Mackenzie District Council

Water Supplies Activity Management Plan

2018 – 2028

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1.0 OVERVIEW

WATER	The Water Supplies 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 future demand and support the expansion of development areas as identified by Council. **Renewals** – implement renewals strategy; including condition and criticality assessments. Ensure appropriate budgets are available to replace aging and/or deteriorating assets. **Havelock North Water Inquiry** – will have an impact on the way the water service is delivered, managed, operated, maintained, monitored and reported on.
COMPLIANCE	**Resource Consents** - Council has a number of Water Supply 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 Supplies activity is delivered via a combination of in-house resources and contracted services including a major contract for the operation and maintenance activities of water reticulation and facilities. Operation and maintenance costs will increase to ensure compliance with resource consents and DWSNZ.
PERFORMANCE	**Performance** - a comprehensive performance monitoring and reporting framework ensures that legislative requirements and other KPIs are regularly assessed and reported on.
RISK & RESILIENCE	**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

2.0 EXECUTIVE SUMMARY

2.1 What are we doing

We protect public health and the environment by supplying water to the District's population through the operation of six individual water supplies. These water supplies are located at:

- Fairlie
- Lake Tekapo
- Twizel
- Burkes Pass
- Allandale
- Albury

There is also a water supply at Pukaki Airport which is operated by Council.

Council supports this service by:

- Providing, operating and maintaining 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

2.2 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 (LGA) 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
A fit and healthy community	Providing quality potable water to agreed areas and protecting communities from water related health issues
Safe, effective and sustainable infrastructure	Providing a sustainable, efficient and effective water service
An attractive and highly valued natural environment	Providing a water service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance
A thriving economy	Demand management Timely response to system failures Maintaining quality and continuity of supply

Council has not found any significant negative effect that the water activity may have on the wellbeing of the community. However, Council is aware that the demand for greater volumes of water has the potential to deplete water resources in the district. Council will continue to identify and implement methods of making water supply services more efficient and sustainable.

2.3 Where are we headed?

Council's principal goal for water over the next ten years is:

- To ensure that adequate potable supplies of water are provided (by either private or public means) for all residential, commercial and industrial buildings (other than single buildings on a single property).

The main focus for Council over the past number of years has been to improve water treatment throughout the district to comply with the Health (Drinking Water) Amendment Act 2007. Achieving

compliance with the Act will continue during the first part of this Plan with the upgrade of the Fairlie Water Treatment Plant.

Upgraded water treatment plants are more sophisticated and compliance with the Drinking Water Standards for New Zealand require increased monitoring and reporting. Additionally, Council will continue to monitor and adapt to any outcomes of the Reports of the Havelock North Drinking Water Inquiry. At this stage Council considers that any increase in national Drinking Water Standards will be able to be met within existing budgeted works or programmed upgrades for all supplies. Additional operational costs, such as increased requirements for staff and contractor training or qualifications, will also able to be met within budgets.

In addition to the need to comply with the Health (Drinking Water) Amendment Act 2007, there is an ongoing need to improve the system to ensure an efficient and effective service.

The water system represents a significant community investment. With age, asset condition and service potential reduces 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.

Generally, the water network is in a fair state of repair and is maintained and renewed regularly, the service can be expected to last indefinitely, without any significantly abnormal costs having to be incurred.

2.4 How will we get there?

Water treatment will improve in all parts of the District to meet the requirements of the Health (Drinking Water) Amendment Act 2007. Council has been upgrading numerous treatment plants over the last number of years to meet the requirements of the Act.

Over the next ten years Council plans to:

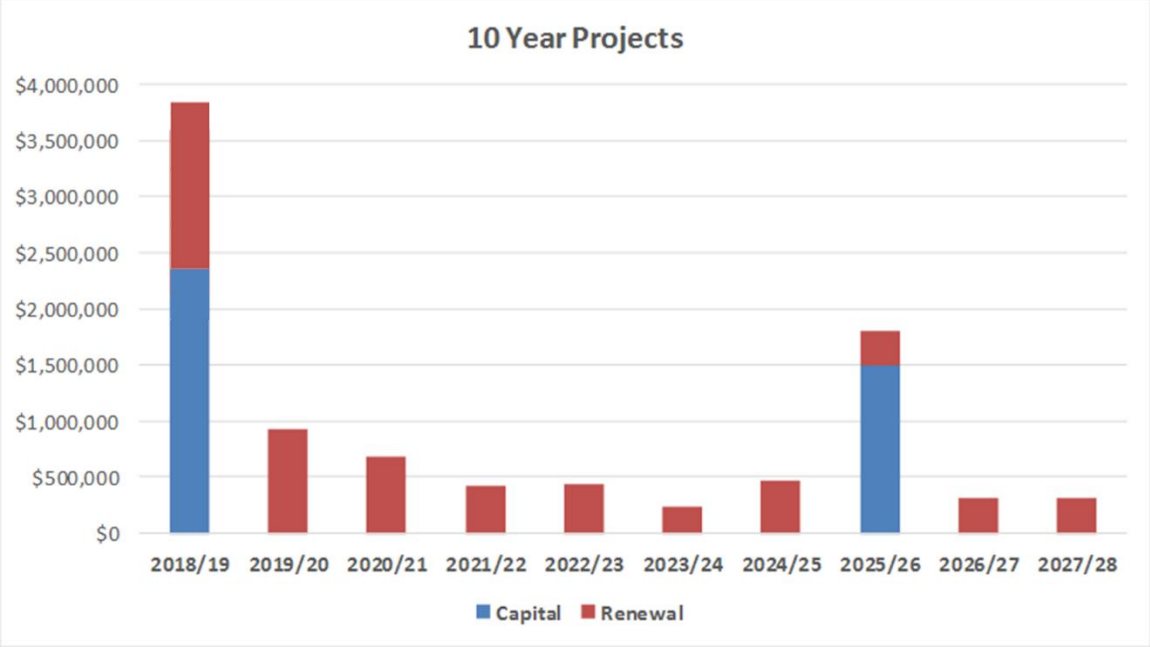
- Maintain consumer's access to water
- Upgrade treatment to supply water which meets the requirements of the Health (Drinking Water) Amendment Act 2007, and
- Continue maintenance and renewal of the water network to meet the needs of current and future consumers.

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

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

Project Description	Year	Amount
New Capital works -		
Fairlie – Water Treatment Plant Upgrade	2018/19	$900,000
SCADA installation	2018/19	$105,000
Connect Pukaki Airport to Twizel water supply	2018/19	$250,000
Fairlie – Increased storage	2025/26	$1,500,000
Total		**$2,755,000**
Renewals		
Pipe, storage, equipment, service connection renewals	2018/19	$1,485,325
Pipe, valuation, service connection renewals	2019/23	$934,500

Project Description	Year	Amount
Pipe & service connection renewals, crypto testing & modelling	2020/23	$686,380
Pipe, service connection & WSP renewals, crypto testing & modelling	2021/22	$424,380
Pipe, valuation, service connection renewals & modelling	2022/25	$441,500
Pipe & equipment renewals	2023/24	$235,000
Pipe & SCADA renewals, modelling	2024/25	$475,000
Pipe & valuation renewals, crypto testing & modelling	2025/28	$297,880
Pipe, WSP renewals, crypto testing	2026/27	$316,380
Pipe, SCADA, equipment renewals	2027/28	$310,000
Total		**$5,606,345**



Key projects:

- upgrading the Fairlie water treatment plant to meet the requirements of the Health (Drinking Water) Amendment Act 2007 in 2018/19
- renewals – refurbishment, replacement of pipes and facilities equipment for water supplies is estimated to be $5.6M over the next 10 years. All water supply 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, including collaboration with other local authorities as we did with the SCADA and Timaru District Council.

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

Council plans to take all practicable steps to comply with the Health (Drinking Water) Amendment Act 2007 and the associated Drinking Water Standards for New Zealand, and will also renew resource consents prior to expiry and report on the following performance measures.

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

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

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

Community outcome	How it contributes	Level of Service	Performance Measure
A fit and healthy community	Providing quality potable water to agreed areas and protecting communities from water related health issues	Water is safe to drink	DWSNZ compliance
Safe, effective and sustainable infrastructure	Providing a sustainable, efficient and effective water service	Water services are available and reliable	Response & resolution
An attractive and highly valued natural environment	Providing a water service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance	Water quality is maintained or improved	DWSNZ compliance Response & resolution
A thriving economy	Demand management Timely response to system failures Maintaining quality and continuity of supply		Real water losses Response & resolution Average consumption

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

People –
The Assets Group has five full time equivalent staff. The Essential Services Group provides management and engineering expertise to the Water, Wastewater, Stormwater, Solid Wastes and Roading activities. The Unit utilises 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.

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 five water supply systems. The supplies consist of water treatment plants, pumping stations, reservoirs and reticulation systems. The reticulation systems consist of pipes, valves, fire hydrants and service connections.

- Length of water mains 242km
- Number of pump stations 4
- Number of valves 723
- Number of fire hydrants 417

The latest valuation, July 2016, estimates the optimised replacement value of the treatment plants, pump stations and reticulation to be $23m.

2.7 Who pays for it?

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

3.0 INTRODUCTION

This section sets out the purpose of this Activity Management Plan (AMP) and shows the plan framework.

3.1 Purpose

3.1.1 Purpose of this Activity Management Plan

The purpose of this AMP is to outline the Council's long-term asset management approach for the provision and intergenerational management of water throughout the District. This may also be considered the overall objective of Asset Management.

This AMP is intended to be read in conjunction with the Long Term Plan (LTP) and fulfils requirements of the LGA Schedule 10.

3.1.2 Purpose of Asset Management

The International Infrastructure Management Manual 2015 (IIMM) states the purpose and scope of AM as:

1. *The objective of asset management is to meet the required level of service, in the most cost effective manner, through the management of assets for present and future customers. As highlighted by ISO 55000, good AM is about achieving best value through the right balance between cost, risk and performance*
2. *Lifecycle asset management encompasses all practices associated with considering management strategies as part of the asset lifecycle. The objective is to look at lowest long-term cost (rather than short term savings) when making decisions*

Activity Management Planning is a management tool that provides the link between strategic planning and managerial areas of Council's business and community's desired outcomes.

3.2 Goals and Objectives of asset ownership

3.2.1 Purpose of Ownership

Council provides a safe, effective and sustainable water supply system:

- to ensure that adequate potable supplies are provided (by either private or public) means for all residential, commercial and industrial buildings and also
- to ensure that adequate water supplies are available for fire fighting purposes.

The Council's overriding goal is:

"***The outcome desired by the community is to have safe, effective and sustainable water, communication, energy and transport systems in place when required, through sound long term planning and funding***".

3.2.2 Review of Activities and Funding

The LTP identifies planned activities, defines the rationale for justifying these activities, and identifies the appropriate funding source.

3.2.3 Legal Authority for Council Action

The LGA gives local authorities the full capacity, and full rights, powers and privileges, to carry on or undertake any activity or business, do any act, or enter into any transaction wholly or principally for the benefit of its district.

Along with these powers comes the requirement to identify all reasonably practicable options before making a decision, and to assess the benefits and costs of each option against the likely economic, environmental, social and cultural impacts.

Local authorities are also required to consult widely, effectively and appropriately with the community to determine the communities' wishes and to seek feedback on all potentially significant activities – not only when a particular course of action is proposed, but at the various stages of the decision-making process.

A significant aspect of this consultation process is the development of the LTP, which forms the long-term (not less than ten years) direction for all Council's activities.

Section 6.9.5 Council Strategies, Plans, Bylaws and Policies discuss the links with other planning documents and processes such as the LTP.

3.3 Links to the Council's Vision, Mission, Goals and Objectives

3.3.1 Vision

Mackenzie will be a district in which:

- We foster the unique attributes and strong sense of community that makes the Mackenzie District special.
- Our natural environment is protected and enhanced in balance with achieving social and commercial objectives.
- A dynamic economy provides employment and investment opportunities consistent with the quality of life aspirations of existing and future generations.
- Democracy is respected and equal opportunity and the rights of the individual are upheld.
- A variety of sporting, recreational, cultural, spiritual, welfare and educational resources are available to enrich the lives of our people.
- Safe, effective, sustainable water, communication, energy and transport systems are in place.
- People are encouraged to use their skills and talents for the benefit of the community.

The Council's outcomes and objectives for the water supply network are stated in the LTP 2018 – 2028.

These outcomes and objectives have been translated into various targets for maintenance and renewals to be achieved in each financial year. The outcomes are reported in each Annual Report.

The principal goal is to provide an effective, efficient, accountable and sustainable range of services that meet the needs of the residents. The water supply provides ratepayers with access to wholesome water to each residence and commercial properties in those communities served and provides for fire fighting in those communities.

The over-riding management strategy is that the water supply infrastructure as it presently exists will be maintained in the same or better state in perpetuity.

The Community Outcomes, Levels of Service and Performance Measures are discussed in Section 6.0.

3.4 Asset Management Drivers

The business drivers, which define the need, priority and scope for improved AM practices within Council may be summarised as follows:

3.4.1 Customer Service

Customers require that agreed levels of service be delivered reliably, efficiently and economically. The use of AM techniques provides the following benefits in satisfying these demands:

- focuses on identifying and satisfying customer requirements
- provides a basis for customer consultation when determining levels of service preferences by identifying the range and cost of service level and service delivery options
- enhances customer confidence that funding is being allocated in an equitable and cost effective manner; that assets are being well managed and improves understanding of service level options and requirements

3.4.2 Financial Responsibility

The LGA requires Councils to:

- determine their long term financial strategy, consider all relevant information and assess the cost/benefit of alternatives
- adopt a financial system consistent with generally accepted accounting practices
- manage assets prudently in the interests of the district and its inhabitants
- fund or otherwise provide for loss of service potential (deferred maintenance or depreciation) from July 1999

The implementation of the optimised work programmes and resulting long-term cash flow projections contained in AMP's will aid compliance with these requirements. AMPs (supported by appropriate processes, systems and data) should provide clear justification for forward works programmes (and associated funding programmes) and provide the ability to even out peak funding demands and account for changes in asset service potential.

The LGA requires that a local authority must prepare and adopt, as part of its LTP, an Infrastructure Strategy for a period of at least 30 consecutive financial years to guide decision-making. This is detailed in Section 6.9.5 Council Strategies.

3.4.3 Environmental Responsibility

Asset Management (AM) Planning demonstrates how the Council is addressing sustainable management of its physical resources while enhancing the protection of the environment as required under the provisions of the Resource Management Act.

3.4.4 Safety

AM planning addresses the Council's safety obligations through:

- adoption of appropriate design standards for the creation of new assets
- development of risk management practices

3.4.5 Economic Efficiency

The techniques incorporated into this AMP support economic efficiency by:

- providing a basis for monitoring asset performance and utilisation
- enabling asset managers to anticipate, plan and prioritise asset maintenance and renewal expenditure
- identifying under-funding of asset maintenance and renewal
- quantifying risk, leading to minimisation of high impact (financial and service level) failures and environmental effects and resulting in savings where asset renovation is less than the cost of replacement
- extending the life of an asset by optimising maintenance programmes and demand management

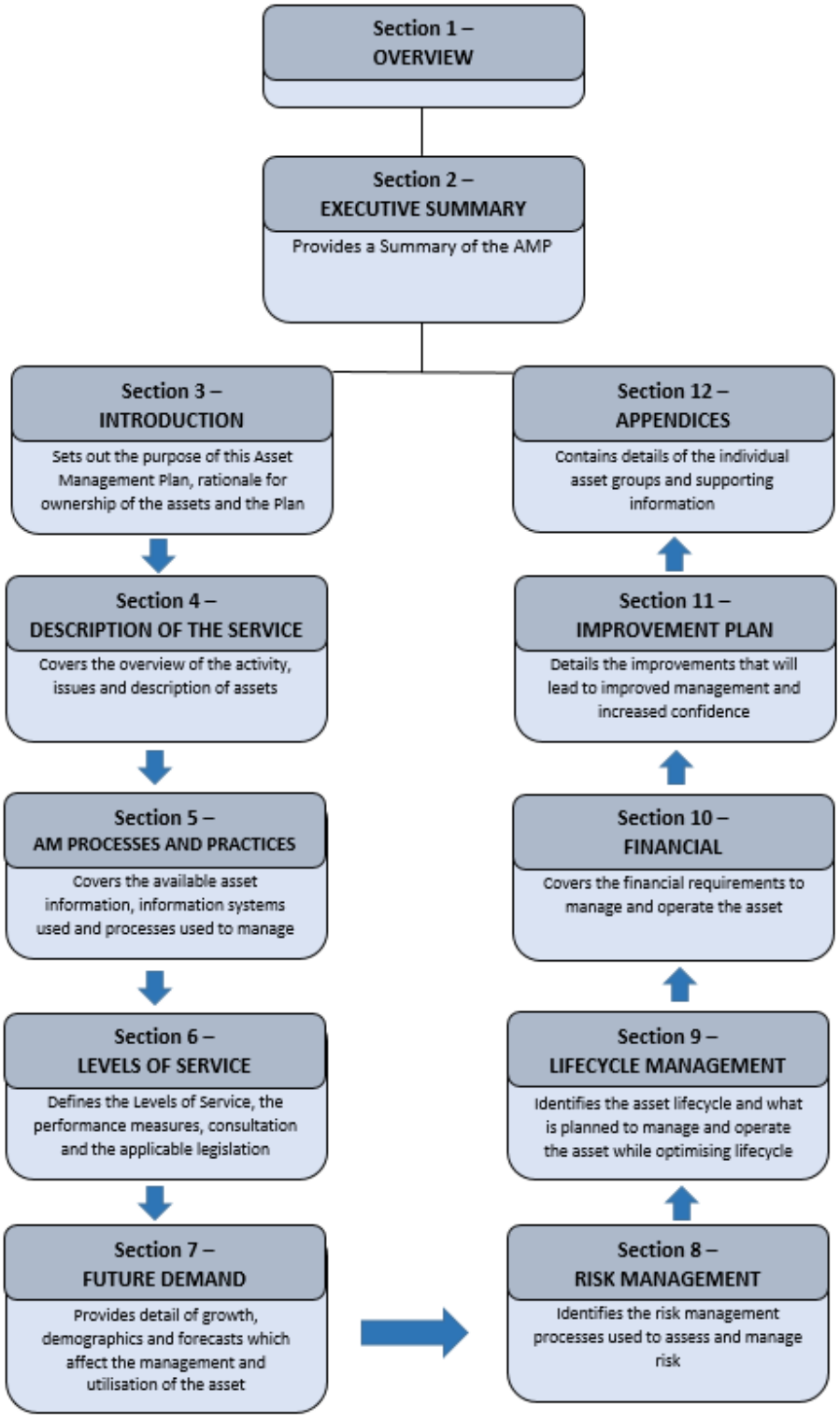
3.4.6 Achieve Strategic Goals

The Council has goals relating to growth, building communities, protecting the environment, supporting the economy and providing quality customer service.

3.5 Plan Framework

The AMP structure is graphically represented below:

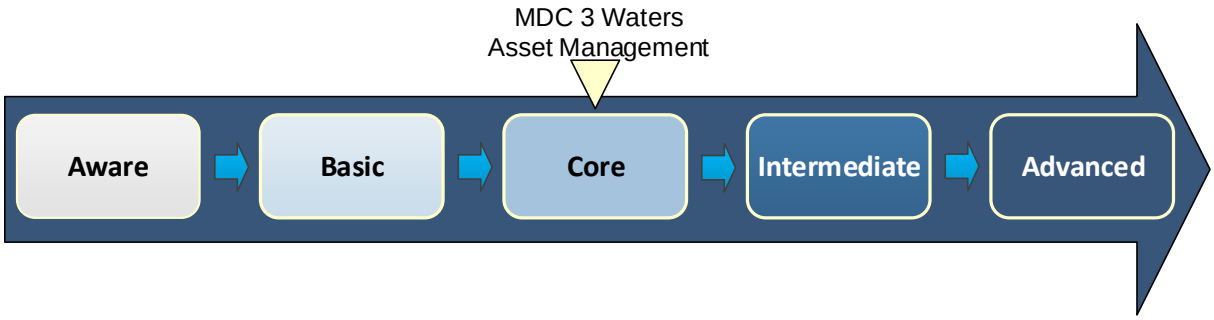
Figure 3-1: AMP Framework



3.6 Appropriate Level of Asset Management

The International Infrastructure Management Manual (IIMM) provides a summary of the different levels of asset management maturity: Aware, Basic, Core, Intermediate and Advanced. The degree of complexity differs according to an organisation's corporate needs. The level of complexity of Asset Management is dependent on the following:

- The costs and benefits to the organisation
- Legislative and other mandated requirements
- The size, condition and complexity of the assets
- The risks associated with failures
- The skills and resources available to the organisation
- Customer expectations



A core Activity Management Plan will meet minimum legislative and organisational requirements for financial planning and reporting. It provides basic technical management outputs such as statements of current levels of service, forward replacement programmes and associated financial projections.

The Council considers the required sophistication of their plan in the short to medium term need not progress beyond a "Core" planning level, as:

- the cost at this time to move to an advanced plan would provide little significant benefit to Council or its' customers
- the size, complexity and use of the assets is consistent with a rural sparsely populated district
- the risks associated with failure are low

The current Activity Management Plan generally meets "**Core**" requirements. By implementing improvement planning Council can assess the asset management performance and identify gaps to drive the improvement actions.

4.0 DESCRIPTION OF SERVICE

This section of the Plan covers the overview of the activity and the description of assets covered under it.

4.1 Overview of the Activity

The Council is a provider of "core" activities, which are the delivery of water (urban and rural), wastewater (sewerage), water races and stormwater services.

How and where water for human, agricultural, cultural and recreational uses is sustainably managed is of considerable importance. Council has consistently regarded the provision of the water services as vital to maintaining the community's health and well-being.

Council owns 6 separate water supply systems consisting of Fairlie, Tekapo, Twizel, Burkes Pass, Allandale and Albury. The Albury Water Supply is managed by the Albury Rural Water Supply Society Inc. The Council has also taken over the Pukaki Airport water supply. Council will connect Pukaki Airport to the Twizel water supply in 2018/19, so it will no longer be a stand-alone supply.

4.2 Description of Assets

Overall there are 6 water intakes, 7 storage facilities and 4 pump stations. Total length of reticulation is 240 km that varies from 15 mm to 300 mm in diameter.

Total operating costs are estimated to be $575,490 gradually increasing from 2018/19 over the ten years to $626,527 in 2028/2029. Replacement value of treatment plants, pump stations and reticulation is approximately $22,750,058 as at July 2016.

Supply	Population (UR)	Type of Supply	Source	Treatment	Storage (m^3)	Pump Stations	Reticulation (km)	Valves	Hydrants	Optimised Replacement Value
Fairlie	**693**	U	S	Cl_2	190	1	41.5	125	111	
Tekapo	**369**	U	G	Cl_2 & UV	1,100	2	22.4	136	61	
Twizel	**1,137**	U	BG	F & Cl_2 & UV	7,500	1	62.7	421	243	
Burkes Pass	**30**	Ut	CG	Cl_2	22	-	3.0	-	-	
Allandale	**291**	R	R	Cl_2	?	-	11.4	41	2	
Albury	**60 (est)**	R	C		180	-	110.2	-	-	$
Water Total	**2,580**					**4**	**240**	**723**	**417**	**$22,750,058**

Type of Supply	***Source***	***Treatment***
U = Urban (on demand)	*B = Bore*	*Cl_2 = Chlorine*
Ut = Urban (tank)	*C = Creek*	*F = Filtration*
R = Restricted	*G = Gallery*	*N = No treatment/disinfection*
	S = Spring	*UV = Ultra Violet Irradiation*
	R = River	
	WR = Water Race	

The Downlands Water Supply extends across three districts, Timaru, Waimate and Mackenzie. The Downlands Water Supply is the responsibility of the Downlands Joint Standing Committee, and managed by the Drainage and Water Unit staff of the Timaru District Council. The village of Albury is connected to the Downlands Water Supply, while the Albury Water Supply supplies water to the surrounding rural area.

4.3 Key Issues

The following key issues are associated with the Water Supplies:

- Compliance with the Health Act and meeting DWSNZ – Water Treatment Plant Upgrades
- Increased operation & maintenance costs associated with new treatment plants and monitoring
- Adequate storage capacity
- Pipe renewals
- Ongoing affordability of the water supply

The following table lists the key issues associated with each individual water supply.

Issues	Resolution
Fairlie	
Concrete pipes	Replace
DWSNZ compliance	Treatment Plant upgrade
Storage	Build reservoir
AC pipe	Planned renewals (long term)
Lake Tekapo	
Cast Iron, Galvanised Iron & AC mains	Planned renewals
Cl_2 dosing point incorrect location	Relocate Cl_2 dosing point
Twizel	
AC pipe	Renewal programme underway
Controls for the gallery	Planned project
Bore pump capacity & efficiency unknown	Investigate, test and compare against future demand
Burkes Pass	
Manage demand within consent limits	Consider changing from on demand to restricted supply
Equal access to water supply	
Galvanised iron pipe	Planned renewals
Monitoring	Install SCADA
Allandale	
Poor workmanship on PE pipes	Investigate resolution
Reservoir leak	Investigate options and implement
Didymo at source	Increased maintenance
Albury	
Ownership & compliance with the DWSNZ (Risk)	Determine management structure and update agreement

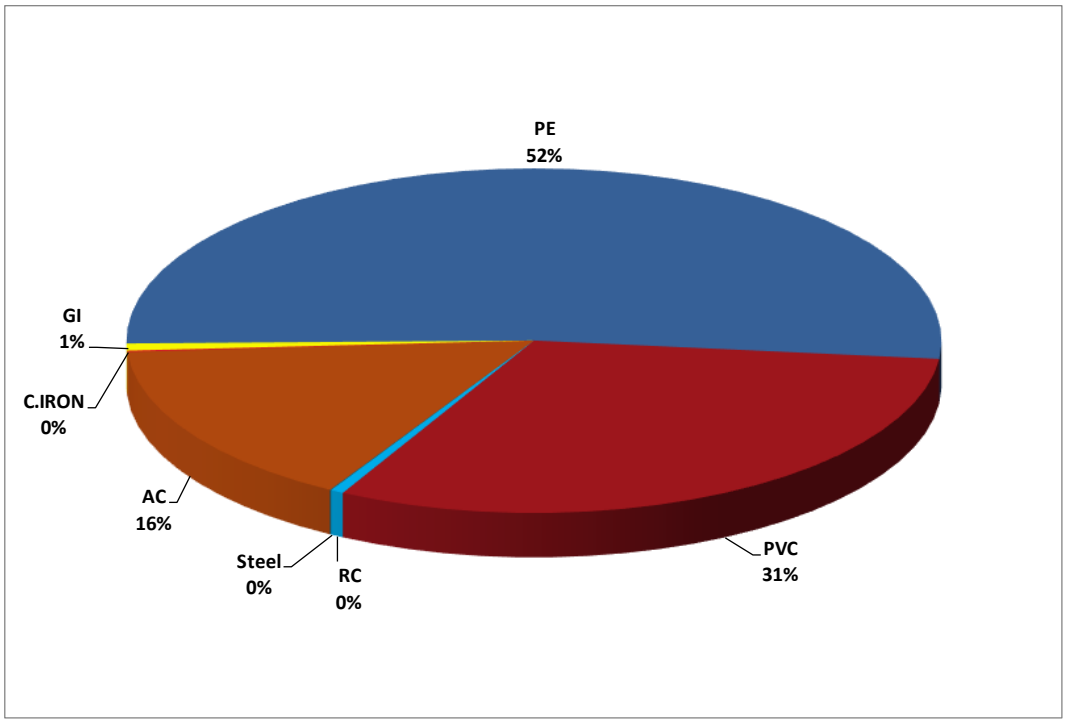
4.4 Water Reticulation

Council owns and is therefore responsible for the management of the water supplies in the District. The urban supplies in most areas provide an "on demand" service to consumers and have provision for some fire fighting from water supply mains. The rural supplies are intended to supply water for stock and domestic use on a continuous but restricted supply basis. The restricted supplies relies on small diameter pipes providing a continuous supply to consumer's boundaries and rely on the consumer's storage provision to satisfy peak domestic and stock water demand. Normal fire fighting is not possible from rural water scheme mains.

A water reticulation network can be divided into three separate groups namely:

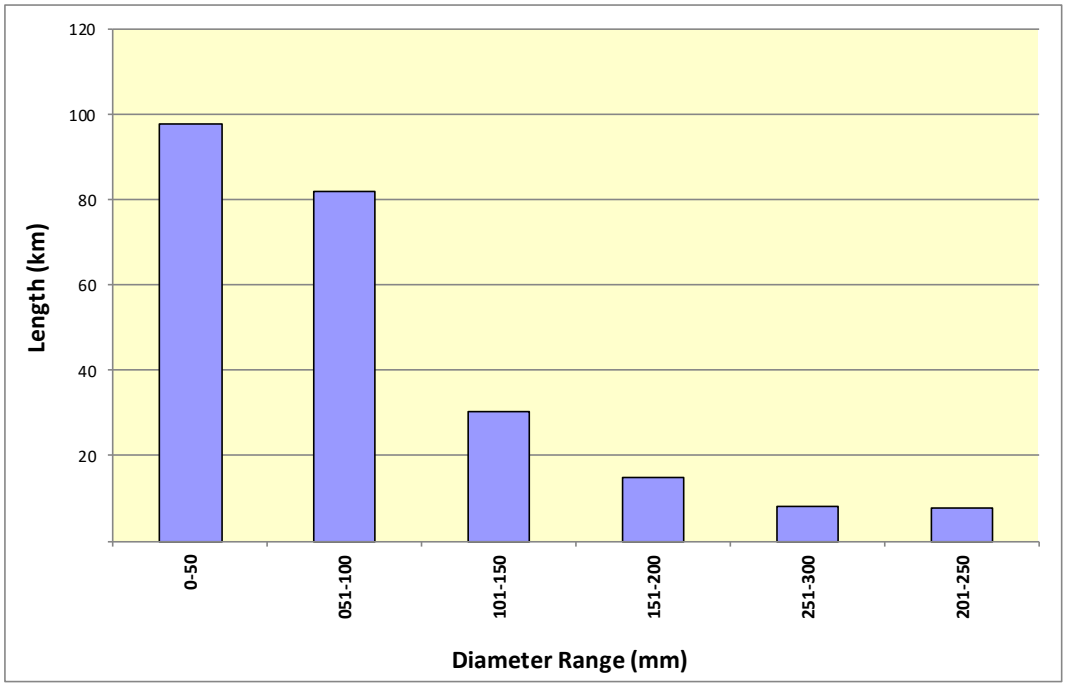
- Trunk mains –connect the water source to treatment plants, treatment plants to reservoirs, and reservoirs to demand areas. Trunk mains rarely have customer connections on them and often do not have fire hydrants. Trunk mains are part of the supply and primary distribution
- Reticulation mains – are mains, fire and rider mains, which distribute the water from the reticulation, trunk mains and in some cases, service reservoirs, to the consumer. Fire mains are fitted with fire hydrants and a minimum 100mm diameter. Rider mains are usually 50mm or 80mm diameter and normally serve less than twenty (20) properties
- Service connections - are the pipes connecting the consumer to the reticulation mains. Service connections are residential connections, commercial/industrial connections and fire connections. Residential connections are mainly 15-25mm in diameter, with commercial/industrial connections ranging from 25/50mm to large, depending on the requirements from the consumer. Fire connections provide fire flows to automatic sprinkler systems or similar fire protection systems

Figure 4-1: All water supplies materials



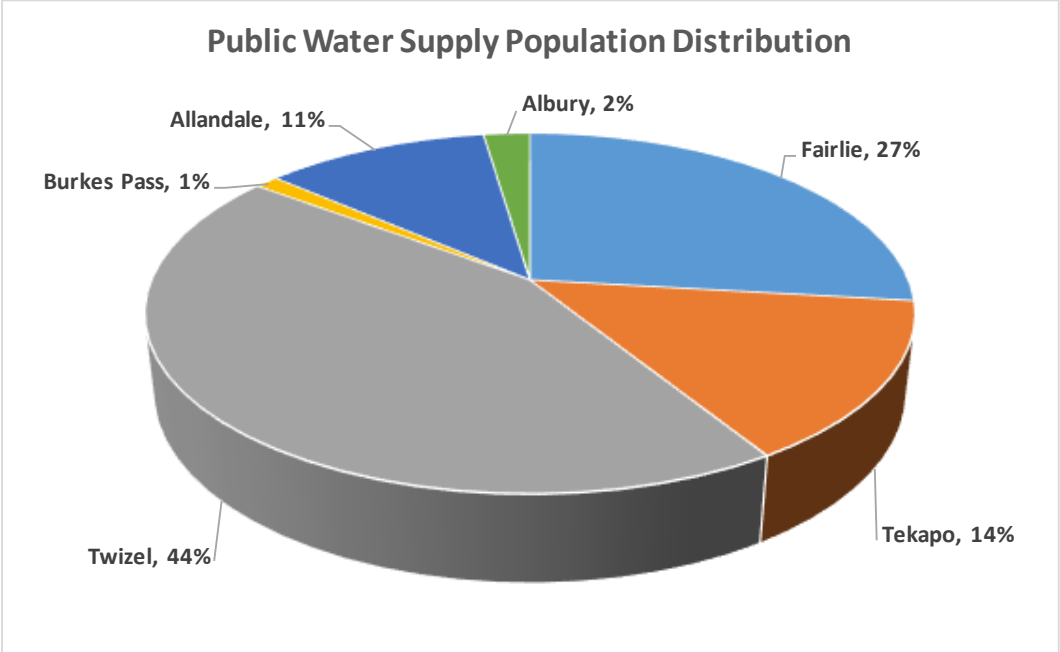
- PE make up most of the reticulation material (52%) due to the extensive PE mains in rural networks
- In the urban supplies PVC make up 47% of the reticulation material
- District wide PVC make up 32% of the reticulation material
- PE, PVC and AC are the main material types

Figure 4-2: All water supplies water main sizes



- 41% of the reticulation is 50mm diameter and smaller
- 25% of the reticulation is 100mm diameter and greater

Figure 4-3: All water supplies population distribution



4.4.1 Fire Fighting

The Fire Service Act 1975 defines Fire Districts; authorise the use of fire hydrants by the Fire Service; requires the testing of fire hydrants by the Fire Service and requires the Fire Service to advise the Territorial Authority as to the sufficiency of the fire fighting supplies and systems; and calls for the publishing of a Code of Practice by the Fire Service.

The Local Government Act 1974 requires the Council to fit fire hydrants to water mains, maintain the fire hydrants and requires the Council to keep the fire hydrants charged.

The Local Government Act 2002 allows local authorities the power of general competence. This Act specifically requires Councils to continue to provide and maintain water and wastewater services if they do so already.

The Building Act 2004 requires under Sections 46 and 47 that copies of certain building consents must be provided to the New Zealand Fire Service Commission (NZFSC) and the NZFSC then may give advice in relation to fire escape and the needs of lawful fire fighters.

The Fire Fighting Code of Practice is prepared and issued by the NZ Fire Service pursuant to The Fire Service Act 1975. It defines various water supply classifications from FW1 – FW7 (ranging from single family dwellings to hotels/businesses to supermarkets/industrial areas) by the fire hazards present and then states minimum water flows, storage volumes and pressures required. The water supply classification can change within a town between the residential properties (FW2), industrial areas (FW6/7) and depending on the floor area (fire cell) of commercial/public properties. Therefore, the demands on the water supply differ between these areas.

Current Approach
The Council is guided by SNZ PAS 4509:2008 *New Zealand Fire Service Fire Fighting Water Supplies Code of Practice for all Urban Fire Districts*. Adoption of the Code of Practice is not mandatory, but the Council uses the Code of Practice as a best practice guide and will identify and promote where applicable improvements to comply with the Code of Practice.

4.5 Water Service Lines and Water Points

Urban - In the urban water supplies the water service line is the sum of the tapping band to the main; the service line and the toby/manifold or meter.

Restricted - There are no water service lines in the restricted water supplies. The water main is connected directly to the restrictor.

4.6 Water Treatment Plants

The HAA 2007 and DWSNZ 2008 are having a considerable effect on the treatment plants of the water supplies. The DWSNZ 2008 requires the following barriers to prevent contamination of the public water supply:

- Protection of source water
- Filtering to remove particulate matter
- Disinfection to inactivate pathogenic organisms still present after filtration
- Protection of treated water from subsequent contamination

The DWSNZ 2008 states that until source water categories have been established the log credit requirement for the supply will be assumed to be 3 logs.

4.6.1 Water Quality

There are six intakes consisting of a range of water supply sources i.e. spring/creek/bore/river. These sources provide unsecure water e.g. with bacteria, protozoa and silt from time to time to the customers. Treatment Plant upgrades and associated Water Safety Plans (WSP) aim to address potential water quality issues.

Acceptance of risk through the WSP is an acknowledgement by the community and Council that they will carry some risks and deal with others through financial and Council resources. In effect the WSP prioritises work by the level of risk it poses to human health. Supply layout, operation and management all determine the risks, therefore this process while being much more focussed on supplies, also requires more staff and community involvement.

Intake and reticulation water is regularly tested for the presence of bacteria in compliance with the DWSNZ 2008.

4.7 Pump Stations

In general, the water supplies rely on gravity systems to take ground/surface water either direct into the network and/or to surface reservoirs. Pumping capacity is limited to the rate (litres per second) specific in the water supply resource consent (take and use).

Fairlie - There is a booster pump station lifting water from Nixons Road reservoir to the 25m^3 reservoir on School Road.

Lake Tekapo – Water is gravity fed from the infiltration gallery through the treatment to the reservoir. There is a booster pump on Lochinver Avenue lifting water to the higher elevations in the Lochinver subdivision.

Twizel – water is pumped from bores to the raw water storage pond, then pumped through the treatment to the treated water wetwell, then pumped into the reticulation. There is a booster pump at North West Arch that boost supply to The Drive subdivision.

4.8 Reservoirs

Reservoirs provide water capacity to even out peak demand from consumers, and where possible ensures sufficient head of water in the water distribution system. Water storage facilities include large reinforced concrete structures, bunded reservoir and small concrete/plastic tanks.

4.9 Buildings

Buildings are often an intrinsic part of the public perception of its Council. Maintenance of public buildings to a good standard throughout their lifecycle is essential to demonstrating a responsible and acceptable level of service.

Treatment facilities and larger pump stations are contained within above ground buildings. These range from timber framed to concrete block structures. The buildings usually house pump/treatment/disinfection equipment, control gear, telemetry and treatment equipment.

The buildings are recorded in the AssetFinda IMS with the building's age and replacement value. Buildings are treated as a component of the facility i.e. similar to a pump at a pump station.

Housekeeping of buildings forms part of the O&M Contract and O&M Manuals where these are available.

4.10 Critical Assets

Council engineers have not performed a documented formal criticality assessment of the infrastructure assets, but Council engineers use practical experience and skilled application of staff and service providers in consideration of critical assets. Development of a formal documented criticality assessment is included as an improvement item (**IP 1**).

5.0 ASSET MANAGEMENT PROCESSES & PRACTICES

This section covers the organisation structure, information systems used, data confidence and processes used to manage the asset.

5.1 Introduction

The Council's organisational structure and Group structure is shown below.

Figure 5-1: Council Organisation Structure

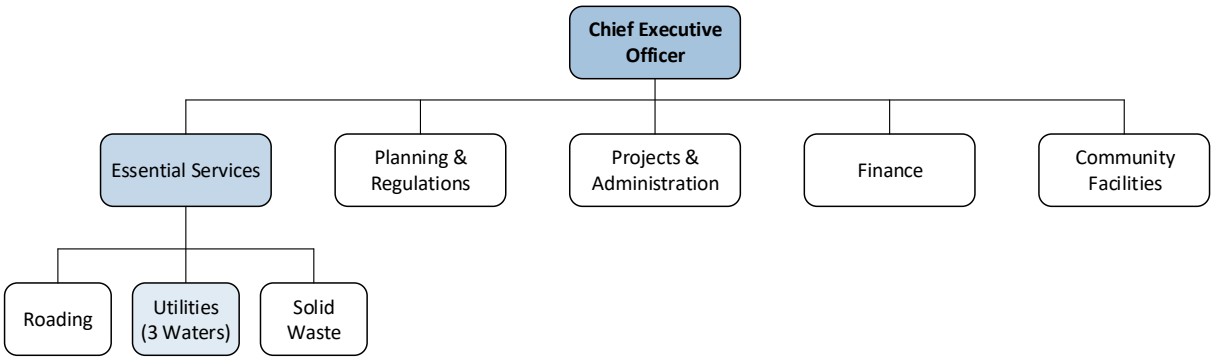
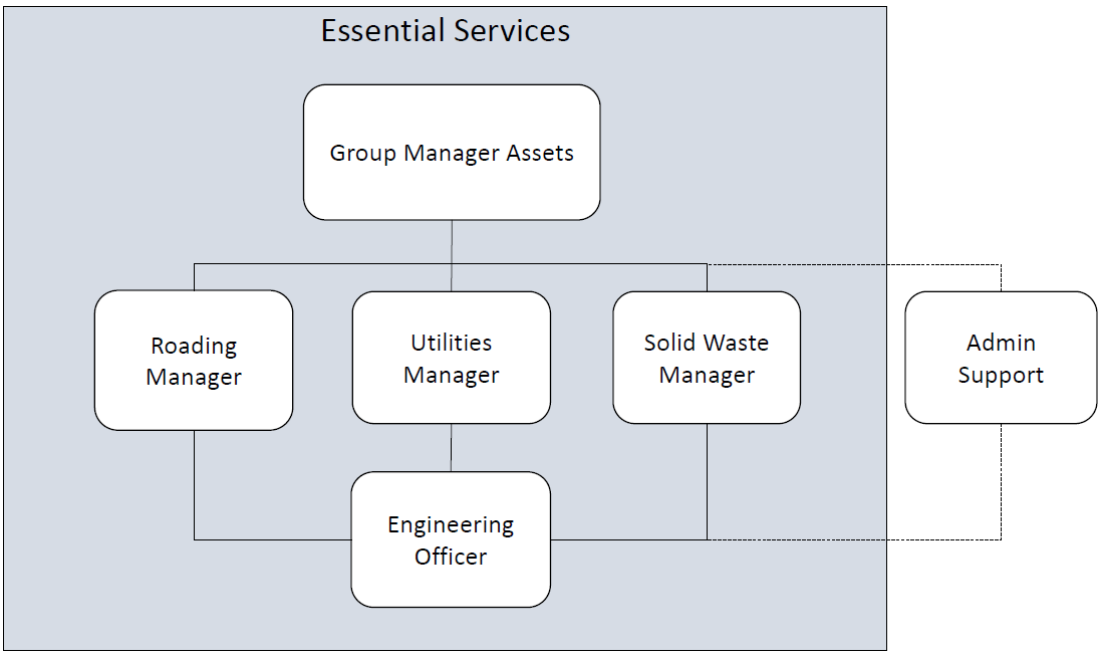


Figure 5-2: Essential Services Group Structure



The Council has an Asset Manager, Utilities Manager and a Engineering Officer responsible for the maintenance management of the Utilities network. Occasionally some elements of the work are tendered to consultancy services to manage (e.g. Pipeline replacements etc). The Utilities Manager and the Maintenance Contractors regularly inspect and monitor the network. Any work identified is directly tasked to the incumbent maintenance contractor or, if it is beyond the scope of the maintenance contract, tendered using Competitive Pricing Procedure guidelines. This may or may not need the involvement of consultants depending on the nature or extent of the work.

The Council accounts for revenue and expenditure on an accrual basis. All work under the Works Programme is identified through a job cost ledger with a significant level of breakdown using analysis

codes. The costs are summarised into the general ledger where operational/maintenance costs are identified separately to capital/renewal items.

The majority of the work (physical works and professional services) carried out as part of the total management of all Utilities Asset functions is actioned under either physical works or consultancy contracts.

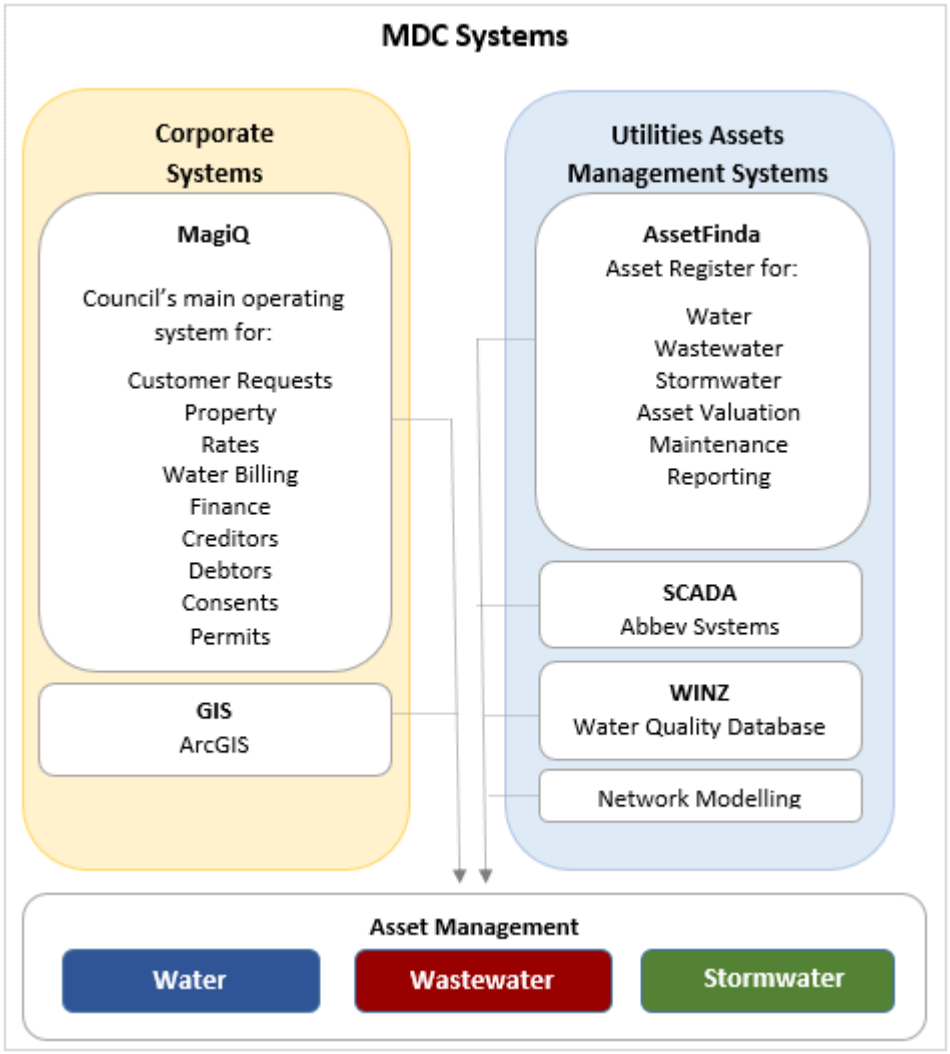
All contract works are claimed monthly against each of the contract item numbers by the physical works and professional services contractors. The Council and/or consultants confirm the payment value for all physical works and the Council confirms the payment of any professional services. The accounts job number and account codes are included on the payment certificate. These certificates are forwarded to Council for payment. The types of work that this system relates to are maintenance, renewals and capital expenditure.

There are a range of reports prepared in order to comply with the requirements of Council, and the Auditors. All external reports are prepared in compliance with Generally Accepted Accounting Principles (GAAP).

5.2 Systems

Information and Data Systems provide Council staff with the ability to obtain, store, analyse and report on the significant quantities of data that is associated with the 3 Waters. The information and data systems available to Council staff are shown below and discussed within this section.

Figure 5-3: Council Systems



Council uses Asset Finda which is a complete system for designing and managing solutions through the application of geographic knowledge. Data can be manipulated within AssetFinda, ArcGIS or exported to excel to assist in the decision making process for Water Supply network issues.

5.2.1 AssetFinda

AssetFinda is an advanced Assets Management System designed to assist Councils in whole of life management of their assets. AssetFinda is designed to meet Council's long term and statutory asset management requirements.

It is has three main components:

Asset Register: An accurate asset register is critical to any asset management system. It controls a database that utilizes GIS, Web and iPad to view, edit, analyse and add data – faster, easier and more accurately than ever before.

Asset Maintenance: Maximizes the useful lifespan of assets by managing past, present and future maintenance requirements of your assets.

Asset Reporting: There is wide variety of reports, including Asset Revaluations, Monthly & Annual Depreciation Calculations, and Predictive Modelling.

AssetFinda utilizes a Web front end, GIS interfaces and iPad apps, thus creates a flexible and user friendly interface that even the newest of users can navigate quickly. The iPad App is designed to give real-time access to data in the field. View, analyse, edit & add data, capture images, run inspections, complete works requests from anywhere in the field with in either Online or Offline mode.

Council uses AssetFinda to manage the following:

- Water
- Drainage
- Wastewater

The Asset Register contained within AssetFinda/ArcGIS (previously MapInfo) is contained within separate databases. Each database records the attribute of each asset to component level including age, condition, performance etc.

Depending on what type of asset is identified there are varying amounts of information recorded for that asset. There are gaps in the information for each asset, but we are continually gathering information on these to complete the Asset Register.

5.2.2 SCADA

SCADA (supervisory control and data acquisition) is a system operating with coded signals over communication channels so as to provide control of remote equipment. The control system may be combined with a data acquisition system.

The term SCADA (Supervisory Control and Data Acquisition) usually refers to centralized systems which monitor and control entire sites, or complexes of systems spread out over large areas. Most control actions are performed automatically by RTUs or by PLCs. Host control functions are usually restricted to basic overriding or supervisory level intervention.

Council is progressively rolling out SCADA to all its remote sites across the district. This will not only control the operation of the site but actively monitor and send the operational data back to the Fairlie in real time via telemetry.

Investigation of options found the best option to be part of the existing Timaru District Council SCADA system.

Table 5-1: SCADA

SCHEME	FACILITY	METER	SCADA REPORT											ALARMING	
			Pressure	Pump Start /Stop	Pump Hours	Level	Flow	Turbidity	FAC Residual	Energy Consumptio	pH	UV Intensity	Intruder	Outgoing Alarms	Flashing Light
Fairlie	Intake	✓					✓								
	Treatment							✓						✓	
	Reservoir	✓	✓				✓							✓	
Lake Tekapo	Intake	✓					✓								
	Treatment	✓	✓				✓	✓	✓			✓		✓	
	Reservoir					✓								✓	
Twizel	Intake														
	Treatment	✓		✓	✓		✓	✓				✓		✓	
	Reservoir					✓								✓	
Burkes Pass	Intake														
	Treatment														
	Reservoir														
Allandale	Intake	✓	✓				✓	✓						✓	
	Treatment														
	Reservoir														
Albury	Intake														
	Reservoir														

5.2.3 Network Modelling

Network modelling is an effective tool to assist in the secure and sustainable supply of water to consumers. Network modelling software aids Council staff in effectively managing the water network distribution system through simulation of the existing and future networks.

Council uses the Infoworks network model simulation programme for managing the network and identifying network inefficiencies. There are currently models for Fairlie, Tekapo and Twizel. Models are to be developed of the remainder of the supplies to provide a tool to maximise efficiency of all supplies within the District (**IP 2**).

