Low	Treatment, Distribution	D2.2	Telemetry (SCADA) monitoring and control for Pratts.	WWM	$16,000	2021/22
4	Low	Treatment, Distribution	P10.2, D2.2	Investigate pump life and reconditioning programme and establish.	WWM & UTL	Staff time	2018/19

Hook Waituna Improvement Schedule Part II: Minor Projects and Operational Improvements
Hook-Waituna Water Supply Water Safety Plan Version 3.0 November 2020 (submitted)

Priority	Risk Level	Water Supply Area	Reference to Risk Table	Details of Proposed Works	Person Responsible	Expected Cost	Intended date of Completion
1	Extreme	Source	S1.1	Ongoing liaison with landowners in the water supply catchment to raise/maintain awareness of catchment protection. Encourage best practice agricultural activities and riparian management.	WWM	Staff time	Ongoing
2	High	Distribution		Undertake condition assessment of AC mains.	WWM	$4000 + staff time	2015/18 Ongoing annually as required
3	Moderate	Other	G1	Prepare Operation and Maintenance Manual including routine operation procedures, preventative maintenance task, inspections, monitoring, record keeping, and instrument calibration.	WWM	Staff time	2021/22 Completed but plant does not fully meet compliance. **Future upgrade still required to make plant compliant**
3	Moderate	Other	G1	Implement and use Asset Management System (AMS) for programming and monitoring regular maintenance and inspection/monitoring tasks.	WWM	Staff time	2015/16 & onwards **In process but to be improved**
3	Moderate	Other	G1	Ensure all plant records – including manuals, drawings, procedure instructions and emergency response plan are available at the plant.	WWM	Staff time	2022/23 Completed but need to align with new plant

Lower Waihao Rural Water Supply Improvement Schedule *Lower Waihao Water Supply Water Safety Plan Version 3.0 November 2020 (submitted)*					**Part II: Minor Projects and Operational Improvements**		
Priority	**Risk Level**	**Water Supply Area**	**Reference to Risk Table**	**Details of Proposed Works**	**Person Responsible**	**Expected Cost**	**Intended date of Completion**
1	Extreme	Source	S1.1	Ongoing liaison with landowners in the water supply catchment to raise/maintain awareness of catchment protection. Encourage best practice agricultural activities and riparian management.	WWM	Staff time	Ongoing
1	Moderate	Other	G1	Prepare Operation and Maintenance Manual including routine operation procedures, preventative maintenance task, inspections, monitoring, record keeping, and instrument calibration.	WWM	Staff time	2022/23
1	Moderate	Other	G1	Ensure all plant records – including manuals, drawings, procedure instructions and emergency response plan are available at the plant.	WWM	Staff time	2022/23 **Completed** but need to align with new plant

Otaio Makikihi Rural Water Supply Improvement Schedule *Otaio-Makikihi Water Supply Water Safety Plan Version 3.0 (under development)*				**Part II: Minor Projects and Operational Improvement**			
1	Extreme	Source & Source Abstraction	S1.1	Ongoing liaison with landowners in the water supply catchment to raise/maintain awareness of catchment protection. Encourage best practice agricultural activities and riparian management.	WWM	Staff time	Ongoing
2	High	Distribution System	C55	Undertake condition assessment of AC mains. N.B. Assessment are done as required and ongoing i.e. samples taken from pipe failure events.	WWM	$2000 + staff time	2018/21 ***In process***
4	Low	General Elements	C58	Seek DWA review and approval of DWSNZ monitoring programme.	WWM	Staff time	Ongoing Annually
3	Moderate	General Elements	C59	Prepare Operation and Maintenance Manual including routine operation procedures, preventative maintenance task, inspections, monitoring, record keeping, and instrument calibration.	WWM	Staff time	Ongoing
3	Moderate	General Elements	C59	Implement and use Asset Management System (AMS) for programming and monitoring regular maintenance and inspection/monitoring tasks.	WWM	$2000 + staff time	Ongoing

Otaio Makikihi Rural Water Supply Improvement Schedule **Part II: Minor Projects and Operational Improvement** *Otaio-Makikihi Water Supply Water Safety Plan Version 3.0 (under development)*							
3	Moderate	General Elements	C59	Ensure all plant records – including manuals, drawings, procedure instructions and emergency response plan are available at the plant.	WWM	Staff time	Ongoing

Waihaorunga Rural Water Supply Improvement Schedule **Part I: Major Projects and Capital Works** *Waihaorunga Water Supply Water Safety Plan Version 2.2 December 2019 (approved)*							
Priority	**Risk Level**	**Water Supply Area**	**Reference to Risk Table**	**Details of Proposed Works**	**Person Responsible**	**Expected Cost**	**Intended date of Completion**
1	Extreme	Source Treatment	S1.1, P1.1, P7.1, P10, P10.2, P11, D2.3	Increase monitoring and control at Waihaorunga Main Treatment Plant as an interim measure before upgrades. • Telemetry (SCADA) • FAC & Turbidity monitoring and control • Control – Plant shutdown (selective abstraction)	WWM	$36,500 (from the $1,007,500 LTP budget for Plant upgrade brought forward)	2018/19
1	Extreme	Source Treatment	S1.1, P1.1, P2, PPT, P7.1, P10, P10.2, P11, D2.3	Increase monitoring and control at Tavendales Treatment Plant as an interim measure before upgrades. • Telemetry (SCADA) • FAC & Turbidity monitoring and control • Control – Plant shutdown (selective abstraction) ***Note:*** *Investigate running the entire supply network off the Main Treatment Plant. If not able to, then increase monitoring and control at Tavendales Treatment Plant.*	WWM	$41,000 (from the $1,007,500 LTP budget for Plant upgrade brought forward)	2019/20

Waihaorunga Rural Water Supply Improvement Schedule *Waihaorunga Water Supply Water Safety Plan Version 2.2 December 2019 (approved)*					**Part I: Major Projects and Capital Works**		
Priority	**Risk Level**	**Water Supply Area**	**Reference to Risk Table**	**Details of Proposed Works**	**Person Responsible**	**Expected Cost**	**Intended date of Completion**

1	Extreme	Source Treatment	P1.1, P7.1, P10, P10.2, P11, D2.3	Upgrade Waihaorunga Main treatment plant to comply with the DWSNZ 2005 (revised 2008).
				• Upgrade Waihaorunga Main Treatment Plant site to Log 4 treatment.
				  ○ Add selective abstraction based on turbidity.
				  ○ Pre-treatment with an invalidated membrane
				  ○ 1µm Filter.
				  ○ UV reactor
				  ○ Disinfection – Sodium hypochlorite
				  ○ Install telemetry for data acquisition and control (SCADA)
				  ○ Make provision for a bypass so a granulated activated carbon filter can be added if ever required.
				• Abandon Tavendales plant.
				• Connect Tavendale Intake Gallery to new Waihaorunga Main Treatment Plant, then boost treated water back to Tavendales booster.
					WWM	$1,007,500	2021

