



Mackenzie District Council

Wastewater

Activity Management Plan

2021 - 2031



Quality Record Sheet

Mackenzie District Council Wastewater Activity Management Plan

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|----------------------------|------|--|
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| 1 | 2000 | Amp produced by Waugh Consulting |
| 2 | 2004 | Revision of first AMP by MDC |
| 3 | 2006 | Revision of AMP by MDC |
| 4 | 2013 | Full update by MDC |
| 5 | 2015 | Revision by MDC to incorporate 30 Year Strategy and Ecans Land and Water Plan |
| 6 | 2017 | General review using Waugh Template to incorporate recommendations from the 2015 IIMM Manual – MDC and Waugh's |
| 7 | 2018 | MDC staff with assistance from Waugh IML |
| 8 | 2021 | MDC staff with assistance from Waugh IML |
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1.0 OVERVIEW

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| WASTEWATER | The wastewater 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 wastewater system comprises pipes, pump stations, treatment facilities and other assets that represent a significant council investment over many years. |
| FOCUS | <p>New Capital and Growth – to improve wastewater treatment and disposal across the district and comply with the environmental compliance framework</p> <p>-to provide capacity to meet future demand and support the expansion of development areas as identified by Council.</p> <p>Renewals – implement renewals strategy; including condition and criticality assessments. Ensure appropriate budgets are available to replace aging and/or deteriorating assets.</p> <p>3 Waters Regulatory Framework – Continue to monitor and respond to the Government's new Water Regulatory Framework including but not limited to the following signals:</p> <ul style="list-style-type: none"> • New national standards for the treatment of wastewater and management of wastewater overflows • Nationally consistent monitoring and reporting requirements for wastewater and stormwater networks • minimising risks to public health and the environment, while meeting local community/iwi values <p>COVID 19 - Central Government's programme and funding package to provide immediate post COVID 19 stimulus to maintain and improve three waters infrastructure</p> |
| COMPLIANCE | Resource Consents - Council has a number of Wastewater related resource consents and aims to achieve compliance with all resource consent conditions. Regular compliance monitoring and reporting is undertaken |
| SERVICE DELIVERY | <p>Service Delivery - the Wastewater activity is delivered via a combination of in-house resources and contracted services including a major contract; for the operation and maintenance activities of wastewater reticulation and facilities</p> <p>Operation and maintenance costs will increase to ensure compliance with resource consents.</p> |
| PERFORMANCE | Performance - a comprehensive performance monitoring and reporting framework ensures that legislative requirements and other KPIs are regularly assessed and reported on. |
| RISK & RESILIENCE | <p>Understand our communities, the hazards and risks and acknowledge that failure will occur.</p> <p>Ensure early detection and recovery through connecting communities, supporting community organisations and robust infrastructure assets</p> <p>The ability to deliver capital projects on time may be affected by the increased consultation processes under Te Mana o te Wai requirements</p> |



2.0 EXECUTIVE SUMMARY

2.1 What are we doing

We protect public health and the environment by providing four wastewater systems that collect, treat and dispose of liquid waste to acceptable environmental standards. These wastewater systems are located at:

- Fairlie
- Lake Tekapo
- Twizel
- Burkes Pass

Council supports this service by:

- Providing, operating and maintaining wastewater infrastructure in compliance with New Zealand legislation, standards and resource consents
- 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. This includes identifying the need for wastewater services and either providing these directly or overseeing the service if it is provided by others. The Council sees the provision of reliable wastewater collection and treatment services to the community as a major contribution to the District's economy and to resident's wellbeing. The Local Government Act 2002 requires ongoing wastewater services unless specific approval is sought to withdraw from this.

Council's wastewater activity contributes primarily to the following community outcomes:

| Community outcome | How it contributes |
|-----------------------------------|---|
| Resilient, successful communities | Providing community reticulated wastewater systems in agreed areas thus protecting the communities from wastewater related health issues |
| | Providing a sustainable, efficient and effective wastewater service |
| A treasured environment | Providing a wastewater service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance |
| Strong and innovative economy | Timely response to system failures |
| | Maintaining quality and continuity of service |

Council has not found any significant negative effect that the wastewater activity may have on the well being of the community. However, negative effects include odour and sludge disposal from treatment plants. The wastewater network is operated under the resource consent framework which requires that any adverse environmental effects associated with the discharges be mitigated. Sludge disposal options will be investigated for treatment plant sludge. The quality of treated effluent is continually monitored and in compliance with environmental compliance conditions

2.3 Where are we headed?

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

- To ensure that Foul Sewer assets are managed to minimise damage and inconvenience to property and there are no environmental ill effects arising from Foul Sewer protection work

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

- Environmental compliance – Council operate the wastewater systems under resource consents granted by the Canterbury Regional Council (ECan). These consents apply to wastewater collection and discharge. These consents require significant sampling, monitoring, operation and maintenance methodologies and regular reporting.



- Increased community involvement through Te Mana o te Wai
- Separated wastewater and stormwater systems
 - Inflow – through illegal connections such as roof downpipes, yard drains, or indirect connections with stormwater pipes
 - Infiltration – through joints, cracks and misaligned pipelines
 - Exfiltration - escape of wastewater from the wastewater collection system into the surrounding soil via cracks or malfunctioning pipe joints
- Central Government's 3 Waters Reform Programme and funding package to provide immediate post COVID 19 stimulus to local authorities to maintain and improve three waters infrastructure.
- Central Government's 3Waters Review is considering
 - New national standards for the treatment of wastewater and management of wastewater overflows
 - New obligations on wastewater and stormwater network operators to implement a risk management plan
 - Nationally consistent monitoring and reporting requirements for wastewater and stormwater networks
 - Stronger Central Government oversight
 - Network operators to
 - adopt industry good practices and minimising risks to public health and the environment, while meeting local community/iwi values
 - implement a certified risk management plan that specifies how they will: –
 - Operate and maintain networks to meet current and future regulatory requirements; e.g. freshwater objectives and limits
 - Proactively manage risks to public health and environment
 - Address community and Māori cultural expectations for wastewater disposal
 - report on nationally prescribed environmental performance measures, and compliance with national standards
- Understanding network capacity and performance
- Ponds capacity and sludge management
- Increased focus on ageing and failing infrastructure
- Maintaining appropriate data and monitoring systems
- Ensure adequate in-house staff resource capacity and capability
- Investigating and implementing improved efficiencies
- Ongoing affordability of the wastewater system

The wastewater 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 wastewater network is in good condition and is maintained and renewed regularly, the service can be expected to last indefinitely, without any significant abnormal costs having to be incurred.

2.4 How will we get there?

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

- Continue to collect, treat, and dispose of wastewater
- Upgrade treatment facilities where required to comply with resource consent conditions
- Plan for future development and needs
- Consult with the community on issues such as health and legislative compliance issues

This vision is supported by a detailed wastewater asset management plan. Significant projects and their funding sources are summarised in the following table:



| Project Description | Priority Type | Amount (uninflated) | Amount (Inflated) | Year | Description of work |
|--|---------------|----------------------------|----------------------------|---------|--|
| Sewer Reticulation - new | LOS | <u>\$4,160,000</u> | <u>\$4,788,569</u> | 2021/29 | Renewals – refurbishment, replacement of pipes and equipment for wastewater systems is estimated to be \$4. the next 10 years. This includes the replacement of AC pi Twizel. |
| Pump Station Renewal | LOS | <u>\$300,000</u> | <u>\$300,000</u> | 2021/22 | Lakeside drive pump station upgrade to improve perform also deliver additional capacity |
| Treatment | Growth | <u>\$17,450,000</u> | <u>\$19,232,125</u> | 2021/26 | Disposal of effluent for the Tekapo treatment plant - Inve consider resolution options, updating resource conse implement and construct Station Bay subdivision triggered the need for an upgr requires extra storage added and pumps replaced |
| Upsize foul sewer - Fairlie Golf Course ¹ | LOS | <u>\$35,000</u> | <u>\$35,000</u> | 2021/22 | Upsize foul sewer - Fairlie Golf Course ¹ |
| Rising Main Mackenzie Park to Twizel WWTP – Design ¹ | Growth | <u>\$14,690</u> | <u>\$14,690</u> | 2021/22 | Connect Mackenzie Park PS to the treatment plant thro rising main |
| Rising Main Mackenzie Park to Twizel WWTP – Construct ¹ | Growth | <u>\$990,000</u> | <u>\$990,000</u> | 2021/22 | |
| Lakeside WW pump station - Design/Construct ¹ | Growth | <u>\$48,598</u> | <u>\$48,598</u> | 2021/22 | Station Bay subdivision triggered the need for an upgrade extra storage added and pumps replaced |
| Deer Fence ponds - Tekapo, Fairlie ¹ | LOS | <u>\$15,000</u> | <u>\$15,000</u> | 2021/22 | Deer Fence around ponds in Tekapo and Fairlie |
| Burkes Pass WWTP upgrade - install outlet flowmeter ¹ | LOS | <u>\$25,540</u> | <u>\$25,540</u> | 2021/22 | Investigate and consider options (aeration/additional pond |
| Burkes Pass WWTP upgrade – baffles ¹ | Growth | <u>\$50,000</u> | <u>\$50,000</u> | 2021/22 | Burkes Pass WWTP baffles installation |
| WWTP monitoring equip - design & install ¹ | LOS | <u>\$210,000</u> | <u>\$210,000</u> | 2021/22 | Upgrade / relocate equipment so that Council can get r updates of the condition of the oxidation ponds |
| WWTP Influent Screens Design - 3 Sites ¹ | LOS | <u>\$22,525</u> | <u>\$22,525</u> | 2021/22 | Milliscreen at intake to improve treatment |
| Connect Allandale Rd WW to Fairlie WW Network ¹ | LOS | <u>\$45,000</u> | <u>\$45,000</u> | 2021/22 | Connect Allandale Rd WW to Fairlie WW Network |
| Stimulus Package – Delivery | LOS | <u>\$62,722</u> | <u>\$62,722</u> | 2021/22 | Programme delivery of the three waters stimulus package |
| Total | | <u>\$23,429,075</u> | <u>\$25,839,769</u> | | |

¹Three Waters Reform Projects



Key projects:

- New rising main (Mackenzie Park to Treatment Plant)
- Tekapo effluent disposal investigation
- AC pipe replacement in Twizel (the start date for this project may be extended out depending on the results of the CCTV surveys to be undertaken in 2021)
- renewals – refurbishment, replacement of pipes and facilities equipment for wastewater systems is estimated to be \$4.8m over the next 10 years. All wastewater system renewal work will be funded by the annual depreciation provision where funds are available.

To ensure on-going affordability of the wastewater 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 New Zealand legislation and standards. Council will continue to report on the non financial performance measures, in accordance with 261B of the Local Government Act 2002, as this covers the key expectations in terms of the delivery of the service.

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

The linkage between community outcomes, 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 |
|-----------------------------------|---|---|--|
| Resilient, successful communities | Providing community reticulated wastewater systems in agreed areas thus protecting the communities from wastewater related health issues | Sewerage is managed to without risk to public health | Number of dry weather sewerage overflows |
| | Providing a sustainable, efficient and effective wastewater service | Safe discharge of wastewater | Compliance with resource consent conditions |
| A treasured environment | Providing a wastewater service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance | Sewage is able to be disposed of without significant disruption | Compliance with resource consent conditions Response & resolution |
| Strong and innovative economy | Timely response to system failures | Safe discharge of wastewater | Response & resolution |
| | Maintaining quality and continuity of service | | Wastewater complaints |

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

People –

The Essential Services Group has seven full time equivalent staff. The Essential Services Group provides management and engineering expertise to the Water, Wastewater, Stormwater and Roading activities. The 3Waters reform is likely to increase the work within the 3Waters area. 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 wastewater 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 four wastewater systems made up of collection, treatment and disposal systems. The collection systems consist of pipes, manholes and pump stations.

- Length of sewer mains 100km
- Number of pump stations 6
- Number of manholes 1,248

The latest valuation, July 2019, estimates the replacement value of the Treatment Plants, Pump Stations and Reticulation to be \$34.9m.

2.7 Who pays for it?

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

The New Zealand Government is undertaking a reform programme for "Three Waters" (drinking water, wastewater and stormwater) service delivery for communities (**Three Waters Reform Programme**). In conjunction with the Three Waters Reform Programme, the New Zealand Government is investing in water service delivery. The investment's objectives are to:

- improve the safety and quality of drinking water services, and the environmental performance of drinking water and wastewater systems, by maintaining, increasing or accelerating investment in core water infrastructure renewals and maintenance; and
- support New Zealand's economic recovery from the COVID-19 pandemic through job creation, by enabling investment to continue at a time when council revenues are uncertain, and they face immediate cashflow challenges.