5.3 Data Management

Key information comes into the Assets Group through work reports, as-builts, SCADA, consumers and contractors. Other information comes into the Unit via emails, journals, Government publications and the media.

Decisions on activity management, renewals and acquisitions are made in consultation with staff, council and the public as appropriate. Staff meetings are held regularly to discuss current and future plans and decisions.

Asset data integrity audits is an ongoing process and data is checked on a continual basis. As work orders are completed and submitted to be captured within the asset register the data recorded on site is compared with the asset register data. This is an ongoing process of ensuring a high level of data integrity.

General maintenance work is continuous throughout the year and responds to the needs of the network. The data from the repairs carried out is reported to Council and recorded in Council's systems on a regular basis.

New subdivisions in the District result in additions to the pipeline infrastructure. In the past there have been difficulties in capturing the resulting updated and additional asset information. Processes are in place to ensure that this data is provided electronically so that it can easily recorded in the Asset Register and available for ongoing effective Asset management.

5.4 Data Confidence

Data confidence grades are held against each individual asset within the AssetFinda asset register. These grades indicate the type of data source and the confidence in the specific data source. A summary of the confidence levels in the attributes of the assets are detailed in the following table.

Table 5-2: Data Confidence

Valuation element	Water
Asset register or database	G
Attribute details	G
Asset category	H
Optimisation information	A
Asset Lives	G
Condition	G
Where	
VH	Very High confidence
H	High confidence
G	Good confidence
A	Average confidence

Valuation element	Water
P	Poor confidence

5.4.1 Condition Assessments

Pipeline failures are inspected and reported to the Utilities Manager for assessment of the likely remaining life of the asset. In some cases the section of pipe removed during the repair process may be sent away for detailed analysis of the remaining life of the asset, as Council engineers have done for AC pipe in the past.

By taking this information on selected pipelines the data can be used to infer the condition of similar aged and type pipes to give a complete picture of the network.

5.5 Information Technology

The responsibility for asset information security rests with the IT department administrators. The data is backed up daily and backup files are stored in a secure place. Data manuals are available that explain the various procedures.

5.6 AMP Preparation

Council engaged Waugh Infrastructure Management Ltd (WIML) to assist with the review and update of the AMPs. The review consisted of the following analysis:

- Review of Council's Utilities AMPs against general industry practice as observed by Waugh Infrastructure in the past 12 months
- Review and commentary on the adequacy of the AMP structure against current industry practice and requirements
- Analysis of AMP individual section strengths and emphasis, including analysis of overall AMP 'message' versus issues identified
- ISO 55000 considerations in AMP updating, structure and messaging
- Analysis of the AMPs against the LGA – identification of any issues or 'misses'
- Provide review comments of AMP strengths and weaknesses identified, with commentary on any suggested priority changes to be completed as part of the 2018 LTP process

Following the review Council engineers consider review recommendations and use these as guidance where appropriate. The AMPs are then updated through a process of regular meetings between Council engineers and WIML staff to identify:

- Status and changes, including but not limited to:
    - Legislation
    - Levels of Service
    - Assets
    - Processes & Systems
    - Demand & demographics
    - Organisation
    - Asset Values
    - Projects
    - Council direction

This information is then used to ensure the AMP demonstrates:

- all 3 Waters (water, wastewater and stormwater) asset based activities of Council are supported through the AMP
- 3 Waters AMPs are easy to read, and follow the same agreed format
- the underlying activity management planning processes occurring for each activity, including improvements made as a result of the review

- levels of service, and show linkages to other Council planning documents
- a robust reflection of the future intentions of Council with respect to 3 Waters activities
- the financials arising from the plans reliably forecast the lowest lifecycle cost to deliver agreed levels of service for a period of no less than 10 years.

5.7 Quality Assurance

5.7.1 Audits

To establish and ensure the ongoing improvement of the quality of this Plan a series of audits are planned and includes Financial, Systems, Technical and Performance Audits.

- **Financial audits** - the LGA requires that independent annual financial audits be undertaken on the operations of Council; such audits may include all significant activities such as activity management planning. The auditor's opinions will be included in the Annual Report. All recommendations are for improvement are adopted and implemented as appropriate and resources permit
- **System audits** - are continuous and ongoing and incorporated in operational practices. However, as part of the LTP process, systems are discussed and reviewed every 3 years. This audit identifies the current status of asset management processes, systems and data and produce targets for Asset Management practices to be achieved in following years.
- **Technical audits** – include peer reviews undertaken at regular intervals to assess and identify compliance with statutory accounting requirements.
    - The quality of the Plan in terms of completeness, objectivity, logic, technical content and presentation
    - Perceived strengths and weaknesses for Plan improvement
    - Recommended specific areas for Plan improvement
    - Technical Audits may be undertaken using external or internal reviewers
- **Performance audits** establish whether the stated objectives for the operation of the asset have been achieved. Measurement of the success of the operation of the asset will be assessed using the results of:
    - Customer satisfaction surveys
    - Key Service Criteria objectives compliance

5.7.2 Knowledge of assets

The process of capturing as-built records for the on-going enhancement of asset registers is included as a requirement of the maintenance contracts. The information is supplied to Council staff for them to upgrade the relevant registers. Projects undertaken outside the maintenance contracts have a requirement within their contract for the relevant information to be collected and forwarded to Council for them to upgrade the registers. Council needs to be diligent in obtaining as built data (e.g. new subdivisions) to ensure infrastructural asset data is up to date enabling informed decision making. The Contractors staff use IPads in the field to check and capture data for updating the asset registers. This information is confirmed by Council staff prior acceptance into the asset register.

5.7.3 Accounting/Economics

Maintenance and renewal costs are recorded against broad activities in the general ledger. Valuations are currently based on straight line depreciation and assumed effective lives.

5.7.4 Risk Management

Although processes are in place for the monitoring of some critical assets (e.g. reservoirs), risk management is generally practised informally based on the knowledge of experienced staff.

5.7.5 Operations

Operational processes are documented in service delivery contracts and are subjected to regular review.

5.7.6 Maintenance

Competitively tendered contract is entered into approximately every five years to deliver the maintenance of this activity. Major new pipeline construction or replacement is tendered individually for larger budget items.

5.7.7 Optimised Lifecycle Strategy

Work optimisation for other assets is based on the judgement of experienced staff, internal inspection of pipelines and renewal projections are based on assumed economic lives.

5.7.8 Design & Project Management

Council uses established procedures during the project evaluation and design phases. Council and consultants use appropriate project management manuals such as NZTA Project Management Manual and other appropriate guidelines. Sound contract management procedures are in place. The supervision of assets constructed within sub-divisional development and subsequently taken over by the Council is considered to be adequate.

5.7.9 Suitably Qualified and Trained Staff

An important measure of this Plan's quality is the ability, experience and qualifications of the individuals and companies involved in its preparation. The Council employs staff appropriately qualified to carry out the asset management function.

On-going training is available for staff involved in infrastructure asset management and includes attendance of:

- IPWEA sponsored workshops on Asset Management
- NAMS seminars
- Annual WaterNZ conference
- Asset Management conferences
- Water Managers (NZ wide) quarterly meeting.

Council engineering staff have qualifications, skills and experience that are adequate and appropriate for carrying out the asset management function of the Council, provided specialised external support is available as the need arises.

5.8 Sustainable Practices

5.8.1 Overview

Sustainability can be defined as meeting the needs of the current generation without compromising the ability of future generations to meet their own needs.

There are increasing signals from Central Government that the focus on more efficient use of water, including better management of its demand, will intensify. Regional Councils are imposing tighter water take consent conditions to ensure sustainable use of water. Increasing demand will lead to a need for investment in additional infrastructure.

The LGA requires Councils to take a sustainable development approach. In doing this Council is required to take into account the following:

- The social, economic, and cultural well-being of people and communities
- The need to maintain and enhance the quality of the environment
- The reasonable foreseeable needs of future generations

5.8.2 Sustainability and Lifecycle

Asset management is designed to improve decision-making about assets to enable the better management of existing and future assets. Effective asset management ensures that agreed levels of service are met and risks, including public health, financial and environmental are minimised, while costs are optimised. Evidence based decision-making is crucial to achieve asset management and sustainability goals. Having the correct asset information available is important to support the decision-making process. It is thus clear that lifecycle costs is part of and supports asset management and sustainability.

Asset management practices include action that recognise the need for environmental, economic, social and cultural sustainability, that is –

- The natural environment needs to be preserved for future generations and not degraded as a result of Council's asset management operations and development projects
- Financially, there is a limit to what ratepayers, developers, and therefore Council, can afford. Expenditure needs to remain within this limit and the costs need to fall equitably on the generations which derive the benefits
- Social relationships between individuals, interest groups and local government are valuable, and Council needs to facilitate and encourage this by providing infrastructure
- Our history, customs and creativity are valuable to us. Their preservation and enhancement over time is facilitated by providing venues where they can be practiced, preserved and displayed

Sustainability is considered in all tasks performed by Council. All water supplies are managed, operated and maintained to an optimum level appropriate for that specific water supply and task. Council endeavours to always act in the best interest of the community.

Council considers the following under sustainability:

- Efficient use of energy within facilities
- Water takes are consented
- Efficient operation of facilities
- Improving effluent quality and/or improved disposal methods
- Collaboration with other Councils

Council also considers collaboration with other Council as sustainable practice. Sharing services/resources/systems/information is key to providing a sustainable service to the community, while maintain a district's own identity. SCADA is a good example in the 3Waters area. Investigation of options found the best option to be part of the existing Timaru District Council SCADA system.

5.8.3 Significant Negative Effects

The negative effects that the water supply activity may have on the social, economic, environmental or cultural well-being of the community are tabled below. The table outlines the existing or proposed approaches to address these.

Table 5-3: Significant Negative Effects

Negative Effect	Impact on well-being				Comment
	Economic	Social	Environmental	Cultural	
Water Treatment Plants					
Noise	None	None	None	None	
Discharge of odour	None	None	None	None	Generally, odours are not generated by this activity. In some cases, chlorine is detected by consumers in drinking water
Pump Stations					
Noise	Minor	None	Minor	None	All pumps are contained within structures with appropriate sound proofing where required
Reticulation					
Overflows	Moderate	Minor	Minor	Minor	Overflows from mains breaks are infrequent and cause mainly short term disruption to consumer supplies
Storage/Reservoirs					
Visual	Minor	Minor	Minor	None	The size and location of reservoirs have a visual impact
Water takes					
Increased demand	Moderate	Minor	Moderate	Minor	With positive growth the demand for water will increase, but will be managed through monitoring demand, water reduction strategies and securing water sources
Competing demand	Moderate	Moderate	Moderate	Moderate	Water allocation is becoming more of an issue. Council take is determined through its resource consents.

There are no significant negative effects as a result of the water activity.

5.9 Environmental Management

A very important aspect of the water supply activity's function is to ensure that the District's natural water sources are managed responsibly. Resource consents are held for various activities relating to the water activity such as for the taking of water.

The Mackenzie district is under the authorisation of Environment Canterbury (ECan).

5.9.1 Schedule of Resource Consents

The following table lists the water resource consents that are presently held for the taking of water and land use:

System	Consent #	Description	Expiry Date	Allowable take
Fairlie	CRC040921	Take and use water	19 August 2044	28 litres/s 2,420m^3/day 725,000m^3/year
Lake Tekapo	CRC971413	To erect structures	13 August 2033	Not applicable
	CRC971414	To take groundwater	13 August 2033	40 litres/s
Twizel	CRC042741	Take and use water	20 August 2047	130 litres/s 3,942m^3/day (annual average) 1,440,000m^3/year
Pukaki Airport				
Burkes Pass	CRC971594	to divert water for Burkes Pass community supply	29 October 2032	6 litres/s 520m^3/day
	CRC971595	to discharge by-wash water to Paddy's Market Stream	29 October 2032	6 litres/s 520m^3/day
	CRC971593	to disturb the bed of Paddy's Market Stream	29 October 2032	Not applicable
Allandale	CRC020124.1	Take and use water	19 October 2030	12 litres/s
Albury	CRC990685	To divert water	20 January 2034	Not applicable
	CRC990686	To take water for community water supply	20 January 2034	12.6 litres/second
	CRC991431	To disturb, and place and maintain structures	20 January 2034	Not applicable
	CRC991418	to discharge water	20 January 2034	Not applicable

Resource consents are required for the abstraction of all natural water that is used for public supplies. These usually stipulate the quantity of the water that can be taken, and a maximum rate for its extraction. When water is treated and backwash is part of the process, consents are also required for discharge of the backwash water.

5.9.2 Consent Monitoring and Reporting

Consent reporting within the Council for water supplies is the responsibility of the Utilities Manager. Information for consent compliance is provided by the Regulatory Department and the Contractor (information drawn from SCADA) and forwarded to Environment Canterbury.

The resource consent compliance for water supplies is considered to be good, with no abatement notices having been received.

6.0 LEVELS OF SERVICE

6.1 Defining the Levels of Service

Activity management planning requires a clear understanding of customer needs and preferences and the minimum obligations that must be met. A key objective of this activity plan is to match the level of service provided by the asset with the expectations of the customers given legislative, financial, technical and safety constraints. Service standards, set to meet this objective, provide the basis for the life cycle management strategies and work programmes identified in Section 7.

The service standards defined in this section will be used:

- to ensure legal and legislative requirements are met
- to inform customers of the type and level of service offered
- as a focus for the asset management strategies developed to deliver the required level of service
- as a measure of the effectiveness of this Plan
- to identify costs and benefits of the services offered
- to enable customers to assess the suitability, affordability and equity of the services offered

The Council's levels of service for water supply reflect current industry standards and are based on:

- Customer Research and Expectations: Information gained from the community on their expectations of quality and price of services
- Strategic and Corporate Goals: Provide guidelines for the scope of current and future services offered, the manner of service delivery and define specific levels of service which the Council wishes to achieve
- Legislative Requirements: Environmental standards, regulations and acts that impact on the way assets are managed (i.e. resource consents, building regulations, health and safety legislation, LGA)
- Demands on the Network: Service demands that are placed on the network.

6.2 Activity Goals and Objectives

The water supply network must be operated to meet Council policy, objectives and various Environment Canterbury requirements. Council's goals and the community's expectations are stated in the LTP which provides the framework for the operation and development of the Water Supply infrastructural assets.

6.2.1 Organisation Mission, Goals and Objectives

The Council's mission statement is: "**FOSTERING OUR COMMUNITY**". The particular aspects of the overall mission that relate to the water supply activity are:

SERVICE
We are a service organisation. Providing efficient and cost-effective services is our prime responsibility.

SUSTAINABILITY
We are committed to the sustainable management of all the resources of the district.

6.2.2 Water Supply Activity Goal and Principal Objectives

As outlined in Council's LTP, the water supply contribution to achieving Council's governance goal and the community outcomes identified in Section 2 is through the Water Supply Activity Goal:

> To ensure that adequate potable supplies of water are provided (by either private or public means) for all residential, commercial and industrial buildings (other than single buildings on a single property).

The specific Objectives of the Water Supply activity are as follows:

- To ensure all of the public systems provide a high quality water treatment and distribution service;
- To anticipate the time when it may be necessary to extend, upgrade or renew the various existing public water supply schemes, and to plan accordingly;
- To anticipate the time when it may be necessary to provide public water supply schemes in communities at present not serviced, and to plan accordingly;
- To ensure the maintenance of the public infrastructural assets in perpetuity, so that there is no diminution in value, and to forecast the estimated future cost of so doing; and
- To put in place a sound management regime for all matters relating to the supply of potable water

6.3 Current Levels of Service

Levels of Service (LOS):

- Define explicitly the standards required from the water supply system
- Are an expansion of the corporate objective, as previously stated
- Will largely shape Council's detailed planning

In providing water services to the community Council must balance the standard of service desired with the cost of providing the service. The Levels of Service are designed by Council to represent the best level of service possible for a cost that the community can afford and is willing to pay.

The following table explains the difference between Urban and Rural Water Supply types:

Supply Type	Definition	Application
On demand	**A supply of water which is available on demand directly from the point of supply subject to an agreed level of service**	Urban supplies
	Water is supplied at pressure to the property boundary and is sufficient for domestic and industrial use	
	Water is supplied at pressure and flows sufficient for fire fighting	
	Supply is for domestic, business and industrial purposes	
Restricted	**A small continuous flow of water supplied by a flow control device/restrictor across an air gap separation**	Mainly Rural Supplies, but also zones within or on the fringes of Urban Supplies
	Supply is an agreed volume of water over a 24 hour period to a storage facility	
	Supply is for domestic and stock purposes	

The Levels of Service that Council is aiming to achieve in future are shown Table 6-1: Community Outcomes & Levels of Service linkage.

It should be noted that the target LOS are not intended as a formal customer contract. Rather Council's responsibility is initially to aim to achieve these levels and then to achieve them more cost effectively through a process of continual improvement

Local authorities are required to use a set of mandatory non financial performance measures when reporting to their communities. The aim is to encourage greater public participation in decision-making processes. The performance measures will do this through providing better information about the levels of service.

Table 6-1: Community Outcomes & Levels of Service linkage provides the linkages between the Community outcomes, Levels of Service and Performance Measurement.

6.3.1 Changes to Levels of Service

In accordance with 261B of the LGA, non-financial performance measures have been adopted which require local authorities to report on the performance of the key activities of water supply, wastewater, stormwater, flood protection and roads annually from 2015/16.

The Council has developed its own LOS and associated performance measures in the past, but in light of the Non-Financial Performance Measures Rules 2013 Council will only use the LOS statements aligned with these new performance measures.

Council will only report on the mandatory measures as this covers the key expectations in terms of the delivery of the service.

6.3.2 Levels of Service

Table 6-1: Community Outcomes & Levels of Service linkage

Community outcome	How it contributes	Level of Service	Performance Measure
A fit and healthy community	Providing quality potable water to agreed areas and protecting communities from water related health issues	Water is safe to drink	DWSNZ compliance
Safe, effective and sustainable infrastructure	Providing a sustainable, efficient and effective water service	Water services are available and reliable	Response & resolution
An attractive and highly valued natural environment	Providing a water service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance	Water quality is maintained or improved	DWSNZ compliance Response & resolution
A thriving economy	Demand management Timely response to system failures Maintaining quality and continuity of supply		Real water losses Response & resolution Average consumption
A democracy that upholds the rights of the individual	Not applicable to water		
A supportive and contributing community	Not applicable to water		

6.3.3 Secondary Levels of Service

These are technical measures included in the Infrastructural Services Contract:

MDC Event	Service Standard
Response	Provide a 24 hour, 365 day per year call out service
Response Time	Repairs completed within two working days Time for reinstatement of service following call out. • During working hours – 6 hours. Outside working hours – 9 hours.
Availability/Disruption to Service	No disruption exceeds 8 hours. Percentage of disruptions where service is out for less than 6 hours. (It should be noted the above duration would not apply for an extraordinary event such as a major earthquake or flood)
Quantity	Flow at point of supply: • Fairlie – 15 l/min • Lake Tekapo – 25 l/min • Twizel – 25 l/min Pressure • Fairlie – 70 kpa • Lake Tekapo –200 kpa • Twizel – 250 kpa Tank Supply • All – 1800 l/day

The Council is committed to maintaining and improving the network where current levels of service may not be being met. Analysis of the network condition over time provides an indication of asset behaviour and performance achievement. The following table outlines the measures that will be used to determine the network condition and performance.

Measure	Explanation	Method of Measurement	Target values	Response times
All water supply facilities function satisfactorily	Water supply facilities, such as: -Pipelines -Valves -Hydrants -Restricted supplies -Treatment Facilities	Visual inspection Operation Measurement	Dead end pipelines flushed. Valves operated to ensure operation annually. Hydrants operated to ensure operation annually. Occasional monitoring of tank and other restricted supplies. Treatment facilities regularly checked for correct operation	As required Annually Annually Inspected at least annually Weekly

6.4 Levels of Service Development

The current LOS being provided has been established through the Council's LTP process. This would suggest there is approval with the current regime, although this could also be interpreted as an over provision of service in the context of Council's broader service profile.

Options to further examine this issue in the future could include:

a) Monitor and interpret customer feedback through customer feedback and complaints. This information can be analysed for any trends or common factors related to current service levels (e.g. number of complaints received)

b) Engage customers in a formal process. There are a number of mechanisms to achieve this from public meetings to surveys to focus groups. This may include the use of documented feedback processes. In all methods the clear description of different LOS options, fully costed, is a prerequisite to meaningful feedback

c) Engagement with key stakeholders. These include the Regional Council, and others. Again good input information to these engagements will produce valuable feedback.

6.4.1 Levels of Service Definition

The current LOS are documented as a combination of:

- LTP LOS documentation based on real or perceived customer feedback
- Contract processes which describe some elements of the quality of service provided, mainly travelling surfaces and intervention levels

This can be improved by:

a) Augmentation of existing information e.g. clearer relationships between alternative service levels for quality, pressure etc and their associated costs.
b) Utilisation of a LOS model defining quality, quantity, location, and timeframe. This would be based on the IIMM and define the water supply service in terms of Accessibility, Health and Safety, Quality, Reliability and Responsiveness, Sustainability, Functionality.

These would form the basis for a consultative process as outlined above.

6.5 Performance Measures

The Council has suite of performance measures agreed with the community which are reported on annually by the Annual Reports. This performance is measured as per contractual requirements and changes in indicators such as increased flooding or maintenance. There are also a suite of mandatory performance measures covering transportation, wastewater, water and stormwater.

These mandatory performance measures have been adopted by Council for inclusion in the 2018-28 LTP and no other measures will be used.

Table 6-2: Levels of Service, Performance Measures, Targets

Levels of Service	Performance Measure	Actual 2013/14	Target 2015/16	Target 2016/17	Target 2017/18	Target 2018-2025
Water supplies are available and reliable	The percentage of real water loss from the networked reticulation system.* [1]	New Measure	Estimated target: less than 25%	Estimated target: less than 25%	Estimated target: less than 25%	Estimated target: less than 25%
	The median response times to attend a call-out in response to a fault or unplanned interruption to the	New Measure				

[1] There are known and recorded pumped volumes supplied to each scheme. However at present the district's urban schemes are each made up of non-metered and metered supplies, and are a mix of on-demand and restricted supply. This means that there is currently no way to measure a difference between supply and consumption. The Council is able to make a coarse estimate only.

Levels of Service	Performance Measure	Actual 2013/14	Target 2015/16	Target 2016/17	Target 2017/18	Target 2018-2025
	network reticulation system:					
	a) Attendance for urgent call- outs: from the time that the Council receives notification to the time that the service personnel reach the site, and		a) 2 hours	a) 2 hours	a) 2 hours	a) 2 hours
	b) Resolution of urgent call-outs: from the time that the Council receives notification to the time that service personnel confirm resolution of the fault or interruption, and		b) 12 hours	b) 12 hours	b) 12 hours	b) 12 hours
	c) Attendance for non-urgent call-outs: from the time that the Council receives notification to the time that the service personnel reach the site, and		c) 72 hours	c) 72 hours	c) 72 hours	c) 72 hours
	d) Resolution of non-urgent call- outs: from the time that the Council receives notification to the time that service personnel confirm resolution of the fault or interruption.*		d) 120 hours	d) 120 hours	d) 120 hours	d) 120 hours
	The average consumption of drinking water per day per resident within the District.*	New Measure	Less than 1.3m³ per person per day within urban schemes.	Less than 1.3m³ per person per day within urban schemes.	Less than 1.3m³ per person per day within urban schemes.	Less than 1.3m³ per person per day within urban schemes.

6.6 Affordability and Willingness to Pay

Hand in hand with the current LOS vs. Desired LOS is the issue of cost. This needs to be addressed at two levels:

a) Cost for different Levels of Service options within the Water Supply Activity
b) Cost of the Water Supply activity within the total Council programme.

The first level can be addressed using the options outlined above where fully described and costed service level options are consulted with the community.

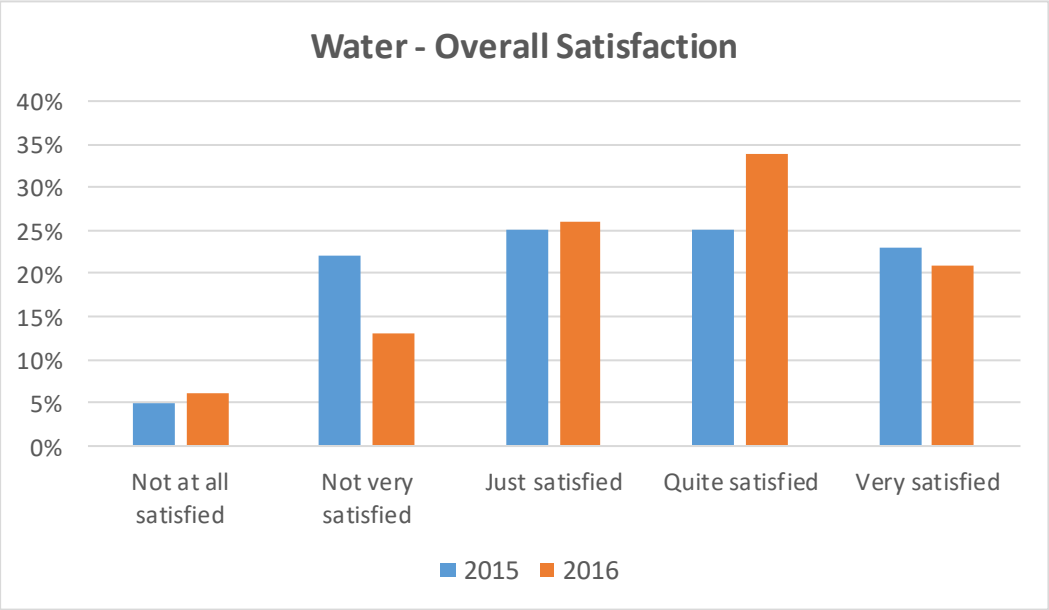
The second level needs to be addressed as an assessment of the relative contribution the Water Supply Activity makes towards the achievements of Community Outcomes at the current level vs. greater or lesser levels of service.

6.7 Reporting

Measurement and reporting of Customer LOS is achieved through the annual customer satisfaction survey. The trend across the results of each year's survey provides a long term view of Council's performance.

The Ratepayers Opinion Survey 2016 provides useful commentary on issues that concern residents.

Figure 6-1: Water Service - Satisfaction Rates



The survey identified that 81% of the respondents were satisfied with the overall water supply activity. This is an 8% increase in satisfaction levels from the 2015 survey. Dissatisfaction responses identified a dislike to chlorine in the water, unpleasant taste, water quality not good enough and low pressure.

Reporting on the achievement of Customer LOS can be compared across different activity groups to provide internal benchmarking within Council, and combined to provide an indication of the contribution towards community outcomes and well-beings. Water quality among others such as swimming pools and stormwater had the largest increases in satisfaction since 2015.

Measurement and reporting of Technical Service Standards is essential for the prudent management of the water activity. With regard to water quality in particular, frequent monitoring and reporting is integral to meeting the Drinking Water Standards for New Zealand.

6.8 Consultation & Communication

6.8.1 Consultation

There are a number of instances where Council will undertake consultation at a District wide or comprehensive level. This generally occurs when there is a requirement to use the Special Consultative Procedure as prescribed in the LGA. This occurs in the following situations:

- Adopting or amending the LTP. The LTP is reviewed every three years with the Annual Plan giving effect to that Plan in the intervening years. The Council must consult on community outcomes at least every six years.
- Adopting, amending or reviewing a Bylaw
- Proposing a change in the way a significant activity is undertaken.
- Significant decisions not already provided for in the LTP.
- Termination of a service.

The Council will decide that some decisions are significant and will therefore require a more rigorous assessment of options and a more robust consultative process. Those decisions may be treated as amendments to the LTP and can be dealt with either separately or as part of the Annual Plan process.

6.8.2 Communication

In operating and maintaining water services Council consults and communicates with the community in various ways.

- Significant projects are notified in the printed media by means of a formal media release in the local papers
- For the duration of significant projects a weekly/fortnightly/monthly advertisement maybe placed in the local papers. This may include a short update on progress, an accompanying map showing the work area
- all consumers associated with the supply interruption maybe notified through a letter drop
- critical and key customers may be identified and notified 72 hours prior work affecting their supply
- the Fire Service may be notified of work/large scale interruptions
- use of the Facebook page or website

This ensure customers stay informed of the project, its progress and how and when they will be affected.

6.8.3 Key Stakeholders

The Council has a history of actively communicating with the public via:

- Extensive public consultation
- Customer surveys
- Project teams for specific significant community projects
- Council website and Facebook page

This Plan recognises the following stakeholders:

Key stakeholders
The Council as the ultimate owner of assets. Other key stakeholders of the Water Supply network include:
Regional Council Owners and operators of inter-connecting or separate Water Supply networks
Funding Partners
Funding is provided by several parties and in particular the following are significant contributors:
Ratepayers – Rates provide funding for maintenance and operation of the networks Developers – By constructing infrastructure and vesting it in the Council plus providing the required financial contributions

Customer Groups	Description	Customers
Associated service providers	These are other service providers who rely on the Water Supply network	Contractors Commercial operators
Users	Those who directly benefit from the service	Ratepayers Residents and holiday home owners Commercial properties Industrial users
The Wider Community	Non-users that are affected if the service is not provided	Ratepayers and residents Tourists Local businesses

6.9 Legislative Requirements

In providing water supply services the Council monitors central government and industry direction for 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.

The following themes are signalled:

Theme	Source
Information • how local authorities identify the right information that provides the evidence on what they need to understand about their assets, and how they collect, capture, and share that information? • how well local authorities are managing and planning to provide services now and into the future? • how good is the knowledge on asset condition and how is it used to determine the nature and frequency of maintenance and renewals? • how is asset information used to make decisions and enable sustainable service delivery?	Office of the Auditor General (multi-year themed work programme 2016/17)
Water *Our proposed theme for 2017/18 is Water. We are interested in water because it is of significant and growing interest to Parliament and citizens here and internationally, in terms of both water quality and quantity. It is a broad topic that spans central and local government, the environment, the economy, and society.* *It therefore provides a focused and useful introduction to our proposed 2018/19 theme of Sustainable development. We are currently considering the scope of work under our proposed sustainable development theme. (*Source – OAG 2016/17 Annual Plan*)*	Office of the Auditor General (multi-year themed work programme 2017/18)
Havelock North Drinking water supplies are regulated under the Health Act 1956 and the source of drinking water is regulated under the Resource Management Act and National Environmental Standards for sources of drinking water. The National Environmental Standards are given effect to by the Regional Council. Following the widespread outbreak of gastroenteritis in Havelock North in August 2016, the Government announced an Inquiry into the Havelock North water supply contamination incident. The report from the final stage of the Inquiry was released in December 2017. The key matters for consideration outlined in the report are the improvement of the safety of drinking water in New Zealand, lessons to be learned from the Havelock North outbreak, and changes which should be made to achieve those goals. In its report the Inquiry made a series of recommendations which are now under consideration by the Government.	Department of Internal Affairs – Better Local Government
Improving New Zealand's Water, Wastewater & Stormwater Sector A position paper prepared by LGNZ identifies three areas for improvement within the Water Service area: • increasing need to renew and replace assets, • Service providers are being asked to meet higher standards of quality • There is not enough information on performance	Local Government NZ
Metadata Standards To ensure the correct asset data is collected and in the correct manner, LINZ and MBIE gained funding from Treasury to work with local councils and central government agencies to develop national metadata standards for the 3-waters (potable, waste and storm) network, and for residential and light commercial buildings. Draft standards have been developed for capturing, describing and storing data for potable water, and residential housing and light commercial buildings. The roll out of these data standards is expected to start mid 2017.	LINZ & MBIE
Earthquake damage & pipe renewals	Water NZ

Theme	Source
The 2011 Canterbury earthquake has led to a major project which could impact on cost of replacing water pipes. A joint venture between Water New Zealand, the Institute of Public Works Engineering Australasia (IPWEA) and the Quake Centre based at Canterbury University, is aimed at providing tools to enable better and more nationally consistent decisions on where and how to renew and replace water piping. This venture may result in significant savings through improved decision-making. The first stage aims to bring together guidance documents and tools to enable Council staff to make evidence based decisions relating to the management and renewal of their drinking, storm and wastewater pipe networks. The programme covers inspection, maintenance and renewal strategies	

6.9.1 National Strategies & Plans

National policy statements are issued by the government to provide direction to local government about matters of national significance which contribute to meeting the purpose of the Resource Management Act 1991.

National Infrastructure Plan

The National Infrastructure Plan 2015 (NIP 2015) is the third National Infrastructure Plan to be released by the Government.

The NIP 2015 confirms the Government's long term vision for infrastructure and is designed to reduce uncertainty for businesses by outlining the Government's intentions for infrastructure development over a 20 year timeframe. It provides a framework for infrastructure development rather than a detailed list of projects and it includes a series of actions.

The NIP provides a Vision for New Zealand's Infrastructure that:
"By 2045 New Zealand's infrastructure is resilient and coordinated and contributes to a strong economy and high living standards."

The NIP 2015 is the first Infrastructure Plan that details a comprehensive suite of actions that will be undertaken to deliver on the new approach. The actions are focussed on what central government, local government and infrastructure peak bodies will do, reflecting the collaborative effort required to change how infrastructure is planned, developed and managed in New Zealand. Significant policy work and consultation will be required to develop the detail. The following list of actions are taken from the NIP 2015.

The Action Plan for **Asset Management** means:'

- Local government will have a long-term view of their investment requirements to make more informed decisions. The Local Government Amendment Act 2014 is a step towards this, requiring an infrastructure strategy for at least a 30-year period;
- Infrastructure providers will develop a more sophisticated approach to understanding the condition of those assets, the timing of renewals, and how they are performing in comparison to similar networks. This be will progressed through the establishment of shared metadata standards across roading, the three waters, and government built assets
- Infrastructure providers will be able to understand how their networks interact with other infrastructure networks as well as the implications for land use planning and the end user of infrastructure services.
- Individual sectors will progress specific programmes to improve their asset management maturity including:
- the establishment of a programme to enhance the capability, productivity and leadership in asset management throughout the public sector in New Zealand by IPWEA New Zealand and the National Infrastructure Unit (NIU);

The Action Plan for the **3 Waters** means:
The sector will be recognised for its mature asset management practices across all providers, underpinned by reliable and accurate data on the state and performance of the network to support better decision-making. A key focus is optimising the existing three waters network. This will be achieved through:

Developing national metadata standards for water infrastructure to ensure a consistent base to build evidence, undertake forecasting, deepen capability (LINZ, NIU, local authorities, and sector bodies).

- Establishing centres of excellence responsible for collating the data obtained through the shared metadata standards, providing the necessary analytics and supporting local decision-making (NIU, sector bodies, and local authorities).
- EquiP LP, Local Government New Zealand's centre of excellence, is developing a Governance Development programme and an Organisational Performance programme to assist councils in raising the standard of governance, performance and asset management (LGNZ).
- The LGNZ 3 Waters project to lift the performance of our potable water, wastewater and stormwater services and infrastructure. The project established a National Information Framework survey in 2014 and the issues paper released in October 2014 explores the issues facing New Zealand's three waters sector. LGNZ will be releasing a position paper in 2015 to outline what a well performing three waters sector should look like and propose options for a sector led approach to improving performance in the future.

Infrastructure providers collaborate more effectively within and across regions, taking a long-term view and ensuring adequate investment in high-growth communities. This will be achieved through:
Investigating options to support long-term integrated regional infrastructure plans, potentially with legislative recognition incorporating central, regional and local government objectives (NIU).

- Recognising the importance of aligning infrastructure delivery with planning
- Investigating how to manage water, wastewater and stormwater services across the subregion

National Policy Statement for Freshwater
The National Policy Statement for Freshwater Management 2014 (NPS-FM 2014) sets out the objectives and policies for freshwater management under the Resource Management Act 1991.

The NPS-FM 2014 came into effect on 1 August 2014.

The NPS-FM is one of the initiatives developed as part of the Government's programme of water reform. The NPS-FM:

- requires regional councils to set freshwater objectives for fresh water, and provides a process for setting them
- requires councils to account for freshwater takes and contaminants, which will provide information for setting and managing to freshwater objectives and limits
- provides for Councils to set the limits and methods which will affect how water is used, and this may require water resources users to adjust their practices
- requires regional councils to involve iwi and hapū in the management of fresh water, and to work with them to identify tāngata whenua values and interests, and reflect these in the management of, and decision-making about, fresh water.

National Policy Statement for 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.

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).

Sufficient development capacity is necessary for urban land and development markets to function efficiently in order to meet community needs. In well-functioning markets, the supply of land, housing and business space matches demand at efficient (more affordable) prices.

The NPS-UDC contains objectives and policies that local authorities must give effect to in their resource management decisions that provide direction on:

1. the outcomes that urban planning decisions should achieve
2. the evidence underpinning those decisions
3. responsive planning approaches
4. coordination between local authorities and providers of infrastructure.

Within these four, the NPS-UDC targets the more challenging requirements for urban areas experiencing the most significant growth.

The New Zealand Productivity Commission

The New Zealand Productivity Commission (NZPC) is an independent Crown entity, which provides advice to the Government on improving productivity in New Zealand. The NZPC conduct inquiries and productivity research to expand knowledge about productivity and identify areas for improvement.

Local Government Regulation

During May 2012 and inquiry was commissioned to contribute to the Government's 'Better Local Government' initiative to improve the legislative framework for New Zealand's councils.
The Commission was asked to:

- develop principles to guide decisions on which regulatory functions are best undertaken by local or central government;
- identify opportunities to improve the regulatory performance of local government; and
- recommend options for regularly assessing the regulatory performance of the local government sector.

Amongst the Commission's recommendations for improving regulation are:

- a tool for helping to decide what regulations, and which parts of implementing regulation, are best performed by Government or councils;
- use of standardised formats and increased transparency to better demonstrate how key council regulatory decisions have been made;
- more focus by government departments, when preparing new regulation intended to be implemented by councils, on the costs and benefits of the proposed regulation, where those costs and benefits will fall, whether or not councils have the capability and capacity required to effectively implement the new regulation, and the likely costs of building that capability and capacity where it does not exist;
- the development of a 'Partners in Regulation' protocol to better guide Government/council engagement;
- the development of new or enhanced joint Government/council forums for overseeing improvements; and
- greater use of risk-based approaches to monitoring and enforcement of regulation by councils, together with enabling greater use of infringement notices to support regulations in place of more costly formal prosecutions.

Urban Planning

During 2015 the Productivity Commission was tasked to review New Zealand's urban planning system and to identify, first from principles, the most appropriate system for allocating land use to support desirable social, economic, environmental and cultural outcomes. The inquiry looked beyond the existing planning system and considered whether a fundamentally different approach to urban planning is needed.

The Commission released its Better urban planning report in March 2017 making 64 recommendations among which the following four were identified as being the most important:

- Clear statutory objectives and principles for the built and natural environments;
- A revamped set of regulatory plans for each region – plans that are built on the platform or a spatial strategy and clear environmental limits;
- Timely, independent and systematic review of plans against the statutory objectives and principles; and
- New mechanisms and models to free up the supply of infrastructure-serviced land for development – particularly in high-growth cities.

It is important for Council to stay abreast of any local government related inquiries conducted by the Productivity Commission as Central Government may use the NZPC's reports and findings as a catalyst to initiate proposed change.

6.9.2 Key Legislation

Council must comply with any relevant legislation enacted by Parliament. Significant legislation and regulations affecting the Water activities are provided in the table below.

Key Legislation
Biosecurity Act 1993
Building Act 2004
Civil Defence Emergency Management Act 2002
Climate Change Response Act 2002
Energy Efficiency and Conservation Act 2000
Environmental Protection Authority Act 2011
Epidemic Preparedness Act 2006
Fire Service Act 1975
Hazardous Substances and New Organisms Act 1996
Health Act 1956
Health and Safety at Work Act 2015
Heritage New Zealand Pouhere Taonga Act 2014
Infrastructure (Amendments Relating to Utilities Access) Act 2010
Land Drainage Act 1908
Local Government Act 2002
Local Government Act 1974
Local Government Rating Act 2002
Local Government Rating Act 1979
Local Government (Financial Reporting) Regulations 2011. Renamed to Local Government (Financial Reporting and Prudence) Regulations 2014
Marine and Coastal Area Act 2011

Key Legislation
Ngai Tahu Claims Settlement Act 1998
Public Works Act 1981
Resource Management Act 1991
Telecommunications Act 1987
Utilities Access Act 2010
WorkSafe New Zealand Act 2013

The legislation that has or is expected to have the most effect is described below:

Building Act 2004
Provides a regulatory framework for building work, establishes a licensing regime and sets performance standards to ensure buildings have attributes that contribute to the health, safety, physical independence and well-being of people. All Council buildings have to meet the requirements of the Building Act.

Civil Defence Emergency Management Act 2002
Under the CDEM Act 2002 there is an expectation that Council's services will function at the best possible level and extent during and after an emergency, including no change from normal operation. Council has established planning and operational relationships with regional CDEM groups to deliver emergency management within Mackenzie district boundaries.

Water supply and wastewater are regarded as critical services requiring attention during adverse events 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 needs. Supply quantity and quality may be limited.

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

The Health Act requires Council to provide the Medical Officer of Health with reports on the level, rate and mitigation measures of diseases, and quality of water.

The Health Act 1956 was amended by the Health (Drinking Water) Amendment Act (HAA 2007) 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 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.

As a consequence of this Act, Council were required to take all practicable steps to comply with the Drinking-Water Standards for New Zealand 2005 (Amended 2008) implementing this through water safety plans (WSP).

Council engineers amended the compliance timetable to smooth the works over multiple years. The amended timetable took into account the timetable requirements of the HAA 2007, while allowing appropriate investigations to ensure the community receives the most effective and best cost option addressing associated risks.

The resulting upgrades of each water supply is shown in the table below:

Water Supply	DWSNZ Supply Category	Year of TP Upgrade
Fairlie	Minor	2019/22
Lake Tekapo	Small	2012/13
Twizel	Minor	2015/16
Burkes Pass	Neighbourhood	To be confirmed
Allandale	Small/Rural Agricultural	To be confirmed
Albury	Small/Rural Agricultural	To be confirmed

Health Act 1956 - Fluoride

During 2016 proposed legislative changes were announced which will allow district health boards (DHBs), rather than local authorities, to decide on which community water supplies are fluoridated in their areas. The Health (Fluoridation of Drinking Water) Amendment Bill gives DHBs the responsibility for making decisions about fluoridation of local government water supplies, such that DHBs will decide which community water supplies are fluoridated in its area.

The Bill describes the:

- powers and duties of DHBs in relation to making decisions about water fluoridation
- powers and duties of water suppliers (including local authorities) in relation to implementing DHB directives about water fluoridation
- information that DHBs must consider when determining whether to fluoridate a water supply.

Each DHB will be required to:

- collect and review local data on community oral health
- apply national tools developed by the Ministry of Health to generate information about water supplies and affected population groups and communities, and
- consider this information and direct water suppliers to fluoridate or not to fluoridate community water supplies as appropriate.

Local authorities will still be responsible for supplying drinking water. A local authority would be required to fluoridate a water supply if it is directed to do so by the DHB. Those already fluoridating will continue to do so unless directed by a DHB to stop.

Local authorities will continue to be responsible for meeting the direct costs of fluoridation. Council engineers commissioned an assessment of the implications for Council water supplies. The Code of Practice for Fluoridation of Water Supplies (Water NZ) identifies a range of requirements including a comprehensive design report. Of note is the Safety in Design process requirements under the Health and Safety at Work Act now in force. These place additional resource requirements during the design phase.

Preliminary cost estimates for the Fairlie, Tekapo and Twizel Water Supplies are as follows:

Costs	Fairlie	Tekapo	Twizel
Capital	$280,000	$300,000	$352,000
Annual Operating	$4,000	$7,000	$22,000

(based on existing water demand and saturator systems dosing sodium fluoride)

The Bill will follow the normal Parliamentary processes. Interested parties (including communities and individuals) submitted on the Bill as it was considered by the Health Select Committee. At the time of writing the Bill had not progressed beyond this point.

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

A range Regulations will be developed as part of this HSWA. The HSWA requires identifying the risks associated with hazards and associated mitigation to reduce those risks.

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.

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

Section	Details	Applies to
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
S136	Empowers Councils to enter into Contracts relating to provision of water services for periods not exceeding 35 years whilst maintaining control over the pricing of the service, retain legal responsibility for the service and being responsible for the development of policy related to the water services	Utilities Contract
S137	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 Rating Act 2002
Provides Council with flexible powers to set, assess, and collect rates to fund Council activities while ensuring that rates are set in accordance with decisions that are made in a transparent and consultative manner and providing for processes and information to enable ratepayers to identify and understand their liability for rates.

Resource Management Act 1991
This Act 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.

Utilities Access Act 2010
The Act establishes a framework for the National Code of Practice to govern how corridor managers and utility operators coordinate their activities within transport corridors.

The purpose of the Code is to:

- Maximise the benefit to the Public while ensuring that all Utility Operators are treated fairly;
- Ensures that disruptions to Roads, Motorways, and railways caused by Work by Utility Operators are kept to a minimum, while maintaining safety; and
- Provides a nationally consistent approach to managing access to Transport Corridors.

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.

6.9.3 Standards, Codes of Practice & Guidelines

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. Region and local councils must enforce these standards (or they can enforce stricter standards where

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.

National Environmental Standards for Sources of Human Drinking Water (2008)
The National Environmental Standard for Sources of Human Drinking Water came into effect on 20 June 2008 and 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. Specifically the NES require Councils 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
- work with Regional Council to place conditions on applicable new consents for the protection of its public supply sources

AS/NZ Standards
Where possible, relevant AS/NZS standards are used as the basis for determining standards of design and construction. The Code for Subdivision and Development AS/NZS: 4404 is the principal document defining design requirements. New works within the urban areas are constructed in general accordance with NZS4404 Land Development and Subdivision Infrastructure which sets minimum standards for reticulation construction, including the provision of firefighting water.

Asset Management Standards
NAMS International Infrastructure Management Manual 2006
NAMS International Infrastructure Management Manual 2011
ISO 55000 International Standards for Asset Management 2014
PAS 55-1:2008 Asset Management (British Standards)
NAMS Developing Levels of Service and Performance Measures Guidelines 2007
NAMS Optimised Decision Making Guidelines 2004
NAMS Infrastructure Asset Valuation and Depreciation Guidelines 2006
NZWWA New Zealand Pipe Inspection Manual 2006
NZWWA The New Zealand Infrastructural Asset Grading Guidelines 1999

6.9.4 Regional Strategies & Plans

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

6.9.5 Council Strategies, Plans, Bylaws and Policies

Mackenzie District Council Long Term Plan
The LGA requires local authorities in New Zealand to prepare a LTP that sets out Council's intentions over a ten-year period. The Act is very clear on how Councils should prepare their plans and what should be included in the final document. Consultation with the community is a very important part of this process. This is to ensure the people who effectively pay for the services delivered in the plan have the opportunity to feedback on what they want to see and how much they are prepared to pay. Water is considered to be a core activity.

The LTP provides information on all Council activities, how these will be delivered, how much they will cost and how they will be paid for. The first year of the LTP is also the Annual Plan for the first year of the ten year LTP period and as a result there is no separate Annual Plan process for that year.

Annual Plan
In accordance with the LGA local authorities in New Zealand must prepare and adopt and Annual Plan for each financial year. The Annual Plan must support the LTP in providing integrated decision-making and co-ordination of the resources of the local authority; and contribute to the accountability of the local authority to the community. The Annual Plan process provides an opportunity for Council to highlight the key issues it faces and update the community on achievements and plans for the following year.

Mackenzie District Plan
Section 73 of the RMA requires the Mackenzie District Council to have at all times a District Plan for its District.

The District Plan specifies objectives, policies and methods, in relation to resource management issues in the District, to achieve the integrated and sustainable management of the District's resources. To achieve the objectives and policies of the Plan, rules are included which prohibit, regulate or allow activities.

The Council has adopted the principle of zoning. This technique recognises that different areas of the District will have different resources, character and levels of amenity and that the community will seek different environmental results for these areas. The zones provide opportunities for future development in keeping with the character and amenity sought for these different areas. Any particular activity must comply with the rules applicable to the zone in which it is situated, as well as general district rules covering a range of matters such as subdivision, heritage values and transportation.

30 Year Infrastructure Strategy
The LGA requires a local authority to prepare and adopt, as part of its LTP, an Infrastructure Strategy for a period of at least 30 consecutive financial years.

The task of building, operating and maintaining infrastructure assets in an affordable manner is becoming increasingly difficult in view of:

- Demographic changes
- Environmental impacts
- New technologies
- Continually changing legislative environment (Central & Regional Government)
- Infrastructure resilience
- Aging of infrastructure

Council considered these impacts and developed a strategy to guide decision-making for the next 30 years.

Delivery of Services Review
Section 17A of the LGA requires that a local authority must review the cost-effectiveness of current arrangements for meeting the needs of communities within its district or region for good-quality local infrastructure, local public services, and performance of regulatory functions.

Section 17A has a number of triggers that apply to the application of the section:

- Significant change in service levels
- Within two years of the completion of a relevant contract (before renewal of contract)
- At Councils discretion with a maximum time between reviews of six years
- The first review is required within three years (clause 1A of new Schedule 1AA)

Exceptions for review are:

- Circumstances where the services cannot be reasonably altered within the two years
- The local authority is satisfied that the potential benefits of undertaking the review do not justify the costs of undertaking the review

The review:

1. Must consider options for
    a. Governance
    b. Funding
    c. Delivery

2. Options for the responsibility for governance, funding and delivery is exercised by
    a. The local authority
    b. A Council controlled organisation of the local authority
    c. A Council controlled organisation where the local authority is one of several shareholders
    d. Another local authority
    e. Another person or agency

At the time of writing no Section 17 A review has been completed.

Activity Management Plans

Asset Management has been described as applied common sense. Therefore, documenting applied common sense results in an Activity Management Plan (AMP). In essence there is limited funding and competing priorities. The Activity Management Plan helps staff/Council decide where and how to spend the limited funds to achieve the desired results.

Changes to the LGA further emphasised the need for activity management planning and the development of Activity Management Plans.