2	High	Source	S1.1	Ongoing investigation into options for alternate sources. ***Note:*** *There are not many options for alternate sources of raw water for Waihaorunga. Work will continue to make sure all options are investigated thoroughly before work starts on the upgrade to existing sites.*	WWM	Staff time	2019/20 ***In process***

Waikakahi Rural Water Supply Improvement Schedule *Waikakahi Water Supply Water Safety Plan Version 2.1 December 2019 (approved)*					**Part II: Minor Projects and Operational Improvements**		
Priority	**Risk Level**	**Water Supply Area**	**Reference to Risk Table**	**Details of Proposed Works**	**Person Responsible**	**Expected Cost**	**Intended date of Completion**
1	Extreme	Treatment	P7.1	Visit treatment plants and adjust chlorine dosing rate if required following a rain event.	WWM	Staff time	As required until 2020/21

Waikakahi Rural Water Supply Improvement Schedule **Part II: Minor Projects and Operational Improvements**
Waikakahi Water Supply Water Safety Plan Version 2.1 December 2019 (approved)

Priority	Risk Level	Water Supply Area	Reference to Risk Table	Details of Proposed Works	Person Responsible	Expected Cost	Intended date of Completion
1	Extreme	Source	S1.1	Ongoing liaison with landowners in the water supply catchment to raise/maintain awareness of catchment protection. Encourage best practice agricultural activities and riparian management.	WWM	Staff time	Annual ongoing
1	Extreme	Treatment	P11	Implement and use Assetfinda (Asset Management System [AMS]) for programming for WSP reviews, manuals and procedures.	WWM	Staff time	2019/20
2	High	Distribution	D2.2, D2.3	Undertake condition assessment of AC mains. N.B. Assessment are done as required and ongoing i.e. samples taken from pipe failure events.	WWM	$2000 + staff time	2018/21 In process
2	High	Distribution	D2.1, D2.2, D2.3	Undertake a reservoir condition assessment and plan maintenance/replacement as appropriate.	WWM	Staff time	2020/21
2	High	Distribution	D2.2, D2.3	Internal audit of flushing points.	WWM & UTL	Staff time	2020/21
2	High	Pre-Treatment	P4	Cyanobacteria monitoring training. Design a Cyanobacteria management plan to be used in an event of a bloom.	WWM	$1000 + Staff time	2019/20
2	High	Treatment	P7.1	Monitor raw water pH at plant and log	UTL	Staff time	2019/20
3	Moderate	Other	G1	Prepare Operation and Maintenance Manual including routine operation procedures, preventative maintenance task, inspections, monitoring, record keeping, and instrument calibration.	WWM	Staff time	2020/21
3	Moderate	Other	G1	Implement and use Assetfinda (Asset Management System [AMS]) for programming and monitoring regular maintenance and inspection/ monitoring tasks. Including looking at other options i.e. Water Outlook.	WWM	Staff time	2017/18 & onwards
3	Moderate	Other	G1	Ensure all plant records – including manuals, drawings, procedure instructions and emergency response plan are available at the plant.	WWM	Staff time	2020/21
3	Moderate	Distribution	D1	Audit reservoir and break tank roof drainage and security. Investigate option of drainage preventable, lockable lids for reservoirs/break tanks.	WWM & UTL	Staff time	2020/21

Waikakahi Rural Water Supply Improvement Schedule **Part II: Minor Projects and Operational Improvements**
Waikakahi Water Supply Water Safety Plan Version 2.1 December 2019 (approved)

Priority	Risk Level	Water Supply Area	Reference to Risk Table	Details of Proposed Works	Person Responsible	Expected Cost	Intended date of Completion
3	Moderate	Distribution	D2.3	Internal audit of Waihaorunga water supply of what areas that need a cleaning programme, e.g. scouring, pigging or flushing for low flow dead end areas.	WWM & UTL	Staff time	2020/21
3	Moderate	Distribution	D2.3	Programme of regular backwashing for Waihaorunga Main and Tavendales intake gallery beds.	UTL	Staff time	2019/20
3	Moderate	Source, Treatment, Distribution	S1.2, P7.1, D2.1, D2.3	Review Priority 2a, 2b and 2c Determinands, which will include heavy metals and plumbosolvency.	WWM	Operational + staff time	2018/19 & onwards
3	Moderate	Treatment, Distribution	P11, D1, D2.3	Formalise hygiene procedures for maintenance works. Implement refresher training for hygiene and disinfection procedures.	WWM & UTL	Staff time	2019/20
3	Moderate	Distribution	D1	Review additional post-treatment storage	WWM	Staff time	2021/22
4	Low	Treatment, Distribution	P1.1, P.2, D1	Promote 96 hour (4 days) point of supply storage policy.	WWM	Staff time	2017/18 & onwards
4	Low	Treatment, Distribution	P7.1, P11, D1	Review generator use, transport and procedures over all the schemes. Create register of generator hire companies.	WWM & UTL	Staff time	2020/21
4	Low	Distribution	D2.4	Backflow Register	UTL	Staff time	2020/21
4	Low	Treatment	P11	Make use of shared digital resources for recording information i.e. pump hours, events, maintenance, etc., via IPads/tablets, Sharepoint.	WWM	$10,000 + Operational + staff time	2018/19 & onwards
4	Low	Treatment, Distribution	P10.2, D2.2	Investigate pump life and reconditioning programme and establish.	WWM & UTL	Staff time	2020/21
4	Low	Distribution	D1	Investigate telemetry (SCADA) options at network reservoir sites.	WWM	Staff time	2021/2024
4	Low	Distribution	D1	Investigate telemetry (SCADA) options at network pumpstations - Melford	WWM	Staff time	2021/2024
4	Low	Distribution	D1	Takitu Pumphouse - New Board and Telemetry (SCADA)	WWM	$22,000	2022/2023

Waimate Rural Water Supply Improvement Schedule *Waimate Water Supply Water Safety Plan Version 3.0 January 2019 (approved)*				**Part II: Minor Projects and Operational Improvements**			
Priority	**Risk Level**	**Water Supply Area**	**Reference to Risk Table**	**Details of Proposed Works**	**Person Responsible**	**Expected Cost**	**Intended date of Completion**
2	High - Extreme	Treatment	P11	Make use of shared digital resources for recording information i.e. pump hours, events, maintenance, etc., via mobile technology i.e. tablets	WWM	Staff time	2019/20
2	High	Distribution	D2.4	Review of Backflow Protection device use on the Waimate Urban Supply.	WWM & UTL	Staff time	2020/21
2	High	Distribution	D2.4	Public Backflow Prevention education	WWM & UTL	Staff time	2020/21
2	High	Source	S1.1	Monthly Constant Composition Testing. Monitoring variances (coefficient and standard) of Conductivity, Chloride and Nitrate at Manchesters Road Bore and Timaru Road Bore. ***Note:*** *This method of analysis will be used for demonstrating Criterion 1 Bore Security as well as regular monitoring.*	WWM	$980 + staff time Annually	2019/20 onwards
2	High	Source	P1.3, P10, P11	Investigate Emergency alternate water sources i.e. the old town supply at Kelcys Bush.	WWM	Staff time	2018/20
2	High	Treatment	P7.1, P10, P11	Review generator use, transport and procedures over all the schemes. Create register of generator hire companies.	WWM & UTL	Staff time	2018/19
2	High	Waimate WS	C1, C3	Complete Councils Emergency Response Plan. ***Note:*** *This WSP and all approved Waimate District Council WSP's are part of the Councils Emergency Response Plan.*	CDEM	Staff time	***ERP in Process. WATER COMPLETED***
2	High	Waimate WS	S3, D2.4	Backflow prevention policy – Formalise a BFP policy to define clear requirements for different property types and activities, and required BFP devices testing regimes *(also review if a separate policy is required)*. ***Note:*** *Existing Backflow prevention Bylaw in Place (Section 1419.1) and other external factors such as the "New Zealand Building Code Clause G12 Water Supplies", "Acceptable Solutions G12/AS1, Section 3.0" & AS/NZS 3500 Pt 1 2018.*	WWM	Internal	~~Dec 2014~~ ***Risk Managed*** 2020/21
3	Moderate	Treatment, Distribution	P1.3, P11, D1, D2.3	Formalise hygiene procedures for maintenance works. Implement refresher training for hygiene and disinfection procedures.	UTL	Staff time	2020/21