The Council has accepted crown stimulus grant funding for projects as part of the Three Waters Services Reform. The crown has committed approximately \$500m nationwide in tranche 1, and the MDC allocation is \$5.111m, of which \$2.560m has already been received by MDC as an advance payment. These stimulus projects are in addition to current LTP projects already underway.

In year one a number of projects will be funded from this fund.



3.0 INTRODUCTION

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

3.1 Purpose

3.1.1 Purpose of this Asset Management Plan

The purpose of this AMP is to outline and summarise in a coordinated manner the Council's long-term asset management approach for the provision and intergenerational management of wastewater services 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 Local Government Act 2002 (and amendments), - 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 Wastewater system:

- to ensure that adequate public wastewater treatment and disposal systems are provided for all dwellings; and
- to provide and maintain reliable and affordable wastewater systems which protect public health, property, safety and the environment and which recognise cultural values, both now and in the future.

The Council's overriding goal is:

"The outcome desired by the community is to have safe, effective and sustainable water, waste 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 Local Government Act 2002 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 wide sweeping 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 Long Term Plan (LTP).



3.3 Links to MDC Vision, Mission, Goals and Objectives

OUR STRATEGIC VISION

Using our guiding values as a solid foundation whilst looking through the lens of our vision and mission statements, Mackenzie District Council along with the community, will work together to discover our southern cross stars, our community outcomes. We remain focussed on our community outcomes as our goal for our district and everything we do.

OUR COMMUNITY OUTCOMES

A TREASURED ENVIRONMENT

- We recognise that our outstanding environment plays a vital role in sustaining our district.
- We manage our environment and natural resources sustainably to ensure they can be enjoyed now and by future generations.
- We have sustainable, efficient and well-planned infrastructure, services and community facilities.

RESILIENT, SUCCESSFUL COMMUNITIES

- Our communities have access to facilities and networks which enable people to enjoy positive, healthy lifestyles.
- Our communities are engaged, connected and are given the opportunity to influence local outcomes and decisions.
- Our communities have a 'sense of place' that makes people proud to live here.
- Our communities are resilient and provide for inter-generational wellbeing through networks that care for all ages.

STRONG AND INNOVATIVE ECONOMY

- We value the role that our District's environmental, social and cultural assets play in supporting economic development.
- We are a welcoming, enabling and business friendly district that encourages creative local economic development.
- We recognise and manage the effects of economic growth and actively support our communities and environment while striving for prosperity.

EMBRACE HERITAGE AND DIVERSITY

- We embrace our partnership with ngā rūnanga and support mana whenua traditions and relationships with their ancestral lands, waterways, wahi tapu and other taonga.
- We are proud of and celebrate the heritage and diversity of our District and our people.
- We respect each other and what we contribute to the District through our traditions and culture.
- Our communities are given the opportunity to celebrate and explore their heritage, identity and creativity.

GUIDING VALUES

- Be fair to everyone
- Strive for a better future
- Dare to be different
- Act with respect and trust
- Protect our peace and serenity

VISION To empower our communities and treasure our environment

MISSION Strengthening our communities

MDC's outcomes and objectives for the wastewater network are stated in the LTP 2021 – 2031.



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 principle goal is to provide an effective, efficient, accountable and sustainable range of services that meet the actual needs of the residents. The foul sewer network provides the means to collect and convey sewage away from properties and dispose of it in an environmental and sustainable way.

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

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

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 Local Government Act requires Local Authorities to:

- prepare and adopt, every three years, a long term (10 years plus) financial strategy for all infrastructural assets which takes into account asset creation, realisation, and loss of asset service potential
- 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.

AMP's (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.

Changes to the Local Government Act 2002 during 2014 requires that a local authority must prepare and adopt, as part of its long term plan, an Infrastructure Strategy for a period of at least 30 consecutive financial years to guide decision-making for the next 30 years. This is detailed in 6.9.5 Council Strategies.



3.4.3 Environmental Responsibility

Asset Management (AM) Planning demonstrates how MDC 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 MDC'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

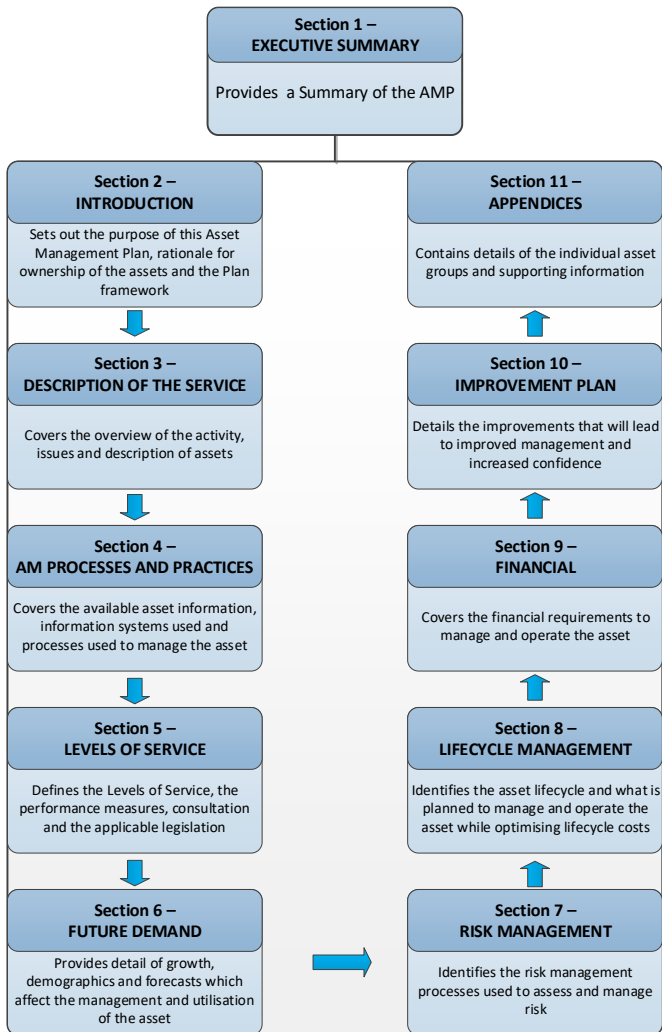
MDC has a strategic intent to “achieve sustainable development” and other goals relating to growth, building communities, protecting the environment, supporting the economy and providing quality customer service.

3.5 Plan Framework

The AMP structure is graphically represented below:



Figure 3-1: AMP Framework



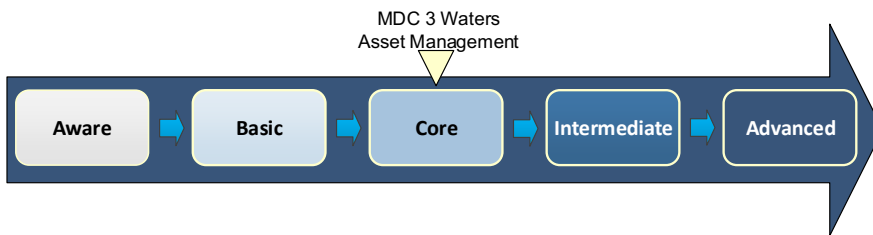
3.6 Appropriate Level of Asset Management

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.

MDC 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 Mackenzie District Council (hereafter council) is a local authority located in the middle of the New Zealand, South Island and covers 7,339 square kilometres.

Council is in many ways a typical example of the majority of its namesakes as a provider of “core” activities. Core activities are considered to be 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 three Water services as vital to maintaining the community's health and well-being.

The wastewater assets are fundamental to Council's statutory responsibilities and strategies for conserving public health in pursuit of its mission to enhance the quality of life of residents in the District.

Council owns 4 separate wastewater systems consisting of Fairlie, Tekapo, Twizel and Burkes Pass.

4.2 Description of Assets

Overall there are 93.4 kilometres of reticulation, 1,037 manholes, 6 pump stations and 4 treatment plants. The reticulation varies from 20mm to 375mm in diameter.

Total operating costs are estimated to be \$222,532 gradually increasing from 2021/22 over the ten years to \$416,127 in 2030/2031. Replacement value of treatment plants, pump stations and reticulation is approximately \$34,934,000 as at the July 2019 asset valuation.

| System | Population (UR) | Length of Reticulation (km) | Manholes | Pump Stations | Treatment Facility | Replacement Value |
|--------------|-----------------|-----------------------------|--------------|---------------|--------------------|---------------------|
| Fairlie | 693 | 12.9 | 104 | 1 | Oxidation ponds | |
| Lake Tekapo | 369 | 27.8 | 362 | 3 | Oxidation ponds | |
| Twizel | 1,137 | 64.8 | 554 | 2 | Oxidation ponds | |
| Burkes Pass | 30 | 1.6 | 17 | - | Oxidation pond | |
| Total | 2,229 | 107.1 | 1,037 | 6 | 4 | \$34,934,000 |

4.3 Key Issues

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

- Environmental compliance – Council operate the wastewater systems under resource consents granted by the Canterbury Regional Councils (ECan). These consents apply to wastewater collection and discharge. These consents require significant sampling, monitoring, operation and maintenance methodologies and regular reporting.



- Increased community involvement through Te Mana o te Wai
- Separated wastewater and stormwater systems
 - Inflow – through illegal connections such as roof downpipes, yard drains, or indirect connections with stormwater pipes
 - Infiltration – through joints, cracks and misaligned pipelines
 - Exfiltration - escape of wastewater from the wastewater collection system into the surrounding soil via cracks or malfunctioning pipe joints
- Central Government's 3 Waters Reform Programme and funding package to provide immediate post COVID 19 stimulus to local authorities to maintain and improve three waters infrastructure.
- Central Government's 3Waters Review is considering
 - New national standards for the treatment of wastewater and management of wastewater overflows
 - New obligations on wastewater and stormwater network operators to implement a risk management plan
 - Nationally consistent monitoring and reporting requirements for wastewater and stormwater networks
 - Stronger Central Government oversight
 - Network operators to
 - adopt industry good practices and minimising risks to public health and the environment, while meeting local community/iwi values
 - implement a certified risk management plan that specifies how they will: –
 - Operate and maintain networks to meet current and future regulatory requirements; e.g. freshwater objectives and limits
 - Proactively manage risks to public health and environment
 - Address community and Māori cultural expectations for wastewater disposal
 - report on nationally prescribed environmental performance measures, and compliance with national standards
- Understanding network capacity and performance
- Ponds capacity and sludge management
- Increased focus on ageing and failing infrastructure
 - Fat build up at pump stations
 - Sanitary products causing issues
- Maintaining appropriate data and monitoring systems
- Ensure adequate in-house staff resource capacity and capability
- Investigating and implementing improved efficiencies
- Ongoing affordability of the wastewater system

The following table lists the key issues associated with each individual wastewater system.

| Issues | Resolution |
|---------------------------------------|---|
| All Systems | |
| 3 Waters Reform | Collaborate with the Government and other local authorities in the region to consider future 3Waters service delivery arrangements |
| Sludge levels | Monitor, and desludge (Fairlie, Tekapo, Twizel programmed for 2021) |
| System capacities | Develop hydraulic model for each system to help identify problem areas through simulation and to evaluate the benefits of specific solutions. |
| Fairlie | |
| Dumping of septage | CCTV cameras at treatment plant |
| Consent compliance | Reduce high faecal count through improved treatment efficiency. Increased monitoring of DO, COD, BOD |
| Sludge levels | Milliscreen at intake to improve treatment |
| Lake Tekapo | |
| Disposal of effluent (consent limits) | Investigate, consider resolution options and implement. |

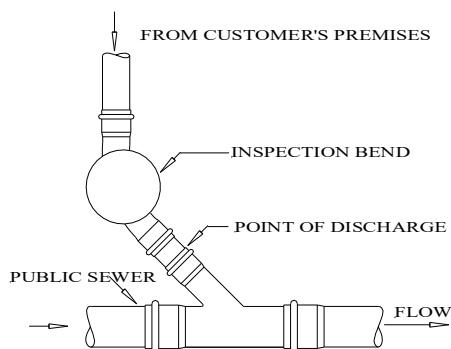


| Issues | Resolution |
|---|--|
| Capacity of Lakeside Drive Pump Station | Station Bay subdivision triggered the need for an upgrade and has extra storage added and pumps replaced |
| Twizel | |
| Dumping of septage | Review Wastewater Bylaw to provide mechanism to prosecute offenders |
| Condition of the AC pipe | Review CCTV and determine remaining useful life of the asset with a view to developing a replacement programme |
| Mackenzie Park Pump Station | Connect Mackenzie Park PS to the treatment plant through new rising main |
| Burkes Pass | |
| Consent compliance | High faecal count at discharge – investigate and consider options (aeration/additional pond) |

4.4 Wastewater Reticulation

The Council owns and maintains the wastewater network from the collector sewer mains to the treatment facility and disposal system. The "point of discharge" for the individual customer is where the property connection connects to the trunk main, not the property boundary.