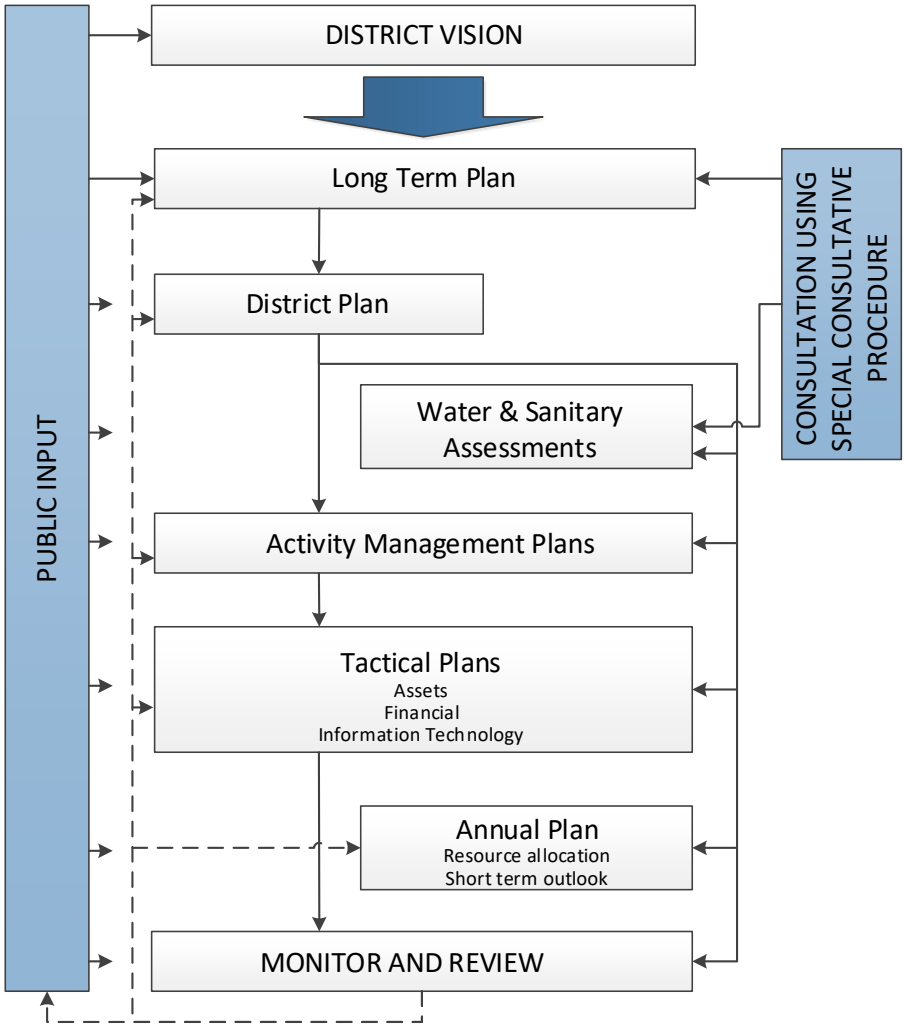
AMPs are a key component of Council's planning process. They are prepared within the context and framework of the LTP, District Plan, Annual Plan and Funding Policy. Figure 6-2: Corporate links to AMPs depicts the links and information flows with the Activity Management Plan, other corporate plans and public consultation.

As part of the LGA requirements (Schedule 10) the LTP must, for the ten years of the Plan, identify for each group of assets the costs for any additional asset capacity required and the maintenance, renewal, and replacement costs for the assets.

This statement of cost for the 10-year period includes the accounting for asset depreciation in accordance with The New Zealand Equivalents to International Financial Reporting Standards, and the recording of all significant assumptions in preparing the financials.

This AMP will provide the basis for identifying service potential and any losses, and determining the long-term financial strategies for Council's water network assets. This AMP is part of a suite of AMPs and forms part of Council's LTP for the period 2018-2028.

Figure 6-2: Corporate links to AMPs



This AMP is intended to be read in conjunction with the LTP and fulfils requirements of the LGA – Schedule 10, which states:

1) The purpose of local government is—
    a. to enable democratic local decision-making and action by, and on behalf of, communities; and
    b. to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses.
2) In this Act, good-quality, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are—
    a. efficient; and
    b. effective; and
    c. appropriate to present and anticipated future circumstances.

In order to demonstrate that the delivery of services are efficient, effective and appropriate; Mackenzie District Council has developed a suite of Activity Management Plans (AMP) for its Core Infrastructural Services as part of this LTP process. These AMPs provide comprehensive account of the efficiency, effectiveness and appropriateness of Council's Core Infrastructural Assets, asset management practices and knowledge.

6.9.6 Bylaws

The Council has in place a number of Bylaws and Policies across a range of Councils activities.

There are two bylaws that apply to the Water Supply service:

- The Water Supply Bylaw 2014
- The Downlands Water Supply Bylaw 2014

The review of these bylaws is programmed for December 2019.

6.9.7 Policies

Significance and Engagement Policy 2014
The purpose of the Significance and Engagement Policy is:

- To enable Council and its communities to identify the degree of significance attached to proposals relating to issues, assets, and other matters
- To provide clarity about how and when communities can expect to be engaged in decisions made by Council
- To inform Council from the beginning of a decision-making process about the appropriate extent, form and type of engagement that may be required

This Policy identifies the following as Strategic assets:

- The urban water supplies of Burkes Pass, Fairlie, Lake Tekapo and Twizel.
- The piped rural water supplies of Albury, Allandale, and Downlands (Albury to Cave section).

Earthquake Prone Buildings Policy
In accordance with Section 131 of the Building Act 2004 Council is required to adopt a policy on earthquake prone, dangerous and insanitary buildings. The Mackenzie District Council Policy on Earthquake Prone Buildings was consulted on and adopted during 2006.

This Policy reflects Council's determination to reduce risk over time in a way that is acceptable in social and economic terms to the community. A flow chart in the Policy details the process for assessing Earthquake prone buildings.

Council's 3 Waters buildings need to be assessed and this is included as an Improvement item (**IP 3**)

6.9.8 Procedures

Procedures include legislation, regulation, standards and guidelines. There are numerous standards and guidelines which Council refers to. These include Standard Operating Procedures and Operation and Maintenance/Management Manuals/Plans. The following details the Key Standards and Guidelines that are used in the management and operation of the Mackenzie District Council 3 Waters Systems.

Standards and Guides
Legislation as listed in Section 4.9.2 – Key Legislation
Drinking Water Standards for New Zealand
NZS/AS3725: 1989 – Loads on buried pipes
NZS 7643: 1979 – Code of Practice for the installation of unplasticised PVC pipe systems
The New Zealand Building Code
New Zealand Fire Service Fire Fighting Water Supplies Code of Practice – SNZ PAS 4509:2008
NZS 1477 7602, 7643 – PVC Pipes
NZS 4765:2007 m PVC pipes
NZS 4441: 2008 o PVC pipes
NZS 4442 – "Welded Steel Pipes and Fittings for Water, Sewerage and Medium Pressure Gas"
BS 5163 – Cast iron fittings (valves)
NZS 3910: 2003 – "Conditions of Contract for Building and Civil Engineering Construction"
Worksafe - Good Practice Guidelines Excavation Safety
Worksafe - Good Practice Guidelines Working at Height
Worksafe - Good Practice Guidelines Electrical Safety on Small Construction Sites
Worksafe - Good Practice Guidelines Conducting Asbestos Surveys

Worksafe - Good Practice Guidelines ACOP – Management and Removal of Asbestos
International Infrastructure Management manual – 2002
Creating Customer Value from Community Assets Manual – 2002
New Zealand Pipe Inspection Manual – 1999
New Zealand Infrastructural Asset Grading Guidelines" – 1999
New Zealand Infrastructure Asset Valuation and Depreciation Guidelines 2001

7.0 FUTURE DEMAND

This section provides details of growth forecasts, which affect the management and utilisation of all water assets and details demand management strategies.

7.1 Overview

The future demand for services will change over time in response to a wide range of influences, including:

- Local population trends
- Local economic trends
- Changing technology
- Changing legislation requirements
- Land use changes
- Resource issues
- Climate change

7.2 Demand Drivers

The future demand for reticulated water services in the Mackenzie District will be driven by:

- Growth in the District
    - Trends in population growth or decline give a good indication of future growth and in turn demand on the network
- Economic changes
    - Changes in land use, industry, economic climate and tourism can all affect the demand on the Water Supply asset.
    - E.g. developments such as motels/hotels and subdivisions where the properties are purchased as holiday homes do not increase the resident population but have a significant effect on the peak tourist population capacity.
- Improvement to Levels of Service
    - Advances in available technology
    - A greater understanding of customers' perceptions and expectations
    - A higher level of public expectations
    - Changing legislative requirements
    - Government organisations setting higher standards

Increasing demand for a service may generate a requirement for the development of additional infrastructure. Expenditure programmes need to be planned to fund the capital works and associated on-going operational expenditure. Alternately, it may be possible to manage demand within the existing system capacity.

Where a reduced demand is forecast it may be appropriate to renew assets with a lesser capacity, operation expenses may decrease, or an asset may become surplus to requirements.

7.3 EMERGING ISSUES

7.3.1 Growth Trends –

Population Projections

Mackenzie's population growth is expected to follow the medium projection issued by Statistics NZ in December 2016. It is anticipated that over the next ten years (2018-28) Mackenzie District will have a growth in population of around 13%, from around 4,300 at present to .4,880. Like much of New Zealand, the

proportion of people aged 65 years and older will grow within the district. It is anticipated that projected population growth will not impact significantly on the operation and maintenance of our water supplies activity.

Household Growth

It is projected that over the next ten years Mackenzie District will have:

- A growth in household numbers consistent with the population growth trajectory;
- Household numbers are projected to increase to 2,200 (+16 per cent) by 2028 (Statistics New Zealand) - the higher percentage increase in households relative to population increase in 2028 reflects a projected increased in single person households;
- With a greater number of older people living alone, a reflection of structural ageing, one-person households are projected to increase by 15 percent by 2028 (Natalie Jackson Demographics Ltd, Sept 2014);
- Future demand in the Mackenzie District will be increasingly driven by one-person households and couples without children, characteristic of population ageing.

Development

Analysis of the future urban and rural residential subdivision over the next 4 years shows an average of 10 sections per year, along with associated infrastructure, to be vested in Tekapo and an average of 46 per year in Twizel.

During the 2015/17, 1,950m of Water Supply network, including valves and hydrants, was vested in Council. Whilst developers have to construct this to Councils standard before vesting the ongoing maintenance and depreciation costs have to be allowed for.

7.3.2 Economic Changes -

The Mackenzie District has an arid climate and as such the demand for water is very high and the availability of water is closely associated with development. Industrial, agricultural, business and residential development all depend on the availability, quantity and quality of water. Development in one sector ultimately has a flow on effect onto the other sectors.

The sustainable and efficient management of water in the District is expected to become increasingly important. There is a high demand for water as it is essential for human consumption, economic activity and stock habitation. The ability to achieve more with less resource consumption is the way of the future.

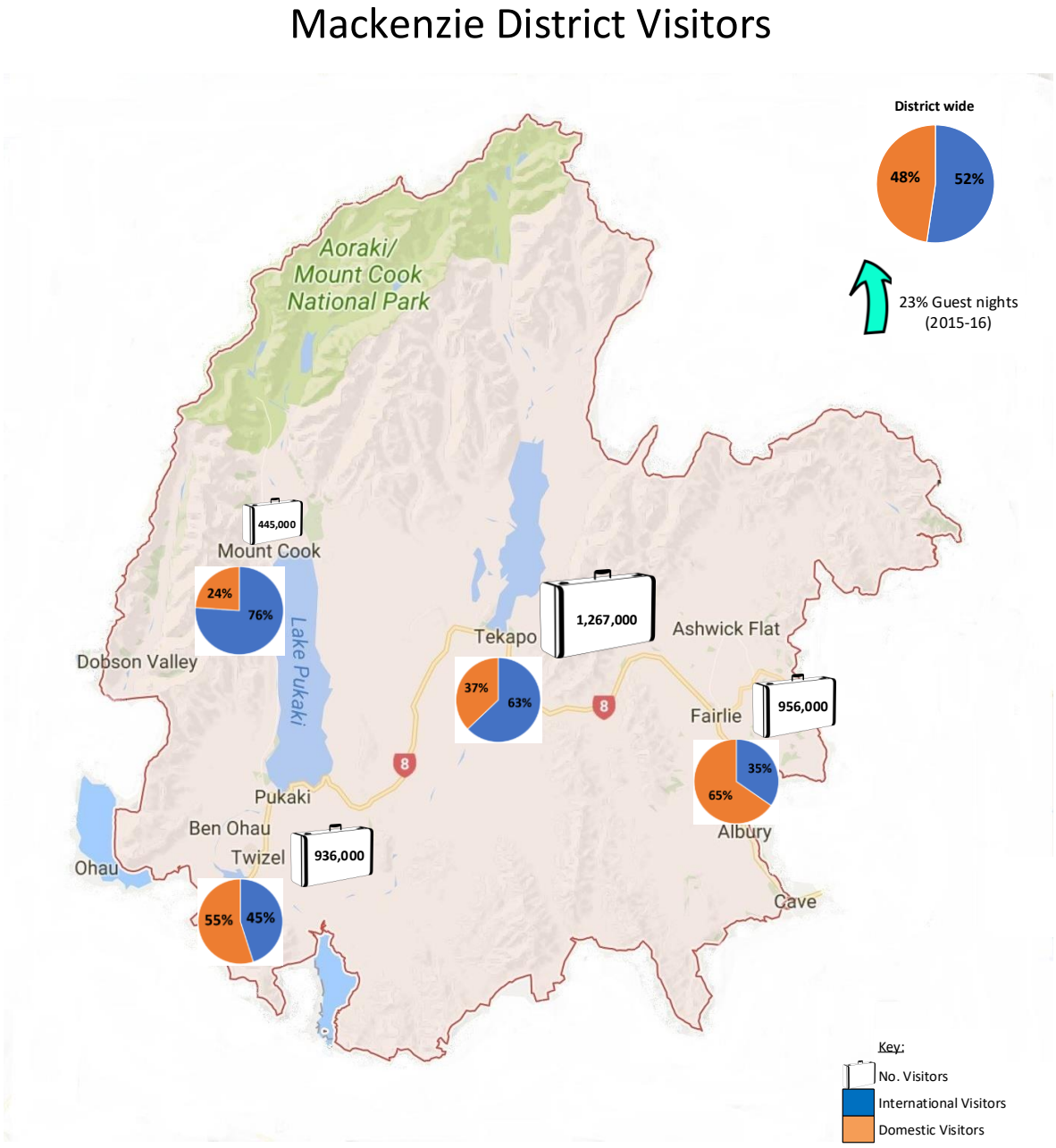
Tourism

Mackenzie has experienced unprecedented growth in visitor numbers (both domestic and international) in recent years, as indicated by a range of data, including the Statistics New Zealand Commercial Accommodation Monitor, which for the year ended September 2016 compared with the year ended September 2015 reported:

- Guest nights rose 23.1 per cent to 705,316
- International guest nights rose 19.9 per cent to 489,769
- Domestic guest nights rose 31.1 per cent to 215,547
- The average length of stay rose from 1.32 nights to 1.33 nights
- The overall occupancy rate rose from 44.4 per cent to 50.2 per cent
- Accommodation capacity, excluding holiday parks, rose 3.1 per cent

International tourism numbers are expected to continue by 5.4 per cent per annum from 2016 until 2022. Based on this, there could be nearly 6 million tourists visiting New Zealand by 2028. Council is assuming average growth in international visitors to the district will be at least equivalent to or greater than the growth in international visitors forecast for NZ. Growth in domestic visitor numbers is also expected to occur at a similar rate.

Tourism growth is expected to impact on Council's water supply activities. The influx of domestic holiday-makers into the district, particularly the Mackenzie Basin, has significant impact on the Water Supply network, increasing the demand substantially. As development occurs, the developers are required to install their own systems and connect to existing Council systems to provide for domestic use and fire suppression requirements at the time of subdivision.



7.3.3 New Technologies

New technology is becoming available within water services and adoption is essentially a continuous process. From a strategic point of view Council seeks to remain aware of technological advances primarily through staff involvement in industry developments via training, seminar attendance and directly from suppliers. Internal development of new technologies is advanced through collaboration between staff and with other councils. Staff maintain strong relationships with professional staff from neighbouring councils.

Significant examples of new technologies that have been adopted within this strategy are the use of pipe bursting for the replacement of asbestos cement water mains at Fairlie and Twizel, the use of "package water treatment plants" for the Fairlie and Burkes Pass water supplies and the continued development of the Council SCADA (system control and data acquisition) system to improve operational efficiency for the water supply plants.

7.3.4 Climate Change

The Mackenzie District is likely be affected by climate change. In preparing the LTP, the Council has reviewed Ministry for the Environment climate reporting[2] and regional projections calculated for the period from now to 2100[3]. The LTP assumes that climate change is happening, and while the impacts are expected to be relatively minor within the period covered by the Plan, they will increase in future.

Influences of climate change on our water supplies activity and possible effects are outlined below.

Function	Affected Assets or Activities	Key Climate Influences	Possible Effects
Water Supply	Water supply sources and infrastructure	– Reduced mean annual rainfall – Increased mean annual temperature; – Increased frequency and severity of drought events – Increased frequency & severity of extreme weather events (rainfall) – Reduced snowfall / retreating snowline & resulting reduction in snowmelt (alpine water catchments)	Reduced security of supply: • reduction in reliable availability of water from both groundwater and surface water sources, with the possibility of increasing regulatory restrictions on water abstraction. • Traditional snow-melt catchments will become dependent on rainfall as snow line retreats, which is anticipated to be less reliable and more extreme and will lead to an increase in winter floods and decrease in year-round flow. Contamination of water supply: • Increased frequency of extreme weather events may result in infiltration and contamination of water.

7.3.5 Improvements to Levels of Service

Changes in Customer Expectations

In recent years there has been an increasing awareness on the part of owners with respect to water supply issues. With rate of growth in the rating base increasing, the following factors may need to be considered:

- Increased level of awareness of water quality
- Increasing demand for better pressure and flow

Changing Levels of Service Demands

The intended Levels of Service defined in Section 4 are considered to be representative of the service demands of the current and the future community. With the lack of growth in the rating base the following factors may need to be considered:

[2] Ministry for the Environment & Stats NZ (2017). New Zealand's Environmental reporting Series: Our atmosphere and c*limate 2017*. Retrieved from www.mfe.govt.nz and www.stats.govt.nz.
[3] Ministry for the Environment (2016). *Climate change projections for New Zealand: Atmosphere projections based on simulations undertaken for the IPCC 5th assessment*. Retrieved from www.mfe.govt.nz.

- reduction in maintenance of some facilities that have little impact on the overall service delivery (if possible)

Policy or Management Changes

Changes to Water Supply policies may be driven from a number of directions. They could be internally driven (e.g. Development Impact Levy policies) or externally driven (e.g. changes driven by regional or national organisations like Environment Canterbury). Monitoring and being aware of possible implications of these changes enables the impacts of such changes to be anticipated and predicted. While there is no certainty, it is important to consider them when developing asset management risk forecasts and strategies.

National Infrastructure Plan

Refer to Section 6.9.1 detailing the National Infrastructure Plan and the implications for Asset Management and the 3 Waters Utilities.

Financial Contributions

Financial Contributions are another means of funding network infrastructure, reserves or community infrastructure. Mackenzie District Council has prepared a 'Financial Contribution Policy'. The contribution policy includes a methodology for calculating the cost of the impact a development will have on existing community infrastructure including water supplies. This ensures that the negative impact of development is in part funded by the developer rather than the ratepayer.

The policy uses the following formula to calculate the level of contribution:
(Asset Valuation — Debt Loading)/the number of connectable properties to the Scheme

For 2017/18, the financial contribution payable on each lot created at the time of subdivision is calculated at $6,993. This amount is GST exclusive.

Council is aware that the ability to levy financial contributions will no longer be available from 2022, and will review and develop a Development Contributions framework for adoption early in the LTP period.

7.3.6 Additional Matters

Havelock North Inquiry

We have reviewed the Reports of the Havelock North Drinking Water Inquiry, and will continue to monitor and adapt to any outcomes. At this stage Council considers that any increase in national Drinking Water Standards will be able to be met within existing budgeted works or programmed upgrades for all supplies. Additional operational costs, such as increased requirements for staff and contractor training or qualifications, will also able to be met within budgets.

Fluoridation

Council is aware that central government is in the process of transferring the decision making on fluoridation of water supplies from local government to District Health Boards. It is possible that fluoridation may become mandatory for water supplies.

Costings for the installation and operation of fluoridation are as follows:

	Twizel	Fairlie	Tekapo
Capital Costs[1]	351,200	278,700	299,700
Operating Costs[1]	21,500	4,000	7,000

1 Opus report – Fluoridation Assessments – Twizel, Fairlie and Tekapo Water Supplies. 16 February 2017

The above figures are based on standalone installation of fluoride in each of the schemes. If fluoride was included in the Fairlie treatment upgrade the treatment drops to $4,000.

The District Health Board has not formulated their position on this issue. This AMP is therefore written on the basis that there will be no fluoride dosing installed at any of the Council's treatment plants.

Water Metering

At present, Council does not require all new connections to reticulated water supplies to be metered. The Council recognises the value of water security and increasing community support for user pays approaches in the provision of its services. Investigation work will be undertaken over the first three years of the LTP to explore the practicalities, costs and benefits of water metering.

Rainwater Collection

Council recognises the correlation between the collection of rainwater and the demand on reticulated water supplies, and the potential for benefits in reducing wastage of treated water, environmental benefits and increased resilience. Council remains open to considering means of encouraging the uptake of rainwater collection systems throughout the district.

7.4 Demand Impacts on Assets

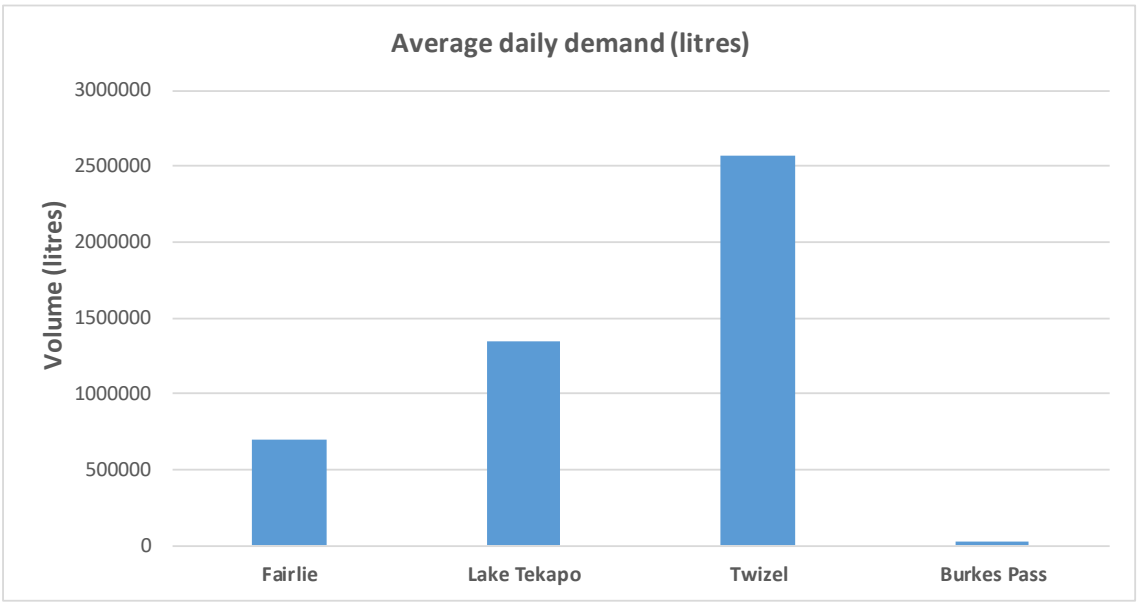
Overall implications for the network of continual demand for improvement in levels of service tied to an effectively static population are:

- An increasing level of treatment caused by outside DWS requirements.
- An increasing focus water quality and pressure
- An increased level of expenditure to attain those desired controls/requirements
- A largely static ratepayer base to fund Mackenzie District Council's contribution to the separate community based water supply budget.

7.5 Current Demand

The average daily demand figures for the water supplies are graphically represented below:

Figure 7-1: Average Daily Demand per Water Supply.



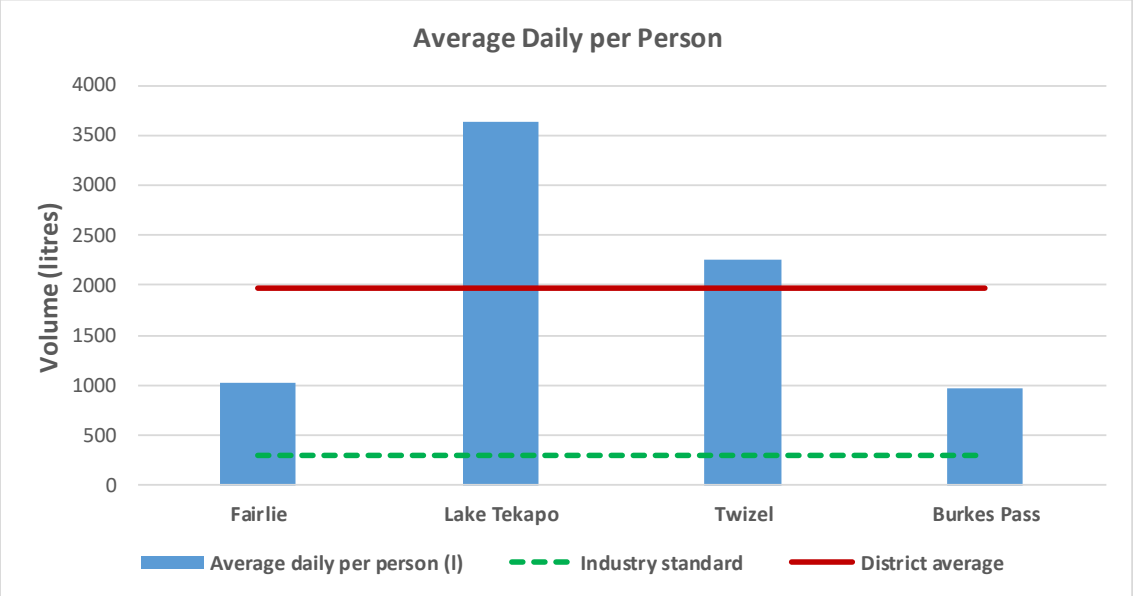
This shows that the Twizel Water Supply has the greatest demand of all the water supplies. The Lake Tekapo demand is greater than the Fairlie demand despite the Lake Tekapo usually resident population figures (369) are well below the Fairlie usually resident population figure (693).

It is important to note that the Lake Tekapo and Twizel are tourist destinations. Developments such as motels/hotels and subdivisions where the properties are purchased as holiday homes do not increase the resident population but have a significant effect on the peak tourist population capacity. Add to that the irrigation of sports facilities such as a golf course and sports grounds and the demand for water is significantly increased. This additional demand results in a skewed average daily demand as shown above.

The NZS 4404: 2010 *Land Development and Subdivision Infrastructure Standard* specifies for design purposes the daily consumption as 250 litres/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. However, these figures provide useful guidance as to what the Ministry of Health deems appropriate for personal consumption, cleaning and washing and suggests a requirement of 300 litres/person/day.

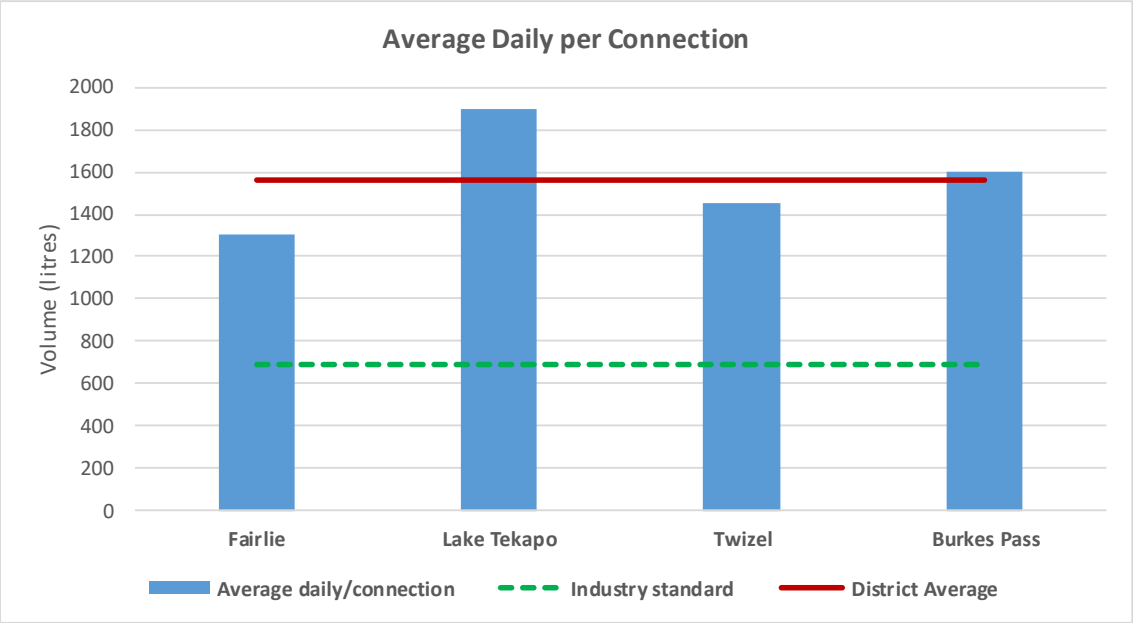
Figure 7-2: Demand – Average Daily per Person



From the above graph it is evident that Fairlie and Burkes Pass are the water supplies where the average daily demand/person is nearer to the industry standard of 300l/person/day. It also shows that the additional tourism and irrigation demands on Lake Tekapo and Twizel water supplies as discussed earlier skews the average daily per person representation.

The 2013 Census data showed the average occupancy rate of 2.29 people/dwelling for the Mackenzie District. This equates to an average daily household use of 686 litres/dwelling (2.29 x 300litres Industry Standard).

Figure 7-3: Demand – Average Daily per Connection



This shows that Fairlie is closest to the industry standard and reinforces that the additional tourism and irrigation demands experienced in Lake Tekapo and Twizel water supplies as discussed earlier skews the average daily per connection representation.

7.6 Demand Management Plan

There are two recognised components to a demand management strategy:

7.6.1 Asset Based Demand Management

Asset Based demand management on the system really can only be focused on removing reducing the demand in particular for irrigation water in the urban areas.

In Twizel where the environment is naturally arid there is a high demand for water, to protect landscaping and as a result of a desire for high amenity values including green areas such as lawns. The larger life style blocks around Twizel are potentially of concern in terms of water supply. The Council has determined that they can be “on-demand” supplies with no real restriction on the volume that can be used.

In Fairlie the maximum water take is determined by limits in the Opihi River Regional Plan and puts severe restrictions on this supply when the un-modified flow in the Opihi as measured at the State Highway One Bridge falls to 8.1 m^3/sec- first trigger and then second trigger of 2.5 m^3/sec or less.

The Council manages this by applying restrictions for those short periods when the water take gets close to or exceeds the consented take.

Upcoming issues during the next ten years

Compliance with the Health (Drinking Water) Amendment Act 2007 is still the main focus for the water supply activity. The Fairlie Water Supply WTP Upgrade is programmed for 2018/19. The Burkes Pass WTP upgrade is still to be confirmed. The Allandale Water Supply could be categorised as a Small Water Supply and assessed against Section 10 of the DWSNZ. Alternatively it may be categorised as a Rural Agricultural Water Supply and assessed against Section 12 of the DWSNZ. Each has its own treatment requirements. However, the criteria for Section 12 of the DWSNZ is still to be prepared and there is uncertainty as to what that part of the DWSNZ will ultimately require.

The Albury Water Supply is categorised as a Rural Agricultural Supply. The Allandale and Albury WTP upgrades will be planned once the requirements are confirmed.

The Twizel WTP upgrade was completed in 2016, and the Lake Tekapo WTP upgrade completed in 2017.

Water Safety Plans - The Health (Drinking Water) Amendment Act 2007 (S69Z) requires drinking water suppliers to prepare and implement a Water Safety Plan (WSP). Water Safety Plans have been prepared for the following Water Supplies:

- Fairlie (2011)
- Lake Tekapo (2011)
- Twizel (2014)
- Burkes Pass (2011)
- Allandale (2011)
- Albury (2017)

WSPs are required to be reviewed at least every 5 years.

Fairlie - The Fairlie WSP identified the following improvements to prevent, reduce or eliminate the identified public health risks:

- Treatment – investigations are on-going to determine the most appropriate and effective source and treatment. Preliminary programming indicates the WTP upgrade for 2019-22.
- Storage - an additional reservoir is required to improve the security of supply to the Fairlie Water Supply. This is programmed for 2025/26.
- Reticulation renewals – concrete pipe replacement programme

Burkes Pass - The Ministry of Health have not assigned a log credit for protozoal treatment as Council has not yet confirmed if it requires the scheme to be assessed under Section 5 or Section 10 of the DWSNZ. It is anticipated that compliance will come under Section 10 'Small Water Supplies, Alternative Compliance Criteria'.
If section 10 compliance is considered then the source best fits the category describing a "Partially protected catchment" and would require three log credit and also bacterial treatment.

Council has assumed that UV disinfection will be added to existing chlorine disinfection. Additional storage is likely to be required to accommodate periods when the source water quality is not suitable for UV disinfection. Converting the scheme to a fully restricted supply scheme would provide that storage on each property.

Allandale - The Ministry of Health have not assigned a log credit for protozoal treatment as Council has not yet confirmed if it requires the scheme to be assessed under Section 5, 10 or Section 12. Section 12 is of the DWSNZ “Rural Agricultural Drinking Water Supplies” is still in the course of preparation and consultation.

It is anticipated that compliance will come under Section 10 'Rural Agricultural Drinking Water Supply Guidelines – 2015.’

Council has assumed that UV disinfection will be added to the existing chlorine disinfection. Some form of filtration is likely to be required for periods when the source water is not suitable for UV disinfection.

Twizel – New gallery controls is programmed for 2018/19.

Lake Tekapo – there are no new capital projects identified for the Lake Tekapo Water Supply.

Albury – The Albury Water Supply can be categorised as either a small supply against Section 10 of the DWSNZ or against Section 5 (the same as larger schemes). Section 5 indicates a protozoal removal requirement of Log 4. This could potentially be reduced to Log 3 if the supplies are designated small supplies and assessed against Section 10. A further option may be Section 12, “Rural Agricultural Drinking Water Supply Guidelines - 2015” which is still in the course of preparation.

The Demand Management Plan involves implementing strategies to reduce water losses and promote more efficient network operations. These strategies involve altering or repairing the asset to achieve the target. The water demand reduction strategies used by the Council are outlined in the table below:

Strategy	Description
Response time	Prompt response and rectification of reported leaks
Replacement/Rehabilitation Programme	A Renewal Programme to ensure assets are not utilised beyond their useful life when the risk of unidentified failure is greatly increased in consideration of asset criticality
Codes of Practice	Ensure all maintenance is carried out to the relevant standards by enforcement of appropriate Engineering Codes of Practice
Technical Standards	Ensuring new assets are constructed to the correct standards and tested appropriately before being commissioned
Standard Materials	The use of standard (high quality) materials.
Quality Audits	To ensure all standards above are being met

7.6.2 Non - Asset Based Demand Management

There are some options to affect reduced demand on the water supply networks that are not asset based. Generally, these all limit the amount of irrigation that can be applied to domestic properties or the encouraging consumers to purchase energy efficient appliances in relation to water use.

Infrastructure Improvements
Council is rolling out SCADA telemetry monitoring system across all water supplies to allow real time monitoring of them from Council's office in Fairlie.

In order to have a more accurate idea of the impacts of demand on the network and managing any growth, Council has modelled the existing water supply network provided definitive information the ability of the existing network to cope with increased development at the top end of the pipe networks.

Fairlie – Council embarked on a replacement programme of its old concrete pipe network in 1998 and have generally spent $100,000 per year on this initiative. The final stage of this replacement programme will commence in 2020/21 ($120,000) and be completed in by 2022/23 ($150,000).

There is 7,007 m of Asbestos Cement water pipes in Fairlie. A testing programme is required to confirm the remaining life and the eventual replacement.

Tekapo - there is 5,892 m of Asbestos Cement water pipes in Tekapo. A testing programme is required to confirm the remaining life and the eventual replacement.

Twizel - There is 24.5km of Asbestos Cement pipe in the Twizel (2.0km is privately owned), all installed in early 1970s. AC pipe is affected by both water and soil conditions and this causes premature failure of the asset. Several samples have been analysed to predict the remaining life of these pipes. Whilst there have been few actual failures yet, the analysis shows that the AC network is at risk of failure from now to 2020 and all the AC pipe should be replaced by 2020. The cost to replace the AC pipe network is $5,020,000. A replacement programme based on a predictive failure model from the various pipe samples has been prepared.

The model takes into account the following:

- Existing and future demand
- Roading replacement programme, both footpath and roadway
- Ability to fund
- Availability of contractors
- Refurbishment method

Due to the scale of the replacement programme and the narrow failure timeframe it is not recommended "sweating the asset" due to the criticality of these assets both for domestic supply and fire suppression.

It is likely that pipe should be replaced prior to any observed failure to fit in the five considerations above.

Table 7-1: Sampling & Replacement date

Location	Pipe diameter	Replacement Date
37 Sefton St	100	2022
Nuns Veil & Mackenzie	150	2043
Wairepo Rd	100	2037
Fraser Crs	100	2024
Mt Cook St	150	Completed
Jollie & Dobson	100	2022
Ohau	100	2023
Glenbrook Crs	100	2029
Omahau Crs	100	2036
226 Mackenzie Dr	150	2021
Rata Rd	100	Completed
16 Glencairn Crs	100	2034
Hooker Crs	100	2023
4 Mt Cook St	100	2024
193 Mackenzie Dr	150	Completed
46 Tekapo Dr	100	Completed
51 Maryburn Rd	150	Completed
Glen Lyon Rd	300	2148
67 Irishman Dr	100	2027

Analysis of these test results shows that the large diameter pipe in the reticulation has very good remaining life (80 years), but the 100mm and 150 mm diameter pipe has a varying remaining life, being at risk of serious failure from now on for the next 20 years.

This strategy recommends that Council continue to replace the rest of the AC pipe over the next 20 years. The average cost per year is $225,000 starting with the most at risk or critical pipelines first. It would be sensible to complete each street fully so the actual cost per year will vary.

Table 7-2: Twizel Indicative Replacement Programme

Location	Year	Estimated costs ($)
Rata & Ohau	17/18	$280,000.00
MacKenzie & Fraser	18/19	$300,000.00

Location	Year	Estimated costs ($)
Jolly,Hunter & Falstone	19/20	$330,000.00
Hooker & Ostler	20/21	$82,000.00
Market Pl	21/22	$250,000.00
Sefton & Cass	22/23	$220,000.00
Glencairn	23/24	$220,000.00
Hopkins & Tasman	23/24	$220,000.00
Omahau & Bendrose	25/26	$240,000.00
Dusky, Hallewell & Preston	26/27	$240,000.00
Simmons & Glenbrook	27/28	$280,000.00
Wairepo	28/29	$220,000.00
Mackenzie	29/30	$220,000.00
Mackenzie	30/31	$220,000.00
Mackenzie	31/32	$220,000.00
Ruataniwha	32/33	$250,000.00
MacKenzie	33/34	$220,000.00
Mackenzie	34/35	$220,000.00
Mackenzie	35/36	$220,000.00
MacKenzie	36/37	$220,000.00

This will be reviewed over time as pipes start to fail and also to fit in with footpath resurfacing. It is recommended that the footpath be resurfaced with Asphalt on completion of the rehabilitation in each street. This will be a better long term whole of life solution than the current chip seal.

With the steady growth of Twizel to the west, the District Plan allowing for low density residential areas and the Council policy of only supplying water on a restricted basis may put off the need for a large trunk water main to be laid into this area. However, this will need to be monitored over time as development and demand increases in this area. Reports provided to Council by Opus International Ltd have recommended the construction of a 300mm trunk main to be laid from the headworks to the Residential 4 zoned land west of Twizel. The cost of this is estimated at $315,000. This work could be funded in part or wholly by developers by way of development contribution.

The Demand Management Plan also involves implementing non-asset strategies to manage the demand for a service. Non-asset solutions for current and future use by the Council are outlined in the table below:

Strategy	Description
New technology	Encourage the adoption of new technologies in the home such as low flow showerheads and dual flush toilets
Water conservation/Public education	Encouraging Water Conservation (within the household) and understanding the issues concerning the water system through public education and advertising campaigns
Leak detection	Active leak detection programme
Restrictor checks	Regular checking of restrictors

7.7 Future Capital Programme

The following table details proposed capital requirements for the period 2018/19 to 2027/28. It can be seen that the new capital is primarily driven by compliance with the DWSNZ and WSP improvements.

				Current LTP cycle			2018 -2028 LTP period									
				Financial Year												
	Water Supply	Project	Funding	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Capital Projects	Fairlie	WTP Upgrade	Capital	x	x	x	$900,000									
	Fairlie	Storage	Capital	x	x	x								$1,500,000		
	Lake Tekapo	Relocate Cl2 dosing	Capital	x	x	$15,000										
	Twizel	Gallery controls	Capital	x	x	x	$70,000									
	Fairlie	Scada install	Capital	x	x	x	$10,000									
	Twizel	Connect Pukaki Airport	Capital				$250,000									
	Allendale	Scada install	Capital	x	x	x	$10,000									
	Burkes Pass	Scada install	Capital	x	x	x	$15,000									
	Tekapo	Scada install	Capital	x	x	$10,000										
	Total			**$0**	**$0**	**$25,000**	**$1,255,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$1,500,000**	**$0**	**$0**
Renewal Projects	Fairlie	Concrete pipes	Depreciation	x	x	x			$120,000	$120,000	$150,000					
	Fairlie	AC pipes	Depreciation	x	x	x										
	Lake Tekapo	Pipe (AC, GI & CI)	Depreciation	x	x	x										
	Twizel	AC pipes	Depreciation	x		$280,000	$300,000	$330,000	$230,000	$250,000	$220,000	$220,000	$420,000	$240,000	$240,000	$280,000
	Burkes Pass	GI pipe	Depreciation	x	x	x		$40,000								
	Fairlie	Eversley upgrade	Depreciation	x	x	x	$28,000	$120,000								
	Allandale	Pipe renewal	Depreciation				$62,325									
	Burkes Pass	Extra Storage Reservoir	Depreciation				$8,000									
	All schemes	Service connections	Depreciation			$28,000	$925,000	$375,000	$280,000							
	All schemes	Revaluation	Depreciation		$41,500			$41,500			$41,500			$41,500		
	All schemes	Meter Verification	Depreciation	x	x					$6,000					$6,000	
	All schemes	Crypto Testing	Depreciation	x	x	x			$16,380	$16,380				$16,380	$16,380	
	All schemes	Scada	Depreciation	x	x								$5,000		$25,000	$5,000
	Burkes Pass	Service connections	Depreciation	x	x	$5,000										
	Burkes Pass	Solar / Plant / meter	Depreciation						$20,000				$10,000			
	Tekapo	Treatment plant	Depreciation			$15,000						$15,000				$25,000
	Twizel	Treatment plant	Depreciation				$70,000									
	Allandale	Treatment/ modelling	Depreciation	x	x	x			$20,000	$3,000	$30,000		$40,000			
	Fairlie (2011)	Water Safety Plans	Depreciation		$5,200					$5,200					$5,200	
	Lake Tekapo (2011)		Depreciation		$5,200					$5,200					$5,200	
	Twizel		Depreciation		$5,200					$5,200					$5,200	
	Burkes Pass		Depreciation		$5,200					$5,200					$5,200	
	Allandale		Depreciation		$5,200					$5,200					$5,200	
	Albury		Depreciation		$5,000					$3,000					$3,000	
	Total			**$0**	**$72,500**	**$328,000**	**$1,393,325**	**$906,500**	**$686,380**	**$424,380**	**$441,500**	**$235,000**	**$475,000**	**$297,880**	**$316,380**	**$310,000**
	GRAND TOTAL			**$0**	**$72,500**	**$353,000**	**$2,648,325**	**$906,500**	**$686,380**	**$424,380**	**$441,500**	**$235,000**	**$475,000**	**$1,797,880**	**$316,380**	**$310,000**

8.0 RISK MANAGEMENT

This section identifies the risk management processes used to assess and manage risk. This involves the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, evaluating, treating and monitoring those risks that could prevent a Council from achieving its strategic or operational objectives or plans, or from complying with its legal obligations.

8.1 Overview

A systematic and consistent approach to risk assessment improves Council's ability to manage its assets within resource limitations and to prioritise expenditure and actions that can avoid or mitigate the effects of an identified event. Risks can be grouped into financial, operational, or organisational categories. Their negative consequences can seriously impact public health and safety, incur financial loss or adversely affect public image. The risks identified might be relevant to many activities and be of concern at corporate level, or they might be localised, at an asset specific level.

This section describes the risk management processes used for the water service. Assessment and management of risk within the Assets Group provides defensible tools for the communities and Council to develop prudent work programmes that support sustainable development.

The risk management processes described here are developed in the absence of a common adopted Council risk management framework.

8.2 Risk Events

The risk events that might impact on assets include but are not limited to:

Risk Event	Description	Examples
Natural events	Where there is no control over the timing or the extent of the event	Earthquake Floods Droughts Tsunami (lakes)
External Impacts	Organisations not providing services, such as material supply failures or transport failures	Power supply Telecommunications Fuel Vandalism Contamination
Physical failures	Where the condition or performance of the asset could lead to failure	Structural Capacity Mechanical components Electrical components
Operational	Where the management or operational activities might impact adversely on an asset	Training Maintenance Management Pollution during O&M

8.3 Current Approach

Various asset risk management tools and techniques, based on practical experience and the skilled application of its staff and service providers, have been used over a number of years at the Council. This approach has generally been sufficient. As the value of the built asset increase, levels of service expectations rise, and threshold limits for cultural and environmental impacts tighten, the need for more formal risk management practices increases. Mitigation strategies need to be put in place and reviewed

continuously to achieve improvement to levels of service. A new Risk Management Schedule will be developed as part of project/improvement item (**IP 4**). This Risk Schedule will include and consider the various mitigation Plans including but not limited to Emergency Management Plan, Contingency Plan, Pandemic Plan, Operational Risk Plan, Business Continuity Plan, etc.

If the levels of service are achieved, in tandem with legislative compliance, prudent investment and good financial management, then minimisation of exposure to public and general liability and risks derived from operation of assets, should also occur.

Risks are considered to arise from many areas of the water service management. They can be derived from the use of physical assets (e.g. a pump or a pipe failure) and management of the services provided (e.g. failure to formalise procedures and reporting of incidents).

8.3.1 Risks Assessed and Mitigated

There are numerous examples where risks have been identified, considered and appropriate mitigation performed. Examples include:

- Fairlie Water Supply trunk main – the trunk main used to be suspended across Halls Stream. This was a significant risk to the Fairlie Water Supply as flood conditions could cause damage to the trunk main affecting continuity of supply and posing a significant contamination risk to the water supply. During the renewal of the trunk main the pipe was installed below the stream bed ensuring greater security of the water supply
- Twizel WTP – did not have a backup power supply. During the WTP upgrade the risk of no alternative power supply was identified and a suitable generator was procured and installed.

This process is ongoing and it is important to note that risk management is not simply about the downside of events such as financial loss or legal proceedings. It also refers to the upside and opportunities that exist for the Council to do things more innovatively, sustainably, and effectively. However, Council engineers acknowledge that this needs to be formalised and documented through the Risk Schedule identified above (**IP 4**).

8.3.2 Water Safety Plans

The Health (Drinking Water) Amendment Act 2007 requires drinking water suppliers to prepare and implement a Water Safety Plan (WSP) 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 2008). These WSPs must be submitted for approval by a Drinking Water Assessor. Initial WSPs were developed for all water supplies and these are now programmed for renewal as the Health Act requires all WSPs to be reviewed, updated and approved every 5 years. The review and update programme of the WSPs are tabled below:

WSP	Review & Update
Fairlie	2021/22
Lake Tekapo	2021/22
Twizel	2021/22
Burkes Pass	2021/22
Allandale	2021/22
Albury	2021/22

In the absence of a council integrated risk management plan, WSP outcomes from a public health risk perspective are viewed in isolation of other Council risks.

Section 11.1 documents the status of the improvement items as recorded within the current WSP for each water supply.

8.3.3 Integration of risk management approach

Council risk management is also integrated with other processes, often driven by legislative requirements. However, they are all integrated with the risk management approach that has been outlined above and can be used as sources for the definition of risk events.

Criticality - 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).

Criticality of assets is identified as an improvement item (**IP 1**) and will allow the assets to be clearly identified and then the asset can be managed more proactively in order to mitigate the risk associated with their failure.

The criticality assessment will aid:

- 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

8.3.4 Health and Safety

The Council is responsible for providing a safe work environment for its staff and public. The Council has aligned its Health and Safety practices with the Health and Safety at Work Act 2015. A voluntary Health and Safety group meets regularly, acting as a point of contact for staff, providing feedback to management on any issues, carrying out some monitoring and audit duties in relation to the Council office buildings. Health and safety is also a standing item on the Audit and Risk Committee agenda and at management meetings.

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

Council contractors are required to complete all works in accordance with safety guidelines as set out under regulation, the Council's Health and Safety Manual and their own Health and Safety Plan.

8.3.5 Business Continuity Plan

No business, financial & operational continuity plan has been developed for the water activity within the Mackenzie District (**IP 4**).

8.3.6 Civil Defence & Lifelines

The Civil Defence Emergency Management (CDEM) Act 2002 requires local authorities to coordinate plans 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 plans.

The Canterbury CDEM Group Plan (June 2014) is a strategic document for the region that provides direction on how comprehensive, risk-based emergency management will be implemented in the Canterbury region. In implementing this plan, the Canterbury CDEM Group will work towards its vision of "*A Resilient Canterbury — Waitaha Tukaha*".

The Canterbury CDEM Group Plan is structured around the 4 Rs — the model used for comprehensive risk management in New Zealand. In each chapter of the Plan, the mechanisms for achieving risk reduction, readiness, response and recovery are outlined. These are supported by key principles identified at the beginning of each chapter.

8.3.7 Emergency Management

Operational Risks are those associated with the day to day operation of the District. The most prevalent of these are snow events followed by flooding and serious wind events. Initial response to all these events is managed through the Utilities Services Maintenance Contract, and is covered in our specifications. These specifications covers response times, liaison, notifications, plant and personnel requirements.

Council has held discussions on the "Life Lines" philosophy with the various groups that provide services within the district and is reviewing its "Disaster Resilience Summary". Council has participated in an Engineering Lifelines project, Earthquake Hazard Assessment, and the summary of the assessment is discussed in the following section.

8.3.8 Earthquake Damage Assessment

The Earthquake Hazard Assessment, Report to Environment Canterbury, May 2008, (Ecan Report no. U/08/18) prepared by Geotech Consulting Ltd identifies the following faults in the Mackenzie basin:

- Ostler Fault Zone: This significant fault system crosses through the middle of the Mackenzie Basin
- Irishman Creek Fault: This complex and relatively poorly studied fault consists of series of short fault traces that are very close to Lake Tekapo and the Tekapo Canal.
- Fox Peak, Albury and Opawa Faults: These faults are located further to the east & southeast of Mackenzie Basin and along the hills and mountains adjacent to Fairlie and the Opihi Valley

The report further states that there are many other active faults within the district that represent a significant earthquake hazard but also some very large potential earthquake sources that are not very far away. The Alpine Fault in particular has a very high probability of generating a large earthquake and is located only 15km from the north-western boundary of Mackenzie District. A large earthquake (Magnitude 8) on the Alpine Fault would result in serious simultaneous impacts over a wide area of the central South Island and is likely to have a major impact on lifelines and other infrastructure in parts of Waimate, Mackenzie and northern Waitaki districts. It is widely accepted by geologists that it is unlikely that the Alpine Fault can continue to accumulate stress at the current rate without an earthquake rupture in the next 100 years. It is therefore important to consider a large Alpine Fault earthquake in the design and management of all lifelines in the central South Island and this event forms the basis of one of the earthquake scenarios outlined in this report.