Appendix C

Significant Forecasting Assumptions

The following table details the significant forecasting assumptions as at March 2021.

Appendix Table 11: Significant Forecasting Assumptions as at March 2021

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
POPULATION CHANGE						
The Waimate District population will observe a gradual increase by 4.38% between 2020-2030. It is assumed that this increase will generate a relative impact on population-related metrics, such as the quantity of rateable properties.	Rationale	Population growth either significantly exceeds that of the projected percentage, or is significantly below the projected percentage.	Low	If population accelerates significantly above the given assumption, existing infrastructure may not be suitable to cope with the extra demand.	Council will monitor population measures provided for the district, and will respond to significant variations to assumptions, where possible.	All activity groups
DEMOGRAPHIC CHANGES						
Between 2020-2030, the district's population retains its comparatively high mean age, while observing a gradual and mild reduction in the mean age level, with the age group of 45-49 years likely to be the most frequent by 2030.	Rationale	The demographic make-up of the Waimate District changes significantly.	Low	If the district's demographic changes significantly from the predicted range, the existing infrastructure may not meet the needs of the relevant demographic classes.	Council will monitor demographic measures provided for the district and respond to significant variations to assumptions, where possible.	All activity groups
OIL PRICE						
Due to the instability of the international petroleum market (as caused by the effects of the COVID-19 pandemic), fuel prices are likely to fluctuate for a period of time. However, it is assumed the time period will be relatively short, as the petroleum	WDC	There is a risk that fuel demand will be different to that assumed, and that significant changes in market price occur with greater	Moderate	Increased fuel costs would have a particular impact on the costs of road maintenance, renewal, and improvement. This may affect Council's ability to carry out planned work without additional funding. It may also increase	Council will monitor the impact of fuel price on spending and aim to optimise spending.	All activity groups

market has historically demonstrated a tendency to stabilise rapidly, where possible.		frequency and/or greater severity.		demand for alternative methods of transport.		

2021-2031 LTP SIGNIFICANT FORECASTING ASSUMPTIONS

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
CLIMATE CHANGE						
The effects of climate change are expected to manifest in three categories: a) gradual change in meteorological conditions (for example, change in temperature, more severe weather conditions and events, rising of sea level, coastal and inland erosion, among others), and b) general socio-economic consequences of such changes, and c) socio-economic consequences of policies/ measures designed to curb the adverse effects of climate change.	WDC	Environmental changes may accelerate at a rate higher than predicted, and/or the socio-economic consequences of adaptation measures may exceed the anticipated range.	Moderate	If environmental changes were to accelerate, Council's infrastructure assets would be significantly impacted. This would result in further modifications or more regular repairs to relevant assets.	Council will monitor the operational and socio-economic effects of environmental changes and adapt its response where required, if possible.	All activity groups
The Emissions Trading Scheme (ETS) became law in September 2008, resulting in minor cost increases. As the ETS grows, Council anticipates that the introduction of new areas will continue to have increases and that those increases are recognised in Council's inflation figures.	Ministry for the Environment	There is a risk of legislative change, which could result in costs being higher or lower than assumed.	Moderate	Should the impact of the scheme exceed significantly from the given assumption, budget for additional cost may need to be considered.	Council will monitor the development of relevant legislation and review the impact of any significant changes in the Annual Plan.	Property, Roading and Footpaths, Rural Water Supply, Urban Water Supply

Appendix C:
Significant Forecasting Assumptions

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
WAKA KOTAHI NEW ZEALAND TRANSPORT AGENCY (NZTA) REVENUE						
Roading expenditure comprises a significant portion of Waimate District Council's total expenditure, therefore using a significant portion of Council's overall rate take. The majority of Council's expenditure on the district's roads is eligible to attract an assistance rate from the Waka Kotahi New Zealand Transport Agency (NZTA). It is further assumed that the funding assistance rate received by Council for qualifying roading expenditure for maintenance and improvement projects is set at 64% for 2020/21 onwards.	NZTA	The subsidy rate may be subject to change, along with any variation in criteria for inclusion in subsidized works programmes.	Moderate	Changes to the funding priorities of NZTA remain outside Council control. Minor variations would impact significantly on forecasted financials.	Any impact of changes to the NZTA funding assistance rate will be applied to the relevant Annual Plan.	Roading and Footpaths
GRANTS AND SUBSIDIES						
It is assumed that all projects funded, or partially funded, from grants and subsidies will be available in the year the expenditure is planned. If the funding is not received, it is most likely that the project will	WDC	Subsidies are not received and projects do not go ahead.	Moderate	Some projects have a more significant impact than others if they do not proceed in the planned year. The roading projects where Council rely on NZTA funding may result in	Build robust business cases and regular liaison with the relevant funding bodies to ensure projects (with a high likelihood of receiving funding) are included in the Long Term Plan.	Roading and Footpaths, Property

not proceed in that year. Examples of projects where funding is assumed are roading maintenance and improvements, and bridge renewals.				reduced level of service.		