Figure 4-1: Typical layout showing point of discharge



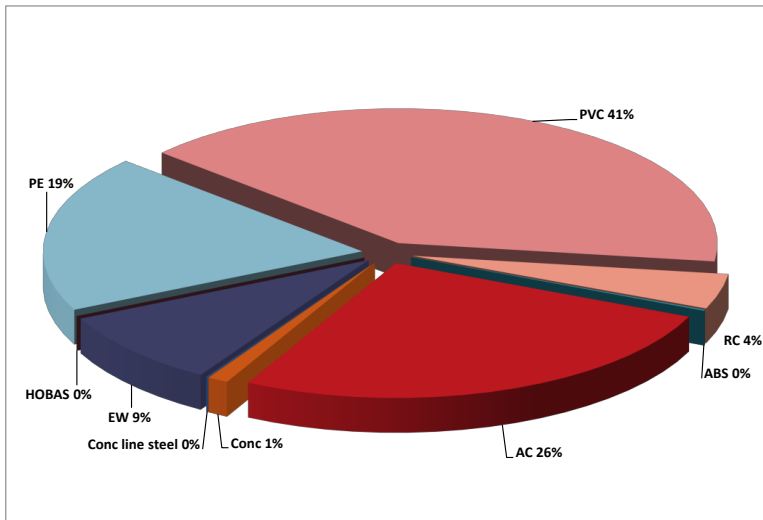
Once sewage leaves the household/private system it enters the public wastewater system. Flows are generally via gravity and pipes are normally only part full and have some air present.

The sewer reticulation consists of reticulation sewers, collector sewers and trunk mains, with manholes located throughout the reticulated system.

- Reticulation sewers are a network of pipes including property connections that receives wastewater from customer properties. Reticulation sewers are generally Ø150mm
- Trunk sewers connect to the reticulation sewers and transport the wastewater to the wastewater treatment plant. Trunk sewers are generally the largest pipes in the network

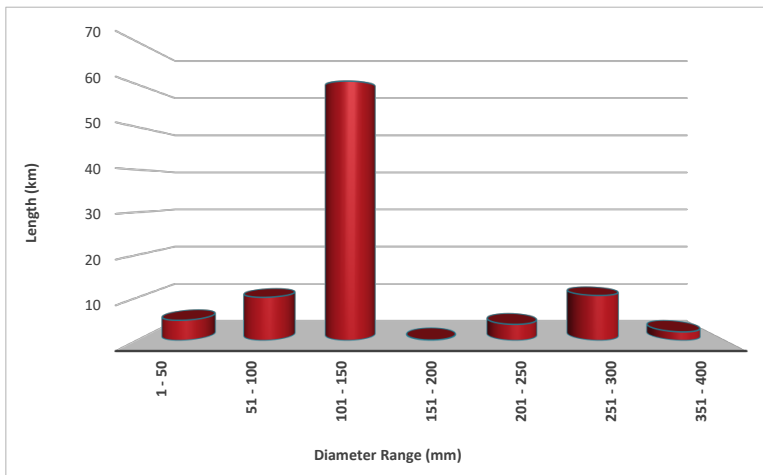


Figure 4-2: District wide Sewer main material distribution



86% of the reticulation consist of three materials - PVC 41%; AC 26%; and PE 19%. The remaining 14% consist of EW (9%), Concrete (5%); HOBAS; ABS & Concrete lined Steel

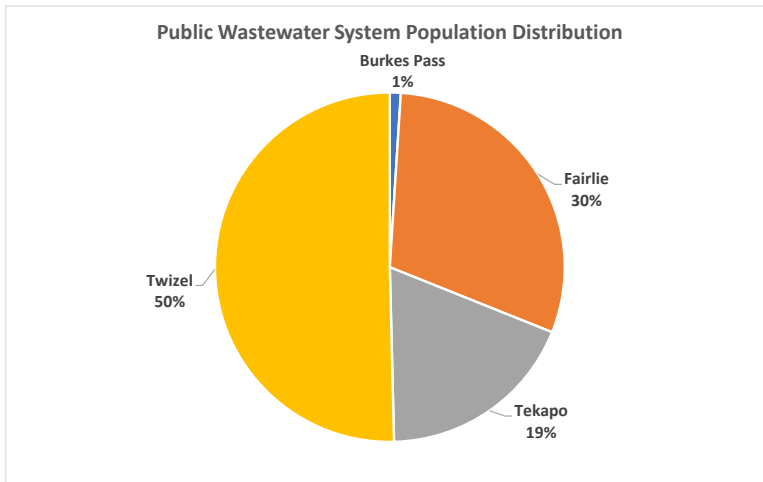
Figure 4-3: District wide sewer main size distribution



66% of the reticulation is 101-150mm diameter. 18% of the reticulation is greater than 150mm diameter.



Figure 4-4: District wide Public Wastewater System Population distribution



4.5 Manholes

A sewer manhole is a sewer access point with a removable cover which allows human and machine access to a (typically buried) sewer pipe.

The manhole provides several functions, such as to:

- conduct inspections
- connect two sewers when there is a change of grade or alignment or size
- provide a junction where two or more sewers meet

Manholes are usually constructed from reinforced concrete, either precast or formed in-situ. There are 846 manholes in the Council wastewater systems.

4.6 Pump Stations

A wastewater pump station is designed to pump wastewater from one location via a rising main to a remote location at a higher level.

Wastewater pump stations are an integral and vital component of the wastewater network. The integrity of the wastewater scheme is very dependent on the proper functioning of the wastewater pump stations where these exist. Failure of a pump station can potentially lead to wastewater overflows to land and natural waterways.

There are only wet well pump stations (no dry wells). The exact combination of components will vary from one pump station to another, but they are typically made up of the following basic components:

- Sump
- Intake pipe work
- Pumps
- Discharge manifold & pipework
- Emergency storage tanks (overflow mitigation)

The rising main is not seen as part of the pump station, but has a significant effect on the performance of the pump and therefore designed in conjunction with the pump station.



There are 6 pump stations within the Council wastewater systems.

4.7 Wastewater Treatment Plants

A Wastewater Treatment Plant is a facility for treating wastewater (sewage). The wastewater treatment plants form an integral part and very important function in the wastewater system. Failure to treat the wastewater adequately will result in environmental contamination and associated public health risks.

The Mackenzie district wastewater treatment plants primarily treat domestic wastewater as there are no large industries contributing high contaminant loads to the wastewater system. The systems range from a basic oxidation pond to primary, secondary and tertiary treatment (pond systems).

Council has continued to maintain its wastewater treatment plants to a high standard and in good conditions with ongoing maintenance. There is a detailed discussion of the treatment system under each scheme.

4.7.1 Discharge/Disposal

An important aspect of the wastewater treatment plant is to ensure that the district's natural water sources are managed responsibly. Resource consents are held for the various activities relating to the wastewater activity such as treatment (including odour) and the disposal of treated wastewater at the wastewater treatment plants.

Discharge/disposal is to land. The resource consent conditions set out the sampling locations and frequency and water quality parameters required.

4.8 Buildings

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

There are no above ground buildings within the wastewater system. Usually 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.

4.9 Critical Assets

Council engineers have not performed a documented formal criticality assessment of the infrastructure. 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).

In the absence of a formal criticality assessment Council's approach in the wastewater activity is based on the following methodology:

Table 1 Critical asset assessment approach

| Criticality Category | Condition Assessments | Renewal |
|--|---|--|
| Critical Assets trunk mains, rising mains and large diameter mains supplying significant areas | Condition assessments performed during connections and pipe repairs. Detailed analysis obtained as deemed necessary | Renewal timing based on conservative base live and actual condition assessments of asset and estimated future deterioration. |



| or key industries or businesses/customers | | |
|---|--|---|
| Non-Critical Assets – distribution network of smaller diameter mains and property laterals | Sample inspections of material types and age bands during connections and pipe repairs. Greater proportion for assets nearing end of base life. Inspections of assets associated with major roading asset renewals to confirm condition. | Generally “run to failure” with renewals on a reactive basis. |

A number of aspects could be considered in identifying those assets that are critical including but not limited to:

- Location of asset, e.g. State Highway
- Asset type, e.g. treatment plant and pump stations
- Network configuration, e.g. single main servicing large area
- Customer type, e.g. Central Business District, Medical facilities, Rest Homes.



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 MDC organisation structure and Group structure is shown below.

Figure 5-1: MDC Organisation Structure

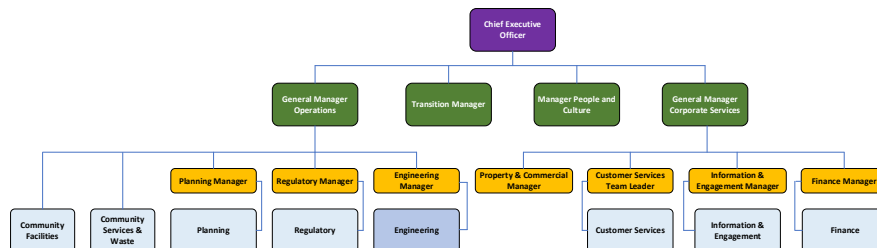
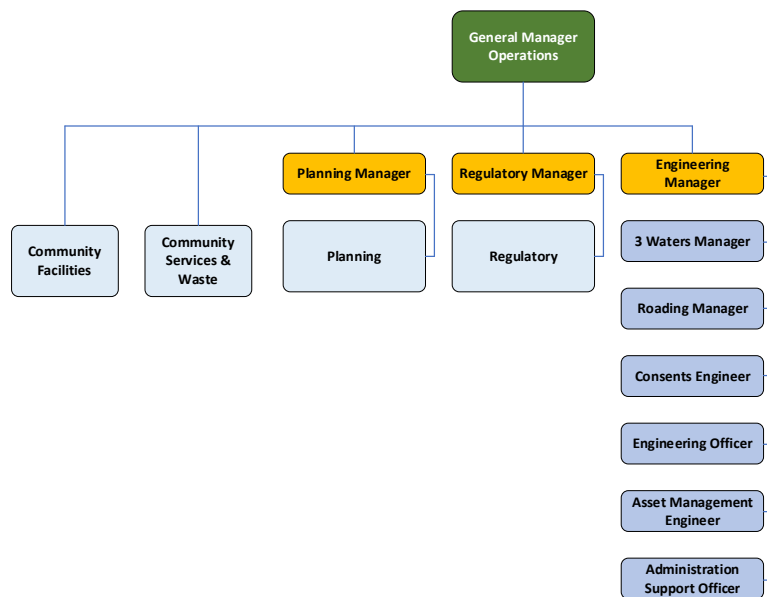


Figure 5-2: Essential Services Group Structure



MDC has an Engineering Manager, 3 Waters Manager and an Asset Management Engineer 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 3 Waters 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.



MDC 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.

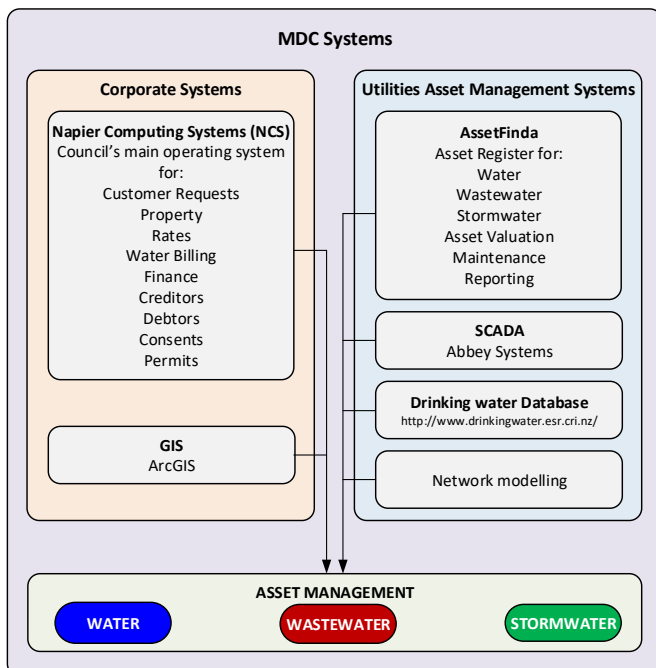
All contract works are claimed monthly against each of the contract item numbers by the physical works and professional services contractors. MDC and/or consultants confirm the payment value for all physical works and the MDC confirms the payment of any professional services. The accounts job number and account codes are included on the payment certificate. These certificates are forwarded to MDC 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 MDC staff are shown below and discussed within this section.