Ground shaking - The majority of Waimate, Mackenzie and northern Waitaki districts is underlain by harder basement rocks of the foothills and mountains that will not amplify earthquake shaking. Most of the remaining areas are on relatively dense older sediments such as alluvial gravels or glacial moraine. These materials will generally not cause much amplification and will behave as "average" foundation materials during earthquake shaking.

Tsunami - The lakes in the study area could all be subject to tsunami (waves created by the displacement of a large volume of water) and seiche (standing waves created by oscillation of lake water following a tsunami or by the earthquake ground shaking). The most likely cause of tsunami and any seiche large enough to be damaging, is a large landslide into a lake, or submarine landslide, particularly in the delta areas at the head of the lakes. The lakes most likely to be subject to these hazards are Ohau, Pukaki and Tekapo.

Liquefaction - overall there is only limited potential for liquefaction occurring in the study area.

The report includes a 'damage assessment chart' (tabled below) based on three shaking zones. The three shaking zones are - areas underlain with strong rock at shallow depth, intermediate ground conditions with a shallow to moderate depth of soil overlying soft rock, and areas underlain with deep soils The 'damage assessment chart' is intended to assist lifeline engineers in their appraisal of the vulnerability of various lifelines located in these three zones.

Zone	Shaking Intensity	Structures	Fixing designed for seismic loads	Equipment not fixed or fittings not designed for seismic loads
Structures				
1	MMVI	Slight damage to Type I buildings	Little or no damage	Movement probable, 10% failure
	MM VII	Minor damage except for poorly constructed weak material Type I buildings	Minor damage	Movement expected, 30% failure
	MM VIII	Well designed structures serviceable, but with at least minor damage. Many non seismically designed structures damaged and unserviceable. Some settlement damage possible	Considerable damage, 30-40% failure	80% failure
	MM IX	Damage and distortion to even modern, well designed structures, some may be unserviceable. Non seismically designed structures likely to be seriously damaged and poorly constructed weak material structures collapse. Settlement damage probable	Widespread damage, 50-60% failure	90-100% failure
2	MMVI	Slight damage to Type I buildings	Little or no damage	Movement probable, 10% failure
	MM VII	Minor damage except for poorly constructed weak material Type I buildings	Minor damage	Movement expected, 30% failure
	MM VIII	Well designed structures serviceable, but with at least minor damage. Many non seismically designed structures damaged and unserviceable.	Considerable damage, 25% failure	70% failure
	MM IX	Damage and distortion to even modern, well designed structures, some may be unserviceable. Non seismically designed structures likely to be seriously damaged and poorly constructed weak material structures collapse.	Widespread damage, 40% failure	90% failure
3	MMVI	As for Zone 2, with some small reduction in severity possible		
	MM VII			
	MM VIII			
	MM IX			

Zone	Shaking Intensity	Welded Steel, Polyethylene	Moderately ductile pipes Concrete with rubber joints Steel and cast iron with rubber joints	Non ductile pipe Ceramic with cement joints Brick
In ground pipework				
1	MMVI	Should be okay	Occasional mains damage and entry and junction failure	Minor mains damage 10% entries and junctions fail
	MM VII	Should be okay	Some mains damage, 25% of entries and junctions failure	Mains damage possible 40% entries and junctions fail
	MM VIII	Should be okay, minor damage and permanent distortion	Mains damage probable 60% entries and junctions failure	Mains damage widespread
	MM IX	Distortion to mains, damage possible at entry to structure and at junctions	Mains damage 80% entries and junctions failure	Major mains damage
2	MMVI	Should be okay	Occasional mains damage and entry and junction failure	Minor mains damage 5% entries and junctions fail
	MM VII	Should be okay	Little mains damage, 10% of entries and junctions failure	Mains damage possible 20% entries and junctions fail
	MM VIII	Should be okay, minor damage and permanent distortion	Mains damage likely 40% entries and junctions failure	Mains damage widespread
	MM IX	Distortion to mains, damage possible at entry to structure and at junctions	Mains damage probable 60% entries and junctions failure	Mains damage
3	MMVI	As for Zone 2, with some small reduction in severity possible		
	MM VII			
	MM VIII			
	MM IX			

It is important to remember that the Earthquake Hazard Assessment Report was developed in 2008, prior to the 2011 Canterbury earthquakes and 2016 Kaikoura earthquake. More information would be available now after these earthquakes which **may** influence the overall assessment.

8.3.9 Alpine Fault 8

Project AF8 is a risk scenario-based earthquake response planning project, informed by 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. It is managed by Emergency Management Southland on behalf of all South Island CDEM Groups.

Emergency response planning in New Zealand, and most other comparable nations, takes an "all hazards" approach, where response resources and coordination arrangements are assumed to be sufficient to meet the needs of any hazard that might occur. The "all hazards" planning provides broad and solid basis for response planning, but it lacks specificity about the sorts of impacts and consequences that individual, large-scale or complex hazards, like major earthquakes, will bring with them, or the community, organisation, and government agency responses that are likely to be required to reduce damage, loss or suffering.

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 (SAFER) Plan will be developed in 2017-18, implemented in 2018 and exercised in 2018-19. Council will keep a keen eye on the response actions and resources from the AF8 project.

8.3.10 Divestment

From time to time Council receives applications from Rural Water Scheme bodies to privatise the water supply. This is possible subject to meeting the conditions under Sections 131 and 135 of the LGA.

Specific management issues related to privatisation of public supplies include but are not limited to:

- Ensuring compliance with the Health Act and the DWSNZ
- Designated properties – procedure to terminate/transfer
- Public utilities on private properties have a measure of protection under the LGA 2002. Private utilities may require easements or formal agreements
- Service Level Agreement to manage, regulate and protect private infrastructure (replacing the Council Bylaw)
- Ownership and associated responsibilities

If this was proposed then the Council would also need to consult with its community under the LGA, as the transfer would involve a strategic asset. There are no plans to transfer any water supplies in the term of this LTP.

8.4 Resilience

Council's customers have a high expectation of continuing functionality and service delivery. 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 lake communities).

Resilience is based on a design philosophy which acknowledge that failure will occur. Resilience requires early detection and recovery, but not necessarily through re-establishing the failed system.

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.

Robust systems are designed to prevent failure. Resilience is about early detection and fast recovery. Resilience is defined as the intrinsic ability of a system to adjust its functioning prior to, during, or following changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions.

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
- Identify critical assets and ensure mitigation methods are developed
- Obtain insurance where this is deemed to be the most cost effective approach

8.5 Insurance

All above ground infrastructural assets are currently insured by Council. The below ground assets are not insured. Council keep a $3M cash reserve balance to part fund any repairs and relies on Central Government assistance for repairs as a result of any natural event. In addition, Council is relying on its strong balance sheet to borrow sufficient funds to replace those assets in the unlikely event that there is widespread damage to those assets.

Council is not a member of LAPP. Council has in the past considered becoming a financial member but due to the Christchurch earthquake there is a significant buy in cost. Council is also concerned that another event like the Christchurch earthquake in another main centre would fully deplete the fund to the point there would not be enough funds available to repair our assets if they were damaged at the same time.

8.6 Assumptions and Uncertainties

The LGA - 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.

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.

Table 8-1: Significant Forecasting Assumptions

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
Population Growth It is assumed that growth in the district's population will generally be consistent with the medium projections issued by Statistics NZ in December 2016, which are that the district's population will grow by a little over 4 percent from 2018 to 2028 (from 4680 to 4880 people). It is not expected that this level of population growth will have any significant impact on demand for infrastructure or services.		✓		Population change occurs within the district at a higher or lower rate than predicted.	A significant, consistent decline in population may adversely affect Council's ability to set rates at a level affordable to the community. A significant, consistent increase in population could adversely affect Council's ability to deliver some services to existing service levels.	Council will continue to monitor population measures within the district and respond to meet needs where possible.
Demographic Changes Most population growth within the Mackenzie District is expected to be at older ages (55+ years), with the proportion of over 65s living in the district projected to be slightly higher than the NZ average. Twizel and Fairlie have a higher proportion of older people (65+) than other areas in the district and this is not expected to change over the life of the plan.		✓		Demographic changes occur at a higher or lower rate than expected.	Changes to the projected demographics may place pressure on some Council services due to increasing demand, which may lead to a lower level of service in these areas or a requirement for additional investment.	Council will continue to monitor demographic changes within the district and respond to meet needs where possible.
Household Changes It is anticipated that changes to household numbers and composition will generally reflect population projections and forecast changes to demographics (that is, an ageing population). This is not expected to create any significant impact on demand for infrastructure and services, given the relatively small increase in total population projected to occur.		✓		Household changes across the district occur at a higher or lower rate than expected.	A slower rate of household growth may mean that some service activities have overinvested in infrastructure (too much capacity too soon).	Council will continue to monitor household changes within the district. Where rapid growth occurs, this is likely to be within existing subdivisions where servicing provision has already been made or, where growth requires additional infrastructure, developers can be required to meet this demand through the payment of financial contributions.

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
Dwelling Numbers It is assumed that growth in dwelling numbers will primarily be driven by demand for short-stay visitor and holiday accommodation due to year-on-year increases in both domestic and international visitor numbers to the district. Growth in demand for private holiday accommodation is predicted to have an impact on the availability of residential housing. However, the large proportion of unoccupied dwellings in the district, particularly in Tekapo (75%) and Twizel (66%), is not anticipated to change or increase significantly.		✓		Dwelling changes across the district occur at a higher or lower rate than expected.	A higher or lower rate of dwelling growth may impact on provision of services, such as the issue of resource and building consents.	Council will continue to monitor dwelling growth in the district and adjust provision of supporting services as required.
Tourism Growth It is assumed the average growth in international visitors to Mackenzie District will be at least equivalent to, or greater than, the growth in international visitors forecast for New Zealand over the coming ten years (an average increase of 5.4% per annum). This is based on current data which indicates growth in international visitors to Mackenzie District is occurring at a rate higher than the national average and forecast growth. It is also assumed growth in domestic visitors to Mackenzie District will continue to occur at a rate similar to international visitor numbers. However, there is more uncertainty around this assumption based on the lack of current domestic visitor survey data.		✓		Change to tourism occurs at a rate significantly above or below the growth levels assumed.	Increases in projected visitor numbers may place pressure on supporting services and infrastructure. Conversely, a drop in tourism to the district may mean that service activities have overinvested.	Council will continue to monitor tourism numbers to the country and district and respond to meet needs where possible.
Climate Change It is assumed that climate change is happening, and the Council will take into account the predicted impacts of climate change as it plans, builds and renews its infrastructure. The impacts are expected to be relatively minor within the period covered by the Long Term Plan, but increasing in the future.		✓		There is a risk that climate change will happen more quickly than expected and require changes to the Council's activities.	If climate change happens more quickly, the Council may need to carry out work on its infrastructure assets. Additional costs may be incurred to mitigate impacts. Council's business units may not recognise climate change in the delivery of their services. Decisions	Council activities will build appropriate mitigation responses into resilient infrastructure development. The Council will continue to monitor climate change science and the response of central

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
					made now without these considerations may have intergenerational effects on land use decisions, environmental policy and infrastructure decisions e.g. relying on undersized assets and resources in highly vulnerable parts of the district.	government and adapt its response where required.
Natural Hazards / Local Natural Disasters It assumed that there will be no major adverse events during the period covered by this Long Term Plan. *Note: the district is at risk from natural hazards such as flooding, earthquake, and storms. These events can occur at any time, without warning.* While events may occur at any time, Council's planning will focus on operational resilience and Emergency Management.	✓			A major adverse event occurs resulting in a significant impact on the district and Council's services.	A disaster has the potential to cause significant, unbudgeted impact on the Council and the community. In the event of a major disaster, Council has assumed additional central government support will be forthcoming. Council would need to borrow additional funds to make repairs and meet the costs of restoration.	The Council seeks to mitigate this risk through its Civil Defence, Risk Management and Insurance Policies. Council keeps appropriate levels of cash reserves ($3.0m) and sufficient head room in its borrowings to enable it to undertake any repairs on its underground assets. Central government has a role in disaster recovery after a natural disaster.
New Technologies There will be no new technologies deployed within the period covered by the Long Term Plan that will significantly change the demand for or provision of services.			✓	Technologies may become available which significantly change the demand for or provision of services.	Inefficient of ineffective provision of services in the traditional manner when other alternatives maybe available.	Council will regularly monitor existing and proposed technologies as they relate to service provision.
Service Delivery Modes & Contracts It is assumed that there will be no significant changes to current modes of service delivery for each service area or variations in terms of contract prices (above inflation and inventory adjustments) for current operations and maintenance contracts.		✓		Maintenance contracts may be re-tendered during the plan period. If maintenance and service contracts are consolidated and/or	This would require Council to either increase rates and/or operating revenue if efficiencies cannot be found or it may consider reducing levels of service.	

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
Council will continue to consider collaboration opportunities and assess changes to service delivery on a case by case basis.				re-tendered there is a possibility contract prices will be higher than anticipated.		
Planning Horizons It is assumed that the planning horizon for growth (30-45 years) and asset lifecycles (30 years plus) are sufficient to inform the ten year forecasts included in the LTP.			✓	The planning horizon for growth and asset life services differ from that assumed.		
Legislative Demands As an organisation that is created and derives its powers from statute, changes to legislation have a direct impact on the way we conduct our business. The speed and scale of review of legislation depends largely on the policy direction and priorities of the government of the day. While we anticipate changes to the Resource Management Act 1991 and Local Government Act 2002 during the life of this Long Term Plan, we have assumed that these and any other changes to legislation will not have a significant effect on our business. The LTP assumes that existing legislation will remain in place and that the structure and responsibilities of the Council will remain the same over the period covered by the plan. It also assumes the Council will remain an independent unit of local government during the next 10 years. The Council sees merit in continuing with shared services where this allows more efficient use of skills and resources.			✓	The impact of government legislation is more or less than expected. New legislation is enacted that alters the activities Council undertakes or provides.	Unrealised impacts of legislative changes may create greater impacts on Council operations, including operating budgets, workloads, time and resource availability. These pressures may lead to additional costs for ratepayers. Where legislative changes require Council to provide additional services or increased levels of services, this may impact fees and charges for cost-recovery activities.	Most changes to legislation are known in advance, giving councils the ability to prepare for implementation. Council will monitor existing and potential legislative changes as they move through parliamentary process. Where appropriate, Council will submit on legislation to encourage reduced or improved impacts on Council operations and limit costs to ratepayers. Historical trends have been for services transferred from central government to local government. The cost and impact on our activities as a result of future legislative changes cannot be quantified at this stage as it would be dependent on the specific services affected by the legislative change. Financial uncertainty in this area would generally impact the cost of introducing changes, and the

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
						mechanisms required to fund any new services.
Legislation Change – Development Contributions It is recognised that the ability to levy financial contributions under the Resource Management Act 1991 will be revoked, effective from 18 April 2022. Council will then recover development contributions. For financial forecasting purposes the Council has assumed that development contributions will provide a similar level of funding and outcomes to financial contributions when this change occurs.			✓	The ability to levy development contributions is not comparable to existing financial contribution provisions.	Council does not recoup costs associated with meeting infrastructure demands of development.	Council will review its Development Contributions and Financial Contributions policy prior 18 April 2022. This work will involve clearly determining the demand for services and the costs of meeting that demand.
Inflation To develop a consistent approach for local government to account for inflation, the Society of Local Government Managers (SOLGM) contracted Business and Economic Research Limited (BERL) to construct forecasts for inflation. It is assumed that long term inflation will be consistent with BERL's Local Government Cost Index (LGCI) forecasts.		✓		Inflationary costs in some areas may increase at a rate different to that forecast.		In preparing the LTP, the Council is required to use best estimates in determining the level of costs to be budgeted in the future. As a result, Council is required to account for the effect of price changes or inflation that is expected to occur over the ten year period. Council has endorsed the rates produced by BERL and has used these rates as the assumption for accounting for inflation for the preparation of the LTP. Some types of costs (eg roading and transport costs) have been subject to fluctuations in recent years, so it is inherently difficult to predict trends with accuracy. However, these costs will be mitigated through the annual plan process where the annual adjustment can be made.

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
Interest Rates and Borrowing Borrowing costs are assumed to be as included in Financial Forecasts. Council assumptions on interest rates are based on the Official Cash Rate (OCR). That rate will be used for calculating interest rates and will be adjusted annually.		✓		Forecast interest rates are higher or lower than forecast.	The movement in interest rates has a wide ranging effect on the Council. The Council's cash investments have derived interest at the market rates and the Council's internal financing policy bases the interest paid to or charged to individual communities on the Official Cash Rate. The level of works and services rates levied is dependent in part on the interest rate used in Council's internal funding policy.	Any exposure to interest movement will be managed by a preference for a higher percentage of fixed term rates.
Insurance It is assumed that an appropriate level of insurance will be secured by Council. There is less certainty that Central Government will provide a sufficient share for post event works. Underground assets will be partly self- insured and that sufficient emergency funding will be available from NZTA for damage to roading assets caused by extraordinary events. It is also assumed that increases in Insurance Premiums will be larger than CPI.	✓			There is a risk that insurance will be difficult to secure and that NZTA will not provide adequate emergency funding to reinstate damaged services. There is a risk that insurance premiums will rise more rapidly than expected.	Council's assets may not be able to be insured in a similar manner to the current approach and different options may need to be considered. This includes increasing reserve funds and higher excess sums. Premiums will exceed budget allocation and savings will be required in insurance policies or funds will need to be reallocated from other areas of expenditure.	
Timing & Level of Capital Expenditure The Long Term Plan assumes that the timing and cost of capital projects and associated operating costs are as determined through the Council's activity management planning process.	✓			There is a risk that capital projects may not occur as planned, or actual costs may vary from the forecast therefore may have an impact on the costs.	If projects do not occur as planned, capital expenditure in any year may differ from that forecast and delay may also change the cost of individual projects.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
				Transport projects seeking subsidy will need a Business Case approach to NZTA which may change originally anticipated outcomes.		
Resource Consents It is assumed that the conditions of resource consents held by Council will not be changed significantly and that the Council will be able to renew and obtain the necessary resource consents for its planned projects.			✓	Resource consents are changed through reviews, or applications for Council projects are not approved or have significant compliance or monitoring costs.	Projects will cost more if compliance requirements are significant, or may not proceed as planned if consents are not obtained.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.
Effects of Assets Vested to Council It is Council policy to accept the vesting of the assets in the year that the Council is able to rate the individual sections created. To determine the value of the assets to be vested, the Council made assumptions based on an analysis of the costs of recent subdivisions in the District. The average costs were assumed as follows: (TBC) • Roading (incl Footpaths) $5,406 per section; • Sewer $8,300 per section; • Stormwater $3,120 per section; • Water $5,500 per section. These amounts will be applicable to all three townships and the amounts will be multiplied by the numbers of urban sections created in each year to arrive at the total assets to be added to the Council's asset register. This will also be inflation-adjusted each year according to the BERL inflation forecasts as described in the assumption for inflation			✓ ✓	The assumption has based the level of assets vested to Council on an analysis of recent major subdivisions carried out in the District. Some subdivisions may not result in any further assets to be vested in the Council as there has already been adequate capacity provided for the new sections and some subdivisions may have a greater amount of assets vested into Council as there may be a greater per property		

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
Each addition to the asset register will be depreciated by any appropriate depreciation charge. No vested assets will be applied to rural sections. To balance the books, the introduction of the asset value needs to be reflected in income, therefore, there will be a corresponding income line called "Vested Assets Income". This income will be treated the same as financial contributions as it is deemed to be capital income rather than operational income. The amount of this income plus the amount of the vested asset will be accounted for in the capital reserve of each asset.			✓ ✓ ✓	costs associated with the subdivision.		
Sale or Transfer of Assets It is assumed throughout this plan that we will retain ownership of our significant assets and continue with the current Council Departments.			✓	That the objectives whether financial or non-financial of holding strategic assets are not achieved.	Should specified returns not be attainable, we would review our investment. Such a review may have a financial impact.	Any decision to sell or partially sell would be significant and a full proposal with options to be considered would be provided to the community for feedback as part of a special consultation process.
Asset Revaluations The Council has a policy of revaluing its buildings, land and infrastructural assets on a three yearly basis. The Long Term Plan assumes that the book values of the relevant assets as at the revaluation dates will be increased by inflation rates as per the BERL inflation forecasts as described in the Inflation assumption above.			✓	Inflationary costs in some areas may be different from that forecast. The condition of the assets may be different to that assumed and the value of the asset may differ accordingly.	There may be a higher or lower asset value and a lower or higher depreciation charge.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.
Sources of Funds for the Future Replacement of Assets It is assumed that funding for the replacement of existing assets will be obtained from the appropriates			✓	A particular funding source is not available.	Depreciation is used to fund renewals and is funded mainly through rates and user charges. Should other sources of capital funding such as subsidies or	

Assumption	Level of uncertainty *(High/Medium/Low)*			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
sources as detailed in Council's Revenue and Financing Policy.					development/financial contributions differ from levels forecast in a particular activity, Council is able to access borrowings through its central treasury function.	
Useful Lives of Assets The useful lives of assets have been assumed as set out in the following table, which matches the depreciation policy under the Statement of Accounting Policies:		✓		Assets last longer than the lives assumed, or assets deteriorate at a faster rate that the lives assumed.	Assets require replacement earlier or later in their life cycle.	Ongoing assessment of the quality of assets means this information is updated regularly and work programmes adjusted to minimise the chance of asset failure. In the event of assets wearing out earlier than anticipated, capital projects could be brought forward. This may affect borrowing and depreciation expenses. Negative impacts are likely to be at least partially offset by some assets lasting longer than estimated. Mitigation may also involve reprioritisation of the capital expenditure programme.

Operational assets	Depreciation method	Life (years)	Operational assets	Depreciation method	Life (years)
Resource consents	Straight line	Over the life of the consent	**Water supplies**		
Water supplies			Hydrants	Straight line	80
Piping mains	Straight line	60-80	Valves and air valves	Straight line	80
Pumps	Straight line	25	Meters	Straight line	25
Service lines	Straight line	80-100	Reservoirs	Straight line	80

9.0 LIFECYCLE MANAGEMENT

This section of the AMP outlines what work is planned to keep the assets operating at the current levels of service defined in Section 5 while optimising lifecycle costs. The overall objective of the Life Cycle Management Plan is:

To maintain performance measures to ensure that the current strategies do not consume the asset leading to an unexpected increase in maintenance/renewal expenditure in the future.

9.1 Overview

Lifecycle asset management focuses on management options and strategies from initial planning through to disposal, while considering all relevant economic and physical consequences. The effective application of asset management principles will ensure the reliable delivery of service and reduce the long-term cost of ownership and in this way reduce service costs. A well-structured lifecycle management plan will reduce the long term costs of ownership and in so doing reduce the service cost.

The Lifecycle Management Programme cover five key categories of work necessary to achieve the required outcomes. These key categories and goals are:

Table 9-1: Lifecycle Management Categories

Lifecycle Categories		Aim
Management Plan	Management functions required to support the other Programmes	To maintain the assets to ensure that the assets achieve their service potential
Operations and Maintenance Plan	To ensure efficient operation and serviceability of the assets so that they achieve their service potential over their useful lives. This includes the day-to-day work to keep the assets operating	
Renewal Plan	To provide for the progressive replacement of individual assets that have reached the end of their useful lives (restores the original capacity)	
Development Plan	To improve parts of the system currently performing below target service standards and to allow development to meet future demand requirements	To meet future demand and close any service gaps
Disposal Plan	To better plan for disposal of assets through rationalisation of asset stock or when assets become uneconomic to own and/or operate	To dispose of assets appropriately

9.2 Management

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.

The following management activities are used to achieve the desired outcomes.

Table 9-2: Management Activities

Activity	Objective
Strategic Planning	This AMP supports the achievement of the relevant Community Outcomes and Infrastructure Strategy
	To develop Levels of Service aligned with strategies and plans
	To develop the professional skills of the staff through adequate training and experiences
Data Management	To develop and optimise the asset register and develop functionality in line with business needs
	Appropriate data collection programmes (condition, performance, asset registers) closely aligned with business needs implemented in accordance with documented quality processes
	To ensure the asset data are subject to defined quality assurance processes
Business processes	To ensure the AMP is s strategic 'living' document through regular updating and 3 yearly reviews
	Risk Management is an essential part of Asset Management and will be managed by the implementation of risk mitigation measures to maintain risk exposure at acceptable levels including but not limited to maintaining emergency response planning, condition monitoring of critical assets, preventative maintenance, development and implementation of operations manuals and standards
	To document, review and implement quality processes
Monitoring	To ensure agreed service levels and appropriate for demand
Financial	To ensure expenditure programmes are in accordance with funding and budget preparation policies and procedures
	To ensure systems are managed in a financially sustainable manner over the long term

9.3 Operations and Maintenance

This covers planning for on-going day to day operation and maintenance to keep assets serviceable and prevent premature deterioration or failure. This plan includes:

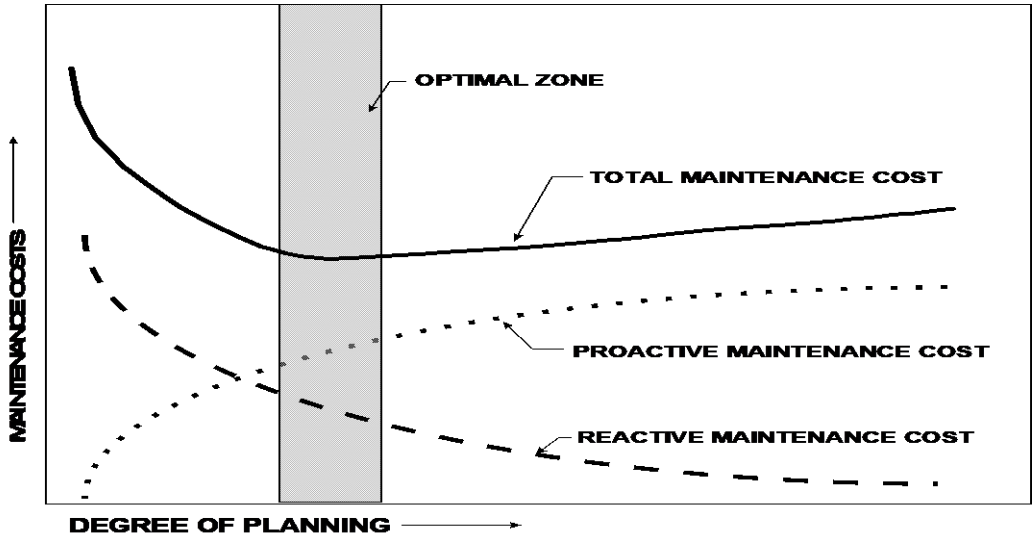
- Current trends and issues
- Maintenance decision making process
- Strategies required to meet levels of service
- How tasks are prioritised
- Summary of future costs
- Any deferred work and associated risks

Two categories of maintenance are carried out:

- Unplanned Maintenance: Reactive work carried out in response to reported problems or defects (e.g. repair broken water mains, respond to low chlorine alarms or pump failure alarms)
- Planned Maintenance: Proactive work carried out to a predetermined schedule (e.g. water main replacement, chlorine plant refurbishment, routine pump inspections and refurbishment etc).

A key element of activity management planning is determining the most cost effective blend of planned and unplanned maintenance as illustrated in Figure 9-1.

Figure 9-1: Balancing Proactive and Reactive Maintenance



9.3.1 Service Delivery

Council staff manage the Water Supply network with some assistance from consultants. The maintenance on the network is maintained through a competitively tendered multi-year contract. The current contracts let are included in Table 9-3.

The Utilities Services contracts (3 year + 1 yr + 1 yr) place considerable onus on the contractors to self-manage all utilities maintenance activities; this involves regular inspection of the various components of the networks, locating maintenance requirements and carrying them out.

Table 9-3: Current Contract

Contract # and Name	Term	Responsibilities	Contractor
1213 - Utilities Services Contract 2013-2016	3+1+1	**Water Supplies** The contract includes the complete operation and maintenance of the following water supplies • Fairlie • Lake Tekapo • Twizel • Burkes Pass • Allandale **Wastewater Systems** The contract includes the complete operation and maintenance of the following waste water systems • Fairlie • Lake Tekapo • Twizel • Burkes Pass • Mt Cook Lookout **Stormwater System** The contract includes the complete operation and maintenance of the following stormwater system • Fairlie • Lake Tekapo • Twizel	Whitestone Contracting Ltd

9.3.2 Management & Maintenance History

Historical data is used to make an assessment of past performance and to see if future trends can be applied. At a network level, these trends can indicate if the condition of the network is deteriorating or improving. The different forms of historical data and their location are outlined in Table 9-4.

Table 9-4: Historical data

Type	Location	Comment
Visual Inspection	Asset Register	Pipelines are inspected whenever a pipeline is excavated for repair and rated for condition
Past Maintenance Costs	Contractor's database	Pipelines are inspected whenever a pipeline is excavated for repair and rated for condition
Past History	MDC	

9.3.3 Maintenance and Operational Strategies

Water Supply maintenance work is included under the main utilities services maintenance contract and covers:

- minimum maintenance standards
- frequency of routine inspections
- response times to correct defects

Water Supply maintenance is achieved by employing the following asset strategies:

Table 9-5: Asset Strategies

Asset	Activities	Comment
Headworks/Treatment	Inspection	Weekly and/or as appropriate
Reservoirs and Tanks	Inspection	As appropriate
Pump Stations	Inspection	Weekly and/or as appropriate
Pumps	Tested	Monthly/weekly and/or as appropriate
SCADA	Signal check	Yearly
Turbidity Meters	Calibration	3 monthly
Chlorine Lines	Replacement	As appropriate
Backflow Preventors	Testing	Annually and/or as appropriate
Working Load Limits on Lifting Gear	Certification/Inspection	Annually
Switchboards	Inspection by Electrician	Annual inspection by electrician
Critical Mains	Inspection	Annually or as appropriate
Selected Mains	Condition Assessment by Pipe Sampling	Selected mains targeted by age/material etc. are sampled during repairs
Dead End Mains and Low Points	Flushing	Annually or as appropriate
Valves	Evaluation and exercise	5 yearly
PRV/PSVs	Inspection	Annually
Restrictors	Inspection	3 yearly inspection (to be developed) (**IP 5**)
All Hydrants	Fire flow testing	5 yearly by the NZFS
Unplanned Maintenance		

Asset	Activities	Comment
All	When a defect has been identified, remedial work is programmed before the risk and consequence of failure become unacceptable	
All	Priority is given to defects which are a safety hazard, likely to cause premature failure or severe economic deterioration	
All	Remain alert and prepared for emergency situations	
All	Respond to and repair failures by the most economic method available, making temporary repairs if major repairs or renewals are required	

Maintenance Strategy
Condition inspections: The maintenance contractors are required to report any defects observed during day to day maintenance activity.

Unplanned maintenance includes all reactive maintenance such as repairs and modifications usually following a reported fault or failure by the public or is obvious through a water leak (in the instance of a water supply network).

Council's contractors are required to maintain an effective communication system and level of preparedness to ensure emergency works are undertaken within the specified response timeframes.

Planned maintenance includes Preventive Maintenance, Servicing and Condition Monitoring. Planned Maintenance is usually carried out at a given frequency either at fixed intervals or 'on condition' to preserve the required levels of service at a minimum cost. On Condition means that once an asset has degraded to a certain condition (detected through condition monitoring) a decision as to the most appropriate maintenance must be made. This does not mean once an asset has failed.

Damaged and malfunctioning water supply assets, which does not require immediate action and identified by public complaint or contractor reports are programmed for repair according to the following priority:

- Loss of Service
- Environmental impact
- Public safety
- Accelerated deterioration

Maintenance Standards
The maintenance standards to be achieved are set out in the Council's specifications contained in the utility services maintenance contract.

All critical water supply assets are required to be inspected and maintained regularly.

Maintenance Programme
The majority of the water supply maintenance is reactive so budgets have been based on historical expenditure.

The following non asset strategies are employed:

Table 9-6: Non-Asset Strategies

Strategy	Description
Alternative Technologies	Alternative technologies are considered as appropriate
Approved Materials	Only approved materials shall be used in the water supply to ensure the quality and longevity of the asset
Backflow Prevention	Backflow prevention policy (**IP 6**)

Strategy	Description
Energy Efficiency	Energy savings and management carried out in a logical manner for the facilities
Health and Safety Audits	Audits undertaken randomly to ensure all work completed by Council and Contractor staff complies with the Health and Safety at Work Act and Traffic Management Regulations
Leak Detection	To proactively detect and repair leaks within the water supply**.**
Monitoring Planned vs Unplanned Maintenance	The mix of Planned vs Unplanned Maintenance will be analysed periodically to allow optimising of the activities
Network Modelling	Network Modelling is carried out to ensure renewal and capital works are programmed appropriately and assist in the identification of faults in the system when low pressures or flows are identified
Pressure Monitoring	Pressure Monitoring is carried out by Council staff to measure compliance with Levels of Service and calibrate network models
Supervision of Facilities	Supervision of Facilities to ensure these buildings and critical assets are maintained appropriately
Telemetry System	The telemetry system will be utilised to assist in monitoring the water demand profile, controlling operations and increase the knowledge of the asset operation therefore enabling efficiencies to be introduced
Water Meters	Water meters are installed on trunk mains and commercial/industrial connections to provide accurate consumption records. Water meters remain the property of the Council. Universal metering will be considered in future.
Water Quality	Water supply to comply with Health Act 1956 and appropriate Ministry of Health Grading Testing for FAC undertaken by the Contractor as per compliance requirements Testing for ecoli undertaken by Council as per compliance requirements
Water Supply Shutdown	All shutdowns to be managed by the Maintenance Contractor to protect the quality of the water and the asset

9.3.4 Current Condition

Council rates the condition of the water supply pipelines and other facilities. There is an ongoing inspection and maintenance regime under the routine maintenance contract. Council has a requirement in its maintenance contract that any pipeline dug up for repair, the size, material location and condition is to be recorded and reported to Council. This information is used to estimate the condition of similar types of pipe in similar ground conditions.

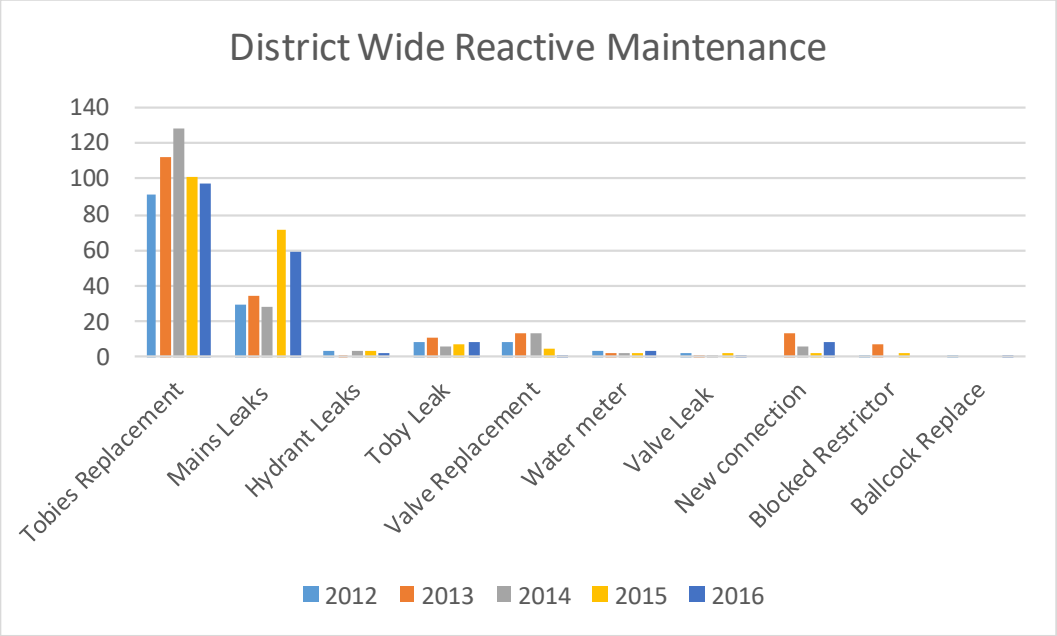
9.3.5 Current Performance

The water supply networks are generally performing well with a few leakage problems in Fairlie. These are generally due to older concrete pipes with perished rubber sealing rings. Specific condition for each asset is not currently measured, but as noted above, representative sections of the network are inspected and the results extrapolated across the network. There is good condition information for water supply assets with the majority of assets graded at 2 or better (89%). Only 3% of the network is graded as having a rating of 4 and no asset is graded as requiring replacement. However, Fairlie has a programme to replace all the pipework installed in the 1940s as this has defective rubber sealing rings allowing significant leakage.

A significant portion of the Twizel reticulation is Asbestos Cement pipe (24.5km/39%) installed in early 1970s. Several samples have been analysed to predict the remaining life of these pipes. Whilst there have been few actual failures yet, the analysis shows that the AC network is at risk of failure from now to 2020 and all the AC pipe should be replaced by 2020. A replacement programme for the AC pipe in Twizel based on a predictive failure model from the various pipe samples has been prepared and the renewal programme is in progress.

Overall the performance of water supply assets is adequate. The main concern is compliance with the NZDWS.

Figure 9-2: District Wide Reactive Maintenance

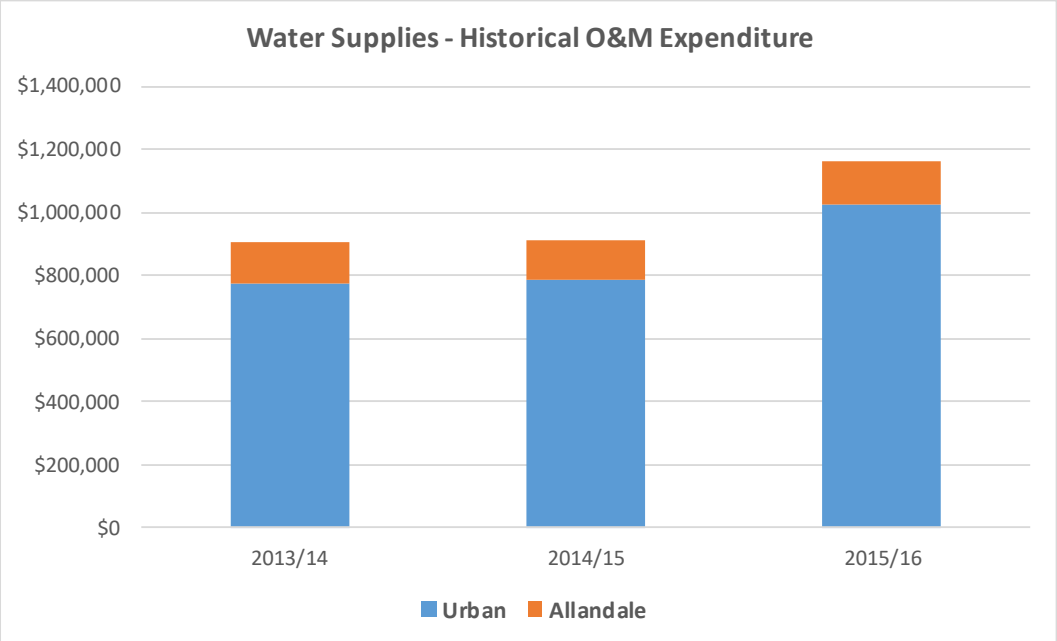


The above reactive maintenance records show that toby replacement peaked during 2014, but are gradually reducing. Toby leaks and toby replacements are related, but toby leaks may result in toby replacements. Toby replacement involve replacing the toby with a manifold which allows potential metering of an individual site. Mains leaks have shown an increase over the last two years, but this is due to the Fairlie trunk main, which has since been replaced and significantly reduced leakage. Reactive maintenance records are considered during renewal planning.

9.3.6 Operation and Maintenance Costs

The average annual expenditure over the three years 2013/14 to 2015/16 equates to $1.5m.

Figure 9-3: Historical O&M Expenditure



The Council is aware of and has been taking an active interest in the Havelock North Drinking Water Inquiry. It is expected that the outcome of this inquiry will have a flow on effect on all drinking water

suppliers. One of the recommendations made is that the government should mandate universal treatment. This should also include residual disinfection. As five of the Council's water supplies have treatment including chlorination (Fairlie, Lake Tekapo, Twizel, Burkes Pass and Allandale) this will not be a significant issue. Work is underway at present to chlorinate the Albury water supply.

9.3.7 Manuals and procedures

Formal procedure manuals for headworks, treatment, reservoirs and pump stations are progressively developed, providing Council's engineers and contractors with documented emergency, operations and maintenance procedures required for Council's water assets (**IP 7**)

9.4 Renewal/Replacement

This covers major work which restores an existing asset to its original capacity or its required condition (e.g. pipeline replacement, pump replacement or reconditioning). This plan includes:

- End of life projections
- Renewal decision making process
- Renewals strategies and methods to meet required LOS
- How renewals are identified, prioritised and to what standard they are replaced
- Summary of future costs

The renewal programme is prioritised on the basis of overall condition.

Preventive Maintenance
Preventative maintenance includes non-routine work required to protect the serviceability of the network and minimise the threat of water leakage and interruption to supply.

Standards
The Council's standards for replacement infrastructure are based on NZS 4404:2010. The O&M Contract specifies Approved Materials.

9.4.1 Renewal Strategy

The current replacement programme (Twizel) is based on a predictive failure model form the various pipe samples has been prepared.

The model takes into account the following

- Existing and future demand
- Roading replacement programme, both footpath and roadway
- Ability to fund
- Availability of contractors
- Refurbishment method

Analysis of these test results shows that the large diameter pipe in the reticulation has very good remaining life (80 years), but the 100mm and 150 mm diameter pipe has a varying remaining life, being at risk of serious failure over the next 20 years.

This strategy recommended that Council start the replacement programme in 2015/16 and continue to replace the rest of the AC pipe over the next 20 years. The average cost per year is $225,000 starting with the most at risk or critical pipelines first. It would be sensible to complete each street fully so the actual cost per year will vary.

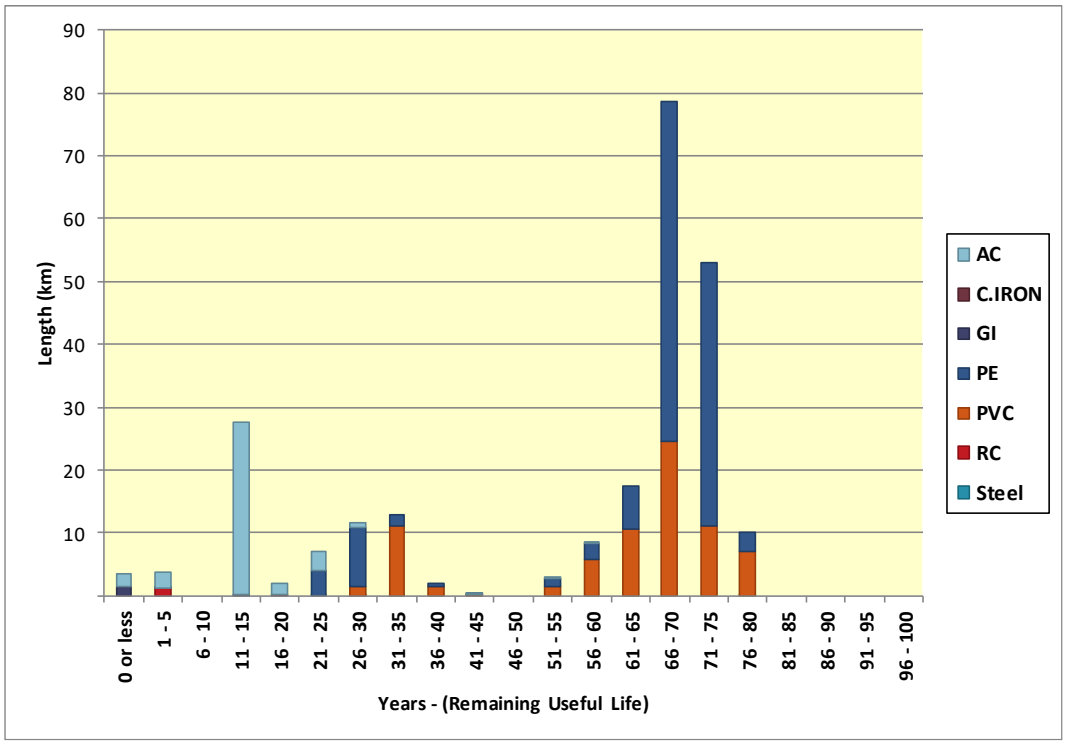
No formal criticality assessment has been documented, but Council engineers use practical experience and skilled application of staff and service providers in consideration of critical assets. This allows for different strategies to be applied depending on priority. For example, a "run to failure strategy" is applied to low priority assets as the consequence of failure is not major and the costs of ongoing condition monitoring may outweigh the costs of failure. A "risk and condition-based strategy" is applied where

there is a significant implication due to failure, such as a major health and safety risk, significant reliability of supply consequence or significant expense to repair.

9.4.2 Projected Renewals

Using the expected useful lives within the asset register provides the following graphical renewal projection of water mains.

Figure 9-4: District Wide Projected Renewals



The graph shows that there are 2km of AC pipe and 1.3 km of GI pipe that have reached the end of their expected useful lives. There is 2.7km of AC pipe and 1.2km of RC pipe that will reach the end of their expected useful life within the 1-5 year window. There is 27km of AC pipe which will reach the end of their expected useful life within the 11- 15 year window.

A significant amount of these mains are being replaced at the time of writing this Plan.

9.4.3 Deferred Renewals

The Fairlie WTP upgrade was initially planned/programmed for the 2017/18 year, but due to the investigation into the appropriate treatment for the Fairlie WS the upgrade have been deferred for one year. The upgrade is programmed to take place during the 2018/19 year. The investigation into the appropriate source and treatment is on-going. Council engineers aim to find the best solution to ensure the community attains the optimum source and treatment for the Fairlie WS.

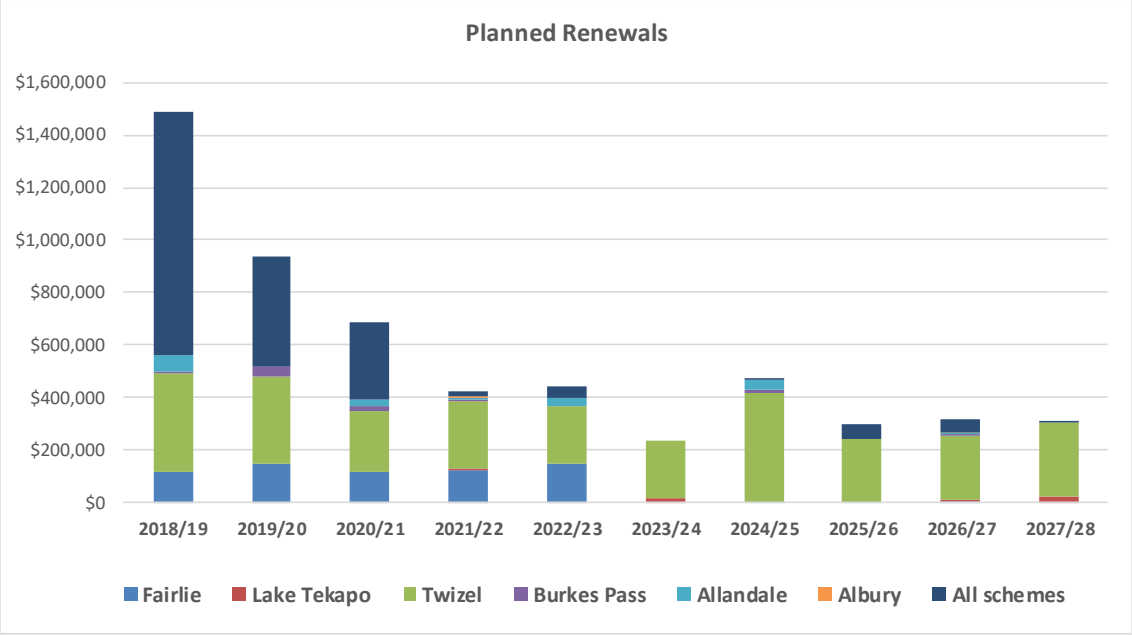
9.4.4 Planned Renewals

The planned renewals for the next 10 years are listed in Table 9-7: Planned Renewals below. This summarise the renewals for each water supply. The specific details are discussed within each individual water supply in Appendix A – Individual Supplies Description.

All schemes include projects such as service connections, revaluation, meter verification, water quality testing, etc.

Table 9-7: Planned Renewals

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Fairlie	$120,000	$148,000	$120,000	$125,200	$150,000	$0	$0	$0	$5,200	$0
Lake Tekapo	$0	$0	$0	$5,200	$0	$15,000	$0	$0	$5,200	$25,000
Twizel	$370,000	$330,000	$230,000	$255,200	$220,000	$220,000	$420,000	$240,000	$245,200	$280,000
Burkes Pass	$8,000	$40,000	$20,000	$5,200	$0	$0	$10,000	$0	$5,200	$0
Allandale	$62,325	$0	$20,000	$8,200	$30,000	$0	$40,000	$0	$5,200	$0
Albury	$0	$0	$0	$3,000	$0	$0	$0	$0	$3,000	$0
All schemes	$925,000	$416,500	$296,380	$22,380	$41,500	$0	$5,000	$57,880	$47,380	$5,000
TOTAL	**$1,485,325**	**$934,500**	**$686,380**	**$424,380**	**$441,500**	**$235,000**	**$475,000**	**$297,880**	**$316,380**	**$310,000**



9.5 Asset Development

Most new assets are created as part of subdivisions and subsequently taken over by the Council.

The criterion used for justifying new/replacement construction undertaken by Council includes evidence of regular leakage and consequent interruption to supply. There are a number of asbestos cement pipelines (19.6%) in the district that are deteriorating from the inside out and will prematurely start to fail in the next twenty to thirty years or so.

Development Standards
The Council uses the Land Subdivision Standard NZS4404: 2010.

Development Programme
The cost of pipeline renewal and development works is included in the Council Renewal Programme.

9.6 Asset Disposal

In general Council has no specific plans for disposal of components of the water supply asset. Details for specific assets are included in the following table.

Asset	Comment
Pipes	Generally left in the ground for possible future use as duct pipe for telecommunications or are removed in pieces as part of the excavation to lay the replacement pipe Pipe bursting
Valves	Generally removed and disposed as scrap
Hydrants	Generally removed and disposed as scrap

All pipeline renewals 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 renewed using 'no-dig' techniques or the asset is replaced in a new location. A work order report records each disposal and the details put in the AssetFinda database. Similarly, replacement of components at treatment plans and pumping stations usually involves disposal of those items being renewed/upgraded.

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 LGA, which covers:

- Public notification procedures required prior to sale
- Restrictions on the minimum value recovered
- Use of revenue received from asset disposal

Under the water supply activity no assets for disposal are considered to be eligible to be for sale. 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

Asbestos Cement Pipe
AC pipes are composed of a mixture of Portland cement, asbestos fibres and finely ground silica. Asbestos fibres are hazardous to health and there has been a well-established link between airborne asbestos fibres and asbestosis since before 1900.