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
NEW ZEALAND DRINKING WATER STANDARDS & SERVICE DELIVERY						
While it is assumed that that there will be change to the ownership and delivery of Three Waters in the next ten years, Council is not able to predict with absolute certainty what those changes will be. It is unlikely that details will be known earlier than mid-to-late 2021. This LTP has been developed on a business-as-usual basis for the delivery of Three Waters; but the change is very likely to occur over the mid-term (3-5 years).	WDC Central Government	Legislation changes under urgency in Parliament that must be implemented immediately.	Moderate	Changes are required to be implemented more quickly than anticipated, and/or changes are mandatory rather than voluntary.	Council closely monitors any and all developments, and responds accordingly.	Rural Water Supply, Urban Water Supply
RESOURCE CONSETS						
The conditions of resource consents held by Council may be changed, and that Council will obtain the necessary resource consents for planned projects.	WDC	There is a risk that resource consent conditions are altered significantly.	Moderate	Advanced warning of likely changes is expected. The financial effect of any change to resource consent requirements would depend on the change.	Council will monitor the development of relevant standards and review the impact of any significant changes.	Roading and Footpaths, Sewerage, Stormwater, Waste Management, Urban Water Supply, Rural Water Supply
WATER IRRIGATION SCHEMES						
Council does not expect major irrigation schemes to be introduced into the	WDC	New major schemes are introduced.	Low	The introduction of a major irrigation scheme is likely to produce minimal	Council will monitor the environment in regard to any potential development, and	Roading and Footpaths, Rural Water

district over the period of the Long Term Plan.				impact on Council, but a more considerable impact on the district's agricultural sector.	seeks to remain involved in discussions/proposals.	Supply, Sewerage

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
EMERGENCY EVENT						
Disruptive or destructive emergency events such as earthquakes, extreme weather events, and pandemics may occur to damage, disable, or destroy community infrastructure (for example, district roads, bridges, water supplies, among others), or community activities. It is further assumed that the cost of correcting such damage is met either by Council or its insurance providers, or by possible special government grants.	WDC	Inability to recover or continue business following a major event.	Moderate	If a major emergency event did occur, Council have some insurance for its infrastructure, and assistance would be offered from Central Government. To pay for additional emergency work not covered by the above, Council would increase internal/external borrowings.	Council undertakes business continuity plans for its own operation, and coordinates Civil Defence planning for the district. In doing so, Council attempts to prepare itself and the district for such events.	All activity groups
DEVELOPMENT CONTRIBUTIONS						
With the Resource Management Act 1991 able to revoke Council's ability to levy financial contributions (effective 18 April 2022), it is expected that Council will still be able to recover development contributions from that date onwards. It is further assumed that the level of funding recoverable	WDC	There is a risk this change will result in significantly different funding levels.	Low	If the available funding levels change, this will have an impact on the rates required to address any shortfall/surplus.	Council will review its funding requirements prior to 18 April 2022 and ensure funding requirements match to demand.	All activity groups

under each system will be broadly similar.						

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
DISTRICT ECONOMY						
Despite the major impact of the COVID-19 crisis on the national economy, the Waimate District's economy is comparatively less negatively impacted, due to its specific characteristics as an area reliant on essential services and production.	WDC	Any significant reduction in income stream for any sector poses a risk.	Moderate	Drop in commodity prices - disposable spending cut back, loss of employment, closure of business. Increase in commodity prices- the reverse of the above occurs.	Council will consider the state of the district's economy when reviewing its Annual Plan and how this compares to the position assumed in the Long Term Plan.	All activity groups
USEFUL LIVES OF SIGNIFICANT ASSETS AND DEPRECIATION						
It is assumed reassessments of the useful lives of significant assets during the ten year period covered by this Long Term Plan will continue every three years. The detail of useful lives for each asset category is covered in the Statement of Accounting Policies.	New Zealand Asset Management Support WDC asset revaluations	There is a risk that assets will wear out more quickly than forecasted and require replacement earlier than planned.	Moderate	If assets require replacement earlier than first considered, capital expenditure projects may need to be brought forward.	Regular review of the useful life of each asset category reduces the risk of significant inaccuracies.	Roading and Footpaths, Rural Water Supply, Urban Water Supply
REVALUATION OF NON-CURRENT ASSETS						
Council conducts asset revaluations every three years. The Long Term Plan assumes the following percentage increases to book value, for each of the following class of assets:	WDC	Revaluations will somewhat differ from those projected carrying values of the assets and depreciation expense.	Moderate	Variation in values is expected to be low unless the valuation methodology changes.	Regular revaluation of non-current assets reduces the risk of significant valuation shifts.	Roading and Footpaths, Rural Water Supply, Urban Water Supply, Sewerage, Property

Land: +10% Buildings: +10% Utilities (Water Schemes, wastewater, stormwater, Sanitation): +8% Roading: +6%						

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
FUNDS FOR FUTURE REPLACEMENT OF SIGNIFICANT ASSETS						
In general, councils have some flexibility in the policies they may set with regard to sources of funds for the future replacement of significant assets. Council's flexibility centres on whether we should collect depreciation monies from ratepayers during the lifetime of the asset to build up a reserve that can fund the replacement of the asset when it comes to the end of its useful life, or when the asset comes to the end of its useful life which would compel Council to rely on borrowed money to replace it. Council considers that the most sensible approach is to collect depreciation during the life of an asset, therefore having reserve funds on hand at the time replacement is needed. See Council's 'Revenue and Financing Policy' and the 'Financial Strategy'.	WDC	Sufficient funds may not be available to pay for planned asset replacement.	Low	Funds may need to be borrowed or rated for, which may be a burden to either the Council or ratepayers in the future.	Council develops Asset Management Plans that determine the timing of asset replacements. Council uses these to forecast and prepare for future funding requirements.	Property, Roading and Footpaths, Rural Water Supply, Urban Water Supply, Sewerage
RETURN ON INVESTMENT- ALPINE ENERGY						
Alpine Energy returns will be in line with the company's FY2022-2024 Statement of Corporate Intent which includes a Dividend Policy of 6c per share, through to 31 March 2024. Thereafter it	WDC (in conjunction with its respective advisors)	There is a risk that returns on investments will be higher or lower than forecasted.	Low	Council is aware of the factors contributing to the changing nature of Alpine Energy's overall profit. If revenues are depressed for a sustained period, the company will be	Council plans to reduce its reliance on any dividend income that presently supports core operational activity.	Investments and Finance

is assumed the dividend will remain at 6c.				unlikely to maintain dividends at the proposed level.		

ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
FORESTRY ASSETS VALUES						
It is assumed that the forestry asset values will increase annually over a rotation cycle of 30 years.	WDC	The value of forestry assets may sharply increase or decrease.	Low	A change in the value of the forestry asset will change Council's financial performance in the year of change occurring. However, it will not have a direct impact on the level of rates or expenditure.	Annual revaluation of forestry reduces the risk of significant valuation shifts.	Investments and Finance
CAPITAL DELIVERY						
Council plan to deliver 100% of all capital projects over the life of the Long Term Plan. The financial model was developed based on this assumption.	WDC	There is a risk that improved levels of service in the Water Supply area will be delayed. There is a risk that the capital projects will not be completed in any given year, and carried over to subsequent years.	Moderate	Variation to planned improved levels of service for the Water Supply area, where any delay in projects relating to Drinking Water Standards New Zealand compliance will result in maintaining current levels of service. If projects are not completed on time, or are deferred, there may be reduced operational costs and depreciation expense impacts. There could also be an increase in required budget to complete the project if delayed.	Additional resourcing (1.5 FTE) has been engaged to ensure the timely delivery of proposed LTP and Stimulus Fund projects. All capital works have been scheduled for 2020/21 and 2021/22 and local contractors have been made aware of the timing. Council is aware of material sourcing and has addressed this issue by sourcing materials early and maintaining stock levels. Procurement is now completed through the Government Electronic Tenders System (GETS), notifying the wider contracting / consulting market of upcoming projects. In anticipation of a large capital programme in Year 1 (2022), a portion of these projects are likely to be tendered by 30 June 2021,	Water Supply & all other activities