Figure 5-3: MDC 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 wastewater 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 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
- Stormwater
- Wastewater
- Parks (to be added)
- Buildings (to be added)

The Asset Register contained within AssetFinda/ArcGIS 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 has progressively rolled 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.



Table 5-1: SCADA

| SCHEME | FACILITY | METER | SCADA REPORT | | | | | | | | | | | | | ALARMING | | |
|-------------|-------------------|-------|-----------------|------------|----|---------|---------------|-----------------|------------------|------|---------|------------------|----|------------------|--------------------|------------|-----------------|----------------|
| | | | Pump Start/Stop | Pump hours | kW | Current | Power failure | Actuated Valves | Level (high/low) | Flow | Aerator | Pond Temperature | pH | Dissolved Oxygen | Intruder/ Operator | Rain gauge | Outgoing alarms | Flashing Light |
| Fairlie | Camp Ground PS | | ✓ | ✓ | | | | | | | | | | | | | ✓ | |
| | Treatment | ✓ | | | | | | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ | |
| Lake Tekapo | Lakeside PS | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| | Domain PS | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| | Sealy Street PS | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| | Treatment | ✓ | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | |
| Twizel | Mackenzie Park PS | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| | Pukaki Airport PS | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| | Treatment | ✓ | | | | | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| Burkes Pass | Treatment | | | | | | | | | | | | | | | | | |



5.2.3 Network Modelling

Network modelling is an effective tool to assist in the managing a wastewater reticulation network. Network modelling software aids Council staff in effectively managing the wastewater collection system through simulation of the existing and future networks. There are currently no models for any of the wastewater systems. Models are to be developed for the wastewater systems as part of the Stimulus package funding from central government as part of the 3 waters reform (IP 2), with Twizel the highest priority.

5.3 Data Management

Key information comes into the Essential Services 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 service requests 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 MDCs systems on a regular basis.

New subdivisions in the District result in additions to the pipeline infrastructure. Processes are in place to ensure that this data is provided electronically so that it can easily be recorded in the Asset Register and available for ongoing effective Asset management. Developers and consultants are required to supply accurate as-built information in appropriate form prior to a Section 224 Certificate being issued.

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. Since the last independent data confidence review there has been a significant improvement in base asset information. An independent assessment was recently undertaken to reassess the data confidence grades of the AssetFinda register would be of value to determine the improvement opportunities prior to the next LTP. An in-house assessment showed an improvement to the data confidence ratings from previous years but the table below reflects the data confidence status at the last independent review (2019). 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 | Wastewater |
|----------------------------|------------|
| Asset register or database | G |
| Attribute details | G |
| Asset category | G |
| Optimisation information | A |
| Useful lives information | G |
| Unit rates | G |



In general, there is a relatively high understanding of the conditions of three waters assets. However, the Council are, through the Three Waters Stimulus Funding, are undertaking a full CCTV assessment of its wastewater network which will allow for a much better understanding of condition of these pipes and their expected lifespan. This is further detailed below.

5.4.1 CCTV Inspections

The aim of asset management is to manage assets, such as sewer systems, in a way that provides the required level of service in the most cost-effective manner through the creation, operation, maintenance, renewal and disposal of assets to provide for existing and future customers.

CCTV inspections can help organisations gain an understanding of the existing condition of their piped assets. This understanding can help organisations make decisions such as which pipelines are:

- Undersized and need to be upsized to meet future flows.
- In risk of collapse.
- In need of maintenance works such, as root cutting or fat build up

Council is then able to prioritise works and prepare a timetable and budget for any required rehabilitation works. Pipelines are regularly internally inspected by CCTV.

Reasons for CCTV inspections include, but not limited to:

- General condition surveys to determine the areas in pipe networks that require attention and to develop long-term programmes for replacement and maintenance of the network.
- Responsive maintenance, e.g. to identify and repair faults in pipes that have caused overflows or flooding.
- Determination of rehabilitation requirements, e.g. to determine which pipes need to be lined to prevent too much water entering into the system. This can result in the pipes not having enough capacity to cope with the flow, thus causing overflows.
- Quality checks on new works or after the rehabilitation of pipes.

A CCTV inspection provides information for asset management, maintenance and rehabilitation purposes. CCTV inspections view the condition of assets, and provide information on attributes. Condition data can be used to:

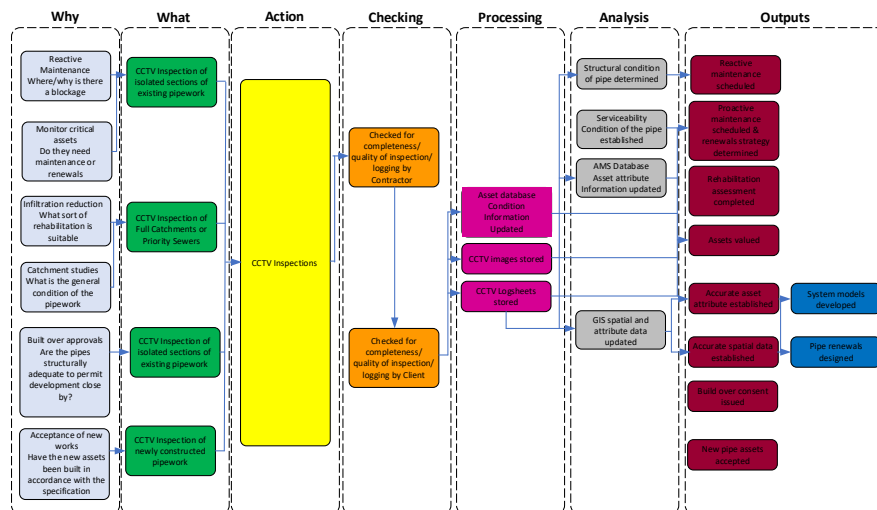
- Determine the structural condition of pipes to enable rehabilitation works to be prioritised.
- Maintain a check on the structural condition and rate of deterioration of pipes to enable forward budgeting for maintenance and rehabilitation.
- Provide an overall inventory of the asset and a global picture of system problems.
- Check service conditions to enable regular maintenance planning.
- Provide miscellaneous information for additional uses, such as locating unused lateral connections for new housing developments.
- Provide a status of sewer systems for industry benchmarking.

CCTV inspections also provide valuable information on the position and type/size of the pipes being inspected, such as:

- Connectivity, i.e. which manholes are connected by the pipe.
- The location of pipes and manholes can be determined by the length of the pipe surveyed and the position of the manholes noted when the CCTV camera was put into or retrieved from the pipe.
- The diameter of the pipe being inspected.
- The material of the pipe being inspected.



Figure 5-4: The CCTV Process



5.5 Information Technology

The responsibility for asset information security rests with the IT department administrators. The data is held in the 'cloud', remote data servers.

5.6 AMP Preparation

In preparation of the 2018- 28 LTP period Council engaged Waugh Infrastructure Management Ltd (WIML) to assist with the review and update of the 3 Waters AMPs. This resulted in significant changes to the 3Waters AMP documents. The 2020 updates, a collaborative effort by MDC staff and WIML staff, did not result in significant changes to document templates and content, but mainly focussed on aligning the content with:

- Government and industry direction
- general industry practice
- all 3 Waters 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 asset management planning processes occurring for each activity
- 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 Local Government Act requires that independent annual financial audits be undertaken on the operations of Council; such audits may include all significant activities such as asset 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 capture data on site and submit hard copy records to the 3 Waters Manager for updating the asset registers. Only two staff members have the ability to change asset data, the 3 Waters Manager and the GIS officer.

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. pump stations), 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

During 2020 Council tendered and awarded the operation and maintenance works with contract term of 5-years plus a 5-years right of renewal. 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

Although there are no documented project management procedures for MDC and consultants, there is confidence that suitable procedures are used during the project evaluation and design phase. 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 MDC is considered to be adequate. The Consents Engineer monitors sub-divisional developments to ensure works and assets to be vested to Council are to Council specifications and standards.

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 Mackenzie District 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 staff has a reasonable record of attendance at these seminars, conferences and workshops. Council engineering staff has the qualifications, skills and experience that are adequate and appropriate for carrying out the asset management function of the MDC, provided specialised external support is available as the need arises.

5.7.10 Skills

The Havelock North Water Inquiry observed that there should be a fundamental review of training in the water industry, with the recognition that the current content of existing qualifications needing to be updated but concluded that curricula and content of training courses were beyond the scope of the Inquiry and will need to be considered in detail by Government in due course.

Training programs should encourage employees to communicate and think critically about the operational aspects of their work.

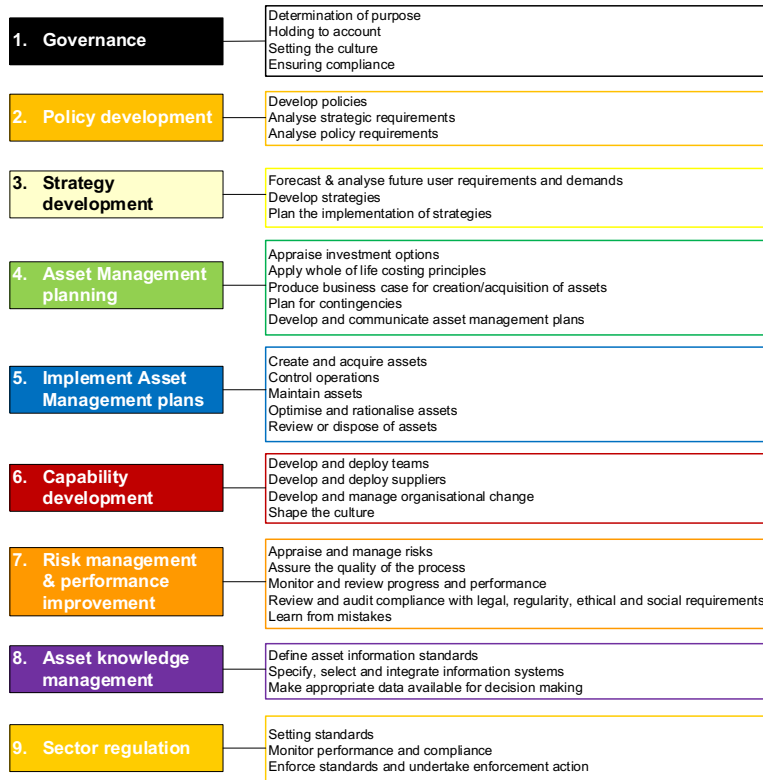
During 2020 Water New Zealand released its draft Competency Framework which describes what people should be able to do and what they need to know to competently undertake their work. The Competency Framework use treatment operator roles, the people who operate, monitor and maintain water and wastewater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

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

The Competency Framework identifies nine areas as shown below.



Figure 5-5: WaterNZ Competency Framework



(Source: Water NZ – Competency Framework)

Council will monitor the development in this area and expect that any future competency requirements may be part of the future regulatory framework.

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 holistic approach to 3Waters management including improved management of water resources. Regional Councils are increasing water take/discharge consent conditions to encompass sustainable use of water. Increasing conditions will lead to a need for investment in additional infrastructure.

The Havelock North Water incident provided the catalyst for the Three Waters Review which resulted in the establishment of a Water Regulator and a Water Services Act. Regulatory coverage will extend to all water suppliers, except individual household self-suppliers. It will also include a multi-barrier approach to drinking water safety, including mandatory disinfection of water supplies, stronger obligations on water suppliers and local authorities to manage risks to sources of drinking water; and strengthened compliance, monitoring and enforcement of drinking water regulation. Furthermore,



Central Government have also signalled through its 'Action for Healthy Waterways' discussion document improved stewardship of wastewater and stormwater services, with Risk Management Plans for wastewater and stormwater networks a likely outcome. This has renewed the focus on the very high standard of care and diligence required to supply drinking water and collect, treat and discharge wastewater and stormwater. A significantly more holistic approach to 3 Waters management is dawning.

The LGA 2002 requires Local Authorities to take a sustainable development approach while conducting its business. 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. In managing, operating and maintaining water supplies Council would like to do this to a level of excellence. However, this is not sustainable and all water supplies are managed, operated and maintained to an optimum level appropriate for that specific wastewater system 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
- Discharges 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. Council collaborated with neighbouring district councils in response to the Government 3 Waters Review.



5.8.3 Significant Negative Effects

The negative effects that the wastewater activity may have on the social, economic, environmental or cultural well-being of the community is tabled below. It indicates how the existing approach or proposed action to address these in the future.