It is therefore critical that exposure to airborne asbestos fibres is, where practical, eliminated or appropriate control measures are put in place to protect those working with AC pipes.

However, there is no evidence to show that asbestos fibres will cause any harm when they are wet and swallowed. The effects of asbestos in the water supply have been studied extensively, and results have not shown an elevated risk of asbestos-related disease.

When AC pipes are left undisturbed the risk of asbestos fibres becoming airborne is very low, and while they should still be treated as hazardous material, they present very low risk. Therefore, whenever it is practical, AC pipes should be left undisturbed (whether in service or abandoned).

When work on, or around, AC pipes is necessary, good working practices must be adopted to, where practical, eliminate or alternatively minimise exposure to airborne particles.

(Source: *Water New Zealand Good Practice Guide - Volume 1, National Asbestos Cement Pressure Pipe Manual*)

10.0 FINANCIAL

This section documents the financial requirements to manage and operate the asset.

10.1 Funding Details

10.1.1 Financial Strategy

The Council is required to have a financial strategy as part of its LTP. The purpose of the Financial Strategy is to facilitate prudent financial management by providing a guide to consider proposals for funding and expenditure against, and to show the overall effects of funding and expenditure proposals on the Council's services, rates, debt and investments.

In the strategy, the Council is required to specify the factors expected to have a significant impact on Council for the period covered by the LTP.

These factors include:

- Tourism and visitor growth
- Land use change
- Climate change and community resilience
- Infrastructure capital costs

These are all relevant to the water supply activity.

The Health (Drinking Water) Amendment Act 2007 requires water suppliers to take all practical steps to comply with the (previously voluntary) NZ Drinking Water Standards. To comply with the Act, Council must have in place a water safety plan which is approved by the Ministry of Health for each urban water supply. Dates for compliance with the Act are staggered depending on the size of the community.

For Burkes Pass, Allandale and Albury, the compliance date was 1 July 2016. (The Albury Water Supply is managed by the Albury Rural Water Supply Society Inc. under an agreement with Council, and expenditure on this scheme is not included in Council's budgeting process).

For Fairlie, Tekapo and Twizel, the compliance date was 1 July 2014. The Tekapo supply meets the drinking water standards, and Twizel meets the drinking water standards. In Fairlie, the expected capital outlay to upgrade the water supply is $900,000, and is programmed for 2018/19.

Replacement of deteriorating infrastructure is also required over the term of the LTP. A new reservoir for Fairlie is planned in 2025/26, which will increase levels of service by providing for additional storage. The Council will undertake works in 2018/19 to connect Pukaki Airport to the Twizel water supply, which will safeguard the airport's water supply and ensure it meets drinking water standards. The Council will retain the bore for other uses.

In the longer term, changes to climatic conditions and growth are also likely to require upgrades to some of the district's water supply systems. In addition, Council has reviewed the Reports of the Havelock North Drinking Water Inquiry, and will continue to monitor and adapt to any outcomes. At this stage Council considers that any increase in national Drinking Water Standards will be able to be met within existing budgeted works or programmed upgrades for all supplies. Additional operational costs, such as increased requirements for staff and contractor training or qualifications, will also able to be met within proposed LTP budgets.

10.1.2 Rating

The District's urban water supply schemes vary in age and condition and there are some large renewal costs over the next decade. This, combined with an increase in costs to meet drinking-water standards and other requirements, leads to significant expenditure in providing these water supplies.

The Council will fund large capital spends associated with the upgrades either through internal borrowing from its own cash reserves, or external borrowing. Depreciation and repayment of debt is charged as part of the targeted water rate.

Rural Water Supplies are funded from the users of those supplies. All costs are charged equally to consumers. This system has worked well in the past and will continue to apply.

Similarly, stock water race systems will continue to be funded as they are at present, from the users of those systems.

The general approach to funding of the annual costs of the 3 Waters schemes starts from the premise that those who benefit (either directly or indirectly) should pay. – termed targeted rating.

10.1.3 Price Level Changes & Forecast Financial Statements

Accounting rules require that Council adjust its forecast financial information to take account of the impact of inflation. This should more fairly indicate rates movements, particularly in the first three years of the Plan. Council, through the Society of Local Government Managers has contracted Business and Economic Research Ltd (BERL) to construct forecast price level changes for key categories of expenditure as they affect local government. Council has considered this advice and considers it appropriate to apply it to our circumstances.

Council has endorsed the rates produced by BERL and has used these rates as the assumption for accounting for inflation for the preparation of the LTP.

Year Ending	Roading	Planning and regulation	Water, sewer, drainage, and waste services	Water and Environmental	Local government administration	Community activities	Earthmoving and site work	Pipelines	All salary and wage rates - Local Govt sector
Jun-17	3.2	2.2	3.8	3.1	2.0	3.2	3.9	1.7	2.4
Jun-18	5.4	3.9	6.6	5.5	3.5	5.0	6.5	3.9	3.5
Jun-19	8.8	5.9	9.2	8.4	5.1	7.7	11.0	6.7	4.7
Jun-20	12.2	8.1	11.8	11.4	6.8	10.4	15.5	9.6	6.0
Jun-21	15.6	10.5	14.8	14.5	8.7	13.2	19.9	12.9	7.5
Jun-22	19.1	12.9	18.0	17.7	10.9	16.0	24.2	16.1	9.1
Jun-23	22.5	15.5	21.6	21.1	13.2	18.9	28.3	19.3	10.8
Jun-24	25.9	18.2	25.5	24.5	15.8	21.8	32.3	22.6	12.7
Jun-25	29.3	21.0	29.8	28.1	18.6	24.8	36.1	25.8	14.8
Jun-26	32.6	24.0	34.5	31.8	21.7	27.8	39.7	29.0	17.0
Jun-27	35.9	27.1	39.7	35.6	25.0	30.8	43.0	32.2	19.5

10.1.4 Vested Assets

When a developer carries out a subdivision, they are required to vest various assets to Council. These assets include any new roads, water mains, sewer mains, stormwater systems, footpaths, street lighting and landscaped areas. The Council is then responsible for the maintenance and future replacement of those assets.

The Council record the cost of those vested assets at the current cost when received and the assets will be revalued in line with the Council's other infrastructural assets. These assets will also be subject to depreciation.

10.1.5 Funding Strategy

The first priority is to maintain and operate the existing network in its current condition then allow for renewal expenditure that revitalises a component of the network that has worn out. Capital projects are funded through the Council's Policy for Funding Capital Expenditure, which was adopted as part of the 2012-2022 Long Term Plan.

The policy is summarised as follows:

Capital Reserves

- A Capital Reserve has been established for each activity that the Council undertakes.
- All depreciation that has been funded from that activity will be lodged into the Capital Reserve on a quarterly basis when each instalment of rates is due.
- Funds from other reserves or financial contributions can also be deposited into the Capital Reserve.
- All capital expenditure will be paid from the Capital Reserve at the time of payment.
- Capital Reserves may go into overdraft at any stage with prior approval of Council.

Capital Expenditure

- All Capital Expenditure must be approved by Council through the budget process or by an explicit resolution.

Interest Component For Debt Incurred Prior to 30 June 2012:

- If the balance of the Capital Reserve is overdrawn, the community of interest for the relevant activity will be charged an interest rate set at 100 basis points greater than the Official Cash Rate determined by the Reserve Bank. Such interest will be charged as a cost to the activity operating expenses and be rated for.
- If the balance of the Capital Reserve is in funds, then the Council will pay the community of interest in the relevant activity an interest payment set at 25 basis points less than the Official Cash Rate determined by the Reserve Bank. Such interest will accrue to the activity's Capital Reserve.

Interest Component For Debt Incurred After 30 June 2012:

- For the component of the debt incurred after 30 June 2012 the interest rate will be set at a level equal to the Council's average bond portfolio rate applying at the previous 1 January. Such interest will be charged as a cost to the activity operating expenses and rated for.

In determining the projects to be undertaken the benefit/cost ratio is the governing criteria used with preference being given to projects which can be shown to be economically justified, attract subsidy and have the necessary Council funding available.

10.2 Asset Valuation

The last valuation of the water supply infrastructural network and associated assets was undertaken as at 1 July 2016 and is summarised in the following table. The valuation is updated 3 yearly to take into account capital works and additions to the water supply network.

The valuation consists of an assessment of the replacement cost, depreciated replacement cost and the annual depreciation or decline in service potential of the network. The annual depreciation or decline in service potential is the amount the asset declines in value over a year as a result of the remaining life of the asset reducing. Provision is required to be made to fund this depreciation so as to make suitable allowance for the future replacement or renewal of the asset.

Table 10-1: Asset Valuation

Asset Type	Optimised Replacement Cost/ORC ($)	Optimised Depreciated Replacement Cost/ODRC ($)	Annual Depreciation ($)
Pipelines	$2,163,385	$16,583,222	$345,132
Service lines	$942,086	$568,757	$12,753
Break Pressure tanks	$29,140	$16,019	$389
Restricted supply points	$1,542,281	$499,517	$34,658
Hydrants	$832,895	$456,948	$10,412

Meters	$49,147	$36,379	$1,827
Valves	$1,021,836	$670,144	$12,885
Plant	$4,162,468	$2,956,665	$89,807
Water Races	$962,207	$962,207	
TOTAL	**$35,705,445**	**$22,750,058**	**$507,863**

The total optimised replacement cost of the Water Supply Infrastructure was assessed to be $35,705,445 as at 1 July 2016. The total optimised depreciated replacement cost was assessed to be $22,750,058.

The annual depreciation has been determined to be $507,863 per annum.

10.2.1 Depreciation

Depreciation is provided on a straight-line basis on all physical assets at rates which write off the cost of the asset to the estimated residual value at the end of its assumed effective life.

Expenditure on renewing or improving the capacity of the asset is capitalised annually as are assets which are vested in Council by developers. Capital work in progress is not depreciated. The total cost of this work is capitalised at the end of the financial year in which it is completed and depreciated from then onwards.

10.2.2 Valuation methodology

All assets have been valued using depreciated replacement cost (DRC). A DRC valuation requires:

- Determination of quantities of assets optimised to relate to those required for current service delivery and foreseeable demand
- Unit rates for replacement with modern engineering equivalent assets
- Effective lives that take account of local influences
- Depreciation that defines current value given a definable remaining life.

The NZ Infrastructure Asset Valuation and Depreciation Guidelines 2006 give direction as to the overall methodology applicable to a DRC valuation for water supply assets. This has been applied in this case to achieve a suitable valuation for Council Improvements and Infrastructure Asset Valuation.

Borrowing costs were excluded from the valuation.

The primary data source for this revaluation was the Council's Asset Register.

10.2.3 Asset Lives and Assumptions

The base life of an asset is set during the valuation process in order to identify what is believed to be the average length of time that the asset will be capable of providing the required level of service. The setting of the base life is the factor in the valuation process that directly affects the annual depreciation requirement for the asset.

The expected base lives in the reticulation for water, sewer and stormwater are reviewed as part of each valuation to align the expected lives, and the method of setting these with the renewal decision making practice.

Asset group	Expected useful life (years)
Pipe mains	60-80
Pumps	20
Service lines	80
Hydrants	80

Valves	20/80
Meters	25
Reservoirs	80

10.2.4 Resource Consents

It is difficult to determine the fair value of resource consents due to their specialised nature and having no active market to compare values against. For these reasons, Council holds resource consents at deemed cost and they are amortised over the life of the consent.

10.3 Financial Summary

The future overall financial requirements for the Water activity are tabled below:

Figure 10-1: Proposed Future Capital Works Programme

WATER	LTP Budget Yr 1 2019	LTP Budget Yr 2 2020	LTP Budget Yr 3 2021	LTP Budget Yr 4 2022	LTP Budget Yr 5 2023	LTP Budget Yr 6 2024	LTP Budget Yr 7 2025	LTP Budget Yr 8 2026	LTP Budget Yr 9 2027	LTP Budget Yr 10 2028
	(thousands)									
Allandale Water Supply										
0158980. Comm Assets - Water Supply	10	70	0	3	42	0	56	0	237	0
Ashwick/Opuha Water Supply										
0168980. Community Assets - Water	0	51	0	56	0	0	0	0	0	0
Urban Water Supply										
0248193. Vested Assets	0	0	1,161	0	1,443	0	0	1,799	0	0
0248203. Reticulation	8	0	0	0	0	0	0	1,799	0	0
0248204. Head Works - Renewal	70	0	0	0	0	0	0	0	0	0
0248205. Treatment - renewal	900	359	21	0	0	17	0	42	0	32
0248206. Service Connections - Renewal	20	0	0	0	0	0	0	0	133	136
0248214. Reticulation Fittings	110	0	0	0	0	0	0	0	0	0
0248215. Plant	25	0	0	0	0	251	6	0	31	6
0248281. Reticulation - Renewal	420	409	86	530	542	421	0	288	295	353
0248285. Reticulation - New	250	0	0	0	0	0	0	0	0	0
Total Water Supply Capital Expenditure	**2,613**	**1,629**	**529**	**590**	**2,027**	**689**	**62**	**3,927**	**696**	**528**

Table 10-2: Annual Net Cost - Funding Impact Statement

	Annual Plan 2017/18	Long-term Plan 2018/19	Long-term Plan 2019/20	Long-term Plan 2020/21	Long-term Plan 2021/22	Long-term Plan 2022/23	Long-term Plan 2023/24	Long-term Plan 2024/25	Long-term Plan 2025/26	Long-term Plan 2026/27	Long-term Plan 2027/28
						(thousands)					
General Rates, uniform annual general charges, rates penalties	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1,183	1,310	1,431	1,466	1,434	1,512	1,527	1,559	1,806	1,887	1,898
Internal charges and overheads recovered	5	5	5	5	5	5	5	5	5	5	5
Local authorities fuel tax, fines, infringement fees and other receipts	193	158	191	195	200	205	210	216	221	227	233
Total operating funding (A)	**1,381**	**1,473**	**1,627**	**1,666**	**1,639**	**1,722**	**1,742**	**1,780**	**2,032**	**2,119**	**2,136**
Payments to staff and suppliers	626	654	692	717	735	789	775	789	868	889	877
Finance costs	19	0	0	0	0	0	0	0	0	0	0
Internal charges and overheads applied	155	192	220	190	121	119	104	98	186	177	180
Total applications of operating funding (B)	**800**	**846**	**912**	**907**	**856**	**908**	**879**	**887**	**1,054**	**1,066**	**1,079**
Surplus (deficit) of operating funding (A-B)	**581**	**627**	**715**	**759**	**783**	**814**	**863**	**893**	**978**	**1,053**	**1,079**
Development and financial contributions	342	0	0	764	0	1,180	0	0	2,441	0	0
Total sources of capital funding (C)	**342**	**0**	**0**	**764**	**0**	**1,180**	**0**	**0**	**2,441**	**0**	**0**
Capital expenditure											
To meet additional demand	0	0	0	0	0	0	0	0	0	0	0
To improve the level of service	790	1,150	0	0	0	0	0	0	1,798	0	0
To replace existing assets	0	811	889	108	590	584	689	62	2,128	696	528
	790	**1,961**	**889**	**108**	**590**	**584**	**689**	**62**	**2,128**	**696**	**528**
Increase (decrease) in reserves	133	(1,334)	(174)	1,415	193	1,410	174	831	1,291	357	551
Total applications of capital funding (D)	**923**	**627**	**715**	**1,523**	**783**	**1,994**	**863**	**893**	**3,419**	**1,053**	**1,079**
Surplus (deficit) of capital funding (C-D)	(581)	(627)	(715)	(759)	(783)	(814)	(863)	(893)	(978)	(1,053)	(1,079)
Funding Balance ((A-B)+(C-D))	0	0	0	0	0	0	0	0	0	0	0

11.0 IMPROVEMENT PLANNING

An important component of this Activity Management Plan is the recognition that it is a "live" document in need of monitoring, change and improvement over time. This section details the improvements that will lead to improved management and increased confidence.

11.1 Improvement Plan Achievements

Many of the Improvement Plan Tasks identified in the 2015 Activity Management Plan have been achieved by the time of this review in 2017. The following table details improvements achieved to date.

Table 11-1: 2015 Improvement Plan Achievements

Project Description	Status	Date	Comment
Current age and remaining life of all assets needs to be reviewed and determined	Complete	June 2017	
Augment existing LoS information (NFPM)	Complete	June 2017	
Undertake customer surveys with defined performance targets.	Completed	2016	Ongoing
Develop a strategy for analysing the condition of the AC pipe assets and produce a reliable deterioration model for Tekapo and Fairlie to more accurately predict replacement programmes.	On going	June 2017	Twizel complete Tekapo and Fairlie to be done
Conduct a research study, including the impact of District Plan changes, to assess future demand on the network, in particular identifying any expected change in land use and other demands on the asset within the MDC area, which potentially could impact on the roading asset.	On going	June 2017	Ongoing
Complete a Customer Survey, including local industry, to establish any changes in customer expectations as they relate to demand on the network.	Complete	2016	Ongoing
All assets need to be assessed for criticality	Transferred	June 2017	Part of the Current IP Programme
Risk management register needs to be developed. Assessed risks can then be linked to maintenance and renewals programmes.	Transferred	June 2017	Part of the Current IP Programme
Significant negative effects need to be identified and provide an input into the LTP. Also identify procedures for mitigating significant negative effects.	Completed	June 2017	Included in Section 5.8.3
Emergency management (including lifelines) requires full review and inclusion. Require procedures in place for rapid response to emergency failures.	Completed	June 2017	Part of Maintenance Contract
Corporate insurance policy/requirements and updating of asset insurance costs needs to be considered and incorporated.	Complete	June 2017	$3M cash in reserve.
Review and update the Asset Register database. Ensure all inventory data is captured.	Complete	June 2017	Ongoing
Complete a full review of the network assets (using both the Asset Register and field inspections) and develop a detailed 10 year Forward Work Programme for all asset groups	Complete	June 2017	
Produce Annual Plan Forecasts, adjust 10 year plan and add Year 10 to total programme	Complete	June 2017	Ongoing
The assessment of annualised depreciation needs to be reviewed to ensure that the depreciation collected is realistic and comparable to the lifecycle renewal cost.	Complete	June 2017	
The default construction date and the expected life of all assets need to be reviewed	Complete	June 2017	Ongoing

Project Description	Status	Date	Comment
Sustainability - Include further summary of sustainability measures that are in place, including details of Council Sustainability policy, strategies and operations enabling greater sustainability etc.			

The following tables document the Improvement Programme from the Water Safety Plan for each Water Supply and the status at the time of writing this AMP (June 2017).

Table 11-2: Water Safety Plans Improvement Plan

Improvement Item	Reference Risk Table	Status
Fairlie Water Supply		
Options for protozoa barrier	1.1, 3.8	On going (TP upgrade)
Construct storage reservoir	1.4, 2.2, 5.5, 5.9	Programmed
Options to remove turbidity	3.9	On going (TP upgrade)
Continue with renewal programme to replace pipes	4.1	On going (significant part complete)
Investigate FAC monitoring	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 5.3	On going (TP upgrade)
Investigate Cl_2 contact tank	3.7	On going (TP upgrade)
Prepare a new sampling programme	5.1, 5.2	Completed
Formal review of operational manual for TP	5.6	On going (TP upgrade)
On-going training and up-skilling of staff	5.7	On-going
Lake Tekapo Water Supply		
Options for protozoa barrier	1.1, 3.8	Completed (TP upgrade)
Treatment process	3.9	Completed (TP upgrade)
Investigate need for increased storage	1.4, 2.2, 6.5	Not necessary at present, maybe required in future
Utilise existing chlorine analyser	3.1, 3.2, 3.3, 3.4, 3.5, 3.6	Completed (TP upgrade)
Implement renewal programme	5.1	On-going
On-going training and up-skilling of staff	5.7	On-going
Regular inspection and cleaning of reservoir	4.1, 4.3	Completed
Prepare a new sampling programme	6.1, 6.2	Completed
Formal review of operational manual for TP	6.6	On going (TP upgrade)
Twizel Water Supply		
Install a protozoa barrier	1.1, 1.2, 2.2, 7.7	Completed (TP upgrade)
Install new bore pumps	2.3	Completed
Replace diesel pump with a generator	5.1	Completed
Investigate security fences around bores and power boxes	2.1	Programmed (17/18)
Replace service pumps	5.2, 5.3, 5.4	Completed
Investigate storage/contact tank (Cl^2)	4.1	Completed
Install telemetry to monitor FAC on-line	4.3, 4.6, 4.7, 7.2, 7.6	Completed
Investigate installing automated Cl_2 dosing	4.4, 4.5, 4.8	On going
Investigate changing to gas chlorination	4.2	On going
Undertake cleaning of bore screen	2.5	Completed
5 yearly raw water chemical testing	1.3, 1.4	On going
Prepare and implement a backflow policy	6.5	To be completed (**IP 6**)

Improvement Item	Reference Risk Table	Status
On-going training and up-skilling of staff	7.5	On-going
Burkes Pass Water Supply		
Investigate power supply options	3.10	Solar power to be installed
Options for protozoa barrier	1.1, 3.8	On going (TP upgrade)
Investigate FAC & turbidity monitoring	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 5.1, 5.2, 5.3	On going (TP upgrade)
Consider flow proportional Cl_2 dosing	3.1, 3.2, 3.3, 3.4, 3.5, 3.6	On going (TP upgrade)
Investigate treatment process	3.4, 3.9	On going (TP upgrade)
Investigate need for Cl_2 contact tank	3.7	Completed
Investigate the need for increased storage	1.4, 2.2, 4.2, 5.5	Plan to move to restricted supply(**IP 12**)
Install a flow meter at TP	2.3	Completed
Implement a renewal programme	4.1	On going
On-going training and up-skilling of staff	5.7, 5.8	On-going
Review supply type and consider restricted	4.2	Completed
Prepare a new sampling programme	5.1, 5.2	Completed
Undertake formal review of operational procedures	5.6	On going (TP upgrade)

11.2 Improvement Plan Focus

The Mackenzie District Council Water Services Asset Management Improvement Plan and Projects will be focused on the following key areas:

- Ensuring our communities are protected against drinking water related health issues by providing quality potable water to agreed areas
- Water treatment improvements
- Risk Management
- Supply knowledge update
- Investigating innovative ways to provide an efficient and cost effective water supply and ensure ongoing affordability of the water supply service
- Asset Management

11.3 Current Improvement Plan

The following table documents the Improvement Items identified during the review and update of the AMP.

Table 11-3: Current Improvement Plan

IP #	Reference Section	Project Description	Timeline	Responsibility	Internal/External Resource
IP 1	Section 4.10	Develop a formal documented criticality assessment			
IP 2	Section 5.2.3	Develop hydraulic network model for Allandale			
IP 3	Section 6.9.7	Assess 3 Waters buildings for seismic vulnerability (EQ prone buildings)			
IP 4	Section 8.3	Develop Risk Management Schedule including all associated documents			
IP 5	Section 9.3.3	Develop 3 yearly restrictor inspection programme			
IP 6	Section 9.3.3	Develop Backflow Prevention Policy			
IP 7	Section 9.3.7	Develop & maintain Operation and Maintenance Manuals			
IP 8	Section 11.6A1.4.2	Investigate options and implement standby power supply for Fairlie WTP			
IP 9	Section 11.6A1.4.6	Implement firefighting ability in Everslea Reserve area			
IP 10	Section 11.6A3.2	Investigate bore pump capacity & efficiency Twizel			
IP 11	Section 11.6A4.2	Implement change in Level of Service (on demand to restricted), Burkes Pass			
IP 12	Section 11.6A5.2	Investigate resolution for poor workmanship, Allandale			
IP 13	Section 11.6A6.2	Investigate options – ownership/divestment associated risks and DWSNZ compliance, Albury	2018/19		

11.4 Project Identification and Assignment

Projects are identified through various processes including but not limited to:

- Legislative Compliance
- Levels of Service
- Growth
- Renewal
- Operation & Maintenance

Projects are then assigned to the individual staff to complete depending on their association or main project criteria e.g. Facilities/Reticulation/Asset Management, etc.

While projects in year 1 of the updated LTP are considered to be highly relevant, over the following two years some become less appropriate. This is generally due to:

- changes in legislation which remove the need for the work or change priorities
- better understanding of methods, costs and timing to deliver the project outcomes. This may be via other council business units, external agencies or through other projects.
- The community and council no longer supporting the work

11.5 Reporting on Projects

Currently all projects in the LTP and Annual Plan are reported quarterly. It is acknowledged that the management and completion of improvement items will contribute to the achievement of Community Outcomes, and regular reporting on activity items assist to ensure that achievement towards each outcome.

11.6 AM Preparation, Monitoring & Review

This AMP will continue to be developed over time to incorporate further advanced asset management techniques, make use of improved data collection and management systems, respond to legislative and policy changes, and address evolving issues. This Plan will be further tested and developed with ongoing focus on legislative compliance, planning for climate change, environmental management, and improving efficiency.

This AMP is to be reviewed on a 3-yearly basis, with the next full review taking place in 2020. Each review will be completed in line with whole of Council LTP delivery plans. During the three year period leading up to this review, the items in the Improvement Programme should be addressed within the timeframes provided. These improvements can then be incorporated into the next review of the AMP.

This AMP is the responsibility of the Utilities Manager.

APPENDIX A INDIVIDUAL SUPPLIES DESCRIPTION

A1 Fairlie Water Supply

A1.1 Overview

Description		Quantity
Population Served 2013 % of district served by community water supply		693 (900 during holidays) 27%
Type of Supply		High pressure with unrestricted/metered. Restricted
Properties	Able to connect	527
	Connected	
	metered	
	restricted	
	not metered	
	Not connected	-
Water Source		Spring
History	Original scheme installed in	1940's
Length of reticulation		41.5km
Number of valves		125
Number of hydrants		111
Number of pump stations		1
Storage		140m^3 (BPT)
Treatment	Treatment	None
	Disinfection	Chlorination
Pressure & Flow	Target level of service at point of supply	
	Pressure	70 kPa
	Flow	15 Lts/min
Sustainability	Source Security	Unsecure
Financial	Funding	Targeted rate (Fairlie, Tekapo, Twizel & Burkes Pass)

A1.2 Key Issues for Service

Issues	Resolution
Concrete pipes	Replace
DWSNZ compliance	Treatment Plant upgrade
Storage	Build reservoir
AC pipe	Planned renewals (long term)

A1.3 Overview & History

The Fairlie Water Supply was established in the 1940's to provide domestic water to the communities of Fairlie and Kimbell. The Fairlie Water Supply does not currently meet the Health (Drinking Water) Amendment Act (2007). Investigations are underway on another spring to the west of the current source to monitor the turbidity of the flow over time. The hope is that the turbidity will remain generally below 1 NTU and as a consequence will not require extra filtration to meet the DWS. If this is not successful then the well on the Guerin property will be further evaluated to see if it remains clear when the current source is turbid.

A1.4 Condition, Capacity, Performance & Criticality

A1.4.1 Source

The source for the Fairlie Water Supply is a spring (known as 3 Springs) adjacent to the Opihi River and beside State Highway 8 approximately 2.2kms North West of Kimbell township. The original intake structure at the spring was constructed in 1940 along with a 75mm diameter pipeline to the break pressure tank (BPT).

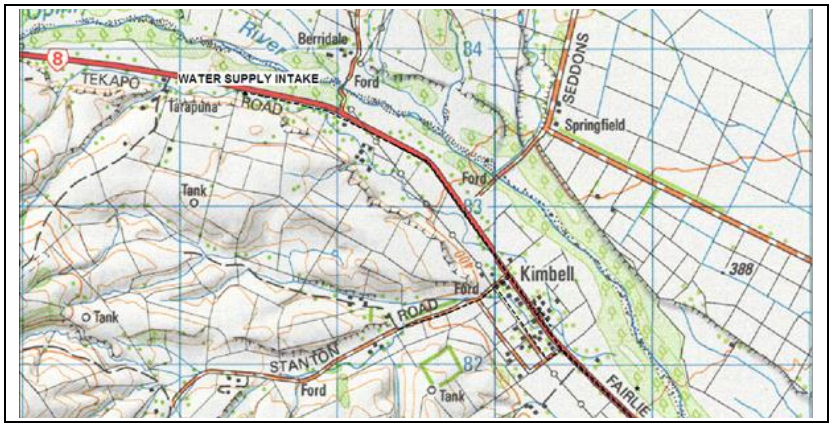
In 1961 another intake structure was constructed along with a 225mm concrete pipe line to the chlorination plant and a 150mm pipeline from the chlorination plant to the reservoir. The pipelines are connected at the chlorination plant to ensure all the water is chlorinated. The pipelines between the spring and the chlorination plant became blocked by tree roots in about year 2000. The 225mm line was unblocked and its replacement was budgeted for in 2007. The 75mm pipe remains blocked. In 2007 Council did replace the Trunk Main from the intake to the Chlorinator shed with a fusion welded pipeline (DN 250 PE PN6.3). During 2016/17 the 150mm AC was replaced with a 225mm PVC pipe and the 75mm pipe no longer exists.

A report in 1973 estimated that the spring is capable of supplying 45,000 m^3/day.

The bacteriological concentration and turbidity of the spring water appear to be closely linked to the Opihi River water. The water has a low Ph (6.8) which may cause corrosion of household plumbing and consequent leaching of metals (blue stain on baths).

The spring has been fenced but it only provides a low level of security. Improvements to the security of the spring should be addressed.

Figure 11-1: Fairlie Water Supply Source & Intake Structure



A1.4.2 Treatment Plant

The Disinfection plant is situated adjacent to SH 8 approximately 1 km from the intake. The WTP building is of concrete block construction. Photograph below shows the outside of the building. The building is well maintained.

Inside one half of the building is the Chlorination unit, which provides the residual disinfection for the reticulation.

In the other half of the building there is a turbidity meter which is measuring the degree of turbidity of the water. This will be important in the event that data is required for the design of a Water Treatment Plant. There is also a Magflow water meter in the line to measure and record the water use.

During periods when the power is interrupted to the site a standby generator is used to power the chlorination system to maintain the water treatment required. Solar power is being investigated as an alternative power supply source (**IP 8**)

Figure 11-2: Fairlie WS Treatment Plant

The WTP is to be upgraded to ensure compliance with the DWSNZ. The final WTP system design is dependent on the protozoa results, which may require filtration and Ultra Violet Irradiation.

A1.4.3 Storage

A Break Pressure Tank (BPT) is installed on the trunk main to bring the pressure within the system back to zero/atmospheric pressure at that specific site. The BPT also provides some minimal additional storage within the system. The BPT is at an elevation of 350m. The Top Water Level of the BPT is 354m and it has a volume of 140m^3. The BPT is incapable of providing sufficient storage for the township.

It was some leakage around the joints, but this is controlled to a degree by a Butynol liner inside the tank and the joints being repaired with Humebond. Lining the reservoir with liquid rubber similar to the Lake Tekapo reservoir is being considered.

Figure 11-3: Fairlie WS BPT

There is also a 25m^3 tank on Nixons road and a booster pump that feeds another 25m^3 tank on School Road. This provides a potable supply to sections on School Road that would be unable to access the supply without it.

A float valve on the inlet pipework controls the flow into the BPT. One of the recommendations in the Fairlie Township Water Supply Strategic Study was to replace this BPT with a capacity of 2,000m^3 as soon as possible.

A pressure sustaining valve is installed at the reservoir to maintain pressure in the Kimbell network.

A1.4.4 Pump Stations

There is a single booster pump that feeds the 25m^3 tank on School Road.

A1.4.5 Reticulation

The trunk main route is within the grass verge running parallel and adjacent to SH 8. The trunk main running from the reservoir into Fairlie is 300mm uPVC. This is a new main installed in 2011 to replace the original 200mm concrete main.

The trunk main also supplies a number of metered rural properties on the route into town, which may not have backflow preventers installed. Rural properties are known to contain contaminants that are dangerous to people and during high flows and low pressures backflow from these types of properties may occur.

There is approximately 21 kilometres of pipework. The remaining concrete pipe is understood to be the original material for the reticulation and is reaching the end of its life expectancy. It is noted that the rubber ring joints cause the major problem with the concrete pipes. During maintenance of the reticulation, samples of the pipework are recovered and the remaining life expectancy estimated. During periods of high demand and consequent low pressure the areas of Struthers Street loses water. Struthers St is provided with “Tank Supply”. On-property storage is required to meet demand during these periods. No evidence was found of air valves present in these positions to release trapped air.

Fairlie experiences a number of high demand periods during the summer months and this can cause pressure loss within the reticulation, and associated risks.

Hosing restrictions are imposed during periods of very high demand to maintain reasonable pressure in the reticulation and to stay within resource consent limits.

A1.4.6 Fire fighting

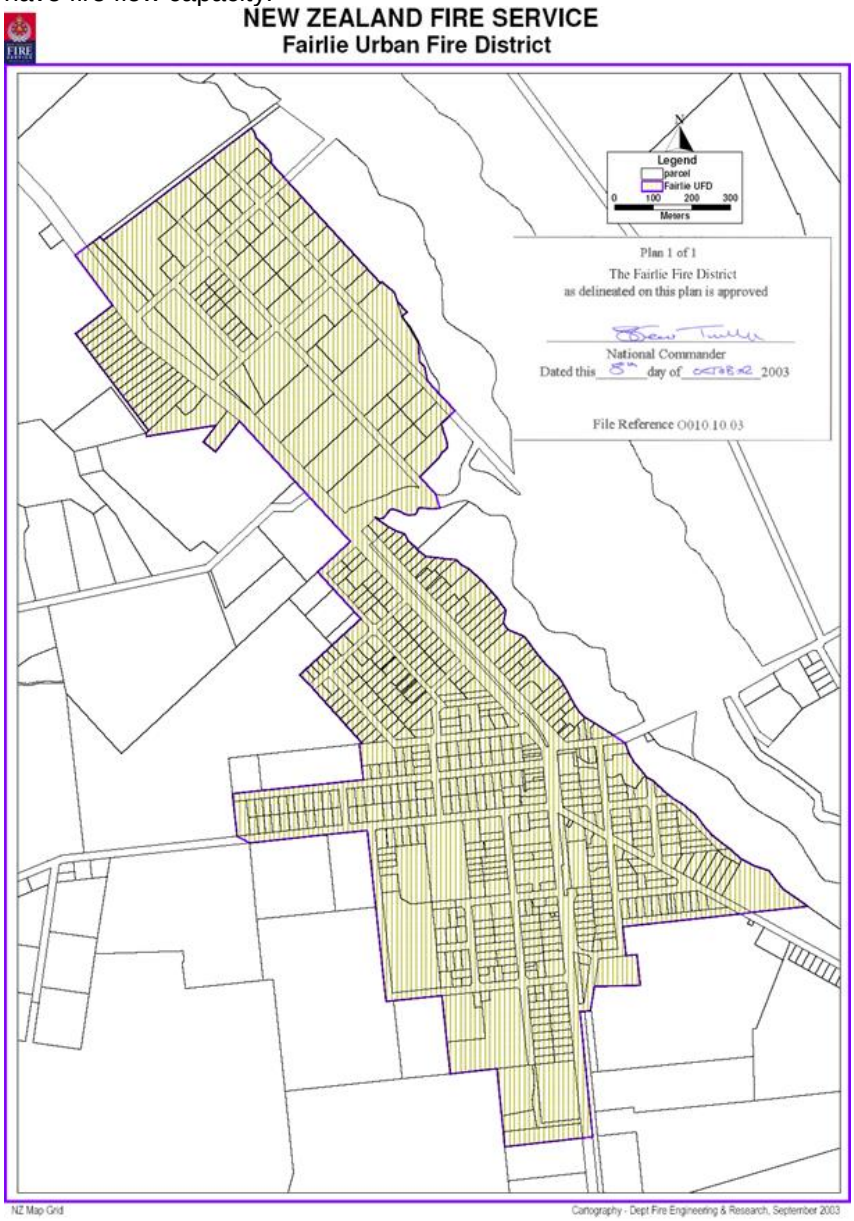
The Eversley Reserve area (which is within the Fairlie Urban Fire District) is zoned 'Rural' and has very low density housing. Most of the properties are supplied with small diameter pipes and there are no fire hydrants available except 3 fire hydrants on the trunk main on State Highway 8 and one on the corner of Railway and Gordon Streets. Investigation into the potential fire fighting abilities and costs is required (**IP 9**)

The Fire Service occasionally tests the flows at fire hydrants and have not reported any serious deficiencies within the Fairlie Urban Fire District.

However, a hydraulic model of the reticulation indicates that it is not able to supply residential fire flows throughout a large part of the reticulation on top of other demand.

The fire flows could be improved in these areas by turning off other parts of the town while a fire is being fought.

There are fire hydrants on pipelines outside the Fairlie Urban Fire District which are incapable of delivering a fire flow eg: Allandale Road and the lower end of Talbot Rd. Other areas outside the Fairlie Urban Fire District which are supplied with small diameter pipe eg: Struthers St and Nixons Rd do not have fire flow capacity.



A1.5 Environmental Management

The following table list the resource consent associated with the Fairlie Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC040921	Take and use water	19 August 2044	28 litres/s 2,420m^3/day 725,000m^3/year

The intake structure and pipe configuration limit the take to 28 litres/sec under normal operating conditions. As there is very little storage the water take closely follows the demand. Hosing restrictions are imposed when the demand exceeds 28 litres/sec or when there are low flows in the Opihi due to dry conditions and as a consequence restrictions in line with the Resource Consent are imposed.

A1.6 Water Quality

Fluoridation	Nil
Disinfection	Chlorine gas
Quality issues	During times of flooding in the Opihi the turbidity rises in the raw water. There is no recognised barrier for Giardia and Cryptosporidium

Appendix Table 1: Fairlie Sampling Locations

Scheme	Sampling Location
Fairlie WS	New sample point in Kimbell
	At Fairlie public toilets

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

A1.6.1 Demand

Council carries out regular leak detection programmes to determine the location of any system leaks. Any leaks that are located are then repaired thus reducing system losses. The initial survey in 2008 and follow up repair work reduced the line losses by 4 litres/sec.

Historical data indicates a nil growth rate in Fairlie. The census figures between 1991 and 2013 also confirm this. It is conservatively assumed that the population will grow 0.5% per annum.

Water Supply	Average daily demand (m^3)	Resource consent limit (m^3)/day
Fairlie	650	2,420

A1.7 Water Supply Standards

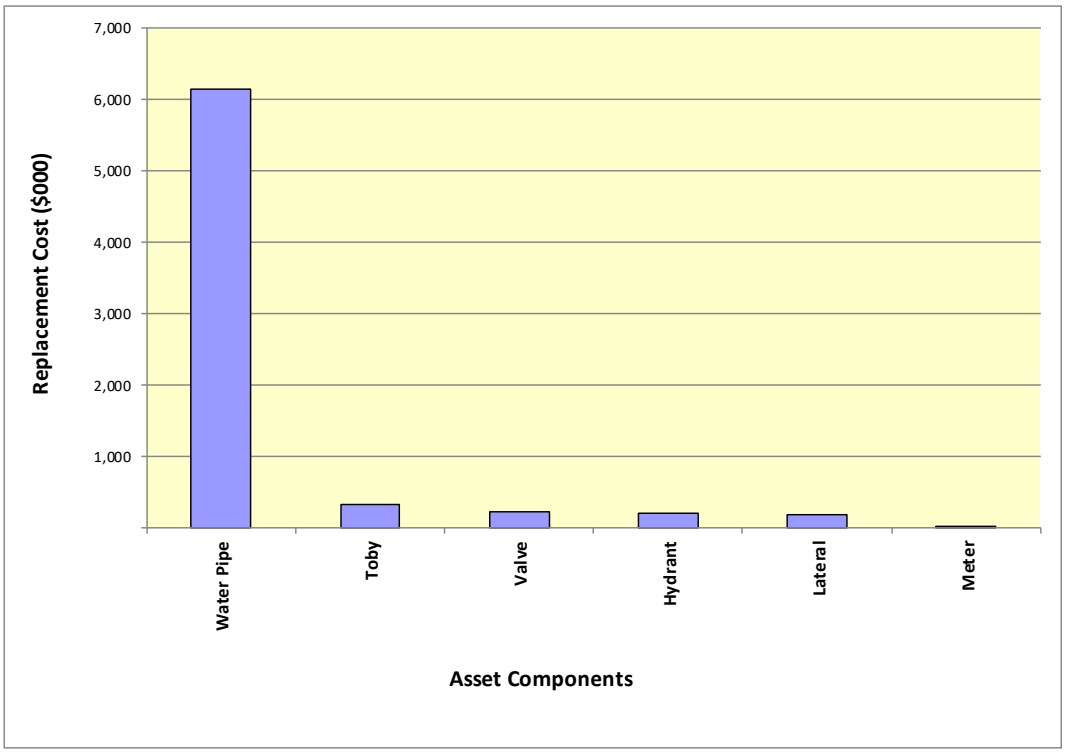
The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The impact of this legislation is discussed in detail in Section 6.9.2

A Water Safety Plan has been completed and approved by the Ministry of Health. At the time of writing this Plan the WSP was under review.

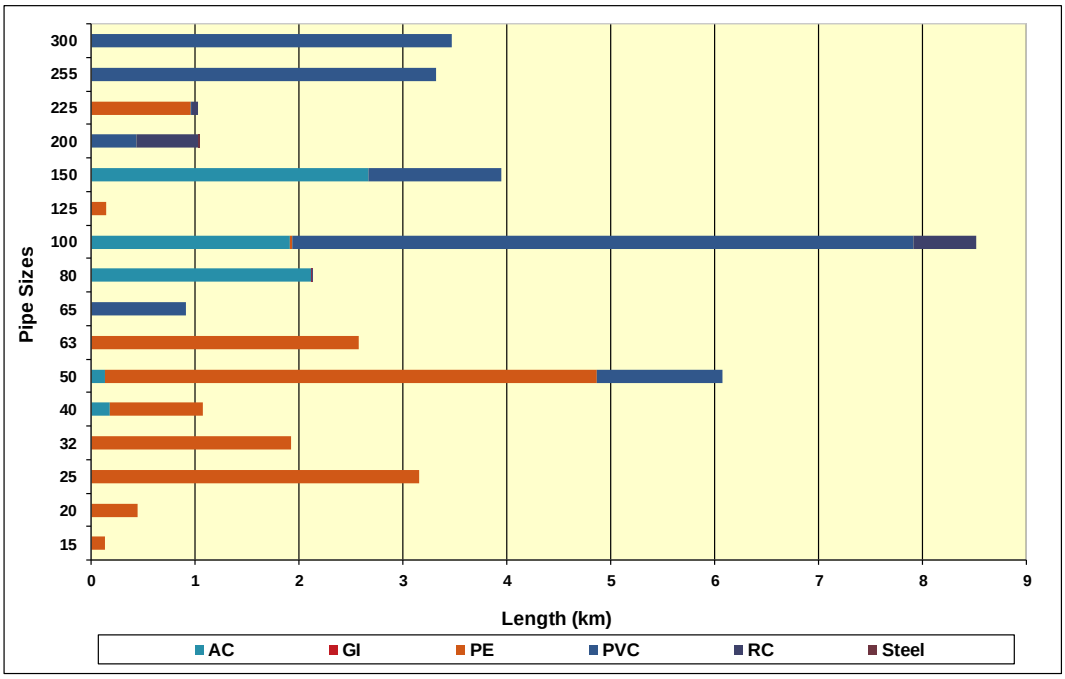
A1.8 Asset Details

Figure 11-4: Replacement Costs for Reticulation



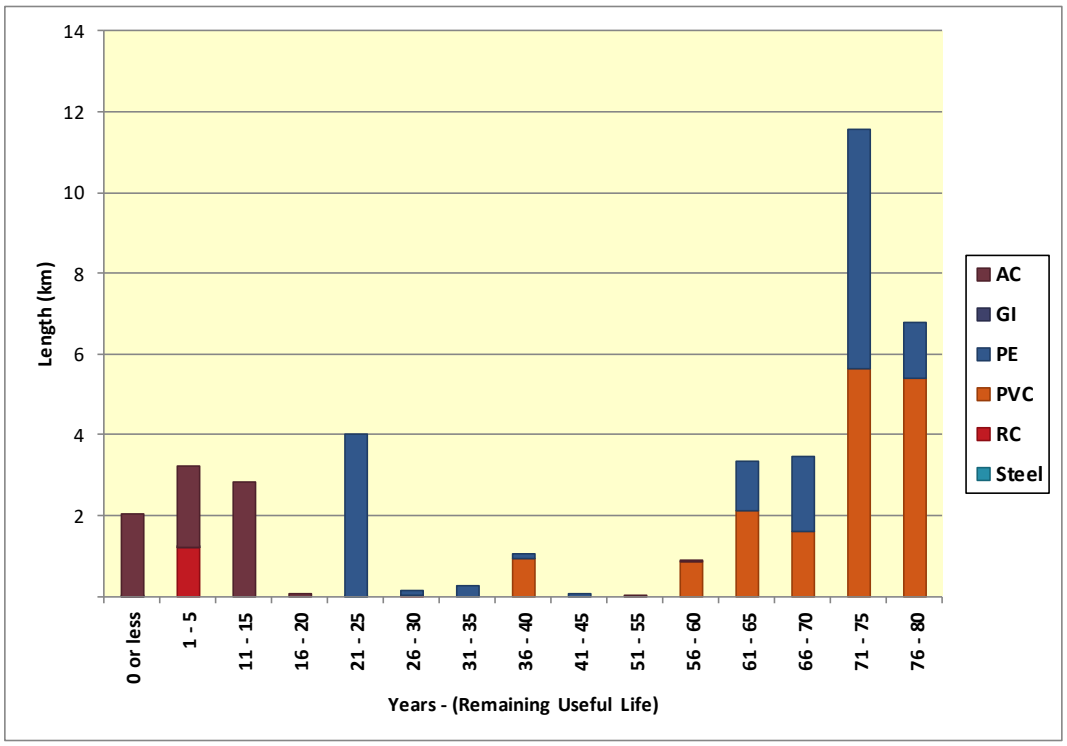
Water mains make up 87% of the total reticulation asset values
Tobies make up 5% of the total reticulation asset value

Figure 11-5: Water Main Diameters



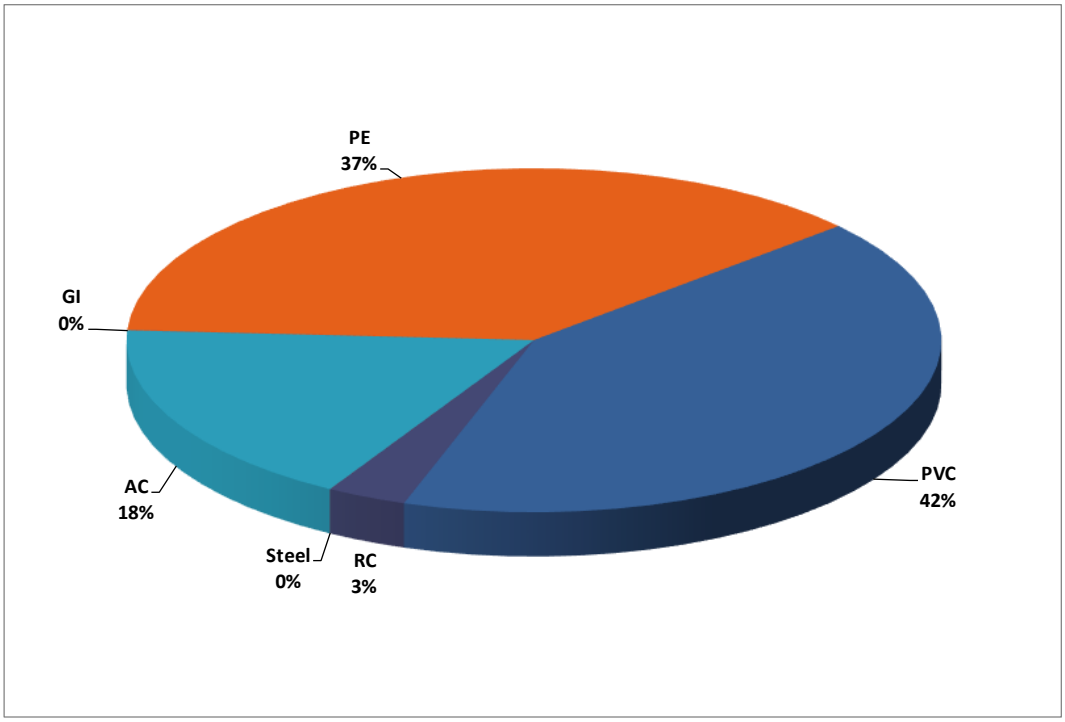
32% of the total water mains length is Ø50mm and smaller
21% of the total water mains length are Ø100mm and the majority of this is PVC

Figure 11-6: Pipe Age Group Replacement Cost



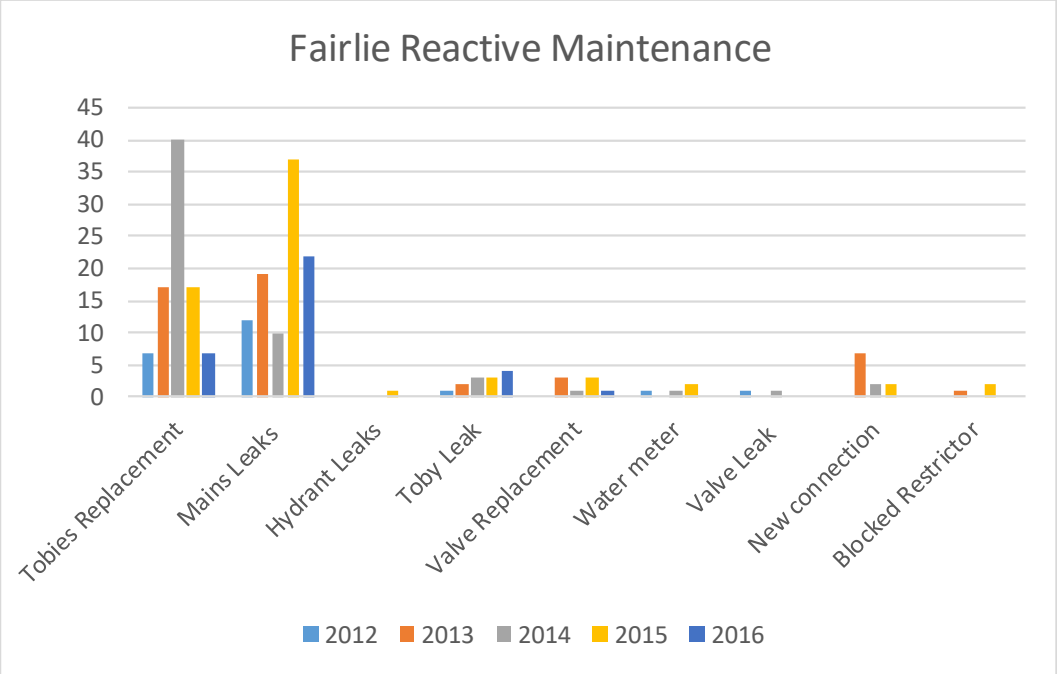
There is 2km of AC pipe that has reached the end of its expected useful life.
There is 3.2km (2km of AC and 1.2km of RC)) of pipe reaching the end of its expected useful life within the first 5 year window.

Figure 11-7: Water Main Material



The graph shows that 42% of the reticulation consist of PVC and 37% of PE.