					or very early in the 2021/22 financial year. Due to the nature of the rates smoothing profile for the Water Supply activity, any delay in project completion will have no effect on the funding and rates required as planned.	
ASSUMPTION	**SOURCE**	**RISK**	**LEVEL OF UNCERTAINTY**	**IMPACT OF VARIATION**	**MANAGEMENT OF RISK**	**ACTIVITY**
RETURN ON INVESTMENTS- OTHER						
It is assumed that Council's cash investments will generate a 1% return based on the current economic climate. It is further assumed that the returns from Council's forestry investments for the duration of the Long Term Plan will be reflective of market conditions present at the time of preparation of this document.	WDC (in conjunction with its advisors)	Returns on investments will be higher or lower than forecasted.	Moderate	Higher interest rates received on cash investments or increased investment income could result in positive cash-flow enabling consideration of higher levels of service or reduced expenditure. Council does not heavily rely on interest revenue for running its operations, therefore the impact of lower investment returns on delivery of Council services would be minimal. Similarly, Council does not use its forestry investment returns to fund other Council operations or activities.	Council sets and maintains its internal interest to provide certainty to internal capital reserves. Council will manage its external investments to optimise returns (as described in the Council's Investment Policy). Council will monitor the forestry market's conditions and review the impact of any significant change in forecasted returns through each subsequent Annual Plan process.	Investments and Finance
INFLATION						

<table>
<tr>
<td>Council, along with many other New Zealand Councils, calculates and applies inflation factors to its 10-year budget forecast, using predictions of future inflation levels from New Zealand [economic research company] Business and Economic Research Ltd (BERL).</td>
<td>Business and Economic Research Ltd.</td>
<td>Inflation will be higher or lower than anticipated.</td>
<td>Moderate</td>
<td>A difference between the inflation rates experienced and those assumed will change the cost base of Council, and therefore impact funding requirements.</td>
<td>Council has endorsed the rates produced by BERL as the most appropriate basis for accounting for the impact of inflation and preparing the Long Term Plan.

In the event of significant changes to the underlying costs supporting work in the activity areas, mitigation planning will feature in the Annual Plan.</td>
<td>All activity groups</td>
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<td colspan="2">
<table>
<tr><th>Year</th><th>Roading %</th><th>Property and Parks %</th><th>Water %</th><th>Staff %</th><th>Other %</th><th>Wastewater %</th><th>Capital Expenditure %</th></tr>
<tr><td>June 2022</td><td>3.3</td><td>1.7</td><td>7.2</td><td>4.8</td><td>1.7</td><td>7.2</td><td>4.0</td></tr>
<tr><td>June 2023</td><td>3.1</td><td>2.0</td><td>3.4</td><td>2.4</td><td>2.0</td><td>3.4</td><td>3.0</td></tr>
<tr><td>June 2024</td><td>3.0</td><td>2.0</td><td>2.1</td><td>1.5</td><td>2.0</td><td>2.1</td><td>2.6</td></tr>
<tr><td>June 2025</td><td>2.9</td><td>1.9</td><td>2.3</td><td>1.7</td><td>1.9</td><td>2.3</td><td>2.6</td></tr>
<tr><td>June 2026</td><td>2.9</td><td>1.8</td><td>2.6</td><td>2.0</td><td>1.8</td><td>2.6</td><td>2.7</td></tr>
<tr><td>June 2027</td><td>2.9</td><td>1.8</td><td>2.3</td><td>2.2</td><td>1.8</td><td>2.3</td><td>2.6</td></tr>
<tr><td>June 2028</td><td>2.9</td><td>1.7</td><td>3.0</td><td>2.3</td><td>1.7</td><td>3.0</td><td>2.8</td></tr>
<tr><td>June 2029</td><td>2.9</td><td>1.7</td><td>3.3</td><td>2.4</td><td>1.7</td><td>3.3</td><td>2.8</td></tr>
<tr><td>June 2030</td><td>2.9</td><td>1.7</td><td>3.3</td><td>2.6</td><td>1.7</td><td>3.3</td><td>2.9</td></tr>
<tr><td>June 2031</td><td>2.9</td><td>1.6</td><td>2.7</td><td>2.7</td><td>1.6</td><td>2.7</td><td>2.7</td></tr>
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ASSUMPTION	SOURCE	RISK	LEVEL OF UNCERTAINTY	IMPACT OF VARIATION	MANAGEMENT OF RISK	ACTIVITY
BORROWING COSTS						
Interest costs are estimated to be 3%. This refers to the internal cost of borrowing, along with the expected external cost of debt facilities (for example, Waimate Event Centre public debt) where costs are not known, and are required to be projected.	WDC (in conjunction with its financial advisors)	Interest rates will differ significantly from those estimated.	Low	If borrowing costs are greater than those assumed, Council may need to increase its rates or reduce its expenditure. Conversely, lower costs may mean rates are lower than they would otherwise have been.	Council will monitor its applicable rate and adjust it through the Annual Plan process to reflect a level best aligned to its external borrowing rate and ability to generate returns on internal debt.	Investment and Finance
UNIDENTIFIED LIABILITIES						
It is assumed that Council does not have any unidentified liabilities.	WDC	There is a risk of an unexpected liability occurring. For example, a claim against Council.	Low	If an unidentified liability arises it may increase Council's expenditure. This risk is mitigated by the Council's Risk Management and Insurance Policies.	Regular review of liabilities reduces against the risk of items being unidentified.	N/A

Appendix C:
Significant Forecasting Assumptions

Appendix D

Risk Summary Table

The following table details the Risk Summary Table that was established in 2011, which identifies risk management strategies to minimise risks associated with the provision of the Water, Wastewater, Stormwater and Solid Wastes services.

For site-specific risk assessment tables see “Risk Tables” in all current and submitted Water Safety Plans (WSP).

- Cannington-Motukaika Water Supply Water Safety Plan *Version 2.1 January 2019 (approved)*
- Hook-Waituna Water Supply Water Safety Plan *Version 3.0 November 2020 (submitted)*
- Lower Waihao Water Supply Water Safety Plan *Version 3.0 November 2020 (submitted)*
- Otaio-Makikihi Water Supply Water Safety Plan *Version 3.0 (under development)*
- Waihaorunga Water Supply Water Safety Plan *Version 2.2 December 2019 (approved)*
- Waikakahi Water Supply Water Safety Plan *Version 2.1 December 2019 (approved)*
- Waimate Water Supply Water Safety Plan *Version 3.0 January 2019 (approved)*

These risk assessment tables are based on the Ministry of Health Water Safety Plan Guides available at http://www.health.govt.nz/publication/water-safety-plan-guides-drinking-water-supplies . The risk assessment tables cover risks associated with Source, Treatment Processes, Distribution Systems and General Elements of all the Waimate District Council water supplies. They go into detail about the known risks and the measures in place to control.