Table 5-3: Significant Negative Effects

| Negative Effect | Impact on well-being | | | | Comment |
|---|----------------------|----------|---------------|----------|--|
| | Economic | Social | Environmental | Cultural | |
| Wastewater Treatment Plants | | | | | |
| Noise | None | None | None | None | Plants are generally outside or on the boundary of urban areas and generally don't have noise producing plant |
| Discharge of odour | Minor | Moderate | Minor | Minor | A high degree of odour control is provided |
| Discharge of treated wastewater to water/land | Minor | Moderate | Minor | Minor | Ongoing maintenance and operation of wastewater treatment plants and upgrade where required to meet increased consent conditions and ensure compliance with resource consents. All discharge is to land. |
| Pump Stations | | | | | |
| Noise | Minor | None | Minor | None | All pumps are contained within structures with appropriate sound proofing where required |
| Discharge of odour | Minor | Minor | Minor | Minor | Where reported, it is resolved within specific contract timeframes |
| Overflows | Moderate | Moderate | Minor | Minor | Pump station overflows are rare and resolved within specific contract timeframes. Emergency storage exist at all wastewater pump stations |
| Reticulation | | | | | |
| Overflows | Moderate | Moderate | Moderate | Moderate | Reticulation overflows are rare and resolved within specific contract timeframes. |
| Discharge of odour | Minor | Minor | Minor | Minor | Where reported, it is resolved within specific contract timeframes |

There are no significant negative effects shown to occur for the wastewater activity.

5.9 Environmental Management

A very important aspect of the wastewater systems function is to ensure that the District's natural water sources are managed responsibly. Resource consents are held for various activities relating to the wastewater activity such as the disposal of treated water at the water treatment plants.

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



5.9.1 Schedule of Resource Consents

The following table lists the wastewater resource consents that are presently held:

| System | Consent # | Description | Expiry Date | Allowable discharge |
|-------------|-------------|-------------------------|------------------|--|
| Fairlie | CRC992647 | Discharge odour to air | 17 December 2038 | Not applicable |
| | CRC992608.1 | Discharge to land | 17 December 2038 | 650m ³ /day (average) |
| Lake Tekapo | CRC042914 | Discharge to land | 17 December 2038 | 1,100m ³ /day (monthly mean) inflow |
| Twizel | CRC172311 | Discharge to land & air | 11 April 2053 | 1,500m ³ /day (average) |
| Burkes Pass | CRC992607 | Discharge to land | 7 June 2040 | 8.1m ³ /day |

Discharge permits are required for the discharge of treated effluent to land or water, and the discharge of odours associated with wastewater treatment plants. There are no resource consents which will expire during the term of this Plan.

5.9.2 Consent Monitoring and Reporting

Consent reporting within MDC for Water, Wastewater and Stormwater is the responsibility of the Utilities Manager. The 3 Waters Manager collate all relevant information aligned with resource consent conditions and report annually to Environment Canterbury.

The resource consent compliance for wastewater systems is considered to be moderate as there has been no abatement notices, but minor non-compliance issues with all wastewater treatment plants. There has been continued increase in environmental standards and Council engineers are working with ECan staff to find suitable resolution for non-compliance issues.

5.10 Climate Change

Climate change is an important consideration in the Council's long-term planning. Guidance from the New Zealand government, based on the best available climate science is used to support the planning. The Ministry for the Environment information on <https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/how-could-climate-change-affect-my-region/Canterbury> provides a summary of projected climate changes over the period 2031-2050 and 2081-2100, compared with 1986-2005 and the key impacts this is likely to have.

Temperature - Compared to 1995, temperatures are likely to be 0.7°C to 1.0°C warmer by 2040 and 0.7°C to 3.0°C warmer by 2090.

By 2090, Canterbury is projected to have from 6 to 35 extra days per year where maximum temperatures exceed 25°C and the number of frosts could decrease by around 13 to 38 per year.

Rainfall will vary locally within the region. The largest changes in rainfall are likely to be for particular seasons rather than annually.

By 2090, winter rainfall is projected to decrease by up to 12 per cent in Christchurch and up to 10 per cent in Hanmer, but increase by 6 to 28 per cent in Tekapo.

According to these latest projections, the frequency of extreme rainy days in the Canterbury region is not projected to significantly change as a result of climate change. Under the highest emissions scenario, there is likely to be a small increase in frequency by 2090.

Snowfall - The Canterbury region will likely experience significant decreases in seasonal snow. By 2090 the number of snow days is projected to decrease by up to 30 days per year. The duration of snow cover is also likely to decrease, particularly at lower elevations.



Less winter snowfall and an earlier spring melt may cause marked changes in the annual cycle of river flow in the regions. Places that currently receive snow are likely to see increasing rainfall as snowlines rise to higher elevations due to rising temperatures. So for rivers where the winter precipitation currently falls mainly as snow and is stored until the snowmelt season, there is the possibility of larger winter floods.

Wind - The frequency of extremely windy days in Canterbury by 2090 is likely to increase by between 2 and 10 per cent. Changes in wind direction may lead to an increase in the frequency of westerly winds over the South Island, particularly in winter and spring.

For Canterbury/Mackenzie this means:

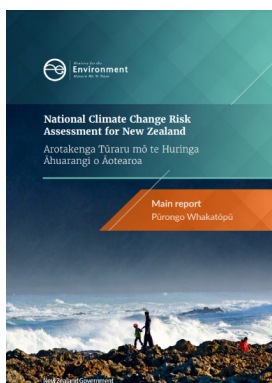
Water shortages – Higher temperatures, less rainfall and greater evapotranspiration are likely to cause increasing pressure on water resources, particularly in North Canterbury. Droughts are likely to become more frequent and more extreme.

Fire risk – Strong winds, combined with high temperatures, low humidity and seasonal drought may result in an increased fire risk in some areas (such as Christchurch, Kaikoura, and Darfield). The length of the fire season is expected to increase.

Biosecurity – Climate change could increase the spread of pests and weeds.

Agriculture – Warmer temperatures, a longer growing season and fewer frosts could provide opportunities to grow new crops. Farmers might also benefit from faster growth of pasture and better crop growing conditions. However, these benefits may be limited by negative effects of climate change such as prolonged drought, increased flood risk, and greater frequency and intensity of storms. There is also likely to be increasing pressure on water resources.

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



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

What this means for wastewater systems

Extreme rainfall events can overwhelm wastewater systems and can restrict maintenance access routes (e.g. manhole covers and pump stations) needed to restore service. Although unlikely, there is potential for drought to disrupt gravity-fed wastewater systems by slowing overall flow and allowing solids to accumulate at pipe joints, leading to blocked pipes and subsequent breaches.

Higher temperatures may affect pond performance.

The Council will factor these key likely impacts into the planning for our infrastructure assets. It is expected that more information will be provided by Central Government to assist and guide local government in its decision making



6.0 LEVELS OF SERVICE

6.1 Defining the Levels of Service

Asset 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 MDC levels of service for wastewater services 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 MDC 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, Local Government Act)
- Demands on the Network: Service demands that are placed on the network.

6.2 Activity Goals and Objectives

The wastewater 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 wastewater infrastructural assets.

6.2.1 Organisation Mission, Goals and Objectives

During 2020 Council developed a new vision statement, mission statement, supporting value statements and community outcomes. These are shown in the diagram below:



Mackenzie District Council

Vision: Empower our communities and treasure our environment

Mission: Strengthening our communities

VALUES

- Be fair to everyone
- Strive for a better future
- Dare to be different
- Act with respect and trust
- Protect our peace and serenity

COMMUNITY OUTCOMES

A TREASURED ENVIRONMENT

- We recognise that our outstanding environment plays a vital role in sustaining our district.
- We manage our environment and natural resources sustainably to ensure they can be enjoyed now and by future generations.
- We have sustainable, efficient and well-planned infrastructure, services and community facilities.

STRONG AND INNOVATIVE ECONOMY

- We value the role that our District's environmental, social and cultural assets play in supporting economic development.
- We are a welcoming, enabling and business friendly district that encourages creative local economic development.
- We recognise and manage the effects of economic growth and actively support our communities and environment while striving for prosperity.

RESILIENT, SUCCESSFUL COMMUNITIES

- Our communities have access to facilities and networks which enable people to enjoy positive, healthy lifestyles.
- Our communities are resilient and provide for inter-generational wellbeing through networks that care for all ages.
- Our communities have a 'sense of place' that makes people proud to live here.
- Our communities are engaged, connected and are given the opportunity to influence local outcomes and decisions.

EMBRACE HERITAGE AND DIVERSITY

- We embrace our partnership with ngā rūnanga and support mana whenua traditions and relationships with their ancestral lands, waterways, wahi tapu and other taonga.
- We respect each other and what we contribute to the District through our traditions and culture.
- We are proud of and celebrate the heritage and diversity of our District and our people.
- Our communities are given the opportunity to celebrate and explore their heritage, identity and creativity.

6.2.2 Foul Sewer Activity Goal and Principal Objectives

As outlined in Council's Long Term Plan (LTP), the sewerage asset contribution to achieving Council's governance goal and the community outcomes identified in Section 2 is through the Wastewater Activity Goal:

To ensure that Foul Sewer assets are managed to measures minimise damage and inconvenience to property and there are no environmental ill effects arising from Foul Sewer protection work.



The specific Objectives of the Foul Sewer activity are as follows:

- To develop and activity management plan for effluent disposal;
- To contract cost effective service delivery;
- To identify and prioritise key areas for network improvements and progressively correct these;
- To ensure all resource consents conditions are met; and
- 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

6.3 Current Levels of Service

Levels of Service:

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

In providing wastewater 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 levels of service that Council is aiming to achieve in future are shown in Table 6-1: Community Outcomes & Levels of Service linkage.

- It should be noted that the target Levels of Service 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

In 2010 the LGA 2002 was amended, requiring local authorities to use 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. The non financial performance measures came into force on 30 July 2014. Local authorities are now required to incorporate the performance measures in the development of their new 2015-2025 long-term plans. The performance measures was reported against for the first time in the 2015/2016 annual reports.

The 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 Local Government Act 2002, Non Financial Performance Measures were adopted on 12 November 2013. These Performance Measures 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.

Council have developed their own Levels of Service and associated Performance Measures in the past, but in light of the Non-Financial Performance Measures Rules 2013 Council will only use the Levels of Service 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.



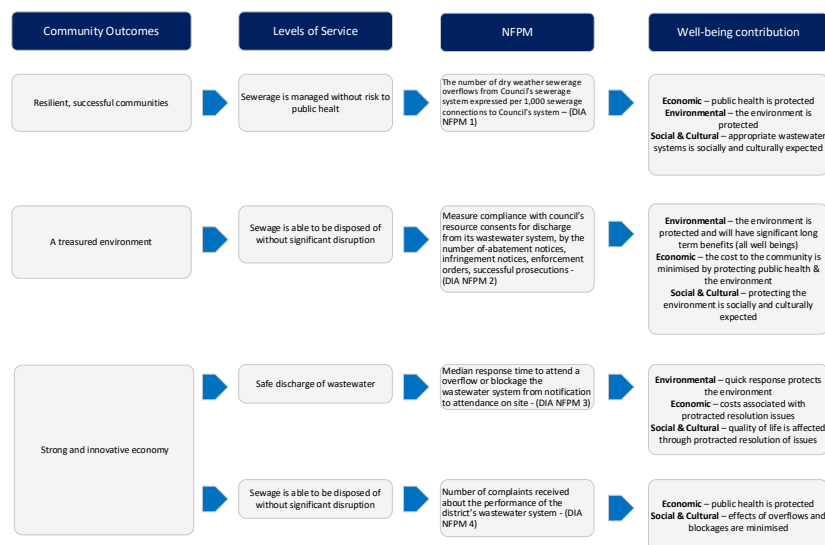
6.3.2 Levels of Service

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

| Community outcome | How it contributes | Level of Service | Performance Measure |
|-----------------------------------|---|---|--|
| Resilient, successful communities | Providing community reticulated wastewater systems in agreed areas thus protecting the communities from wastewater related health issues | Sewerage is managed to without risk to public health | Number of dry weather sewerage overflows |
| | Providing a sustainable, efficient and effective wastewater service | Safe discharge of wastewater | Compliance with resource consent conditions |
| A treasured environment | Providing a wastewater service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance | Sewage is able to be disposed of without significant disruption | Compliance with resource consent conditions Response & resolution |
| Strong and innovative economy | Timely response to system failures | Safe discharge of wastewater | Response & resolution |
| | Maintaining quality and continuity of service | | Wastewater complaints |

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

The figure below demonstrates the sewer activity contribution to the four well-beings.