Figure 11-8: Reactive Maintenance



Toby replacements peaked in 2014.
Reactive maintenance consists mainly of Toby Replacements and Mains Leaks.
Mains leaks appears to show an upward trend but these are mainly associated with the Fairlie trunk main which has been replaced.

A1.9 Data Confidence

Appendix Table 2: Data Confidence

Scheme	Component	Intake	Pump Stations	Reservoirs	Reticulation
Fairlie	Asset Attributes	G	G	G	G
	Condition	G	G	G	G
	Performance	G	G	G	G

Where

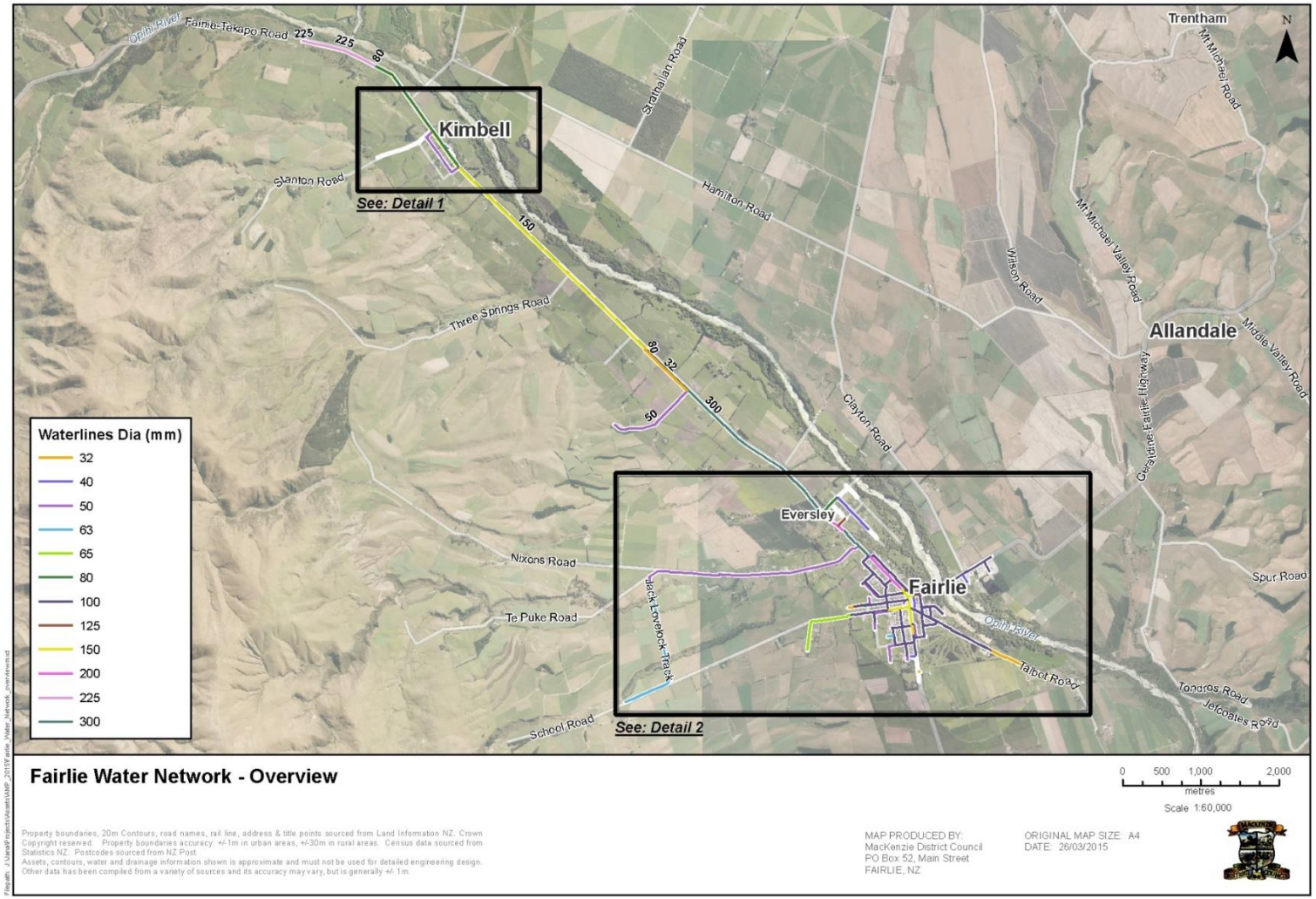
Score	Description	Definition
1	Accurate	100%
2	Minor inaccuracies	± 5%
3	50% estimated	± 20%
4	Significant data estimated	± 30%
5	All data estimated	± 40%
X	No asset	

A1.10 Capital Projects

Appendix Table 3: Capital Projects

Name	Type	Value	When
WTP Upgrade	Level of Service	$2M	2018/19
Storage	Level of Service	$1.5M	2025/26
SCADA install	Level of Service	$10,000	2018/19
Replace concrete pipes	Renewal	$360,000	2020-2023
Eversley upgrade	Renewal	$148,000	2018-2020
WSP Review	Renewal	$5,200	2021/22
WSP Review	Renewal	$5,200	2026/27

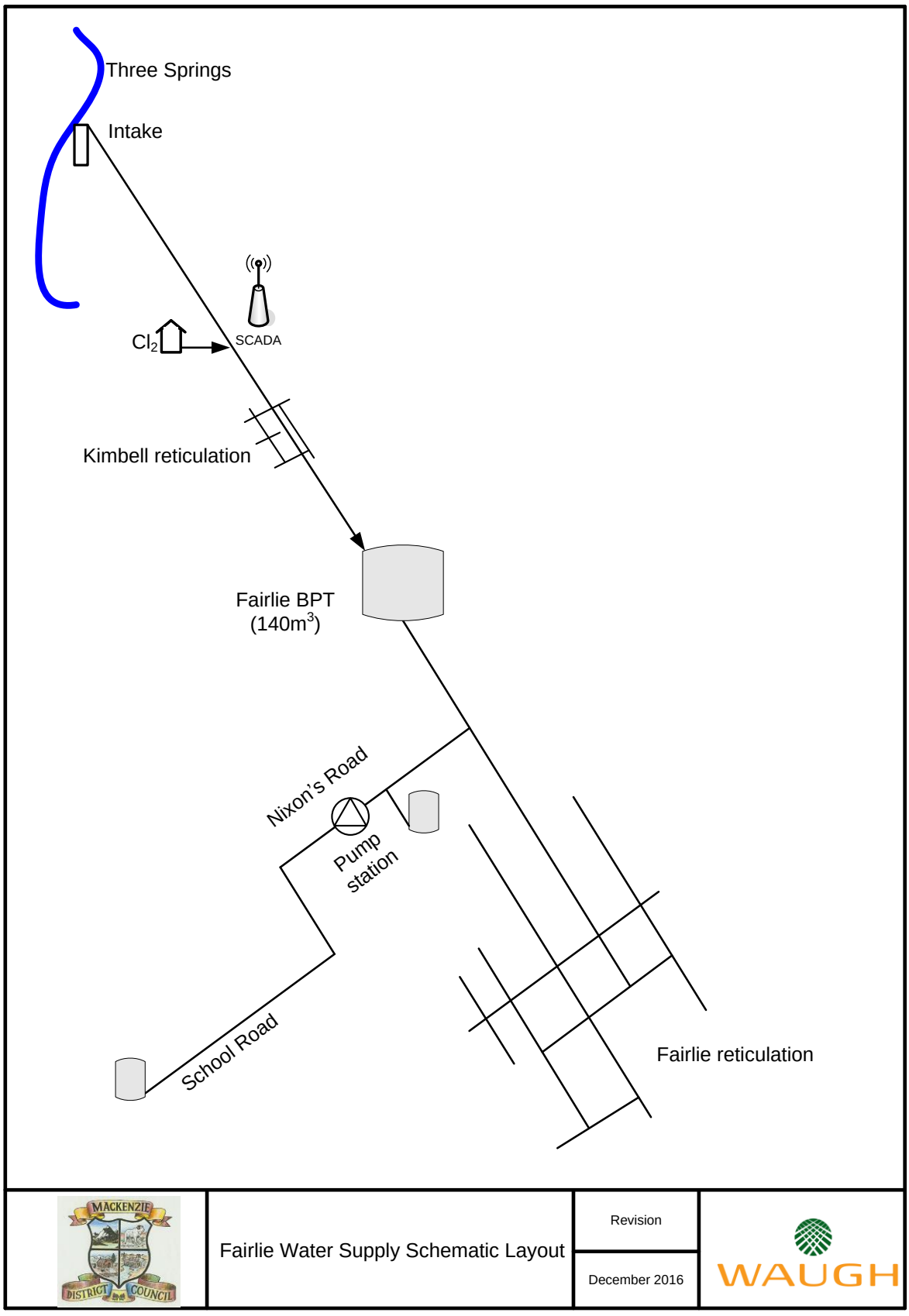
A1.11 Supply Map




Saddlers Road
Opihi River
Hamilton Road
Stamon Road
Fairlie-Tekapo Road
50
50
50
Waterlines Dia (mm)
DIAMETER
50
63
80
100
150
Fairlie Water Network - Detail 1
0 75 150 300
metres
Scale 1:10,000
MAP PRODUCED BY
MacKenzie District Council
PO Box 52, Main Street
FAIRLIE, NZ
ORIGINAL MAP SIZE: A4
DATE: 26/03/2015


N
Waterlines Dia (mm)
DIAMETER
32
40
50
63
65
80
100
125
150
200
225
300
Fairlie-Takapo Road
Kerrs Road
Clayton Road
Eversley
Arthur Street
North Street
Geraldine-Fairlie Highway
Nixons Road
Te Puke Road
Jack Loveloock Track
School Road
Opihi River
Talbot Road
Albury-Fairlie Road
Fairlie Water Network - Detail 2
0 200 400 800
metres
Scale 1:24,000
Property boundaries, 20m Contours, road names, rail line, address & title points sourced from Land Information NZ. Crown Copyright reserved. Property boundaries accuracy: +/-1m in urban areas, +/-30m in rural areas. Census data sourced from Statistics NZ. Postcodes sourced from NZ Post.
Assets, contours, water and drainage information shown is approximate and must not be used for detailed engineering design. Other data has been compiled from a variety of sources and its accuracy may vary, but is generally +/- 1m.
MAP PRODUCED BY:
MacKenzie District Council
PO Box 52, Main Street
FAIRLIE, NZ
ORIGINAL MAP SIZE: A4
DATE: 26/03/2015

A1.12 Supply Schematic



A2 Lake Tekapo Water Supply

A2.1 Overview

Description		Quantity
Population Served 2013 % of district served by community water supply		369 (1,050 during holidays) 14%
Type of Supply		High pressure with unrestricted/metered. Restricted
Properties	Able to connect	687
	Connected	
	metered	
	restricted	
	not metered	
	Not connected	-
Water Source		Infiltration Gallery
History	Original scheme installed in	1950's
Length of reticulation		22.4km
Number of valves		136
Number of hydrants		61
Number of pump stations		1
Storage		1,100m^3
Treatment	Treatment	None
	Disinfection	Chlorination & Ultra Violet Irradiation
Pressure & Flow	Target level of service at point of supply	
	Pressure	200 kPa
	Flow	25 Lts/min
Sustainability	Source Security	Unsecure
Financial	Funding	General rate for community of benefit (Fairlie, Tekapo, Twizel & Burkes Pass)

A2.2 Key Issues for Service

Issues	Resolution
Cast Iron, Galvanised Iron & AC mains	Planned renewals
Cl_2 dosing point incorrect location	Relocate Cl_2 dosing point

A2.3 Overview & History

The Tekapo Water Supply was developed during the 1950's when the town was a village serving workers on the Tekapo hydro-electrical scheme. The town has since developed into a significant tourist destination.

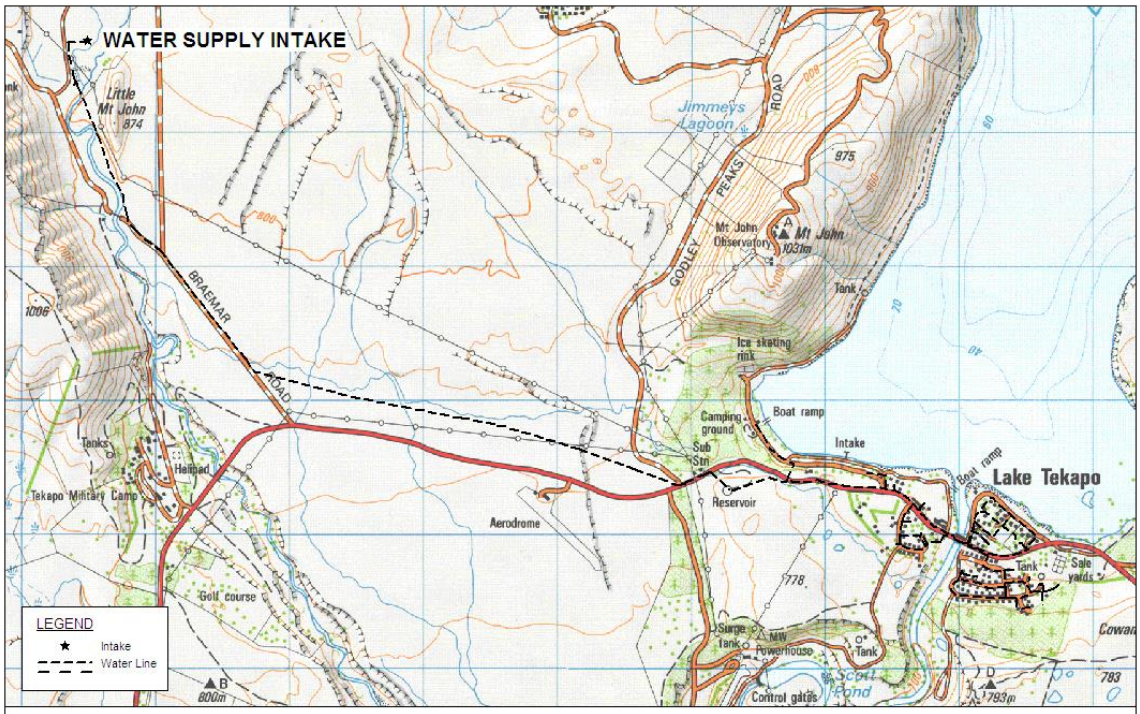
A2.4 Condition, Capacity, Performance & Criticality

A2.4.1 Source

The supply abstracts water from an infiltration gallery adjacent to Fork Stream, which was installed during the early 2000's and is accessed from Braemar Road.

The gallery is 150 metres long and consists of two arms, each 75 metres and six metres deep. The gallery is located within 130metres of Fork Stream, but groundwater quality is relatively stable indicating that the influence from surface conditions and the stream are minimal.

Figure 11-9: Lake Tekapo Water Supply Intake



The source of the Tekapo water supply is a shallow aquifer besides the Forks River west of Little Mount John. For further information see Paddle Dalamore report on y:\Asset Management\Reports.

A2.4.2 Treatment Plant

The abstracted water is disinfected by chlorine gas and Ultra Violet Irradiation, each in separate buildings.

The chlorination plant is located on Braemar Road, where 2 x 70kg gas cylinders are installed in a duty/standby arrangement. The Cl_2 building is concrete tilt slab construction and was constructed in 1998.

Inside one half of the building is the Chlorination unit, which provides the residual disinfection for the reticulation. The monitoring equipment is housed in the other half of the building and consist of turbidity monitor, flow meter, FAC monitor and pH monitor.

Figure 11-10: Lake Tekapo WS Cl_2 building & UV treatment

The location of the UV treatment is located in a shed off State Highway 8 west of Tekapo. The treatment uses a Trojan UV reactor model D03 complete with all controls and Magflow metering.

The current configuration is chlorination followed by UV treatment. This is an incorrect order as UV treatment affects chlorine residuals and chlorine may affect UVT through fouling of UV lamp sleeves. As a result, the configuration requires changing to UV treatment then chlorination and is planned for 2017/18.

A2.4.3 Storage

The reservoir construction is a poured in situ reinforced concrete storage tank of 1,100m^3, at an elevation of 780m.

Figure 11-11: Lake Tekapo WS Reservoir

The reservoir provides only one days storage at the current average daily demand. This does not cause any problems as the supply is reliable and the turbidity is constantly within guidelines. The delivery of water to the reservoir is currently by gravity which provides certainty of supply.

An ultrasonic transducer controls the diaphragm valve on the supply line beside SH8 which controls the water level in the reservoir.

The tank condition is consistent for its age with no leakage due to the specialist rubber coating applied in 2016. A bypass line have been installed at the reservoir.

With increased demand and development additional storage may be required. The elevation of the reservoir restricts supply to possible development in some areas without inline boosting.

A2.4.4 Pump Stations

Flow is boosted to the higher elevations in the Lochinver subdivision by an in ground booster pump set on Lochinver Avenue.

A2.4.5 Reticulation

The trunkmain route is overland through Mt John Station, crossing SH 8 near the sub-station then directly to the reservoir. This pipeline is a 225 dia uPVC. There are numerous air relief valves on the line including intermediate line valves or washouts on the trunkmain.

The trunkmain also supplies water to the Tekapo Airfield (metered) and the Horse Trekking operation (restricted) on Godley Peaks Rd.

There is approximately 6.8 kilometres of pipework in the trunkmain, this pipework is in excellent condition being only installed in 1998.

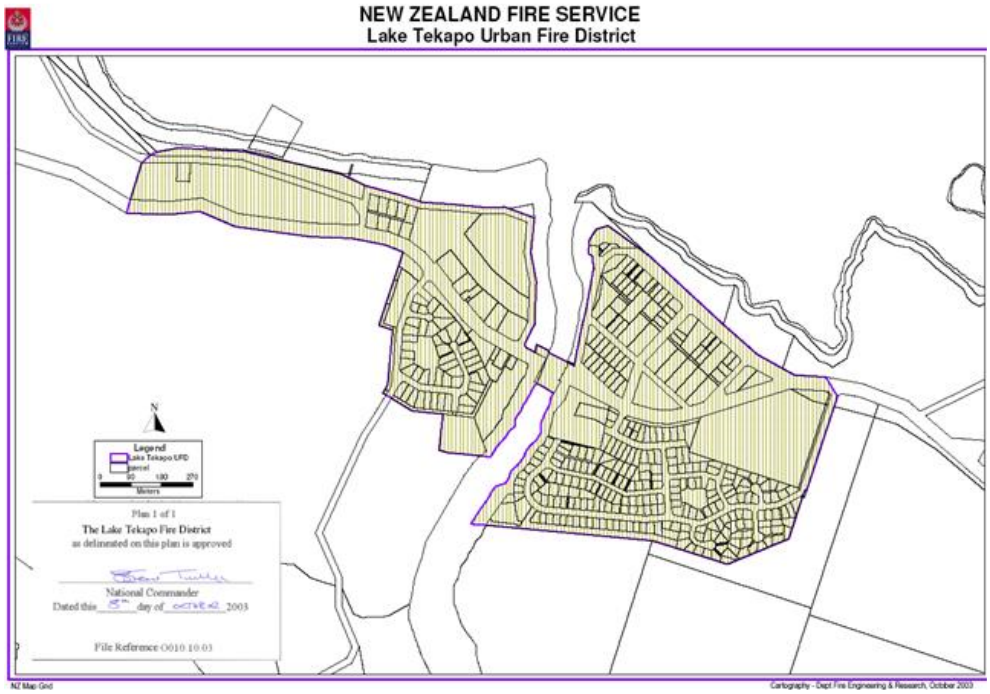
Tekapo reticulation is generally in good condition with initial pipework installed in 1955 and progressively since then.

There are 5885m of Asbestos Cement pipework within the reticulation that will need testing to confirm its condition and remaining life.

A2.4.6 Fire fighting

The NZ Fire Service test flows and pressures at fire hydrants on a regular cycle and notify defects to Council for repair etc. There have been no flow or pressure issues notified.

All new water supply reticulation is required to meet the standards as defined in SNZ PAS 4509:2008, New Zealand Fire Fighting Code of Practice



A2.5 Environmental Management

The following table list the resource consent associated with the Lake Tekapo Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC971413	To erect structures	13 August 2033	Not applicable
CRC971414	To take groundwater	13 August 2033	40 litres/s

A2.6 Water Quality

Fluoridation	Nil
Disinfection	Chlorine gas & UV Irradiation
Quality issues	There are no water quality issues.

Appendix Table 4: Lake Tekapo Sampling Locations

Scheme	Sampling Location
Tekapo WS	At UV shed (TP)
	At Lochinver pump station
	In reticulation

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

A2.7 Demand

Council carries out a regular leak detection programme to determine the location of any system leaks. Any leaks located will be repaired under the normal maintenance regime.

The daily water use per head is quite high due to the amount of irrigation required to maintain the landscaped areas within Tekapo.

The census figures from 2006 to 2013 show an increase of 16% of the resident population in Tekapo, indicating reasonably strong growth for this area. This however should be treated with some caution as this reflects only the resident population.

The recent design for a new water source predicted a design population of 3,500 by 2017. This design population reflects the peak tourist population, not the resident population. It is anticipated that the resident population will increase at a lesser rate than the peak tourist population. **Developments such as motels/hotels and subdivisions where the properties are purchased as holiday homes do not increase the resident population but have a significant effect on the peak tourist population capacity.**

It is estimated that the resident population will increase at 5% to serve the peak tourist population. However the cost of housing in the township is at a level that a lot of workers serving the tourist industry cannot afford to live there.

The only possible concern is the current trend to extensively landscape new subdivisions that require significant volumes of water to irrigate these features.

Water Supply	Average daily demand (m^3)	Resource consent limit (m^3/day)
Lake Tekapo	1,341	3,456

A2.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The Ministry of Health agrees with a 3 log protozoal treatment being appropriate as indicated in the catchment assessment using table 5.1a.
The following improvements were implemented for preventing, reducing or eliminating the identified public health risks in the Tekapo drinking water supply.

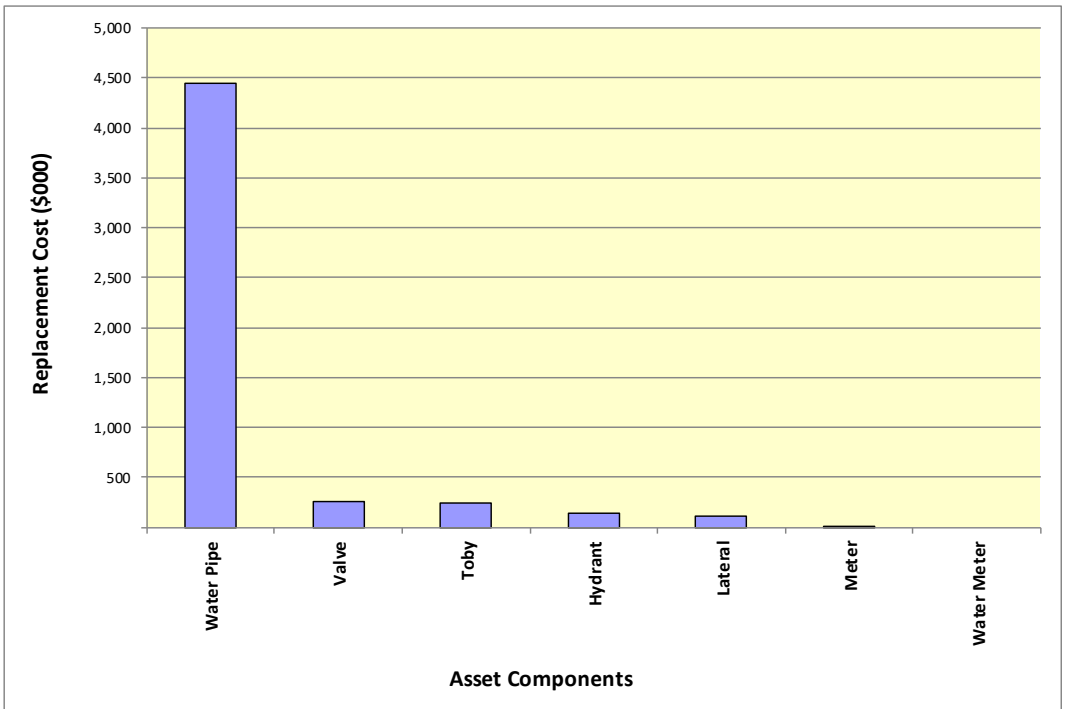
i. Treatment — Indications are that the supply will need to remain chlorinated, and be disinfected by UV.

This work was completed in 2012.

A Water Safety Plan has been completed and approved by the Ministry of Health. At the time of writing this Plan the WSP was under review.

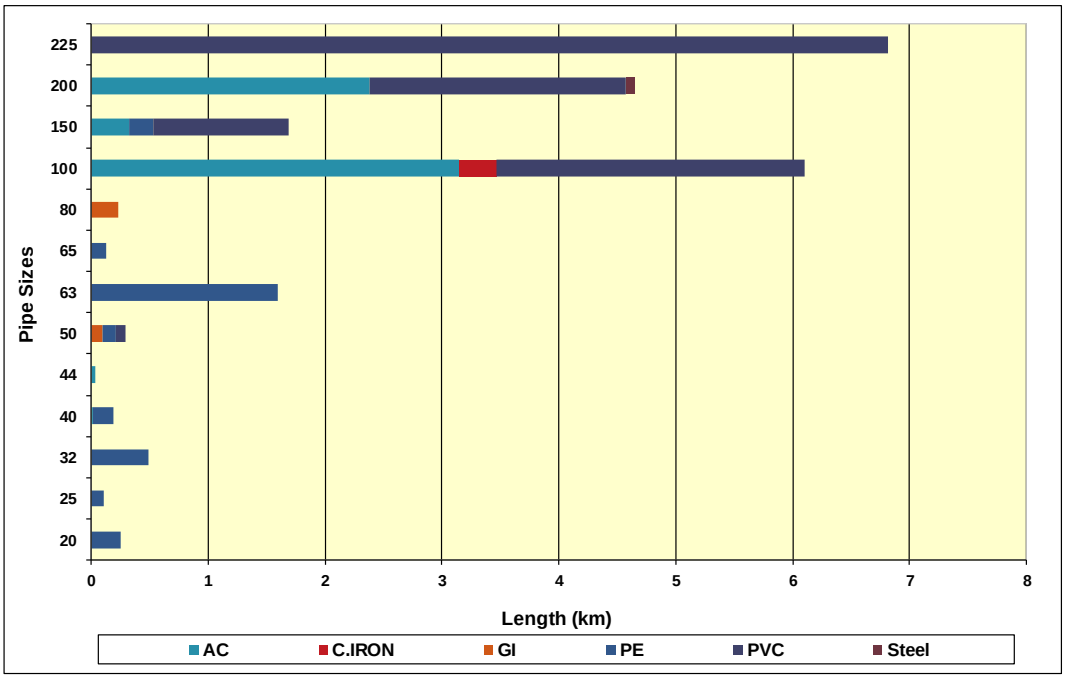
A2.9 Asset Details

Figure 11-12: Replacement Costs for Reticulation



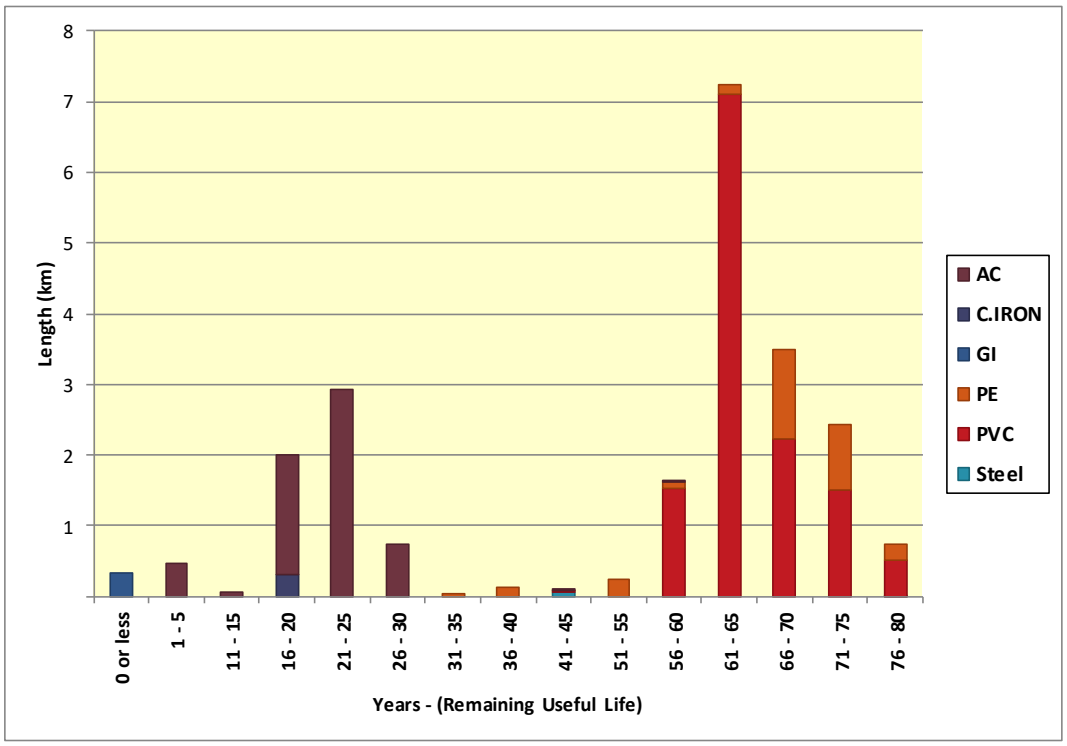
Water mains make up 85% of the total reticulation asset values.
Valves make up 5% of the total reticulation asset value.

Figure 11-13: Water Main Diameters



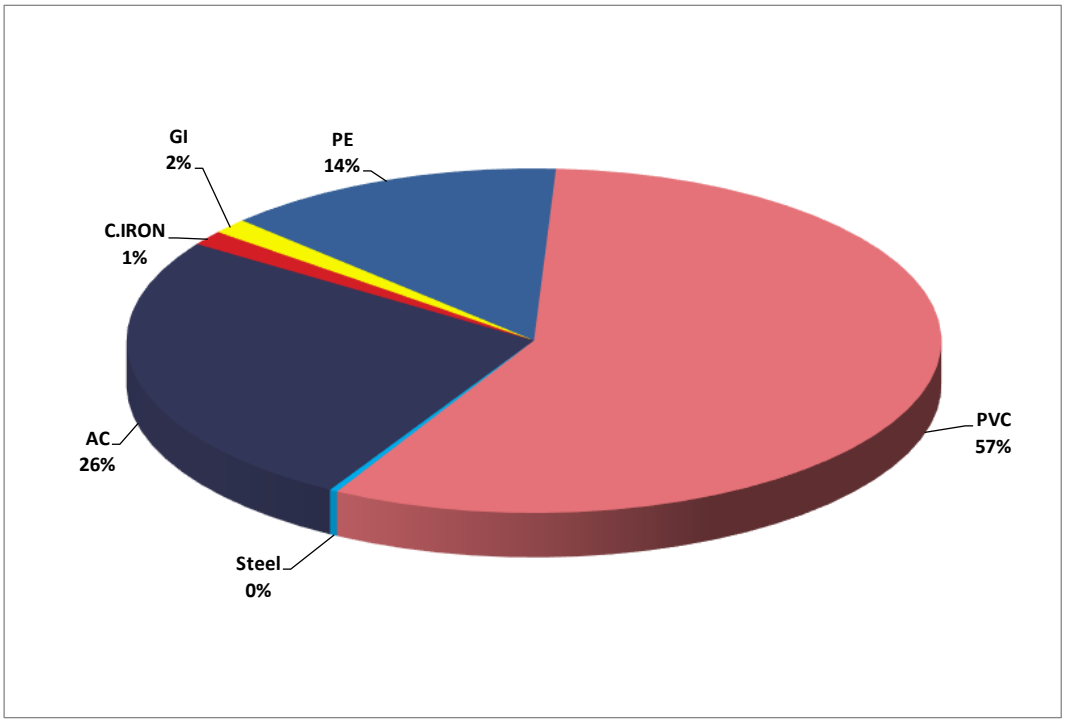
6% of the total water mains length is Ø50mm and smaller.
27% of the total water mains length are Ø100mm and the majority of this is AC.

Figure 11-14: Pipe Age Group Replacement Cost



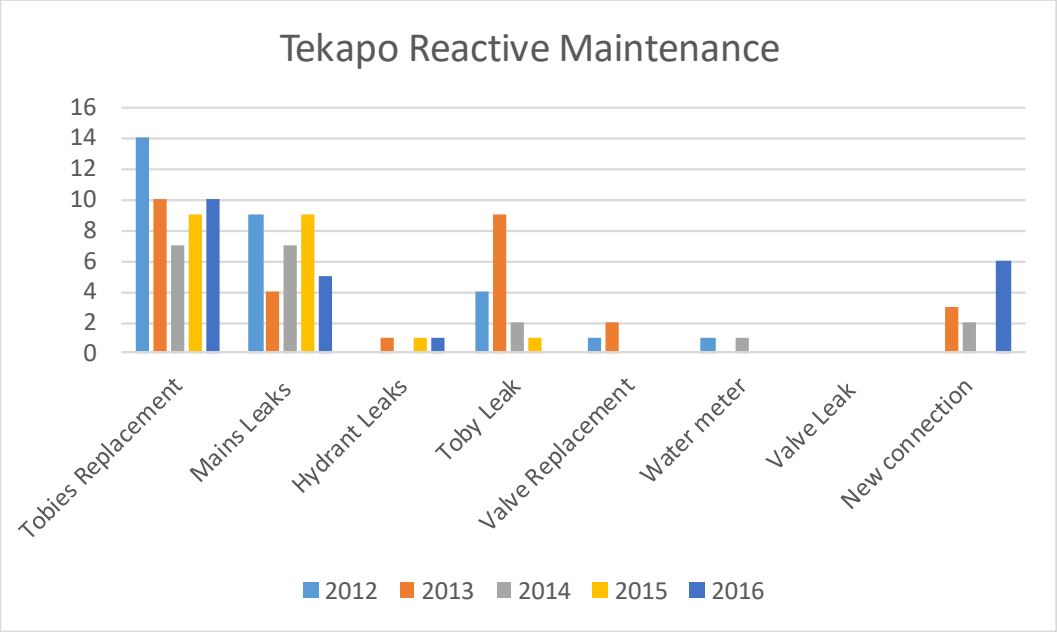
There is 0.3km of GI pipe that has reached the end of its expected useful life.
There is 0.5km of AC pipe reaching the end of its expected useful life within the first 5 year window.

Figure 11-15: Water Main Material



The graph shows that 57% of the reticulation consist of PVC and 28% of AC.

Figure 11-16: Reactive Maintenance



Most of the work associated with reactive maintenance consists of toby replacements and mains leaks.
Toby replacements & Mains leaks show a downward trend.
New connections show an upward trend.

A2.10 Data Confidence

Appendix Table 5: Data Confidence

Scheme	Component	Intake	Pump Stations	Reservoirs	Reticulation
	Asset Attributes	G	G	G	G
	Condition	G	G	G	G
	Performance	G	G	G	G

Where

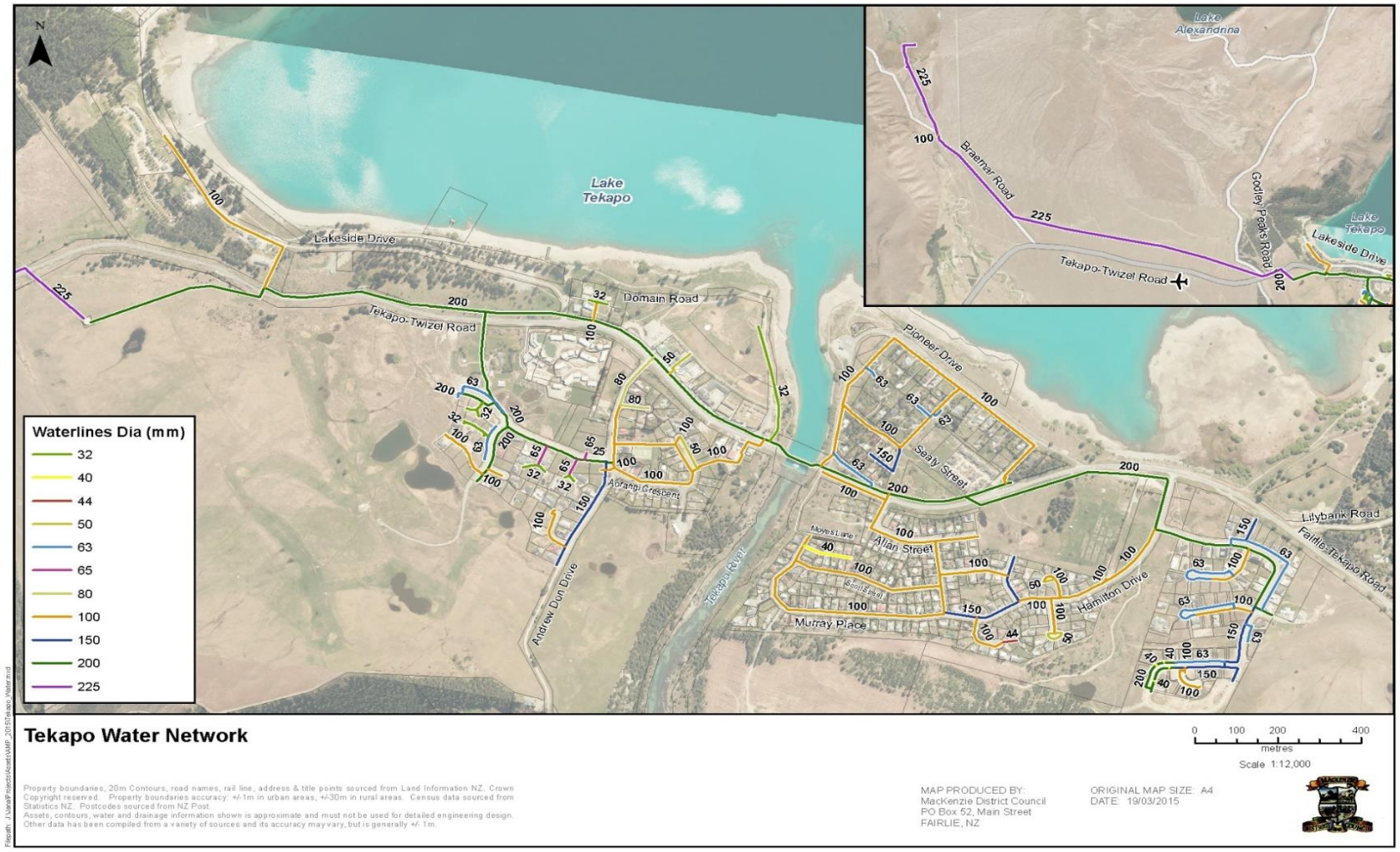
Score	Description	Definition
1	Accurate	100%
2	Minor inaccuracies	± 5%
3	50% estimated	± 20%
4	Significant data estimated	± 30%
5	All data estimated	± 40%
X	No asset	

A2.11 Capital Projects

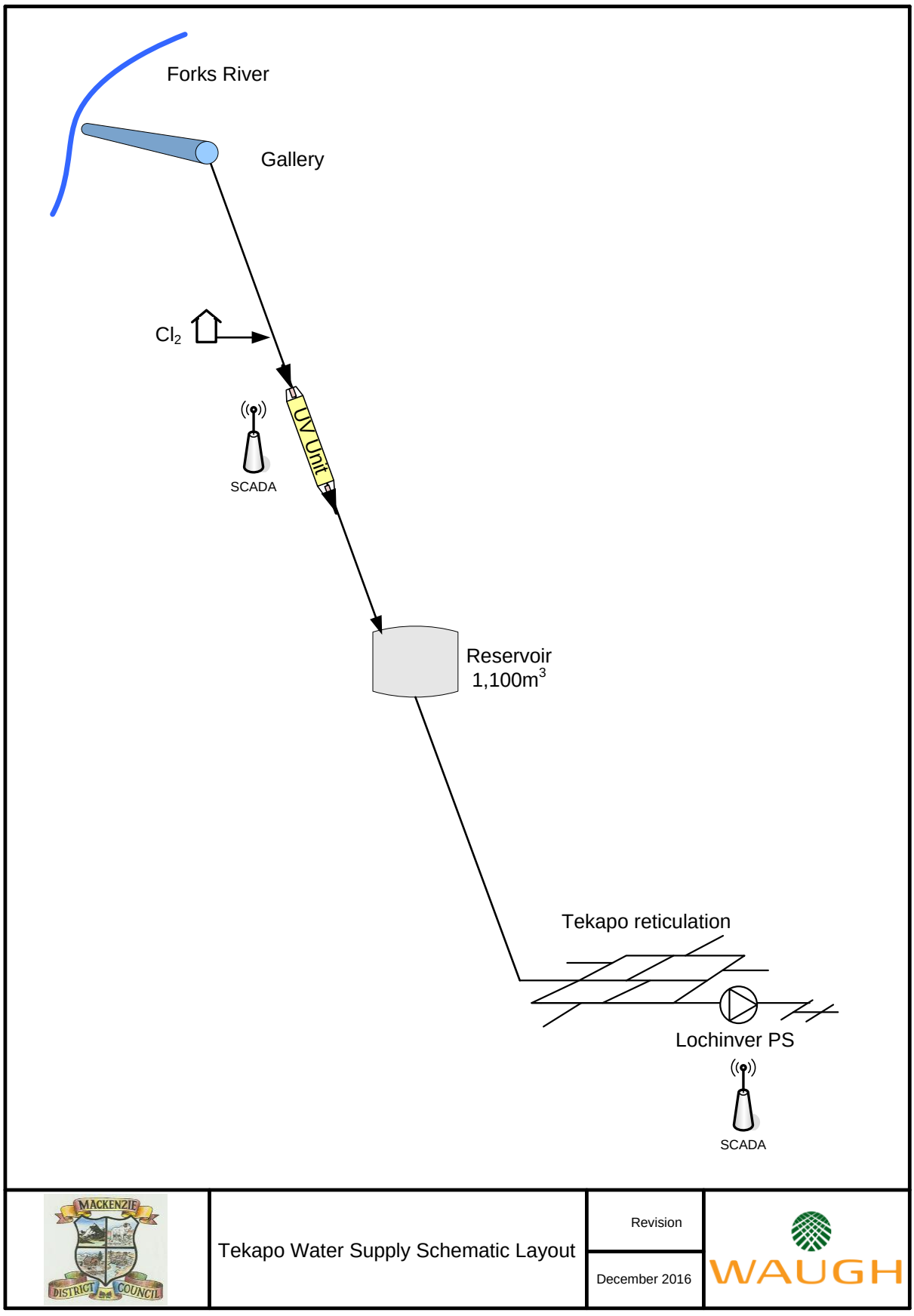
Appendix Table 6: Capital Projects

Name		Type	Value	When
Current LTP period	Relocate Cl_2 dosing	Level of Service	$15,000	2017/18
	SCADA install	Level of Service	$10,000	2017/18
WSP Review		Renewal	$5,200	2021/22
WSP Review		Renewal	$5,200	2026/27

A2.12 Supply Map



A2.13 Supply Schematic



A3 Twizel Water Supply

A3.1 Overview

Description		Quantity
Population Served 2013 % of district served by community water supply		1,137 (3,500 during holidays) 44%
Type of Supply		High pressure with unrestricted/metered. Restricted
Properties	Able to connect	1,769
	Connected	
	metered	
	restricted	
	not metered	
	Not connected	-
Water Source		Three shallow bores
History	Original scheme installed in	1969/70
Length of reticulation		62.7km
Number of valves		421
Number of hydrants		243
Number of pump stations		2
Storage		7,500m^3
Treatment	Treatment	Filtration
	Disinfection	Ultra Violet Irradiation
Pressure & Flow	Target level of service at point of supply	
	Pressure	250 kPa
	Flow	25 Lts/min
Sustainability	Source Security	Unsecure
Financial	Funding	Targeted rate (Fairlie, Tekapo, Twizel & Burkes Pass)

A3.2 Key Issues for Service

Issues	Resolution
AC pipe	Planned renewal
Controls for the gallery	Planned project
Bore pump capacity & efficiency unknown	Investigate, test and compare against future demand (**IP 10**)

A3.3 Overview & History

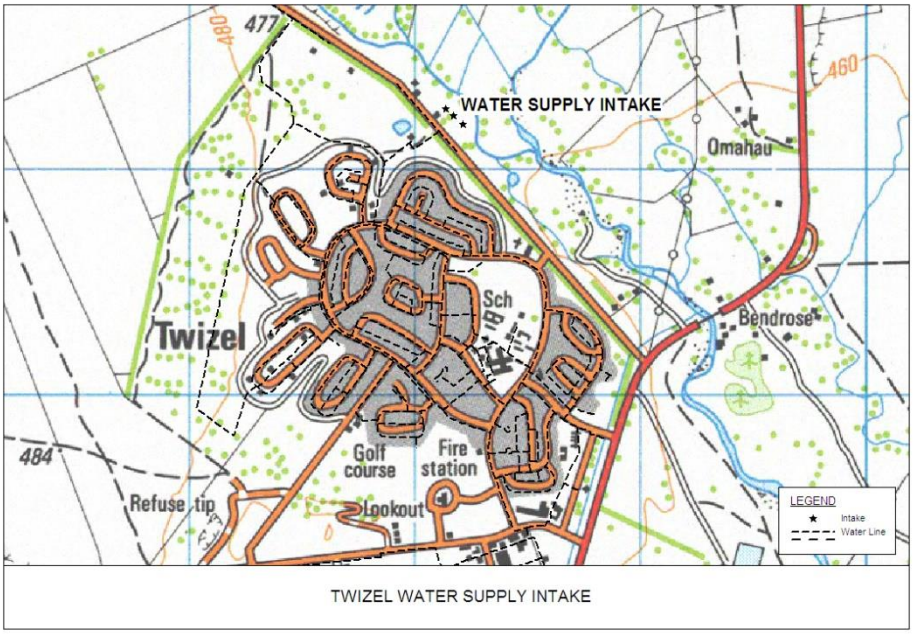
The Twizel Water Supply was installed during 1969/70 to service the Upper Waitaki Hydro Development and was not intended to remain in place after its completion. However, extensive lobbying by various groups ensured the town's survival and the town has since developed into a significant holiday and tourist destination.

A3.4 Condition, Capacity, Performance & Criticality

A3.4.1 Source

The source of the Twizel water supply is three wells (200mm dia pipe, 16.75m long, within a 1200mm Benoto bore 21.5m deep) drawing from a shallow unconfined aquifer besides the Fraser Stream adjacent to Glen Lyon Rd. The space between the bore and the 200mm dia pipe has been filled with washed gravels 8-25mm

Figure 11-17: Twizel Water Supply Intake



TWIZEL WATER SUPPLY INTAKE

A3.4.2 Treatment Plant

Until December 2011 the Twizel water supply was not treated. However, at that time the Community Board installed a temporary a Sodium Hypochloride solution proportional flow dosing plant to disinfect

the supply as a result of an approach by the Medical Officer of Health. This system had some initial set-up problems with odour due to die off of the biofilm build up. This was expected and after line flushing and time the odour and taste issues have been corrected.

Note. During the Hydro project days the water supply was disinfected with Chlorine Gas and Fluoridated. The equipment was housed in the current pump house, built in 1970 and is located on Glen Lyon Rd adjacent to the reservoir.

During the WTP upgrade in 2015/16 the existing pump set that provides pressure to the town has been completely replaced and all controls modernised. The treatment upgrade included filtration, UV and chlorination and complies with the DWSNZ. A permanent generator was also installed providing backup power in the event of a power failure.

Figure 11-18: Twizel WS Treatment Plant

A3.4.3 Storage

There are two reservoirs serving Twizel. The covered raw water reservoir (7,000m^3) is an earth structure, waterproofed with a HDPE liner.

There is a covered reinforced concrete reservoir (500m^3) beneath the pump house which contains the treated water.

Figure 11-19: Twizel WS Raw Water Reservoir

A3.4.4 Pump Stations

Apart from the pumps at the Treatment Plant there is one other pump station within the reticulation, at North West Arch which boosts supply to The Drive subdivision.

A3.4.5 Reticulation

Total length of reticulation. = 62,751m

The rising main takes a direct route from the wells to the raw water reservoir. This pipeline is a 300 dia AC with spiral welded steel pipe above ground. The above ground steel pipe is programmed for replacement.

Apart from the AC mains (24..5km and 39% of the network) the Twizel reticulation is generally in good condition. The initial pipework (100 mm dia and greater) for the village is Asbestos Cement pipe. This pipework has been the subject of recent specialist testing on various samples to determine its remaining life. Those tests have shown some alarming results with some sections of water main at risk of eminent failure due to softening of the pipe wall. As a consequence, a replacement programme has been devised that will see all the 100mm to 150mm diameter AC pipe replaced during the period 2015-35 at a cost of $3.7m (2015 dollars). This replacement programme is detailed in section 7.6.2. Smaller rider mains are PVC and in good condition.

There are also some small diameter galvanised iron pipe serving individual properties that have corroded so much as to restrict the flow to those properties. Council has an ongoing replacement programme for these service connections. Leaking supply points is an on-going issue and are replaced as they are identified.

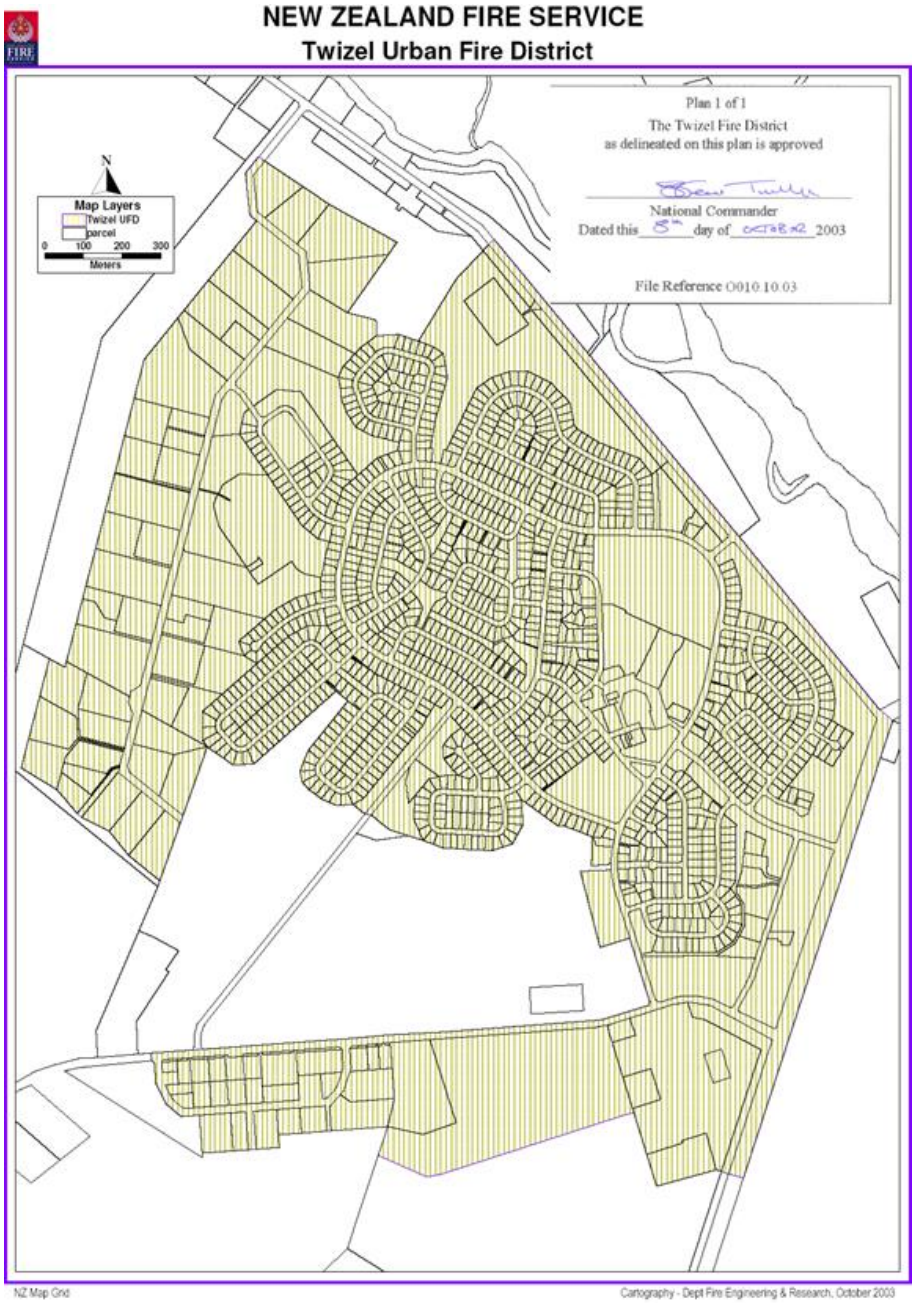
The network layout plan shows the area where Council provides an “on-demand” supply in the residential area. Those areas outside that zone, but supplied with water from the Twizel water supply are only supplied as a restricted supply. Those properties are restricted to one unit (1,820 litres/day) of water.