Risk Summary Table – all Services

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
1		Higher Level Policies, Procedures and Controls				
1.1	Subdivision Code, District Plan not up to date	Inappropriate development and/or poor design of assets.	Moderate	Subdivision and Development Code up to date and activity to have input to District Plan.	Low	
1.2	Operations Manuals not up-to-date	Failure to supply water or cause adverse health effects due to poor operation of assets.	Moderate	Operating Manuals substantially complete and ensure staff comply with requirements.	Low	The existing operation and maintenance manuals are to be updated where required. Particularly when treatment processes are updated
1.3	Not having clear direction on public consultation	Council in breech of LGA2002 with respect to Public Consultation.	Low	Need ability to get advice from specialist council staff on consultation plan for each project.	Low	
1.4	Districts Bylaws not up to date	Inability to properly control inappropriate behaviour by others.	Low	Bylaws up to date	Low	Bylaws are being updated prior to 30 June 2018
1.5	The Council does not have an acceptable position on the impact of climate change on service delivery	Financial loss due to liability for property damage, loss of asset. Not able to provide service.	Significant	Council needs policy and relevant action plans including relevant design parameters) on Climate Change.	Low	Strategies to implement Councils future policy on the effects of climate change
1.6	Inaccurate growth information or growth not considered	Inappropriate decisions made about development.	Moderate	Growth developed by Council	Low	
2		Financial				
2.1	Lack of long-term financial planning	Higher than necessary financial costs	Significant	Existing network models are up to date and available	Low	
2.2	Service levels vs funding and works not clear	Service levels not being met due to lack of funding as decision makers not aware of implications for Service Levels.	Significant	Set performance targets for next 10 years and monitor and report on performance. Impacts of delayed capital works reported to Council.	Low	

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
2.3	Assumptions for financial forecasting not always understood	Additional costs incurred because assumption/uncertainties not accounted for i.e.: asset valuations, depreciation	Significant	Finance/managers need to be aware of assumptions and uncertainties behind financial forecasting information.	Moderate	
2.4	Unforeseen Additional Costs	Reputation of Council detrimentally affected	Significant	Ensuring AMPs and asset information up to date	Low	
2.5	Valuations not accurate for asset facilities	Fixed Asset Register not reconciling with existing assets causing incorrect valuations and affecting true financial requirements	Low	Asset register reviewed and updated	Low	
2.6	Development Contributions policy not implemented and/or do not have robust system for calculating contributions from developers	Adequate contributions for development not obtained costing the Council more than it should. Council faces legal action if contributions not in line with Section 199 of the LGA 2002.	Moderate	Development Contributions Policy implemented.	Low	Changes to the RMA are likely to impact financial contributions.
2.7	All potential sources of Government and other external funding (Third Party funding) not appreciated or obtained	Higher cost to Council than should have been	Moderate	Identify potential availability of third party funding and apply / take advantage of it.	Low	
2.8	Insurance cover needs review	Insurance not adequate and unnecessary costs incurred	High	Insurance cover reviewed to ensure adequate cover on annual basis.	Low	
3		Organisational Management				
3.1	Lack of Strategic Thinking/ Long-Term planning	Inefficient use of time and money.	Moderate	Implementation of AMP and undertake condition assessments.	Low	
3.2	Failure to act on identified risk - e.g. Water Safety Plans Plans	Possible legal action against Council if event occurs which Council knew about. Public Health adverse affected.	Moderate	WSP's have been carried out and recommendations being implemented	Low	Need to monitor outcomes of Havelock North Enquiry and proposed 3Waters review

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
3.3	Lifelines Plan not up to date or implemented	Large scale asset failure due to a naturally occurring event resulting in prolonged and substantial loss of service to District	Significant	Ensure Lifelines Plan up-to-date and recommendations implemented that includes having a high level of risk reduction, readiness, response and recovery during and following Civil Defence Emergency.	Significant	Update lifelines plan, engage with regional lifelines group
3.4	Legislative requirements not understood	Council faces legal action because legal requirements are not met	Moderate	Annual reviews	Low	
4		Human Resources				
4.2	Accountabilities not clear	Staff not accountable for actions allowing apparent problems to continue	Moderate	Up-to-date job descriptions. Staff performance monitored and dealt with if not performing.	Low	
4.3	Information in peoples heads or inappropriate recording of information	Organisational knowledge lost with staff leaving	Significant	Ensure staff document and appropriately file everything that is relevant. Ensure good management succession when existing staff leave.	Moderate	Formalise and update maintenance schedules and procedures, contingency and operation and maintenance manuals.
4.4	Insufficient staff or not appropriately skilled	Programmed work not completed due to insufficient staffing or skill levels, having negative impact on service levels and creating public health risk.	High	Skill levels are appropriate	Low	Formal training programme required that includes the use of activity management plans
4.5	Inadequate attention to staff succession	Organisational knowledge lost with staff leaving	High	Implement good staff/management succession plan and document procedures	Moderate	Implement good staff/management succession plan and document procedures
5		Health and Safety				
5.1	Do not have a good health and safety culture	High accident rate	Moderate	Council health and safety procedures implemented, appropriate training undertaken and manuals up-to-date.	Low	
5.2	Health and Safety Risks not identified or managed appropriately	Council faces legal claims for not meeting health and safety obligations	Moderate	Health and Safety manuals up to date and be effectively managed.	Low	
6		Asset Management				

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
6.1	Network modelling, condition assessments not undertaken.	Capital Works programme not optimised. Renewal works not completed due to lack of knowledge causing failure of assets. Future forecasting not accurate.	Significant	Undertake condition assessments of network and develop robust renewals programme based on sound knowledge.	Moderate	Development and maintenance of network model.
6.2	As-built information can be slow or incorrect coming from maintenance staff, Contractors, Consultants	Council faces legal action because of incorrect information provided (particularly with regard to LIMS)	Significant	Ensure As-builts up to-date and on record promptly. Ensure GIS capability	Low	
6.3	Criticality assessment not undertaken	Failure of critical assets resulting environmental damage or not meeting service levels	Significant	Undertake criticality assessment of assets and implement strategy for managing critical assets	Low	Incorporate criticality assessment of reticulated assets, undertake criticality assessment of plant assets and implement strategy for managing critical assets
6.4	Asset Risk Register and Asset Risk Plan not implemented	Council faces legal action because of asset failure or unnecessary costs incurred due to asset failure	Moderate	Maintain Asset Risk Register and Asset Risk Plan	Moderate	Improve risk plan to reduce residual risk
6.5	Asset management systems not up-to-date or completed	Failure to of utility systems because maintenance work not completed or management system not operational.	Significant	Asset Management System in place and updated as required	Moderate	Review AM system practices and processes
6.6	Performance monitoring of service levels not completed	Target Service levels not met resulting in customer dissatisfaction.	Moderate	Monitoring programme established and reviewed regularly.	Low	
6.7	Poor standards of constructed assets due to design and/or construction of infrastructure	Substandard physical works resulting in poor asset performance	Moderate	NZS4404 is updated regularly and Contractors & Consultants are familiar with this. Contractors/Consultants take responsibility for work done.	Low	Perhaps develop Sub-Division Code of Practice