This is a preliminary assessment and Council will further develop these contributions to the four well-beings in alignment with national guidance

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 Complete administration functions in a timely manner |
| Response Time | Faults with potential to cause disruption of service – two working days Blockage in Public Sewer and Other Emergency Repairs: <ul style="list-style-type: none"> During working hours - The service to be reinstated by temporary or permanent repairs within six hours of call out Outside working hours - The service to be reinstated by temporary or permanent repairs within nine hours of call out |
| Availability/Disruption to Service | Maximum duration of one disruption - 24 hours Normal duration of one disruption - eight hours <i>(It should be noted the above duration would not apply for an extraordinary event such as a major earthquake or flood)</i> |

MDC 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 sewerage facilities function satisfactorily | Sewerage facilities, such as: -Pipelines -Manholes -Pump Stations -Treatment Facilities -Disposal systems | Visual inspection DO Monitoring | Pump station failures Treatment plant faults Repairs to breakages or blockages affecting the system's operation Repairs to damaged pipes and manholes not critical to the system's operations Notified requests to check screens, and stormwater outlets in event of heavy rain warnings New service connection | 1 hour 1 hour 1 hour 5 working days 2 hours 10 working days |

6.4 Levels of Service Development

The current LOS being provided has been established through 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:

- 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)
- 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
- 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 wastewater 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

Council has suite of performance measures agreed with the community and 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. However Central Government introduced a suite of mandatory performance measures covering Transportation, Three Waters and Flood Control that came into force on 1 July 2014.

These mandatory performance measures have been adopted by Council for inclusion in the 2021-31 Long Term Plan and no other measures will be used.


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

| What you can expect from us | What we will measure | Latest result (2019/20) | Targets: | | | |
|---|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | | | 2021/22 | 2022/23 | 2023/24 | By 2030/31 |
| Wastewater | | | | | | |
| Maintain excellent sewer network services | The number of dry weather sewerage overflows from Council’s sewerage system, expressed per 1,000 sewerage connections to that sewerage system* | 3.11 per 1,000 connected properties | ≤ 2 per 1,000 connected properties | ≤ 2 per 1,000 connected properties | ≤ 2 per 1,000 connected properties | ≤ 2 per 1,000 connected properties |
| Wastewater is discharged in a safe manner | Compliance with the Council's resource consents for discharge from its sewerage system measured by the number of: | | | | | |
| | a) attendance for urgent call- outs | Nil | Nil | Nil | Nil | Nil |
| | b) resolution of urgent call-outs | Nil | Nil | Nil | Nil | Nil |
| | c) attendance for non-urgent call-outs | Nil | Nil | Nil | Nil | Nil |
| | d) resolution of non-urgent call- outs | Nil | Nil | Nil | Nil | Nil |
| | received by the Council in relation those resource consents* | | | | | |
| Maintain excellent customer services | Where the Council attends to sewerage overflows resulting from a blockage or other fault in the Council’s sewerage system, the following median response times measured:* | | | | | |
| | a) attendance time | 2.75h | ≤ 1h | ≤ 1h | ≤ 1h | ≤ 1h |
| | b) resolution time | 2.5h | ≤ 4h | ≤ 4h | ≤ 4h | ≤ 4h |
| | The total number of complaints received about any of the following:* | 9.4 per 1,000 connected properties | ≤ 50 per 1,000 connected properties | ≤ 50 per 1,000 connected properties | ≤ 50 per 1,000 connected properties | ≤ 50 per 1,000 connected properties |
| | a) sewage odour | | | | | |
| | b) sewerage system faults | | | | | |
| c) sewerage system blockages, and | | | | | | |
| d) MDC response to issues with its wastewater system. | | | | | | |
| | Satisfaction with wastewater treatment and disposal service. | 94% | ≥ 85% | ≥ 85% | ≥ 85% | ≥ 85% |

* Mandatory Performance Measure

Attendance time: from the time that the Council receives notification to the time that the service personnel reach the site.

Resolution time: from the time that the Council receives notification to the time that service personnel confirm resolution of the fault or interruption



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 Wastewater Activity
- b) Cost of the Wastewater 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 Wastewater Activity makes towards the achievements of Community Outcomes at the current level vs. greater or lesser levels of service.

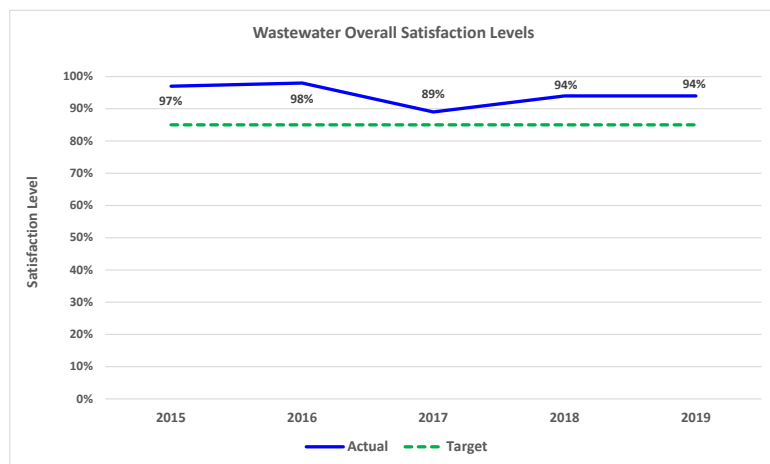
6.7 Reporting

Measurement and reporting of Customer Levels of Service shall be achieved through the customer satisfaction survey. With the use of everyday language in the Customer Levels of Service residents can fairly gauge their opinion on each issue.

The customer satisfaction survey is undertaken annually and this can be used as a benchmark for the next year, and the trend across the results of each year's survey provides a long term view of Council's performance.

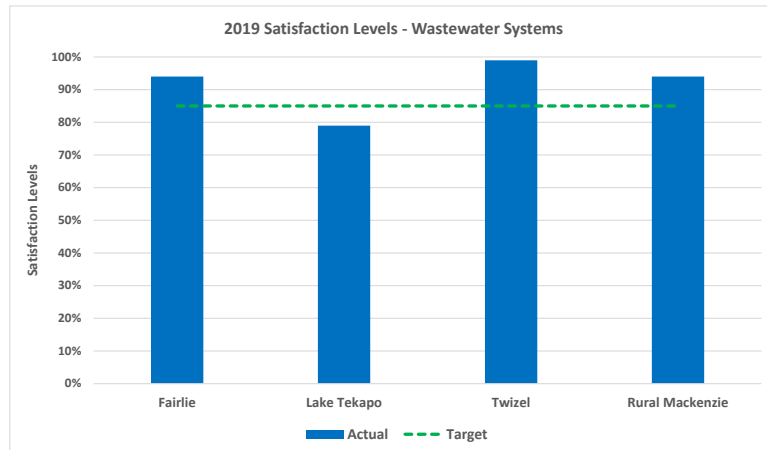
The Ratepayers Opinion Survey 2019 provides useful commentary on issues that concern residents.

Figure 6-1: Wastewater Service – Overall Satisfaction Rates



The survey identified that 94% of the respondents were satisfied with the overall wastewater activity the same as the previous year. Council is maintaining a high level of customer satisfaction with the wastewater service.

As shown below the satisfaction levels vary across wastewater systems. Apart from the Lake Tekapo customers all other customers have satisfaction levels well above the target of 85%.

**Figure 6-2: Wastewater Service - Satisfaction Rates**

Measurement and reporting of Technical Service Standards is essential for the prudent management of the wastewater activity. With regard to wastewater discharge/disposal in particular, frequent monitoring and reporting is integral to meeting resource consent conditions.

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 LGA2002. This occurs in the following situations:

- Adopting or amending the Long Term Plan (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 the Annual Budget.
- 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 are 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 the Wastewater Service 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 service interruption maybe notified through a letter drop
- critical and key customers maybe identified and notified 72 hours prior work affecting their service



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

6.8.3 Key Stakeholders

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

- Extensive public consultation
- Annual Plan Submissions
- Customer surveys
- Project teams for specific significant community projects
- Community Noticeboard (Council website)

This Plan recognises the following stakeholders:

Key stakeholders

The Council as the ultimate owner of assets. Other key stakeholders of the Wastewater network include:

Regional Council
Owners and operators of inter-connecting or separate Wastewater 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

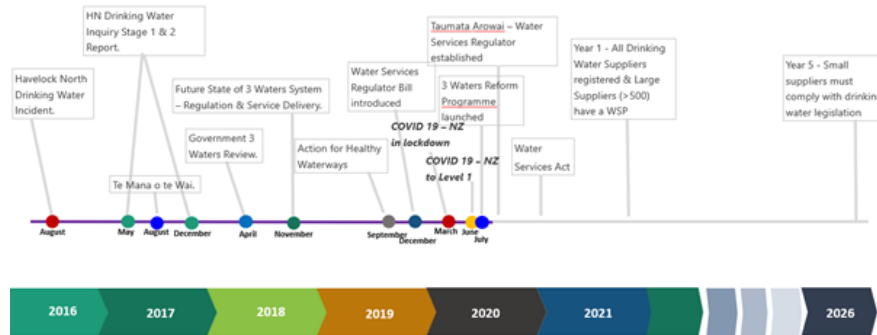
| Customer Groups | Description | Customers |
|------------------------------|--|--|
| Associated service providers | These are other service providers who rely on the wastewater network | Contractors Commercial operators |
| Users | Those who directly benefit from the service | Ratepayers Residents 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 the 3 Waters Services the Mackenzie District Council keep a weather eye on the Central Government and Industry direction for the national infrastructure assets and public service provision. This is done through attending conferences and seminars, studying reports released by Central Government agencies and membership of industry organisations e.g. IPWEA, Water NZ, etc.



3 Waters - Government & Industry Direction



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

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

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

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

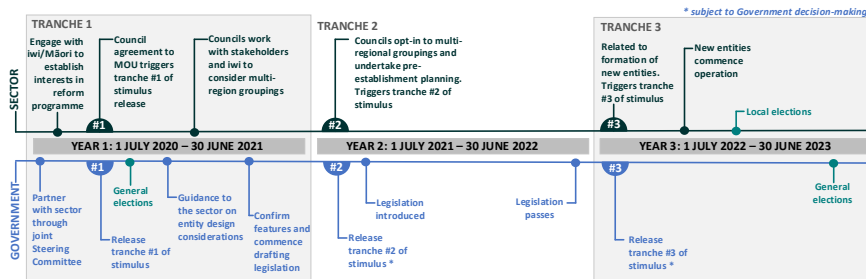
Towards the end of 2019, the Government agreed to establish a new drinking water regulator as an independent Crown entity. Associated legislation is expected to be passed in 2020/21 and the establishment and roll out of the new Regulator will follow and is expected to take a number of years.

Following the global outbreak of the Corona Virus the Government announced New Zealand's four-level COVID-19 Alert System specifying public health and social measures to be taken against COVID-19. New Zealand went into Level 4 on Thursday 26 March 2020. Level 4 requirements included the general public to stay at home, educational facilities closed, only essential services & lifeline utilities remain open & operational, severe travel limitations, major reprioritisation of healthcare services, etc. NZ progressively reduced the alert levels from 27 April and returned to Level 1 on 10 June 2020.

The response to COVID 19 has had significant impact on the economy and the ability to implement and progress the abovementioned Government initiatives.

July 2020 saw the Government announce the 3 Waters Reform Programme consisting of a \$761m funding package over the next three years to provide immediate post COVID 19 stimulus to local authorities to maintain and improve three waters infrastructure. Initial funding will only be made available to councils that sign up to the Memorandum of Understanding. Mackenzie District Council signed up to the Memorandum of Understanding.