This is because those properties are generally larger than a residential section with the potential to use a large amount of water. The use of the restrictor eliminates the peak demand for those properties.

A3.4.6 Fire fighting

The NZ Fire Service test flows and pressures at fire hydrants on a regular cycle and notify defects to Council for repair etc. There have been no flow or pressure issues notified.

All new water supply reticulation is required to meet the standards as defined in SNZ PAS 4509:2008 New Zealand Fire Fighting Code of Practice



A3.4.7 Pukaki Airport

There is also a stand alone water supply that to date has served the Pukaki Airport. It comprises a well, pumps and reticulation that provides to each section on a restricted basis. The Council will connect Pukaki Airport to the Twizel water supply in 2018/19, which will mean it will no longer remain a stand-alone supply. The asset registers are being updated to include this network.

A3.5 Environmental Management

The following table list the resource consent associated with the Twizel Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC042741	Take and use water	20 August 2047	130 litres/s 3,942m^3/day (annual average) 1,440,000m^3/year

A3.6 Water Quality

Fluoridation	Nil
Disinfection	Chlorine hypochloride
Quality issues	There is no recognised barrier for Giardia and Cryptosporidium

Appendix Table 7: Twizel Sampling Locations

Scheme	Sampling Location
Twizel WS	At the TP
	At the public toilets

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

A3.7 Demand

Council is carrying out a leak detection programme to determine the location of any system leaks. Any leaks located will be repaired under the normal maintenance regime.

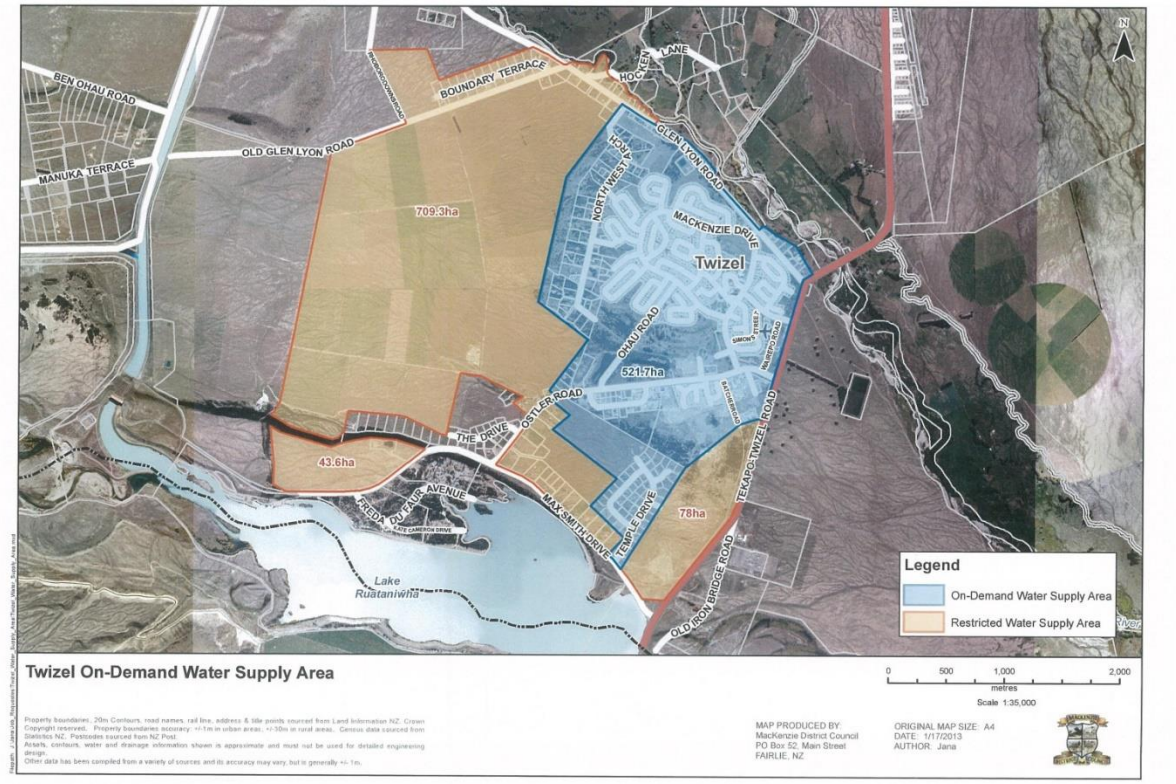
The daily water use per head is very high due to the amount of irrigation, both private and public, required to maintain the landscaped areas within Twizel. During the peak day in February 2005, 8491m3 were consumed. This represents a daily demand of approximately 6m3 per property per day. NZS 4404:2010 suggests a figure of 1.5m3 per property per day.
Census figures show that there has been growth of 11.8% in the resident population in Twizel in the period 2006 – 2013.

Twizel is experiencing a growth in demand in a number of areas close to Twizel. These are creating rural/residential blocks on restricted supply.

Twizel experiences significant fluctuations in peak tourist population and in water demand largely due to sporting events such as rowing and skiing and the summer holiday tourists. Twizel has experienced peaks of up to 7000 people during rowing events.

Recent rezoning around Twizel has bought with it an expectation that water supply will be available. Council has completed its investigations into a possible new source and determined that the only viable option is to rebuild the current plant using the existing source. What this means is that all those areas outside the original Twizel area will either have to receive water on a restricted basis without full or any fire fighting capacity or the supply to those areas will require boosting to supply the required flows and pressures.

Water Supply	Average daily demand (m^3)	Resource consent limit (m^3/day)
Twizel	2,568	3,942



A3.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The Ministry of Health agrees with a 3 log protozoal treatment being appropriate as indicated in the catchment assessment using table 5.1a.

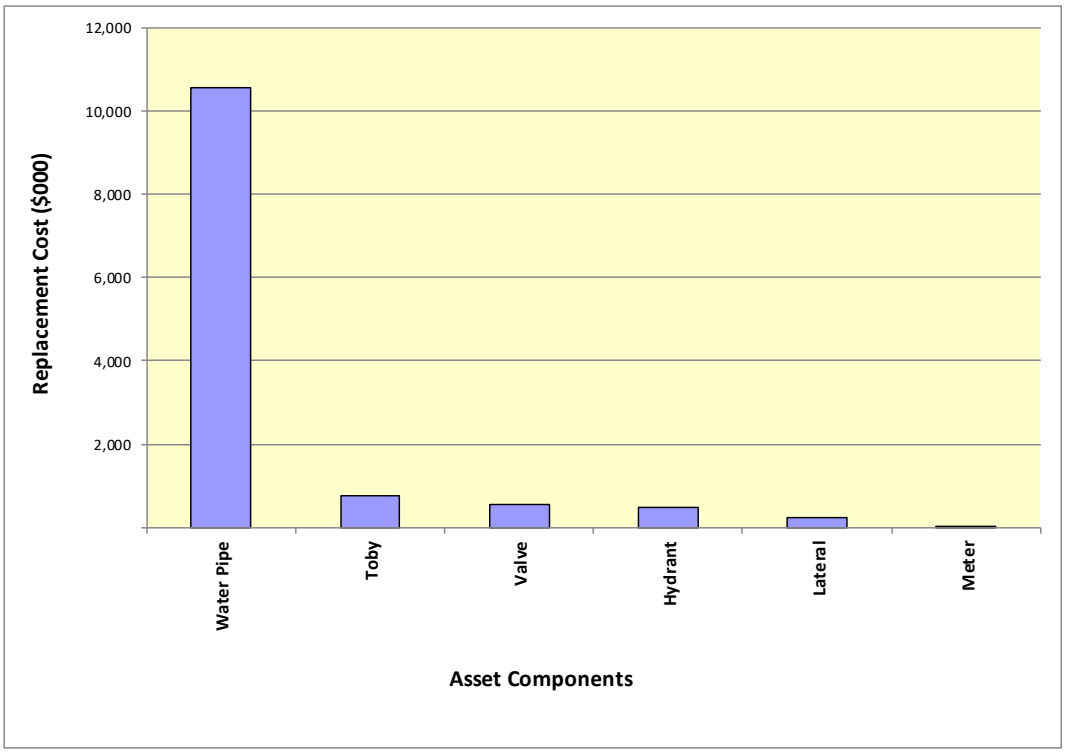
The following improvements were implemented for preventing, reducing or eliminating the identified public health risks in the Twizel drinking water supply.

ii. Treatment —the supply will need to remain chlorinated, and be disinfected by UV.

This work was completed in 2015/16. A Water Safety Plan has been completed and approved by the Ministry of Health.

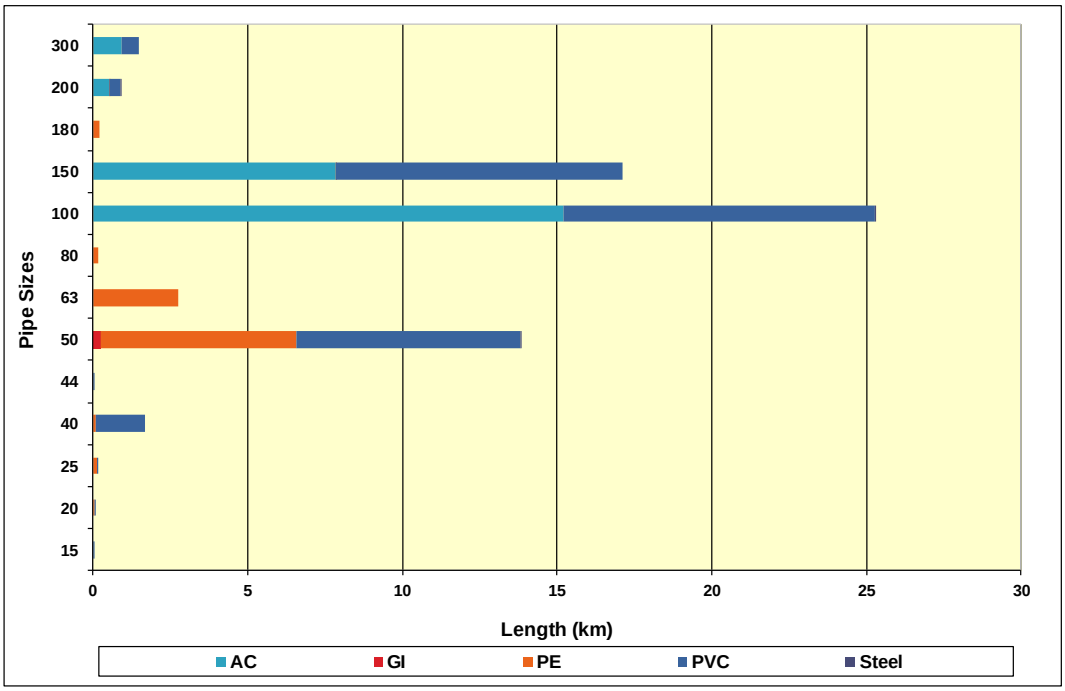
A3.9 Asset Details

Figure 11-20: Replacement Costs for Reticulation



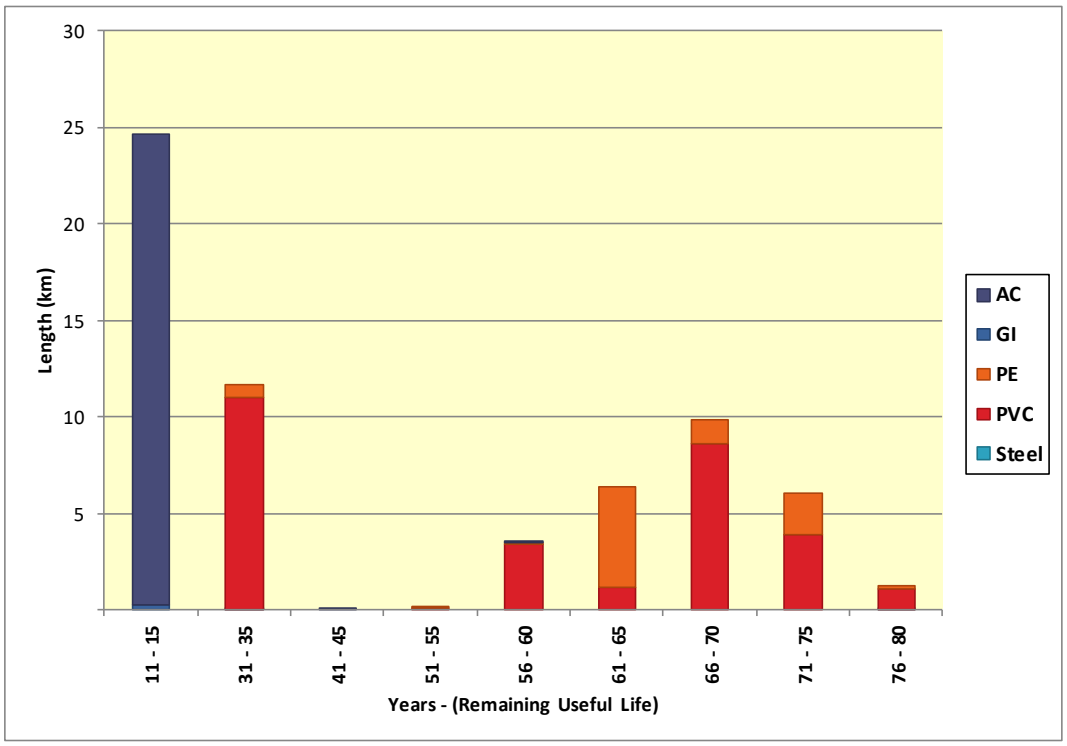
Water mains make up 84% of the total reticulation asset values.
Tobies make up 6% of the total reticulation asset value.

Figure 11-21: Water Main Diameters



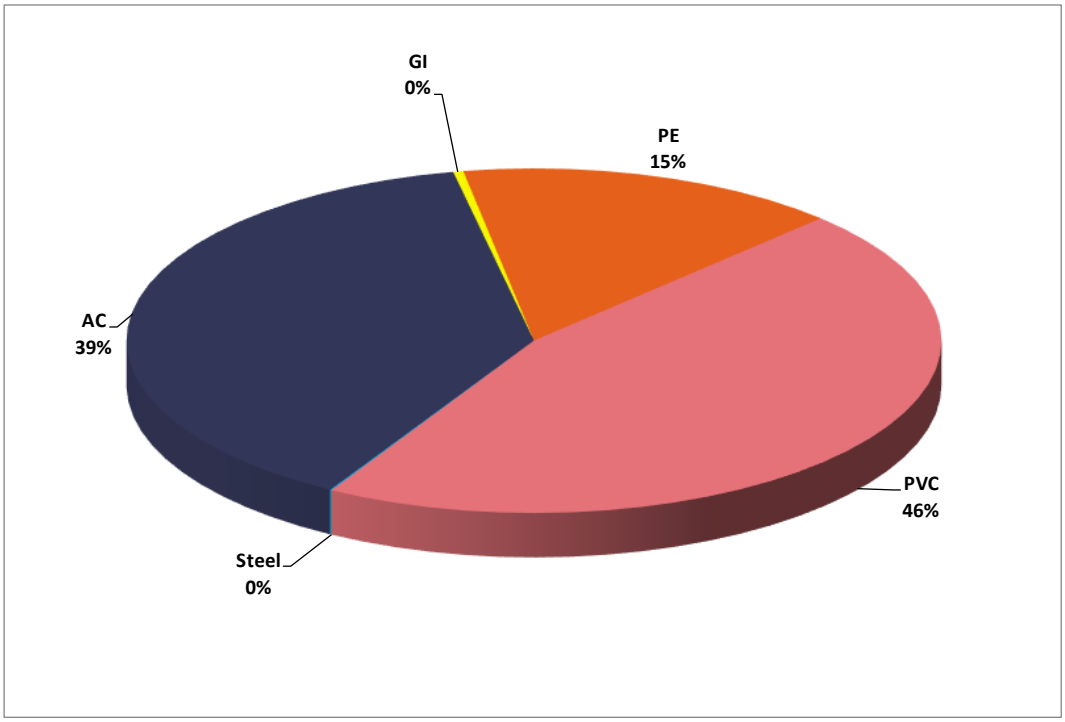
25% of the total water mains length is Ø50mm and smaller.
40% of the total water mains length are Ø100mm and mainly AC and PVC.

Figure 11-22: Pipe Age Group Replacement Cost



There is 24km of AC pipe reaching the end of its expected useful life within the 11-15 year window. There is 11km of PVC pipe reaching the end of its expected useful life within the 31-35 year window. The renewal programme for replacing the AC pipe is current and discussed in Section 7.6.2.

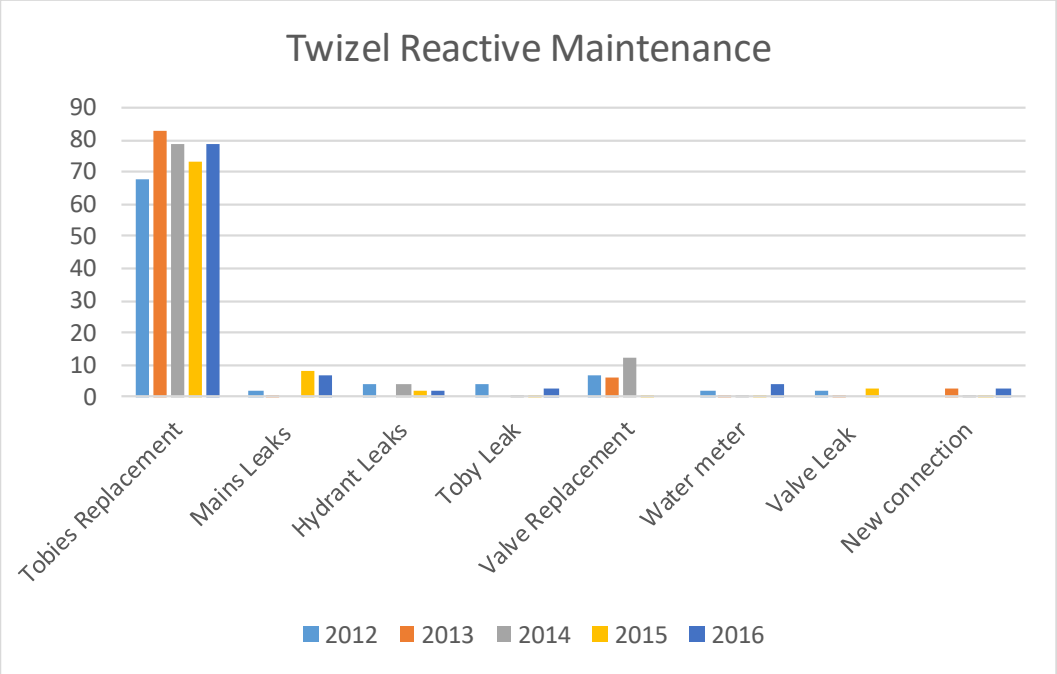
Figure 11-23: Water Main Material



The graph shows

- 46% of the reticulation consist of PVC and
- 39% of AC
- 15% of PE

Figure 11-24: Reactive Maintenance



Most of the work associated with reactive maintenance consists of toby replacements. Toby replacements show a slight upward trend. Toby leaks and toby replacements are related, but toby leaks may result in toby replacements. Toby replacement involve replacing the toby with a manifold which allows potential metering of an individual site. Valve replacements show an upward trend.

A3.10 Data Confidence

Appendix Table 8: Data Confidence

Scheme	Component	Intake	Pump Stations	Reservoirs	Reticulation
	Asset Attributes	G	G	G	G
	Condition	G	G	G	G
	Performance	G	G	G	G

Where

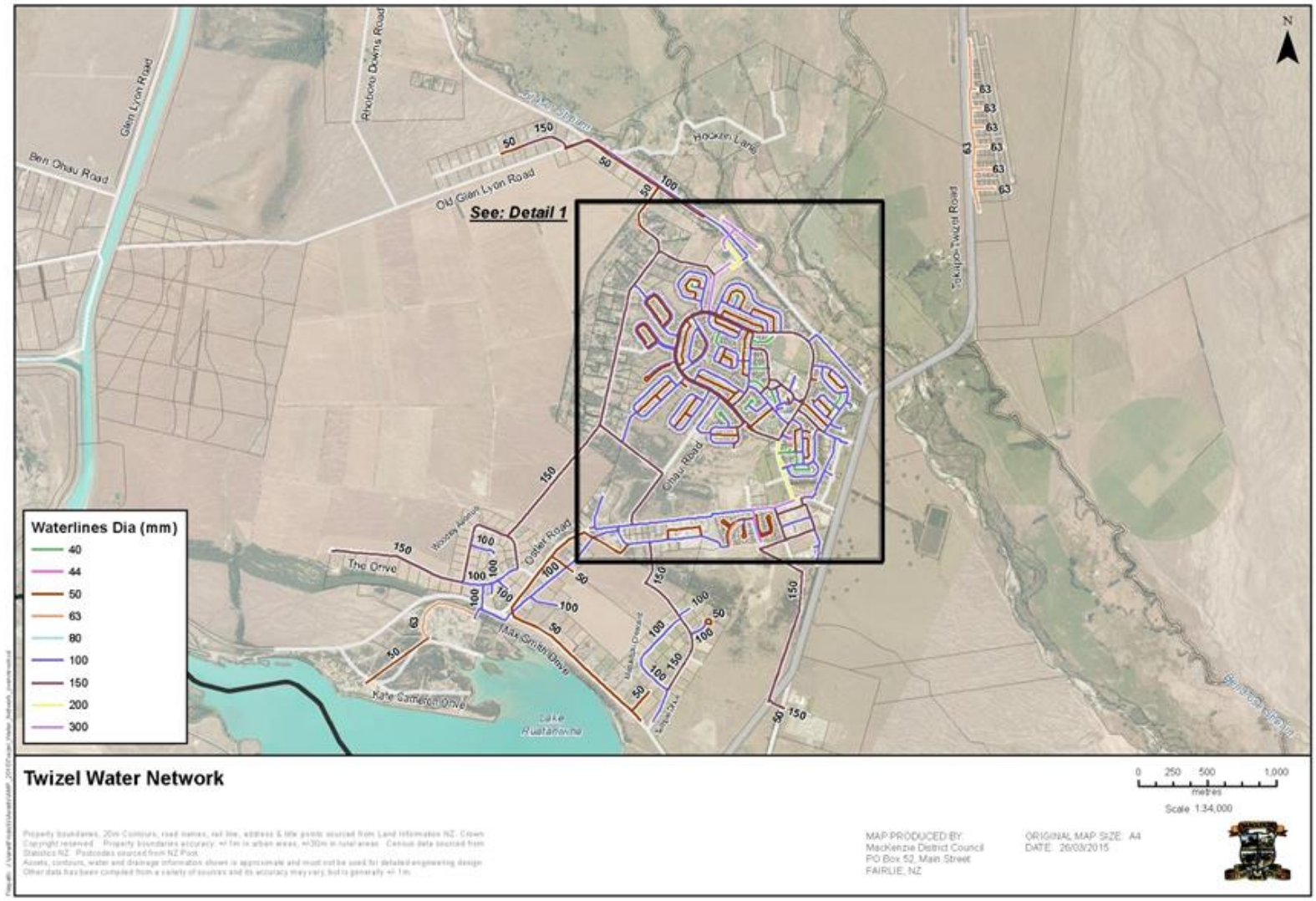
Score	Description	Definition
1	Accurate	100%
2	Minor inaccuracies	± 5%
3	50% estimated	± 20%
4	Significant data estimated	± 30%
5	All data estimated	± 40%
X	No asset	

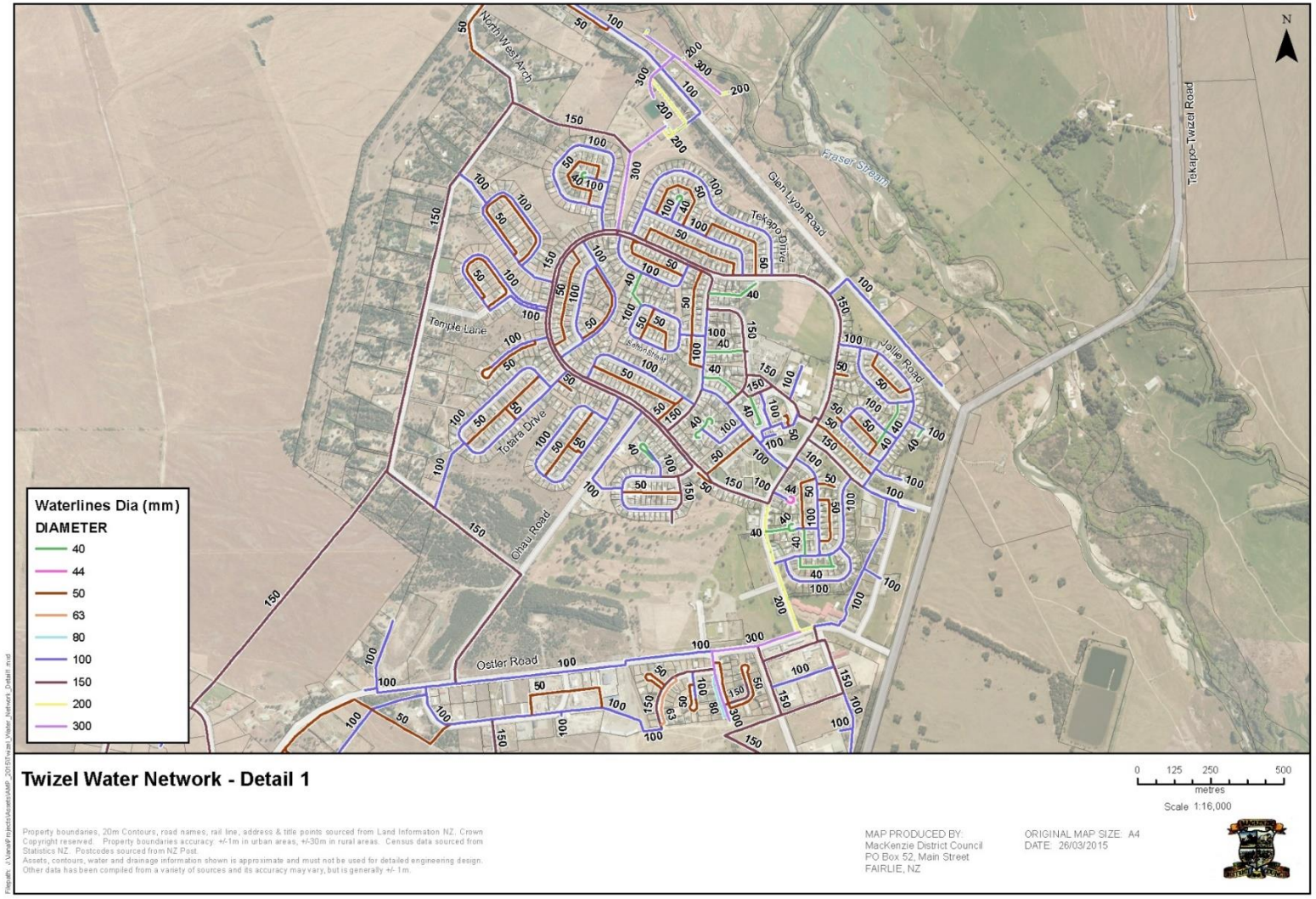
A3.11 Capital Projects

Appendix Table 9: Capital Projects

Name	Type	Value	When
Gallery controls	Level of Service	$70,000	2018/19
Replace AC pipe	Renewal	$2,730,000	2018 -2028
Treatment	Renewal	$70,000	2018/19
WSP Review	Renewal	$5,200	2021/22
WSP Review	Renewal	$5,200	2026/27

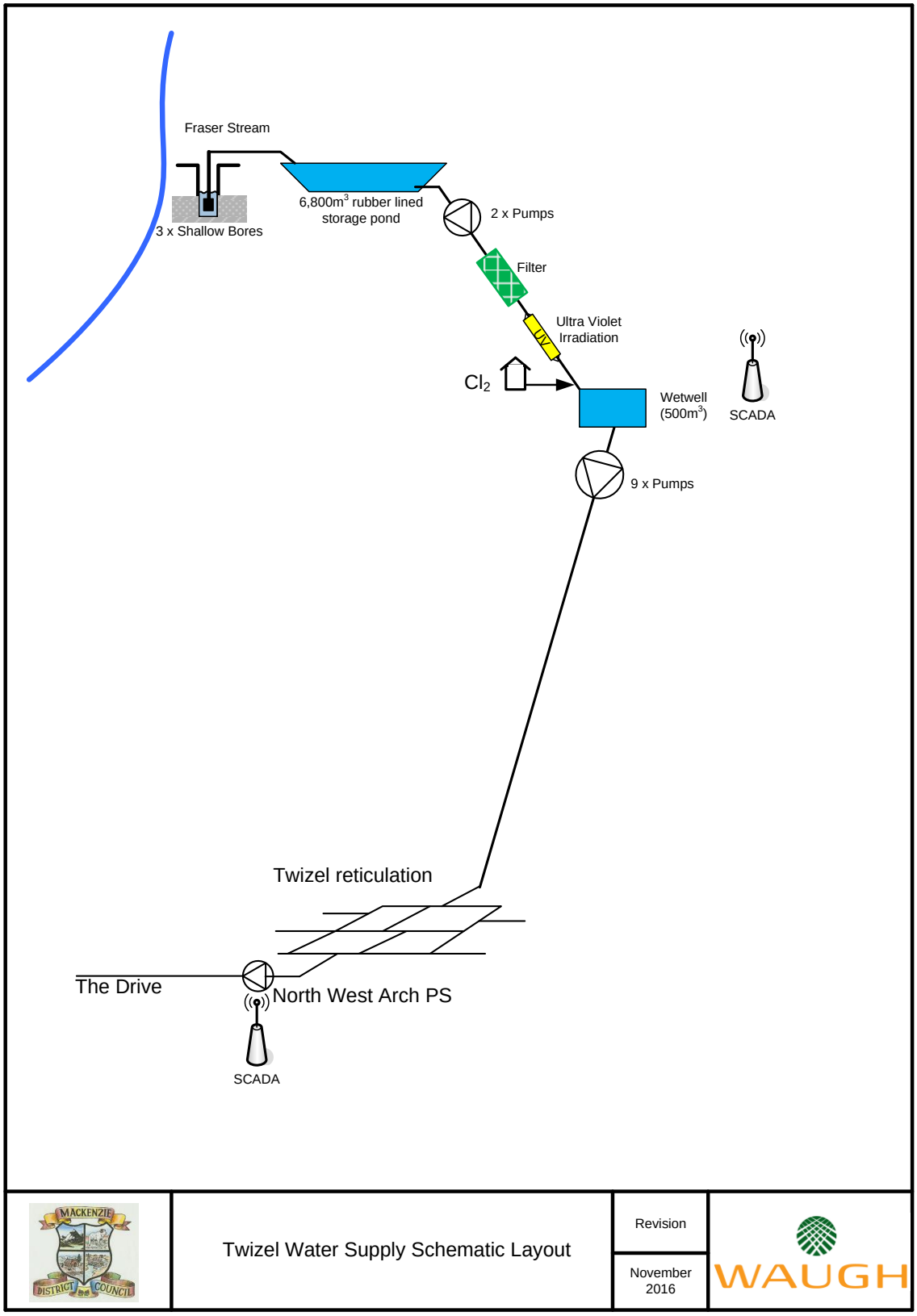
A3.12 Supply Map




Waterlines Dia (mm)
DIAMETER
40
44
50
63
80
100
150
200
300
N
North West Arch
Glen Lyon Road
Tekapo Drive
Fraser Stream
Tekapo-Twizel Road
Temple Lane
Tobare Drive
Jollie Road
Ohau Road
Ostler Road
Twizel Water Network - Detail 1
0 125 250 500
metres
Scale 1:16,000
Property boundaries, 20m Contours, road names, rail line, address & title points sourced from Land Information NZ. Crown Copyright reserved. Property boundaries accuracy: +/-1m in urban areas, +/-30m in rural areas. Census data sourced from Statistics NZ. Postcodes sourced from NZ Post.
Assets, contours, water and drainage information shown is approximate and must not be used for detailed engineering design. Other data has been compiled from a variety of sources and its accuracy may vary, but is generally +/- 1m.
MAP PRODUCED BY:
MacKenzie District Council
PO Box 52, Main Street
FAIRLIE, NZ
ORIGINAL MAP SIZE: A4
DATE: 26/03/2015

A3.13 Supply Schematic

15



A4 Burkes Pass Water Supply

A4.1 Overview

Description		Quantity
Population Served 2013 % of district served by community water supply		30 1%
Type of Supply		Mix of on demand/unrestricted/metered/restricted.
Properties	Able to connect	18
	Connected	
	metered	
	restricted	
	not metered	
	Not connected	-
Water Source		Infiltration Gallery
History	Original scheme installed in	1940's
Length of reticulation		3.0km
Number of valves		-
Number of hydrants		-
Number of pump stations		-
Storage		22m^3
Treatment	Treatment	None
	Disinfection	Chlorination
Flow	Target level of service at point of supply	1,818 litres/day
Sustainability	Source Security	Unsecure
Financial	Funding	Universal rate (Fairlie, Tekapo, Twizel & Burkes Pass)

A4.2 Key Issues for Service

Issues	Resolution
Manage demand within consent limits	Consider changing from on demand to restricted supply (**IP 11**)
Equal access to water supply	
Galvanised iron pipe	Planned renewals
Monitoring	Install SCADA

A4.2.1 Overview & History

The small village of Burkes Pass currently is occupied by some permanent residents and some holiday homes. The scheme was first built around 1940 but over the years has been modified and extended.

Originally the Burkes Pass WS was developed as a restricted supply, with on site storage tanks and the reticulation all small diameter pipes. Over time, connections have been made without flow restrictors or storage tanks, creating potential demand issues.

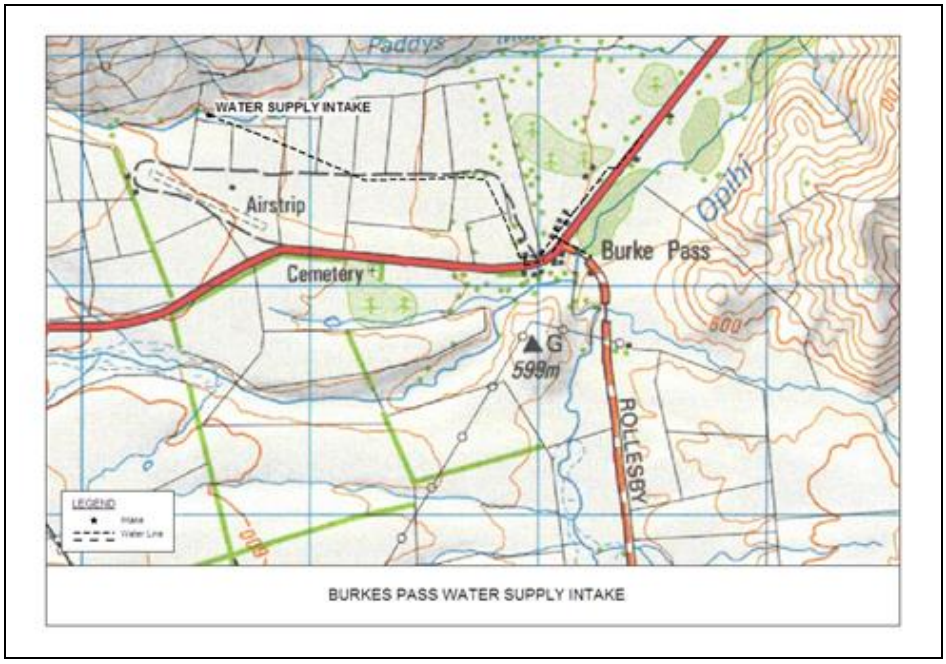
A4.3 Condition, Capacity, Performance & Criticality

A4.3.1 Source

The source for the Burkes Pass water supply is an infiltration gallery in the bed of Paddy's Market Stream approximately north west of the village.

The infiltration gallery has been damaged and stock have access to the water course at the gallery. Council has a proposal to shift the gallery slightly upstream and fence off the creek bed for approximately 100m.

Figure 11-25: Burkes Pass Water Supply Source & Intake Structure



A4.3.2 Treatment Plant

The treatment is located adjacent to the intake gallery. It was upgraded in 2010 with the installation of two Dosatron dosing pumps.

The raw water is flow proportionally dosed with Calcium Hyperchloride solution using the two Dosatron dosing pumps. There is no mains power available at the site, the dosing pump is driven by water from the stream.

The water is filtered through an Arcle disk filter. This has to be regularly cleaned to eliminate blockage.

The treatment system is a low cost and generally reliable operation that requires regular inspection by the Contractor to ensure continuity of treatment.

A4.3.3 Storage

The reservoir for this supply is a 22.5m^3 concrete tank.

A4.3.4 Pump Stations

There are no pump stations within the Burkes Pass reticulation.

A4.3.5 Reticulation

Total length of reticulation. = 2,984m.

The pipe work is generally as shown however we believe there may be other material used as well on the trunk line to the township. This will be confirmed as maintenance is carried on the pipelines. The trunk main has been laid quite shallow and is at risk from farming operations.

The pipework is suitable only for tank supply however it is known that some properties have hose connections prior to the tank. If these supplies are used to any great degree it impacts on the service to the higher level properties. As the community is so small, this issue generally does not cause too many problems.

All new connections are supplied on a restricted supply basis.

A4.3.6 Fire fighting

The scheme has no fire fighting capability being a small bore scheme.

A4.4 Environmental Management

The following table list the resource consent associated with the Burkes Pass Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC971594	to divert water for Burkes Pass community supply	29 October 2032	6 litres/s 520m^3/day
CRC971595	to discharge by-wash water to Paddy's Market Stream	29 October 2032	6 litres/s 520m^3/day
CRC971593	to disturb the bed of Paddy's Market Stream	29 October 2032	Not applicable

A4.5 Water Quality

Fluoridation	Nil
Disinfection	Calcium Hypochloride
Quality issues	Water take is from a surface stream that stock have access to

Appendix Table 10: Burkes Pass Sampling Locations

Scheme	Sampling Location
Burkes Pass WS	At reservoir
	In reticulation

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

A4.6 Demand

On average each property uses 800 m^3 per annum. Like all the communities in the Mackenzie a significant proportion of this is used for irrigation. A meter has been installed to better monitor the water use.

Water Supply	Average daily demand (m^3)	Resource consent limit (m^3/day)
Burkes Pass	34	520

A4.7 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The Ministry of Health agrees with a 4 log protozoal treatment being appropriate as indicated in the catchment assessment using table 5.1a.

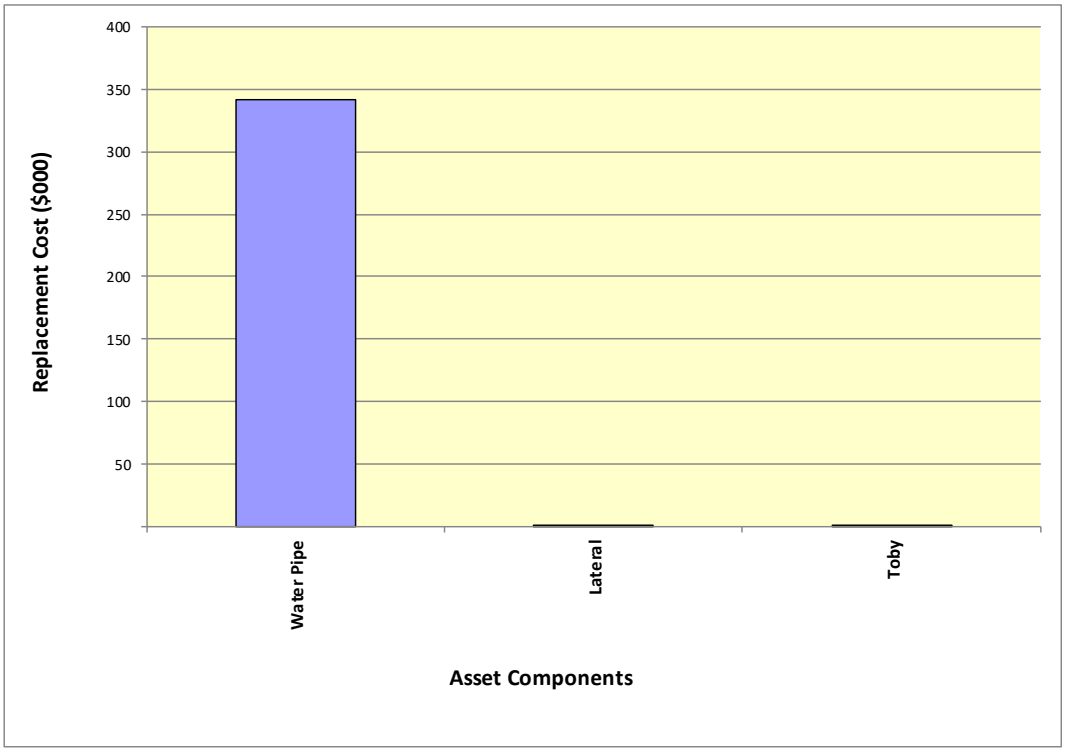
The following improvements are recommended for preventing, reducing or eliminating the identified public health risks in the Burkes Pass drinking water supply.

i. Treatment — Indications are that the supply will need to remain chlorinated, most likely go through a filtration process followed by UV disinfection.
ii. Storage — new reservoir for one day's storage
iii. Reticulation Renewal — Reticulation is renewed as required.

A Public Health Risk Management Plan has been completed and submitted to the Ministry for consideration. At the time of writing this Plan the treatment options were still under investigation.

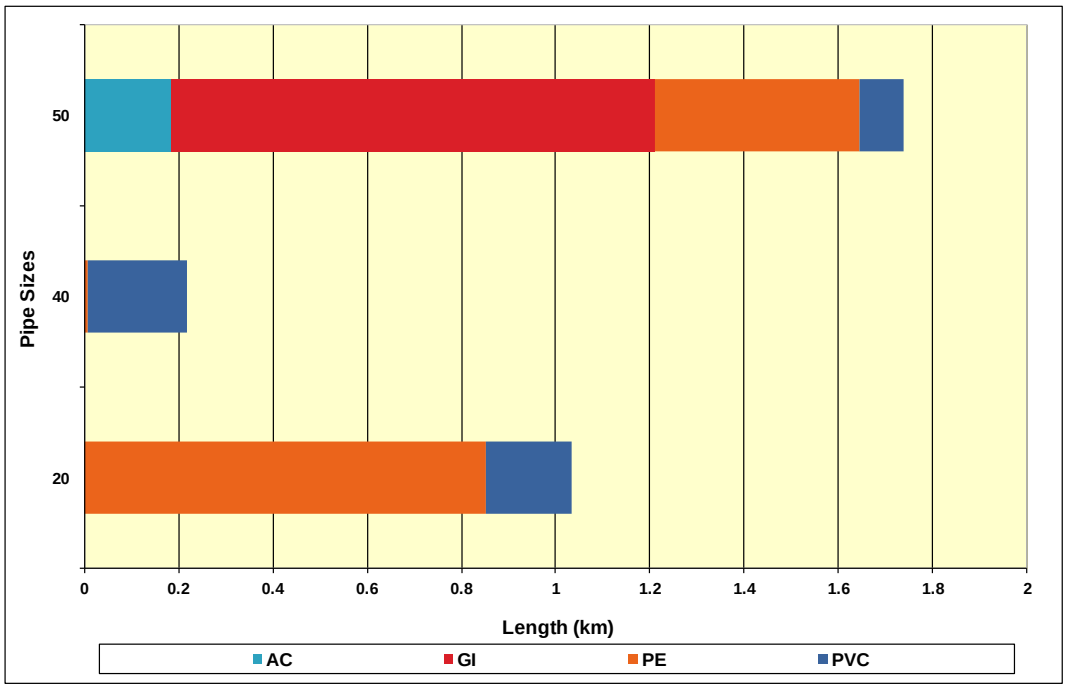
A4.8 Asset Details

Figure 11-26: Replacement Costs for Reticulation



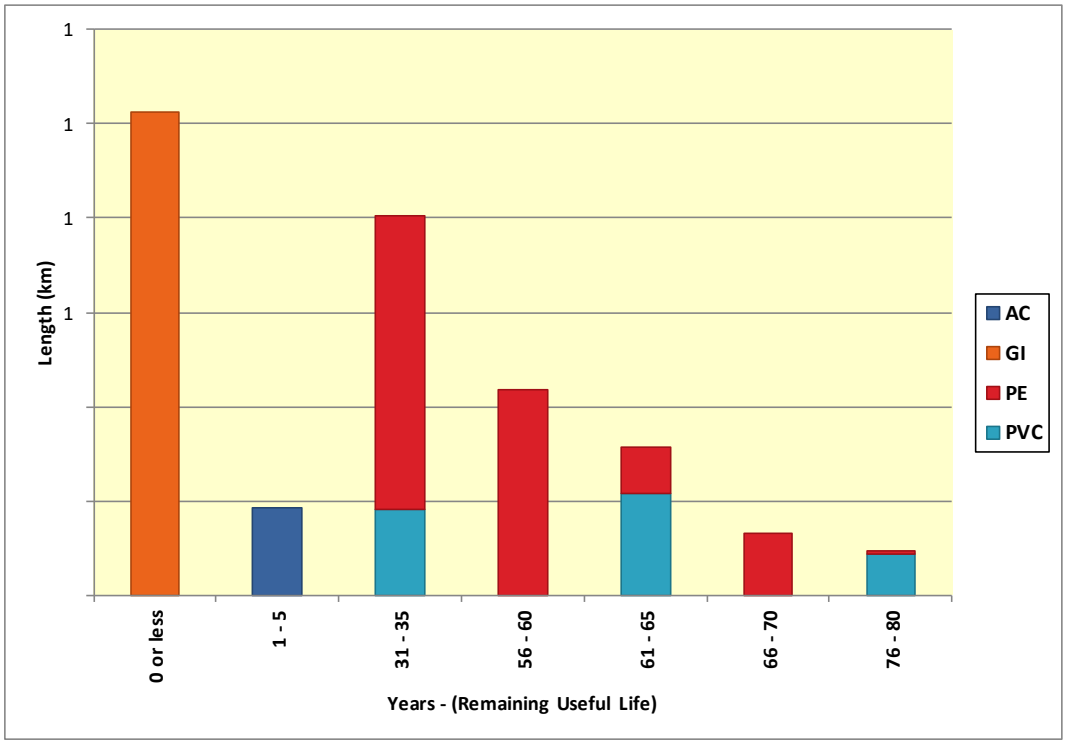
Water mains make up 99% of the total reticulation asset values

Figure 11-27: Water Main Diameters



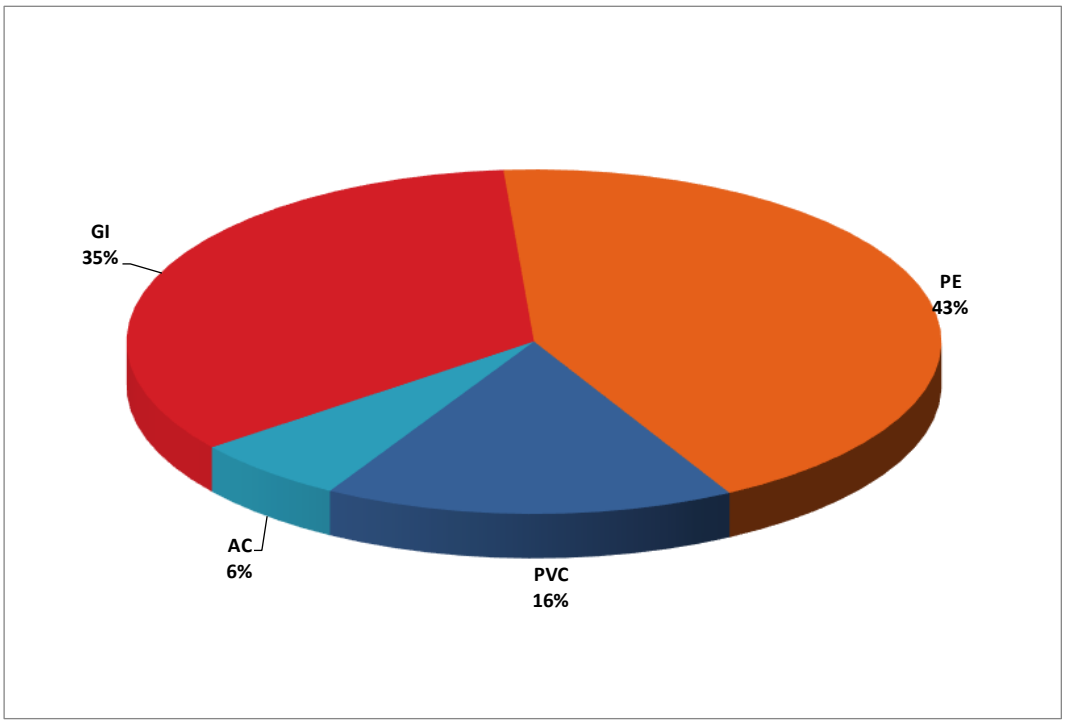
58% of the total water mains length is Ø50mm and the majority is Galvanised pipe.
35% of the total water mains length are Ø20mm and the majority of this is PE.