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
6.8	Capital works delayed due to unforeseen circumstances	Programmed Capital Works not completed. Target Service Levels not met	Significant	Staff held accountable for delays & Staff trained in project management.	Moderate	Develop projects process that provides for project plans to be prepared for every approved renewal and capital development item.
6.9	Deferred renewal and maintenance not recorded or not done	Deferred maintenance not recorded causing unexpected, additional costs from asset failure	High	Record all deferred maintenance and renewals	Significant	Ensure all deferred renewals work recorded and management aware of impact on service levels if not funded.
6.10	Not all easements recorded or obtained	Council faces legal action or cannot carry out its activities because it does not have legal right to cross a property	Significant	Keep up-to-date record of easements. Establish clear policy for processes to be followed when easements are required.	Significant	Easement information needs to be improved with all identified easements provided with details of interested part. Legal situation to be clarified.
6.11	Insufficient documentation of escalating process decision making	Response to emergency situations reduced, higher expenditure	Significant	Employment of staff with the appropriate qualifications and skills	Low	
7		Resource Consents and Designations				
7.1	Review of Designations required	Council faces legal action because water assets have not been designated in the District plan	Moderate	Designations reviewed every three years to ensure these are appropriate.	Low	
7.2	Resource Consents	Council faces legal action because resource consents not applied for or conditions not met. Public dissatisfaction with environmental damage being caused.	Moderate	All consents that are required are obtained and consents monitored and reported on as required.	Low	
8		Asset Risks - Water				
8.1	Some treatment plants not capable of meeting drinking water standards	Dissatisfaction of customers from not meeting target water supply gradings due to non compliance with drinking water standards.	Significant	Upgrade of water supplies to meet standards underway with monitoring programme in place.	Low	

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
8.2	Reticulation - Inaccurate and/or unknown location of main	Asset broken - inability to supply service	Low	Maintain good as-builts that are current via GIS	Low	Update locations as and when data becomes available
8.3	Insufficient reticulation capacity	Low pressure	Low	Maintain reticulation model with updates as required	Low	
8.4	Poor reticulation condition - reduced flows	LoS not achieved	Low	Maintain reticulation model with updates as required. Good renewals programme that understands the issues with the network	Low	
8.5	Insufficient reservoir storage	Fire fighting Code of practice not achieved	Moderate	Maintain reticulation model with updates as required	Low	
8.6	Insufficient Operational Pump Station Capacity	Low pressure/insufficient flow	Low	Good understanding of schemes capacities and on-going monitoring of usage	Low	
8.7	SCADA Failure	No alarm available, no water	Significant	Back up systems and procedures	Low	Backup system already implemented
8.8	Treatment Plant - Equipment/component Failure	Failure to meet consent conditions, reduced water pressure	Moderate	Early warning via SCADA & site monitoring by staff	Moderate	
8.9	Vandalism at facility	Reduced LoS	Significant	Warning via SCADA of any issue at facilities	Moderate	
8.10	Rising Mains - Insufficient Capacity	Insufficient water during peak usage periods	Significant	Good understanding of schemes capacities and on-going monitoring of usage	Moderate	
8.11	Operator Error	Failure to achieve consent conditions or facility failure	Significant	Employment of staff with the appropriate qualifications, skills and training	Moderate	Upskill staff when new training becomes available.
8.12	Power failure for extended periods	No water - reservoirs run dry	Significant	Standby generators made available in an event of extended power failure	Moderate	Review generator use if there are changes in level of expectation and or demand
8.13	Fire at facility	Control equipment failure with resulting lack of ability to supply demand	Moderate	Management and operational staff have the skills to manage natural events	Moderate	

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
8.14	Movement failure caused by, Earthquake, landslide or settlement.	Inability to supply all or majority of demand	Moderate	Management and operational staff have the skills to manage natural events	Moderate	
8.15	Snow and wind	Power failure - see power failure	Significant	Standby generators made available in an event of extended power failure	Moderate	Review generator use if there are changes in level of expectation and or demand
8.16	Flooding	Intakes flooded - poor water quality or inability to pump water	Significant	Management and operational staff have the skills to manage natural events	Moderate	
9		Asset Risks Wastewater				
9.1	Blocked mains occurring on frequent basis	Flooding of roads, health risk	Moderate	Cleaning (via water blasting) those areas most effected on an annual basis	Low	
9.2	Manholes - Insufficient maintenance	Failure leading to blockages - Flooding of roads, health risk	Low	Inspections of key points within network during high rainfall periods	Low	Document and schedule manhole inspections in AssetFinda
9.3	Reticulation - Inaccurate and/or unknown location of main	Asset broken - inability to supply service	Low	Maintain good as-builts that are current via GIS	Low	
9.4	Insufficient reticulation capacity	Surcharging in wet weather - health issues	Low	Maintain reticulation model with updates as required	Moderate	Address known surcharging.
9.5	Poor reticulation condition (blockages)	Failure leading to blockages - Flooding of roads, health risk	Low	Maintain reticulation model with updates as required. Good renewals programme that understands the issues with the network	Low	Log all blockages in AssetFinda
9.6	Insufficient grades or flow to achieve self cleansing velocities	Build up of fats - blockages - Flooding of roads, health risk, increased costs for cleaning	Low	Maintain reticulation model with updates as required. Good renewals programme that understands the issues with the network. Known areas within network that have issues are inspected on regular basis	Low	
9.7	Chemical damage of pipes	Decreased asset life - premature replacement	Moderate	Inspections of network CCTV, cleaning etc	Moderate	

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
9.8	Pump Stations - Equipment or component Failure	Wastewater discharges to the environment having an impact on environmental, cultural and health issues. Customer complaints	Moderate	Early warning via SCADA & site monitoring by staff	Moderate	
9.9	Pump Stations - Insufficient Wet Weather Storage Capacity	Insufficient storage or capacity resulting in wastewater discharges to the environment having an impact on environmental and cultural issues	Moderate	Good understanding of schemes capacities and on-going monitoring of flows	Moderate	
9.10	Pump Stations - Corrosion and sulphur attack of electrical/control equipment	Surcharging in wet weather - health issues	Low	Monitoring of facilities on a regular basis	Low	
9.11	Insufficient Operational Pump Station Capacity	Surcharging in wet weather - health issues	Low	Good understanding of schemes capacities and on-going monitoring of flows	Low	
9.12	SCADA Failure	No alarm available	Significant	Back up systems and procedures	Low	
9.13	Treatment Plant - Equipment/component Failure	Failure to meet consent conditions.	Moderate	Early warning via SCADA & site monitoring by staff	Moderate	
9.14	Ponds - Overloading of Components Treatment Capacity	Failure to comply with resource consents and Customer complaints.	Moderate	Good understanding of treatment capacities and on-going testing and monitoring of flows	Moderate	
9.15	Odours at treatment plant, or reticulation		Moderate	Good understanding of treatment capacities	Moderate	
9.16	Vandalism at facility		Moderate	Warning via SCADA of any issue at facilities	Moderate	
9.17	Overloading of Components Treatment Capacity	Discharge of Biosolids to environment. Failure to comply with resource consents. Customer complaints	Moderate	Good understanding of treatment capacities and on-going testing and monitoring of flows	Moderate	