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



The following themes are signalled:

| Theme | Source |
|---|---|
| <p>Among a range of observations the OAG states “I remain concerned that Council’s might not be adequately reinvesting in their critical assets”.</p> <p>To do this well, councils need to improve their asset management information. In particular, they need:</p> <ul style="list-style-type: none"> good data about their critical assets in order to value, depreciate, and plan renewals; good processes and sufficient resources to maintain and update their critical asset data; effective working relationships between asset management, finance, and strategic planning staff, all of whom have an important role to play in supporting a council’s asset management function; and timely engagement with, and involvement by, elected members. | <p>Insights into local government: 2019</p> <p>OAG June 2020</p> |
| <p>Common challenges</p> <ul style="list-style-type: none"> Working with iwi Completeness and reliability of data Staff capability and capacity Under-delivery of planned capital spending | <p>Managing the supply of and demand for drinking water</p> <p>OAG Sept 2018</p> |
| <p>A more strategic and integrated approach to water management is needed</p> <ul style="list-style-type: none"> The Government is responding to the need for a more strategic and integrated approach to water management A strategic and integrated approach would support targeting of investment decisions A stronger focus on implementation is needed when setting strategy Long-term thinking is needed when setting a strategic and integrated approach <p>Understanding of water resources needs to improve</p> <ul style="list-style-type: none"> A national picture of the state of freshwater quality would support a more strategic and integrated approach Information gaps can limit the ability to make well-informed decisions Information needs to be understandable both to decision-makers and to those holding them to account Good information depends on collecting quality data There will always be some uncertainty <p>Water management challenges require adaptive ways of working</p> <ul style="list-style-type: none"> Balancing different views and values requires flexible frameworks Collaboration needs to translate into action More can be done to involve Māori in water management Water management challenges require both central and local government response | <p>Reflecting on our work about water management</p> <p>OAG Feb 2020</p> |
| <p>Recommendations</p> <ul style="list-style-type: none"> that councils prioritise collecting condition and performance information of critical assets and, in the meantime, take a precautionary approach for significant services where the condition information of critical assets is unknown; | <p>Matters arising from our audits of the 2018-28 long-term plans</p> <p>OAG Feb 2019</p> |



| Theme | Source |
|--|---|
| <ul style="list-style-type: none"> that the Department of Internal Affairs and the local government sector review the required content for long-term plans to ensure that they remain fit for purpose, particularly: – the current suite of mandatory performance measures; – the disclosure requirements for financial and infrastructure strategies; – disclosures required under the Local Government (Financial Reporting and Prudence) Regulations 2014; and – how assumptions are disclosed in long-term plans; that the Productivity Commission, in its review into the adequacy and efficiency of the existing funding and financing options for councils, consider the trends arising in the 2018-28 long-term plans, particularly the trends and concerns we have raised about increasing debt; and that central government and local government continue to consider how increased leadership can be provided for climate change matters, particularly: – what data is needed and who collects this; – the quality of this data; and – how councils should consider this in future accountability documents, including the long-term plan. | |
| <p>LGNZ are working on four significant projects with the sector at present: Water 2050; Climate Change; Housing 2030 and the Localism Project.</p> <p>Water 2050 - The Water 2050 project promotes discussion and contribute to policy development by central and local government, particularly in regards to the Government's Three Waters Review, across five key areas:</p> <ul style="list-style-type: none"> Allocation Water Quality Infrastructure Cost and funding Governance <p>Climate change - leading and championing policy to deal with the impacts of climate change is a key policy priority for LGNZ. Climate change poses an unprecedented level of risk and adapting to and mitigating the impacts of climate change is a new priority focus for councils.</p> <p>Housing is a significant issue for our communities' social and economic futures. Unaffordable housing is having a negative impact on local economies, discretionary household expenditure and social well-being. This means addressing matters of supply, how social and community housing needs are met and the importance of healthy homes. Underpinning the issue is the need for appropriate funding and financing. LGNZ efforts are focussed in three general areas:</p> <ul style="list-style-type: none"> Supply; Social and community housing; and Healthy homes. <p>Localism - Local government is calling for a shift in the way public decisions are made by advocating for greater self-government at the local and an active programme of devolution and decentralisation.</p> | Local Government NZ |
| <p>This project has two intended outputs.</p> <ul style="list-style-type: none"> The first is to research the current quantity and value of infrastructure (roads, 3Waters and buildings) exposed to sea level rise at four increments; 0.5, 1.0, 1.5 and 3.0 metres, and to quantify replacement value. The second and more important output of this research is to provide responses to rising sea levels. This study intentionally avoids specific and local costs, and targets discussion at a regional and national level in order to highlight trends and general areas of high and low priority. It raises questions about how to improve procurement, appropriately share management of risk, and communicate with stakeholders about priorities. | <p>Vulnerable: the quantum of local government infrastructure exposed to sea level rise</p> <p>Local Government NZ January 2019</p> |
| <p>This document explores the workforce skills and capabilities for an effective, efficient, accountable and resilient three waters sector in New Zealand. It describes what people should be able to do and what they need to know to competently undertake their work. It is a work in progress and includes the following roles.</p> <ul style="list-style-type: none"> Drinking Water Treatment Operators Wastewater Treatment Operators Drinking Water Distribution Operators (to be developed) Wastewater Network Operator (to be developed) | <p>Water NZ Competency Framework</p> <p>Water NZ</p> |



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.

Infrastructure Commission, Te Waihanga

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

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

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

National Policy Statement for Freshwater

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

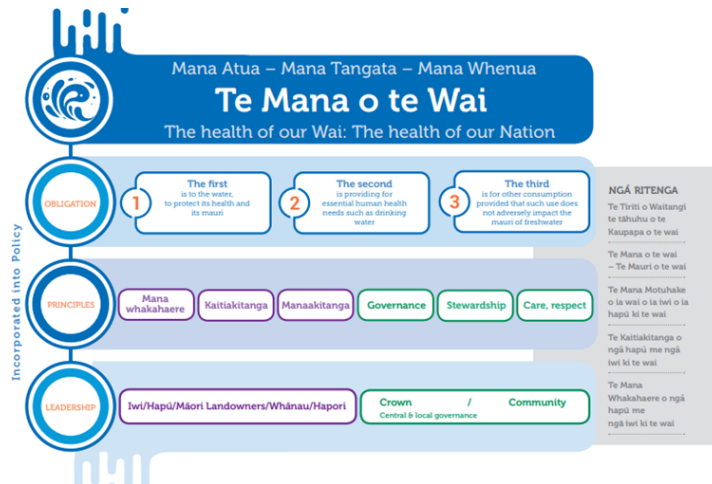
- first, the health and well-being of water bodies and freshwater ecosystems
- second, the health needs of people (such as drinking water)
- third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

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

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

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

This strengthens and upholds Te Mana o te Wai and signals the direction for urban development, rural land and water management including Risk Management Plans for wastewater systems and stormwater systems, likely regulatory requirements under a new 3 Waters regulatory framework.



(Source – *Te Mana o te Wai - Kāhui Wai Māori Report to Hon Minister David Parker - April 2019*)

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

National Policy Statement on Urban Development 2020

The National Policy Statement on Urban Development 2020 (NPSUD) sets out the objectives and policies for providing development capacity under the Resource Management Act 1991.

The NPSUD came into effect on 20 August 2020

The NPSUD 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 NPSUD contains objectives and policies that local authorities must give effect to in their resource management decisions. These objectives include the following:

- **Objective 1:** New Zealand has well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future.
- **Objective 2:** Planning decisions improve housing affordability by supporting competitive land and development markets.
- **Objective 3:** Regional policy statements and district plans enable more people to live in, and more businesses and community services to be located in, areas of an urban environment in which one or more of the following apply:
 - the area is in or near a centre zone or other area with many employment opportunities
 - the area is well-served by existing or planned public transport
 - there is high demand for housing or for business land in the area, relative to other areas within the urban environment.



- **Objective 4:** New Zealand's urban environments, including their amenity values, develop and change over time in response to the diverse and changing needs of people, communities, and future generations.
- **Objective 5:** Planning decisions relating to urban environments, and FDSs, take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).
- **Objective 6:** Local authority decisions on urban development that affect urban environments are:
 - integrated with infrastructure planning and funding decisions; and
 - strategic over the medium term and long term; and
 - responsive, particularly in relation to proposals that would supply significant development capacity.
- **Objective 7:** Local authorities have robust and frequently updated information about their urban environments and use it to inform planning decisions.
- **Objective 8:** New Zealand's urban environments:
 - support reductions in greenhouse gas emissions; and
 - are resilient to the current and future effects of climate change

Productivity Commission

The New Zealand Productivity Commission (NZPC) is an independent Crown entity that 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.

In their Local Government Insights report (February 2020) the NZPC identified the following significant and challenging work facing local government.

- Councils will need to do better in advancing Māori interests,
- protecting the natural environment,
- tackling housing affordability
- lifting the performance of essential infrastructure such as three-waters services.
- adapting to climate change is a major new challenge facing councils

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 |
| Hazardous Substances and New Organisms Act 1996 |
| Health Act 1956 |



Key Legislation

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

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.

**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 Local Government Act there are some specific clauses that apply to water services.

| Section | Details | Applies to |
|-----------------------|--|---|
| S 10 | Restores the four aspects of community well-being by requiring local authorities to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future | Water and Waste Services |
| S 17A | Requires that Councils review the cost effectiveness of the way they deliver their services to ensure they meet the needs of communities | All services |
| S 101B | Requires a 30 Year Infrastructure Strategy | Core Services |
| S125 | Places a requirement to assess water and other sanitary services from time to time | Water and Sanitary Services Assessment |
| S130 | Imposes an obligation to maintain water services and places limitations on the transfer or selling of assets | Divestment of services |
| 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 Act 1974

Part XXVI Sewerage and Stormwater, sections 440-469 provide council with authority to construct, maintain and operate the sewerage and stormwater systems.

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

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

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

- The RMA to be repealed and replaced with two new pieces of legislation
 - The Natural and Built Environments Act to strengthen the current system by not only seeking to protect the environment, but improve it.
 - The Strategic Planning Act to give statutory weight to strategic spatial plans and, critically, force reconciliation and alignment across central and local government to ensure implementation.

Taumata Arowai – the Water Services Regulator Bill

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



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

It is anticipated this Bill will be enacted during 2021.

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

Utilities Access Act 2010

The 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.

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

Water NZ - New Zealand Gravity Pipe Inspection Manual 2019

NZWWA The New Zealand Infrastructural Asset Grading Guidelines 1999

6.9.4 Regional Strategies & Plans

Under Section 30 of the Resource Management Act of 1991 Regional Councils are required to provide policies and methods to achieve integrated and sustainable management of the regions natural and physical resources. The Canterbury Land and Water Regional Plan provides a framework for the sustainable management of the regions water resources. These resources include groundwater, rivers, lakes and wetlands.

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

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

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

6.9.5 Council Strategies, Plans, Bylaws and Policies

Mackenzie District Council Long Term Plan

The Local Government Act 2002 requires local authorities in New Zealand to prepare a Long Term Plan 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. Land Transport/Water/Wastewater/Stormwater is considered to be a significant/core activity.

The Long Term Plan sets out the direction for Mackenzie District Council over the following ten years. The LTP is reviewed by Council every three years.



The Long Term Plan 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 Long Term Plan 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 Local Government Act 2002 local authorities in New Zealand must prepare and adopt an Annual Plan for each financial year. The Annual Plan must support the long-term plan 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 to adjust the direction of Council and the community for the twelve months following. It also 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 Resource Management Act 1991 requires the Mackenzie District Council to have at all times a District Plan for its District.

The District Plan sets out in a systematic way the manner in which the Council intends to deal with its functions under the Act. In doing this, 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.

The District Plan must reflect and provide for the principle resource management issues pertaining to the District. The District Plan identifies and discusses the issues that have been identified by the Council and sets out the objectives and policies of the District Plan in regard to those issues. The District Plan also specifies the environmental results anticipated to be achieved by the implementation of the objectives and policies.

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

Changes to the Local Government Act 2002 during 2014 requires that a local authority must prepare and adopt, as part of its long term plan, 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 Local Government Amendment Act 2014 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

The Section 17A Review was completed and found no driver for change in the current arrangements for service delivery in the 3 Waters.

Asset Management Plans

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

Changes to the Local Government Act 2002 further emphasised the need for asset management planning and the development of Asset 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 6-3: Corporate links to AMPs depicts the links and information flows with the Asset Management Plan, other corporate plans and public consultation.

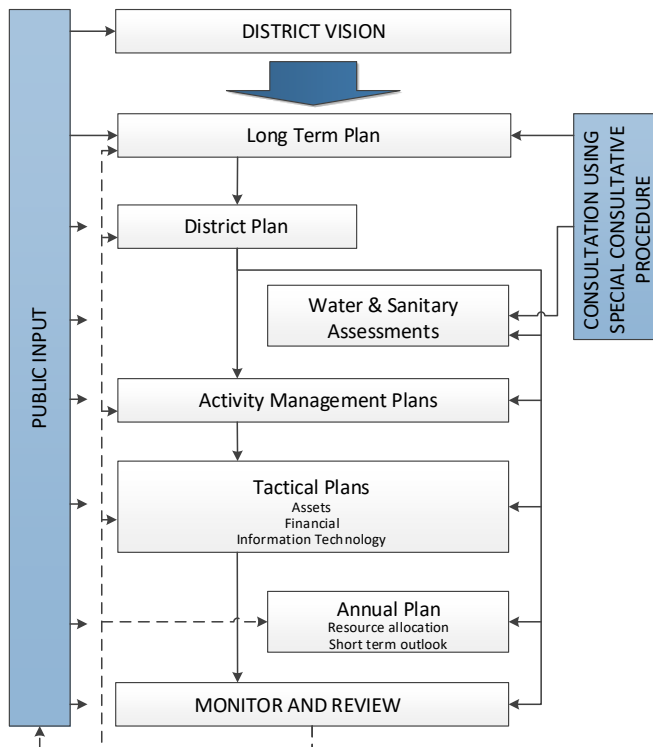
As part of the Local Government Act 2002 requirements (Schedule 10) the LTP must, for the ten years of the Plan, identify for each group of assets the costs for any additional asset capacity required and the maintenance, renewal, and replacement costs for the assets.