Figure 11-28: Pipe Age Group Replacement Cost



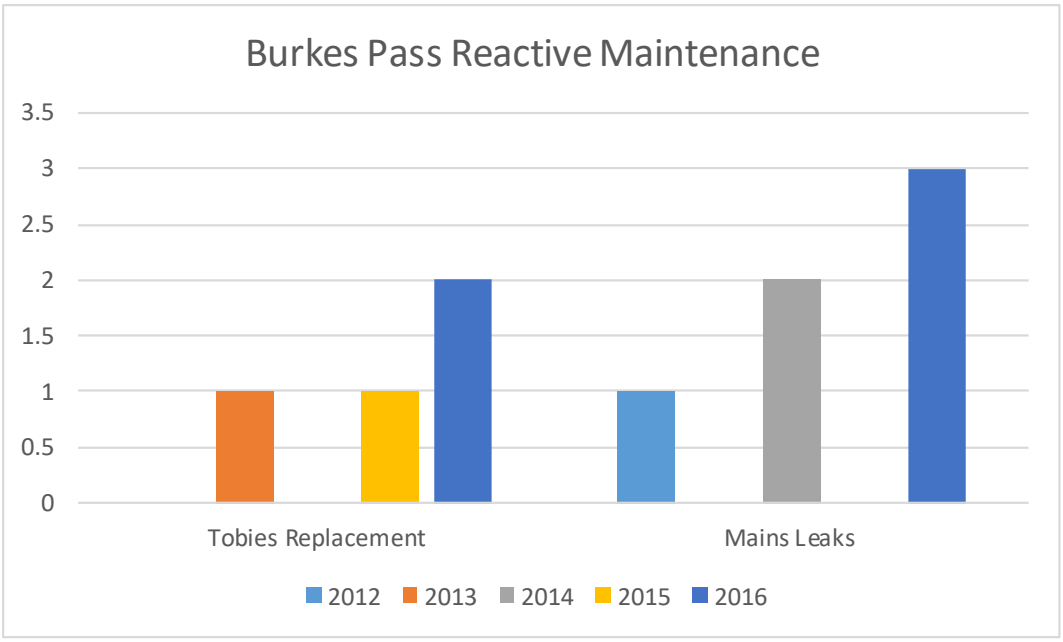
There is 1km of GI pipe that has reached the end of its expected useful life
There is 0.2km of AC pipe which will reach the end of its expected useful life within the 1-5 year window

Figure 11-29: Water Main Material



The graph shows that 43% of the reticulation consist of PE and 35% of GI.

Figure 11-30: Reactive Maintenance



Toby replacements show a slight upward trend.
Mains leaks show an upward trend.
Due to the size of the system the above is not seen as significant and addressed through a reactive maintenance approach.

A4.9 Data Confidence

Appendix Table 11: Data Confidence

Scheme	Component	Intake	Pump Stations	Reservoirs	Reticulation
	Asset Attributes				
	Condition				
	Performance				

Where

Score	Description	Definition
1	Accurate	100%
2	Minor inaccuracies	± 5%
3	50% estimated	± 20%
4	Significant data estimated	± 30%
5	All data estimated	± 40%
X	No asset	

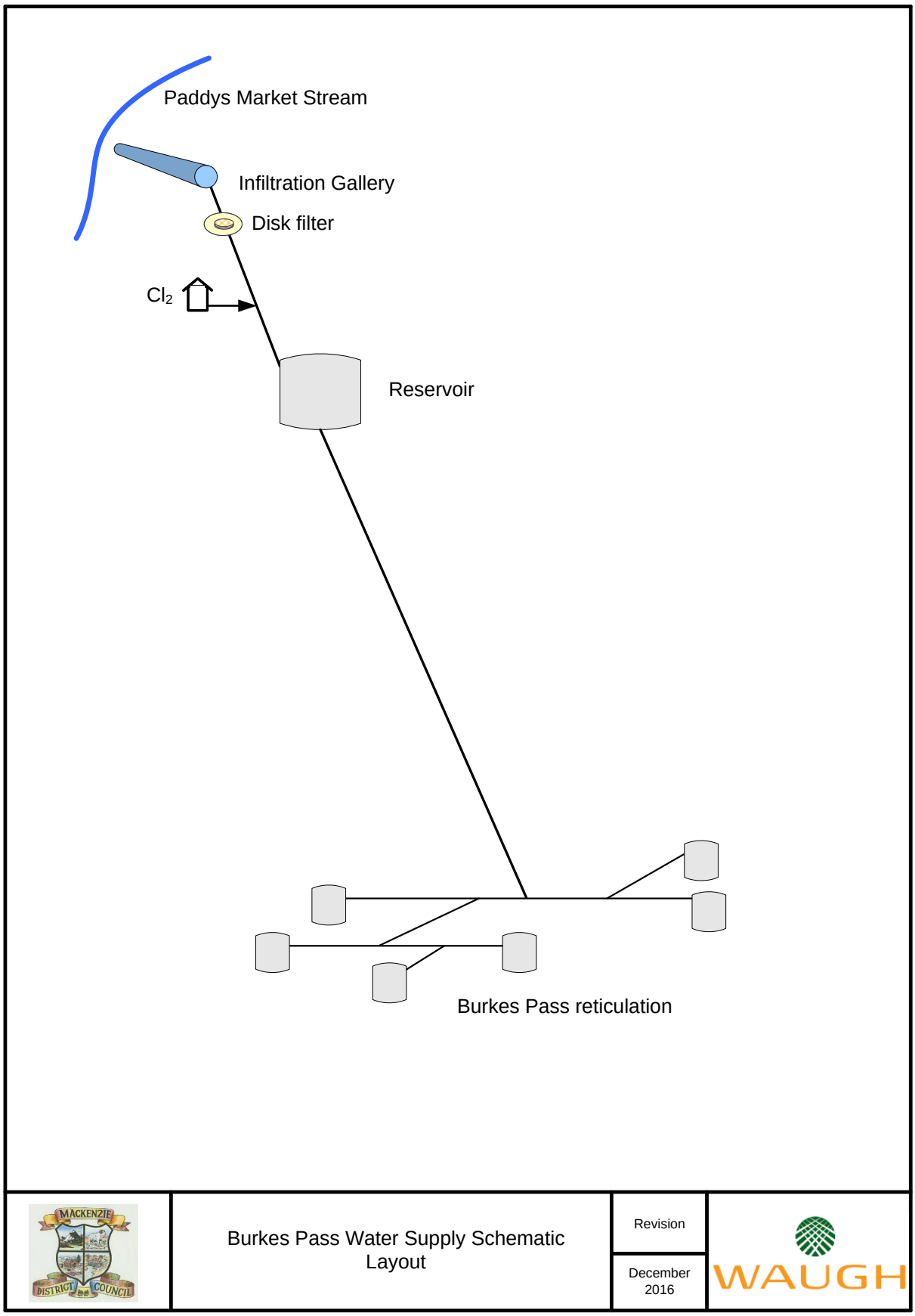
A4.10 Capital Projects

Appendix Table 12: Capital Projects

Name	Type	Value	When
SCADA install	Level of Service	$15,000	2018/19
Replace GI pipe	Renewal	$40,000	2019/20
Storage reservoir	Renewal	$8,000	2018/19
Solar/Plant/Meter	Renewal	$20,000	2020/21
Solar/Plant/Meter	Renewal	$10,000	2024/25
WSP Review	Renewal	$5,200	2021/22
WSP Review	Renewal	$5,200	2026/27

A4.11 Supply Map

A4.12 Supply Schematic



A5 Allandale Water Supply

A5.1 Overview

Description		Quantity
Population Served 2013 % of district served by community water supply		291 11%
Type of Supply		Restricted
Properties	Connected	
	restricted	524
Water Source		Opuha River
History	Original scheme installed in	
Length of reticulation		11.4km
Number of valves		41
Number of hydrants		2
Number of pump stations		-
Storage		
Treatment	Treatment	None
	Disinfection	Chlorination
Flow	Target level of service at point of supply	1,818 litres/day
Sustainability	Source Security	Secure/Unsecure
Financial	Funding	Targeted rate for community of benefit

A5.2 Key Issues for Service

Issues	Resolution
Poor workmanship on PE pipes	Investigate resolution (**IP 12**)

A5.3 Overview & History

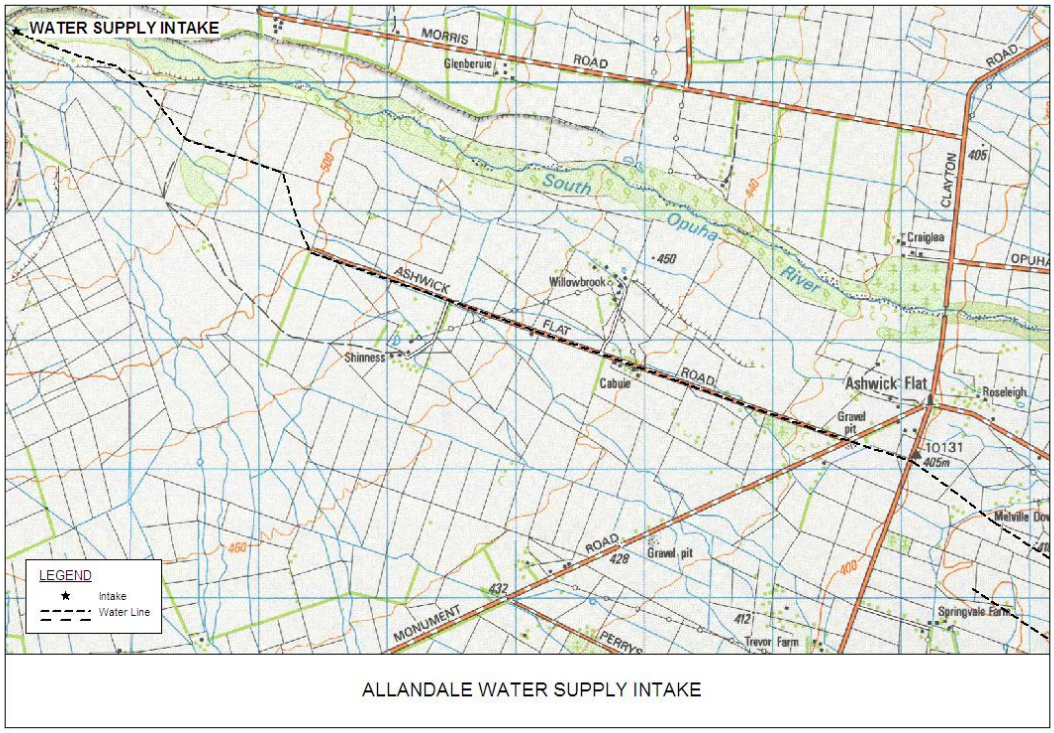
The Allandale rural water supply is a 'Restricted Flow' supply. A restricted flow supply is where a small continuous flow is supplied by a flow control device across an air gap separation, and storage is provided by the customer to cater for his/her demand fluctuations.

A5.4 Condition, Capacity, Performance & Criticality

A5.4.1 Source

The water source for this supply is a surface water connection to the Ashwick Opuha stock water race. In the past the water was sourced from an infiltration gallery adjacent to the South Opuha River where it emerges from the gorge. This was a new intake constructed in 2003 which silted up over time and struggled to supply the required flow. The gallery was enhanced by two free draining gravel trenches to the edge of the river. However, these trenches have silted up and a surface water take connection from the Ashwick supply has had to be installed. Didymo in the Opuha River is causing blockage to the inlet filters necessitating regular cleaning.

Figure 11-31: Allandale Water Supply Source & Intake Structure



ALLANDALE WATER SUPPLY INTAKE

A5.4.2 Treatment Plant

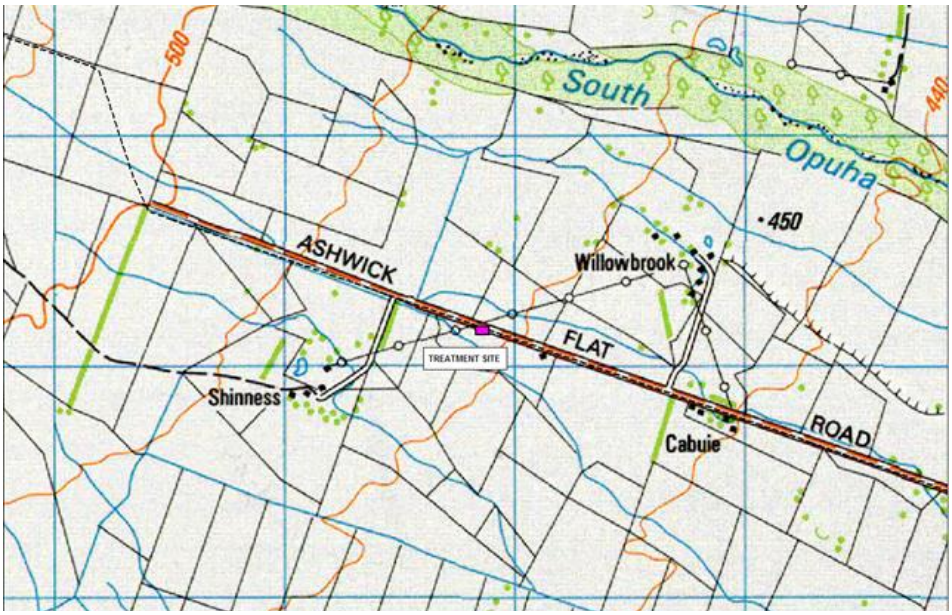
The water treatment plant was built as part of the Headwork's upgrade in 2003 and as such it is in excellent condition.

At the time there was some debate about the type of disinfection to be used for the scheme and the building has been set up to allow enough room to treat the water with UV. This issue has not yet been resolved. In the meantime a Sodium Hyperchloride solution proportional flow dosing system has been installed to provide the necessary disinfection.

The water supply becomes turbid during periods of high river flow. More research on this issue, needs to be undertaken prior to considering improved treatment.

Ultra Violet Irradiation treatment is considered. Transmitted UV light dosage is affected by water clarity and the water take will potentially be shut down during periods of high turbidity. A reservoir is important to balance the water demand during these periods of no take, until water turbidity levels return to normal. However, the cost of replacing the reservoir is deemed to be too high and the 13 kilometres of trunk main is deemed to provide sufficient storage.

Figure 11-32: Allandale WS Treatment Plant



A5.4.3 Storage

The reservoir was built for the original scheme in 1966.

With the new gravity source the reservoir is largely redundant but is kept in service for emergency storage. However, the costs to replace/renew the reservoir is too a high a cost and the 13 kilometres of trunk main is deemed appropriate storage. As a result, the reservoir will not be renewed, but will be decommissioned. As the scheme is a restricted supply with constant flow and on property storage, additional storage is not required.

The existing reinforced concrete structure is in average condition with some leakage that needs to be sealed. The timber framing for the roof has deteriorated significantly.

Figure 11-33: Allandale WS Reservoir

A5.4.4 Pump Stations

The Spur Road booster pump boosts supply to the elevated properties along Spur Road.

A5.4.5 Reticulation

Total length of reticulation. = 111,381m

The 13km long trunkmain was ploughed in through difficult country in 2003. It is a RRJ uPVC 200mm diameter pipeline in excellent condition.

The trunk main and gallery was designed to supply 12 litres/sec at a point 10 metres above the existing Allandale reservoir. The design also allowed for a further 12 litres/sec on Ashwick Flat Rd for a possible future piped water supply to cover some of the area currently serviced by the Ashwick Opuha water race.

The scheme was upgraded in 2007 and amalgamated with the Spur Rd supply. Part of the process was to significantly enhance the scheme and sell extra units up to the maximum of the allowed take, 12 litres/sec. The new scheme supplies 597 units to the enlarged area.

The reticulation upgrade abandoned a significant amount of existing scheme pipe, replacing it with larger pipe to supply the additional units.

A5.4.6 Fire fighting

The scheme has no fire fighting capability being mainly a small bore scheme. There is one hydrant used only for scouring the line and drawing off small quantities of water.

A5.5 Environmental Management

The following table list the resource consent associated with the Allandale Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC020124.1	Take and use water	19 October 2030	12 litres/s

A5.6 Water Quality

Fluoridation	Nil
Disinfection	Sodium Hypochlorite
Quality issues	The water supply is basically a surface take with most of the flow coming from a pipe in the Ashwick intake. The catchment above the intake has very low stocking rates therefore is not subject to significant contamination.

Appendix Table 13: Allandale Sampling Locations

Scheme	Sampling Location
Allandale WS	2km downstream of the TP
	In reticulation at Mt Michael

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

A5.7 Demand

The scheme is a restricted supply delivering 532 units to the Allandale area, plus a further 65 units are pumped to the higher area serving Spur Road. . Flow to each property is controlled by Marac flow controllers that deliver the nominated flow with an accuracy of +/- 10%.
There is a meter at the treatment plant which can be used to reconcile water produced and water sold to identify possible line losses.

A5.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008).

The Ministry of Health have not assigned a log credit for protozoal treatment as Council has not yet confirmed if it requires the scheme to be assessed under Section 5, 10 or Section 12. Section 12 is of the DWSNZ “Rural Agricultural Drinking Water Supplies” is still in the course of preparation and consultation.

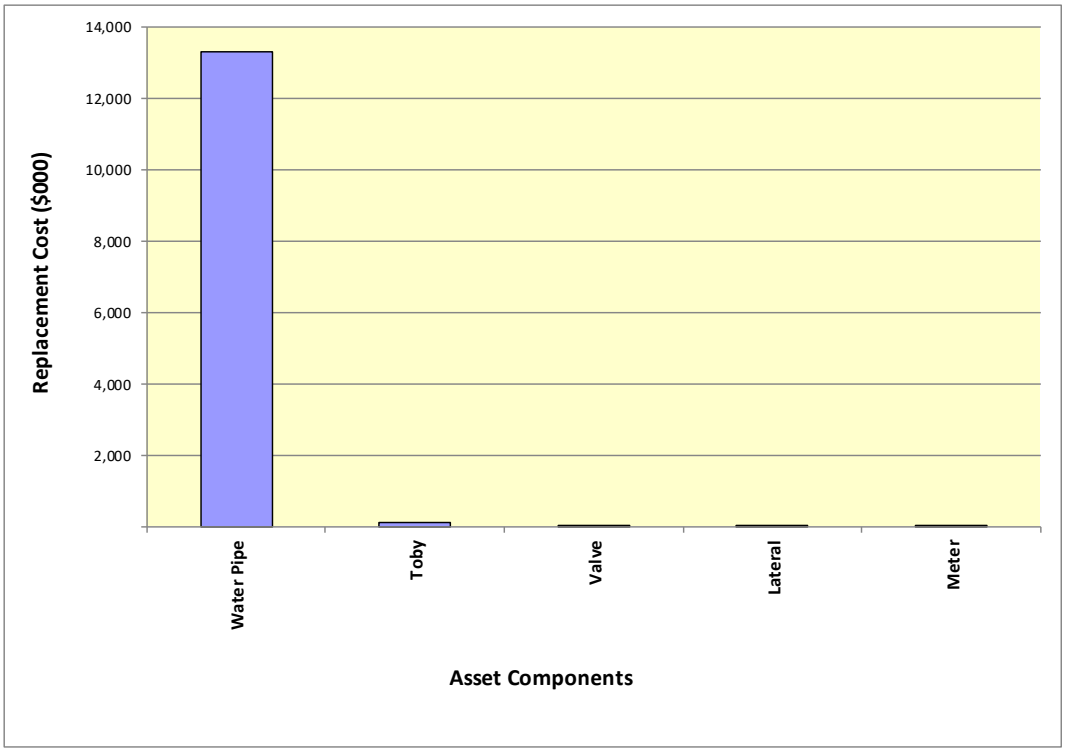
It is anticipated that compliance will come under Section 10 'Small Water Supplies, Alternative Compliance Criteria'.

Council has assumed that UV disinfection will be added to the existing chlorine disinfection. Some form of filtration is likely to be required for periods when the source water is not suitable for UV disinfection.

A Water Safety Plan was completed.

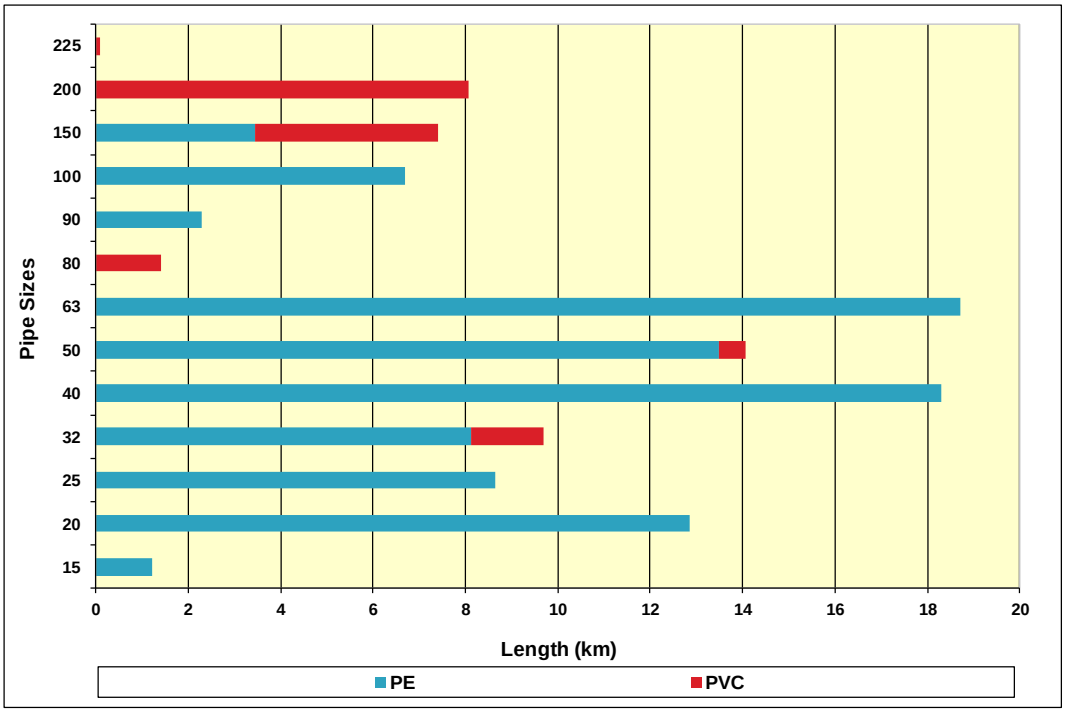
A5.9 Asset Details

Figure 11-34: Replacement Costs for Reticulation



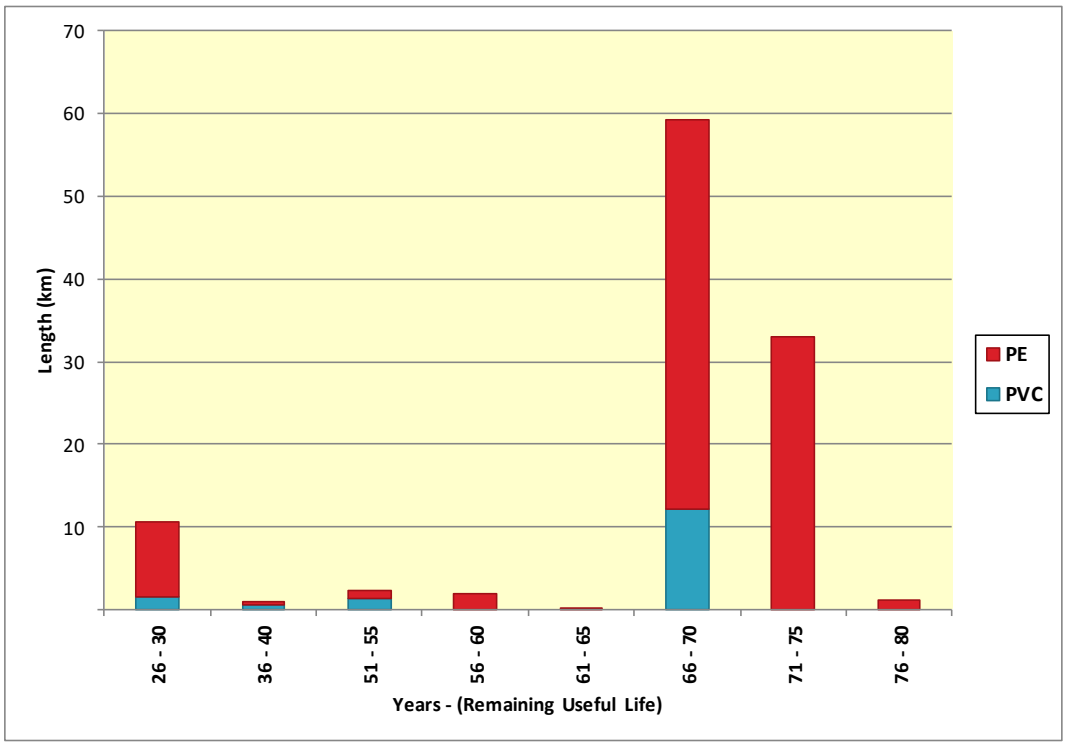
Water mains make up 99% of the total reticulation asset values.
Tobies, valves, laterals 7 meters make up the remaining 1% of the total reticulation asset value.

Figure 11-35: Water Main Diameters



59% of the total water mains length is Ø50mm and smaller and this is mainly PE.
20% of the total water mains length are Ø100mm and greater and 56% of this is PE.

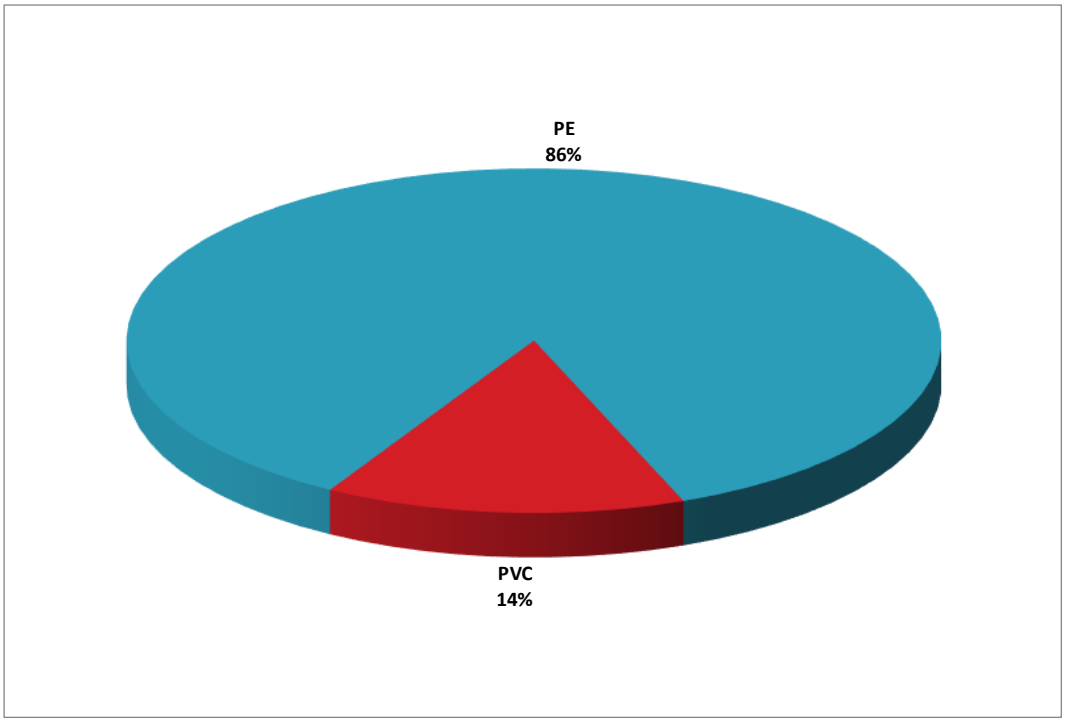
Figure 11-36: Pipe Age Group Replacement Cost



There is 9km of PE pipe and 1.5km of PVC pipe that will reach the end of its expected useful life during the 26 – 30year window.

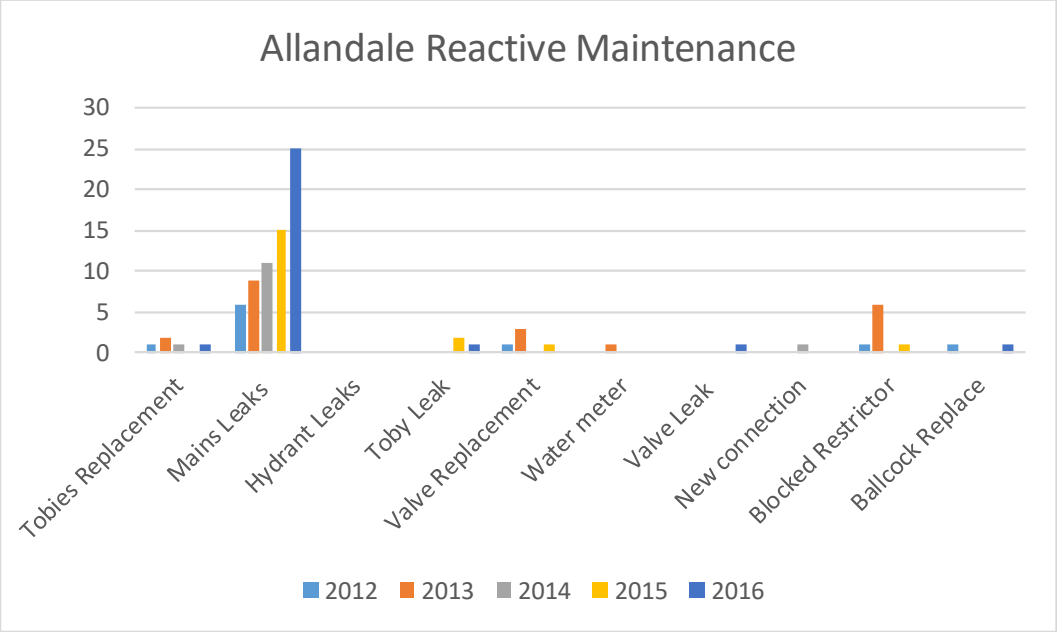
There is 47km of PE pipe and 12km of PVC pipe reaching the end of its expected useful life within the 66 – 70year window.

Figure 11-37: Water Main Material



The graph shows that 86% of the reticulation consist of PE and 14% of PVC

Figure 11-38: Reactive Maintenance



Mains leaks make up the greatest component of reactive maintenance. Mains leaks show a significant upward trend. This is the result of poor quality workmanship (butt welding). Pipes are being replaced as leaks appear and leakage is being tracked to ensure early detection and progressive replacement of leaking pipes.

A5.10 Data Confidence

Appendix Table 14: Data Confidence

Scheme	Component	Intake	Pump Stations	Reservoirs	Reticulation
	Asset Attributes				
	Condition				
	Performance				

Where

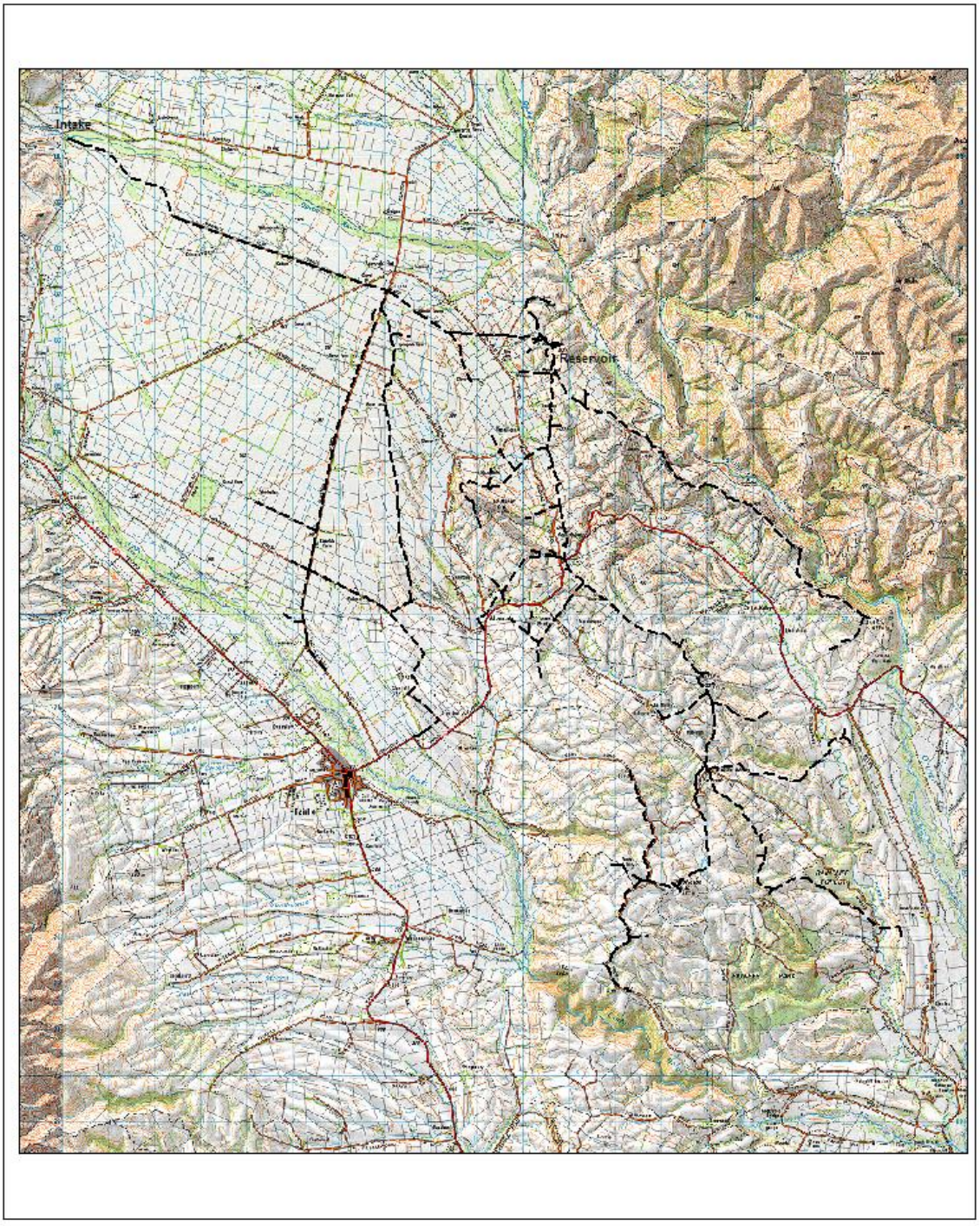
Score	Description	Definition
1	Accurate	100%
2	Minor inaccuracies	± 5%
3	50% estimated	± 20%
4	Significant data estimated	± 30%
5	All data estimated	± 40%
X	No asset	

A5.11 Capital Projects

Appendix Table 15: Capital Projects

Name	Type	Value	When
SCADA install	Level of Service	$10,000	2018/19
Replace pipes	Renewal	$62,300	2018/19
Treatment /modelling	Renewal	$93,000	2020 - 2025
WSP Review	Renewal	$5,200	2021/22
WSP Review	Renewal	$5,200	2026/27

A5.12 Supply Map



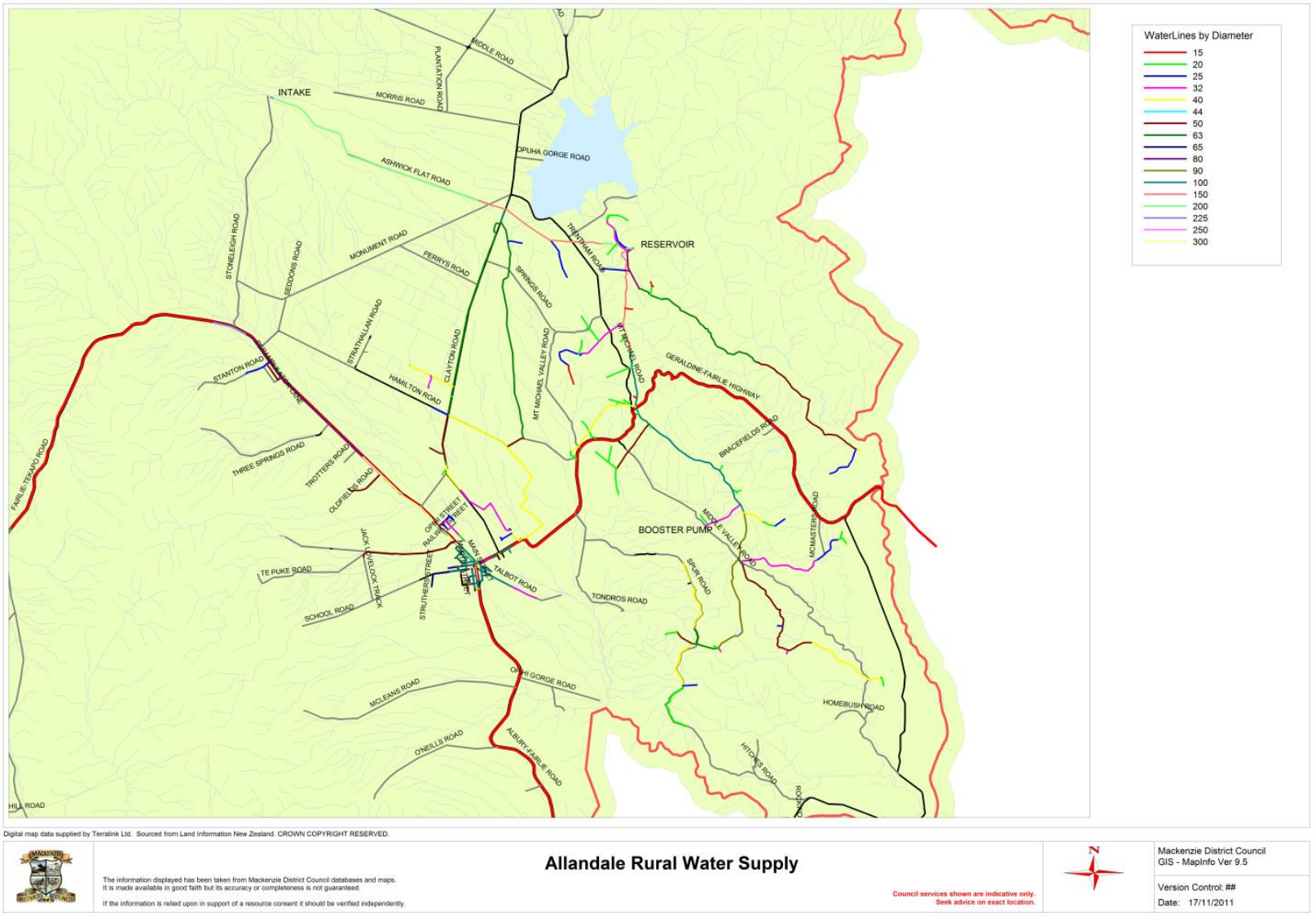
ALLANDALE WATER SUPPLY LINES

N

Scale 1:500 @ A4

Date: 19/02/2009

Mackenzie District Council
GIS - MapInfo Ver 9.5
Council services shown are indicative only.
Seek advice on exact location.



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It is made available in good faith but its accuracy or completeness is not guaranteed.

If the information is relied upon in support of a resource consent it should be verified independently.

Allandale Rural Water Supply

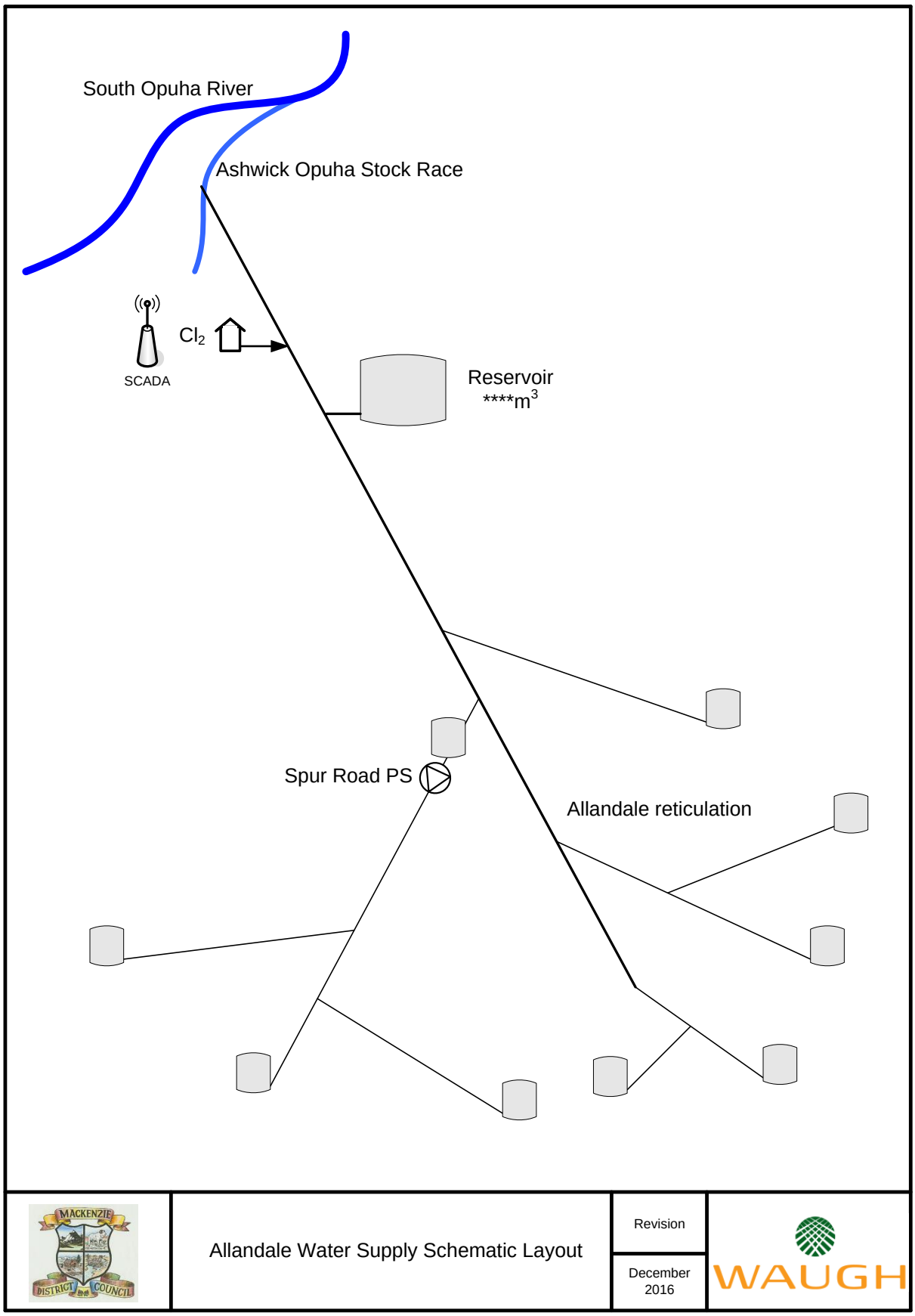
Council services shown are indicative only.
Seek advice on exact location.

Mackenzie District Council
GIS - MapInfo Ver 9.5

Version Control: ##

Date: 17/11/2011

A5.13 Supply Schematic



A6 Albury Water Supply

A6.1 Overview

Description		Quantity
Population Served 2013 % of district served by community water supply		125 (estimated) 2%
Type of Supply		Restricted
Properties	Connected	
	restricted	
Water Source		Opawa River
History	Original scheme installed in	1971
Length of reticulation		110.2km
Number of valves		-
Number of hydrants		-
Number of pump stations		-
Storage		180m^3
Treatment	Treatment	Filtration
	Disinfection	None
Flow	Target level of service at point of supply	1,818 litres/day
Sustainability	Source Security	Unsecure
Financial	Funding	Targeted rate for community of benefit
	Annual maintenance cost (2015/16) % of District Water O&M	$********* ******%

A6.2 Key Issues for Service

Issues	Resolution
Ownership & compliance with the DWSNZ	Investigation of options (**IP 13**)

A6.3 Overview & History

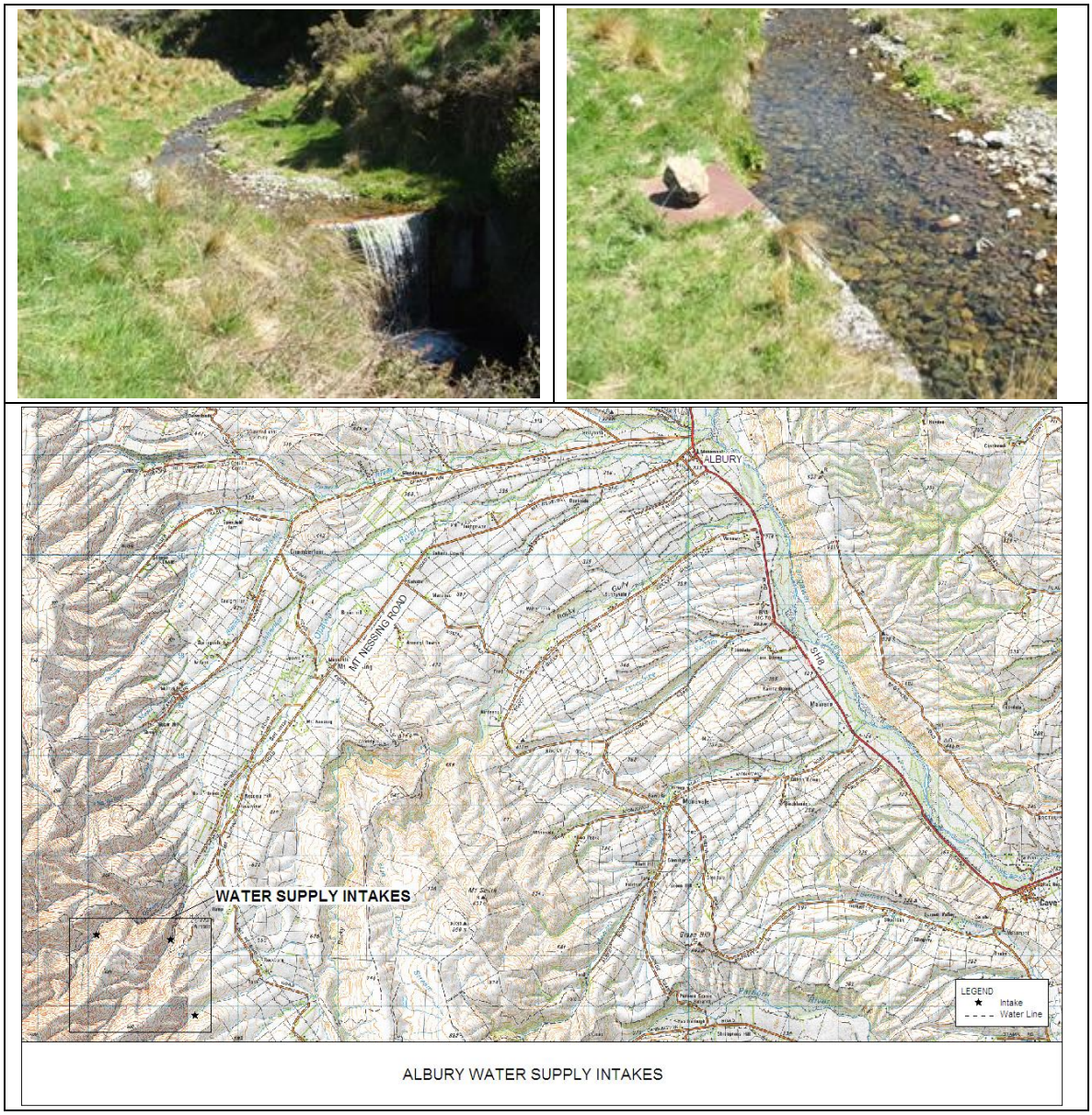
The scheme is owned by Mackenzie District Council but managed by the Albury Rural Water Supply Society Inc. The Council has a formal agreement with this group to control the direction of the scheme but the operation and management is all carried by that group. Data on upgrades and pipeline condition has not been supplied to Council for some years. As such little is known about the current condition of the scheme and the size of the asset. The society is aware of the requirement to meet the Drinking Water Standards. At the time of writing this Plan the Water Safety Plan have been submitted and being assessed by the DWA. The agreement between Council and the Society expired within the next year and Council are considering the way forward and all associated risks.

A6.4 Condition, Capacity, Performance & Criticality

A6.4.1 Source

The water source for this supply is from the headwaters of the Opawa River.

Figure 11-39: Albury Water Supply Source & Intake Structure



A6.4.2 Treatment Plant

The water supply is not disinfected and regularly returns a low E Coli count and as such the scheme has a permanent “Boil Water” notice in place. Water paces through a Rapid Sand Filter which is regularly back washed with un-filtered water.

Figure 11-40: Albury WS Treatment Plant

A6.4.3 Storage

The reservoir is a tank farm consisting of eight 22,500 litre concrete tanks.

Figure 11-41: Albury WS Storage Tanks

A6.4.4 Pump Stations

There are no pump stations within the Albury WS.

A6.4.5 Reticulation

Total length of reticulation = 110,158m.

The scheme was built in 1971 with various additions since. As such the pipework is generally in good condition.

A6.4.6 Fire fighting

The scheme has no fire fighting capability being mainly a small bore scheme. There are hydrants used only for scouring the line and drawing off small quantities of water

A6.5 Environmental Management

The following table list the resource consent associated with the Albury Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC990685	To divert water	20 January 2034	Not applicable
CRC990686	To take water for community water supply	20 January 2034	12.6 litres/second
CRC991431	To disturb, and place and maintain structures	20 January 2034	Not applicable
CRC991418	to discharge water	20 January 2034	Not applicable

A6.6 Water Quality

Fluoridation	Nil
Disinfection	None
Quality issues	The water supply is a surface take. The catchment above the intake has very low stocking rates therefore is not subject to significant contamination.

Appendix Table 16: Albury Sampling Locations

Scheme	Sampling Location
Albury WS	Unknown

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 and performed by the water operator, Albury Scheme Committee.

A6.7 Demand

The scheme is a restricted supply delivering 368 units with capacity of 616 units. Flow to each property is controlled by Marac flow controllers that deliver the nominated flow with an accuracy of +/- 10%.

A6.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The Albury Supply has not had a catchment risk assessment completed.

For Albury, the supply can be assessed as either a small supply against Section 10 of the DWSNZ or against Section 5 (the same as larger schemes). Section 5 indicates a protozoal removal requirement of Log 4. This could potentially be reduced to Log 3 if the supplies are designated small supplies and assessed against Section 10. A further option may be Section 12, “Rural Agricultural Drinking Water Supplies” which is still in the course of preparation. A Water Safety Plan was completed.

A6.9 Depreciation

The scheme does not fund depreciation on the network but relies on volunteers and user contributions when renewals or upgrades are required.

A6.10 Asset Details

There are no asset details within the asset register.

A6.11 Data Confidence

Appendix Table 17: Data Confidence

Scheme	Component	Intake	Pump Stations	Reservoirs	Reticulation
	Asset Attributes				
	Condition				
	Performance				

Where

Score	Description	Definition
1	Accurate	100%
2	Minor inaccuracies	± 5%
3	50% estimated	± 20%
4	Significant data estimated	± 30%
5	All data estimated	± 40%
X	No asset	

A6.12 Capital Projects

Appendix Table 18: Capital Projects

Name	Type	Value	When
WSP Review	Renewal	$3,000	2021/22
WSP Review	Renewal	$3,000	2026/27

A6.13 Supply Schematic