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
9.18	Rising Mains - Insufficient Capacity	Wastewater discharged to the environment at pump stations having an impact on environmental and cultural issues.	Moderate	Good understanding of scheme capacities and on-going monitoring of flows	Moderate	
9.19	Operator Error	Failure to achieve consent conditions or facility failure	Moderate	Employment of staff with the appropriate qualifications and skills	Moderate	
9.20	Power failure	Treatment capacity diminished	Low	Standby generators will be made available in an event of power failure if required	Low	Review generator use if there are changes in level of expectation and or demand
9.21	Fire at facility	Control equipment failure with resulting lack of ability to continue service	Moderate	Management and operational staff have the skills to manage natural events	Moderate	
9.22	Movement failure caused by, Earthquake, landslide or settlement.	Inability to supply all or majority of demand	Moderate	Management and operational staff have the skills to manage natural events	Moderate	
9.23	Snow and wind	Power failure - see power failure	Low	Standby generators will be made available in an event of power failure if required	Moderate	Review generator use if there are changes in level of expectation and or demand
10		Asset Risks Stormwater				
10.1	Mains - Blocked mains prior to storm events	Flooding of houses and properties	Moderate	Council staff have good maintenance and monitoring provisions	Moderate	
10.2	Manholes - Insufficient maintenance	Flooding of houses and properties	Moderate	Council staff have good maintenance and monitoring provisions	Moderate	
10.3	Outlets, culverts, Blocked & erosion with insufficient cleaning	Flooding of houses and properties	Moderate	Council staff have good maintenance and monitoring provisions	Moderate	
10.4	insufficient cleaning	Flooding of houses and properties	Moderate	Council staff have good maintenance and monitoring provisions	Moderate	
10.5	Insufficient overland flow paths	Flooding of houses and properties	Significant	Modelling of system will ascertain flow path requirements	Moderate	Complete modelling area to reduce risk and identify overland flow paths to protect.

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
10.6	Overland Flow Paths located on private property - no maintenance (overgrown/built upon)	Flooding of houses and properties	Significant	Council staff have good maintenance and monitoring provisions	Moderate	
10.7	Overland Flow Paths Located on Councils property or roads - no maintenance (overgrown etc.)	Flooding of houses and properties	Significant	Council staff have good maintenance and monitoring provisions	Moderate	
10.8	Power failure	Nil	Low	Management and operational staff have the skills to manage natural events	Low	
10.9	Fire	Nil	Low	Management and operational staff have the skills to manage natural events	Low	
10.10	Movement failure caused by, Earthquake, landslide or settlement.	Inability to supply all or majority of demand	Low	Management and operational staff have the skills to manage natural events	Low	
10.11	Snow and wind	Possible flooding	Moderate	Management and operational staff have the skills to manage natural events	Moderate	
10.12	Hail	Possible flooding	Moderate	Management and operational staff have the skills to manage natural events	Moderate	Utilise good design parameters on pipe entry structures.
11		Asset Risks - Solid Wastes				
11.1	Landfills - Non compliance of consents	Attention by Ecan	Low	Defined post closure procedures	Low	
11.2	Landfills - Erosion of closed land fills by streams or rivers	exposure of old wastes to the environment	Moderate	Watching brief	Moderate	

No.	Weakness or Vulnerability	Risk	Gross Risk	Mitigation Strategies	Residual Risk	Improvement Required
11.3	RRP (resource Recovery Park): Power failure	Nil	Low	Management and operational staff have the skills to manage natural events	Low	
11.4	Fire	Emergency closure	Low	Redirect to temporary site or TDC	Low	
11.5	RRP - Movement failure caused by, Earthquake, landslide or settlement.	Inability to carry out service	Low	Management and operational staff have the skills to manage natural events	Low	
11.6	Snow and wind	Disruption of collection cycle	Low	Management and operational staff have the skills to manage natural events	Low	
11.7	RRP - Major Flood	Short term closure	Low	Redirect to temporary site or TDC	Low	
11.8	RRP - Chemical spill	Short term closure	Moderate	Redirect to temporary site or TDC	Low	
11.9	RRP - Dust & noise nuisance	Reputation of Council detrimentally affected	Low	Good practices and processes carried out on site	Low	
11.10	RRP - Loss of market for recyclables	Build up of recyclables	Significant	Different Markets for each recyclable	Low	Contractor wears this risk
11.11	Bin/bag collection - spillage	Litter over wide area	Moderate	Contract processes	Low	
11.12	Bin/bag collection -Loss of contractor providing service	Collection disruption	Low	Management and operational staff have the skills to manage contractual issues and resolution	Low	

Appendix E

References

The following details reports and other significant reference areas associated with the four utilities

#	Title	Issue Date	Sector	Author /Consultant
1	Water Safety Plans - Cannington-Motukaika - Hook Waituna - Lower Waihao - Otaio-Makikihi - Waihaorunga - Waikakahi - Waimate Urban	 Dec-17 * Oct-15 Nov-15 May-15 Dec-17 * Dec-17 * Feb-14	Water	Paul Roberts Water & Waste Manager * = *Submitted for approval*
2	Waimate Stormwater Investigation – Study Report	May-09	Stormwater	Opus
3	Queen Street Stormwater Issues and Options Report	Jul-17	Stormwater	Opus
4	Cast Iron Pipe Assessments	Mar-11	Water	Opus
5	AC Pipe Evaluation Reports	On-going	Water	Opus
6	Pressure Management Study	Jul-09	Waimate Water	Opus
7	Capital Assistance Programme Funding – Otaio-Makikihi	Complete	Water	Dan Mitchell Asset Group Manager
8	Capital Assistance Programme Funding – Lower Waihao	On-going	Water	P Roberts Water & Waste Manager
9	Capital Assistance Programme Funding – Hook Waituna	On-going	Water	P Roberts Water & Waste Manager
10	2020 Valuation	Sep-17	Three Waters	In-house / BECA
11	Disaster Resilience Summary Report	2006	All	COUNCIL Asset Management Group
12	Stormwater AMP 2014	2015	Stormwater	Opus
13	Solid Waste AMP 2014	2015	Solid Waste	Opus
14	Water AMP 2014	2015	Water	Opus
15	Parks and Recreation AMP 2014	2015	Parks and Reserves	Opus
16	Wastewater AMP 2014	2015	Wastewater	Opus
17	Leak Detection programme	Jul-05	Water	Detection Services
18	Waimate Water Supply Leakage Detection and Analysis Study	Jul-09	Water	Opus

#	Title	Issue Date	Sector	Author /Consultant
19	Council's Assessment of Water & Sanitary Services	Jun-11	All	M McTigue Water & Waste Manager
20	Leak Detection Programme	Oct-98	Water	Opus
21	Issues & Options for Universal Water Metering	Oct-98	Water	Opus
22	Waimate AMP Compliance Status	Feb-11	All	Waugh Infrastructure Management Ltd