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 2021-2031.



Figure 6-3: Corporate links to AMPs



This AMP is intended to be read in conjunction with the Long Term Plan (LTP) and fulfils requirements of the Local Government Act 2002 (and amendments) – 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 is 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 Long Term Plan 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

Bylaws are Council rules to regulate its own affairs and an enforcement tool and policies to guide decision making. Council requires a number of Bylaws and Policies to enable staff to perform their functions to the best of their ability across the full range of Councils responsibilities.

There is one bylaw that apply to the Wastewater service.

- The Wastewater Bylaw 2014

The Wastewater Bylaw needs to include a mechanism to better manage septage disposal (**IP 6**) as currently effluent disposal contractors dispose of septage within the network or at wastewater treatment plants. This has a significant effect on pond performance.

6.9.7 Policies

Significance and Engagement Policy 2014

During 2014 Council adopted the Mackenzie DC Significance and Engagement Policy:

- 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 Strategic assets:

- The entire urban and rural roading network of the Mackenzie District.
- 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).
- The stock water race systems at Ashwick/Opuha, Punaroa/Eversley and School Road
- The wastewater reticulation and treatment systems at Burkes Pass, Fairlie, Lake Tekapo and Twizel.
- The stormwater reticulation systems at Fairlie, Lake Tekapo and Twizel.
- The Council cemeteries at Albury, Burkes Pass, Fairlie, Tekapo and Twizel.
- All Council's parks, recreation reserves, sports fields and facilities held under the Reserves Act 1977 or otherwise.
- Council's swimming pools at Fairlie and Twizel.
- Council's stock of tenanted pensioner housing.
- The Fairlie Medical Centre.
- The Twizel Events Centre and the community hall at Lake Tekapo.
- The Mackenzie Community Centre at Fairlie.
- Council's administration buildings in Fairlie and Twizel.
- Council's shareholding in Alpine Energy Limited.

The Significance and Engagement Policy provides a procedure to determine significance and a community engagement guide.

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 are located at sites such as treatment plants, pump stations and storage facilities. Generally, the existing 3 Waters facility buildings will not trigger any of the above assessments.



- Buildings are usually located on the edge or outside of urban boundaries
- Buildings are mainly timber framed buildings
- Equipment (pumps etc.) are usually fixed to the floor where possible
- Reservoir & storage structures are usually reinforced concrete materials
- Most were constructed post 1976, when unreinforced masonry buildings were prohibited.
- Buildings are only visited for short periods at a time

In view of the above, seismic assessments are not deemed necessary for any of the 3 Waters buildings.

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 |
| Water NZ - New Zealand Gravity Pipe Inspection Manual 2019 |
| 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 wastewater 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
- Accuracy of predicted future populations
- 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 Foul Sewer 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 DEMAND FORECASTS

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

Typically, MDC used the growth projections prepared by Statistics New Zealand (StatsNZ). However, growth in the district has far exceeded even the most ambitious predictions, as this was driven by growth in the tourism industry, attracting both visitors and residents.



Due to the delayed release of the StatsNZ growth projections based on the 2018 Census and their typically conservative nature, MDC commissioned the latest growth projections to provide a single source of the truth for council and understand the future growth in their district.

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

The report considered four growth scenarios i.e.

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

Scenario 3 is considered to be the most appropriate for MDC's long term planning as there will be short term effects due to COVID-19. *However, it is not yet known what, if any, long term effects there will be. Due to this uncertainty it is recommend that annual "check-ins" are completed with the most up-to-date data to monitor the impact of COVID-19 and the progress of recovery {Rationale}.*

7.3.1 Growth Trends

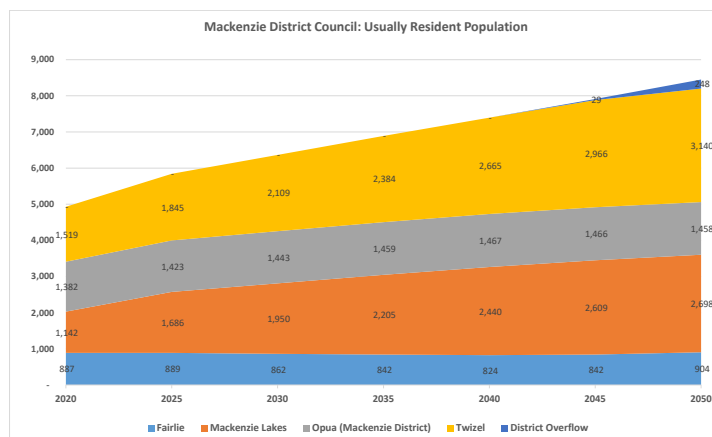
Population Projections

The key characteristics of Mackenzie's population are:

- A relatively recent an influx of younger people to the area for the employment opportunities provided by the tourism industry.
- People later in their working lives or early retirement are moving to the area for the lifestyle.
- Older people (over 70) tend to leave the area, likely in search of better healthcare.

MDC's population is predicted to continue to grow in all areas, at differing rates. Fairlie's population is predicted to decline through to 2045. This is due to the age profile of the district and low migration. However, after 2045 a slight increase in population is predicted this is due to Tekapo reaching capacity and 'spilling-over' into Fairlie.

Figure 7-1: MDC Usually Resident Population



Consequently the following graph predicts a relatively static population growth over the period of this asset management plan. As a result there will not be any significant increase or decrease in demand for Council services based on change in population.

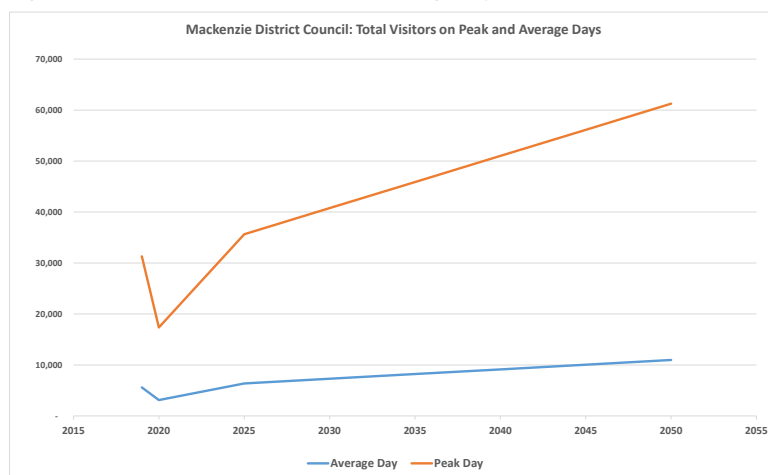


Tourism Projections

Due to COVID-19 and the closure of New Zealand's borders, the number of international tourists visiting Mackenzie has significantly reduced in the projections from 2020 to 2025.

Based on current assumptions around the reopening of New Zealand's borders and the speed at which tourists are likely to return to New Zealand, the industry is expected to recover by around 2025.

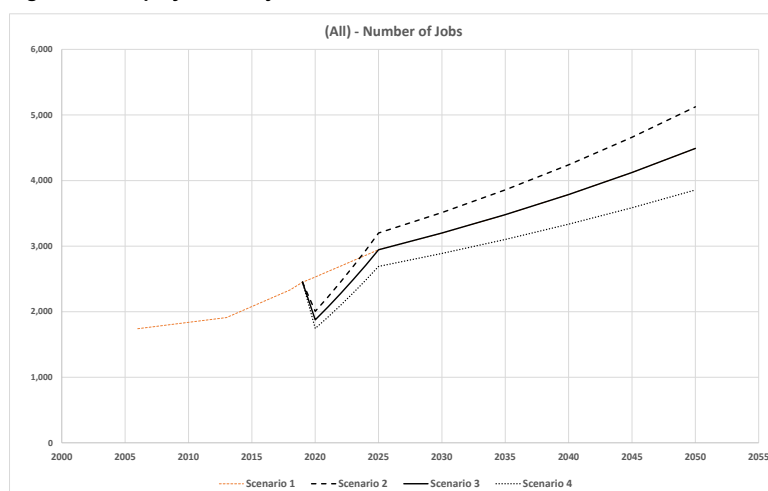
Figure 7-2: MDC Total Visitors – Peak & Average Day



Employment Projections

Due to the importance of the local tourism industry and its dependence on international visitors it is expected that the Mackenzie district will experience a larger impact than other areas around the country in terms of COVID-19 related job losses (Rationale). However, domestic tourism has performed better than expected and may lessen the forecasted impact.

Figure 7-3: Employment Projections





7.3.2 Response to Projected Growth

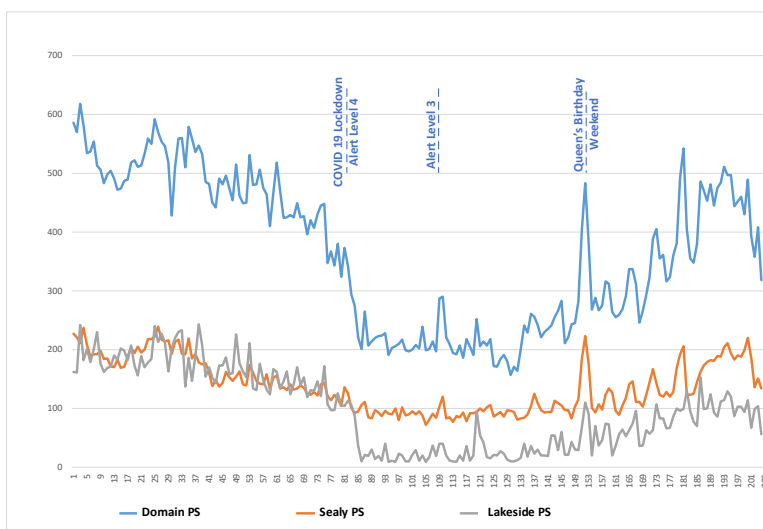
From the above it is evident that the effects of COVID-19 will have a significant impact on especially tourism and employment. This will slow down other areas such as population growth and dwellings etc. The projected deceleration in demand during the first part of this plan period provides Council an opportunity to reassess existing systems capacity and performance and focus on master planning for service provision.

However, Council is also mindful that COVID-19 also invigorated the domestic tourism market as data indicates that there were almost as many domestic visitors to the Mackenzie area at midday on the Saturday of Queens Birthday as there were on the Saturday of Waitangi weekend pre-COVID-19 lockdown.

The influx of domestic holiday-makers into the district, particularly the Mackenzie Basin, has a significant impact on the wastewater network, increasing/reducing the effluent flows. As development occurs, the developers are required to develop their own wastewater system to connect to the Council system.

The graph below clearly shows the reduced flows as a result of COVID-19 impacts.

Figure 7-4: Wastewater Pump Station Flows



In Twizel, change in land use around the oxidation pond could affect their continued use. There is a no build zone of 150m for rural residential building around the oxidation ponds. During 2018 Council obtained a new consent (CRC 172311), decommissioned the disposal trench and installed new infiltration basins. A 150m buffer around the ponds was purchased by Council and a further 150m no build zone established.

In Lake Tekapo the disposal system needs to be upgraded. During winter periods ponding issues are experienced. Due to the increase in development and tourists the effluent discharge volumes increase accordingly. This places further strain on existing effluent disposal systems. Investigations indicate that a larger effluent disposal system is required.



7.3.3 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 wastewater issues. It is anticipated that the following issues will become an increasing priority for Council in determining design and operational standards.

- Extended areas being desiring to be connected to reticulated wastewater systems
- Improved response times

Changing Levels of Service Demands

The intended Levels of Service defined in Section 6 are considered to be representative of the service demands of the current and the future community. With rate of growth in the rating base reducing, the following factors may need to be considered:

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

Policy or Management Changes

Changes to wastewater 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.

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 equity in the existing specific infrastructure network including wastewater. This ensures that the Developer pays their fair share of that network, installed previously, that allows the development to connect to that service and proceed to completion.

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 2019/20, the financial contribution payable on each lot created at the time of subdivision is calculated at \$4,349.34. This amount is GST exclusive.

The financial contribution figures are reviewed annually.

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 and disposal caused by outside agencies requirements.
- An increasing focus environmental controls/requirements
- An increased level of expenditure to attain those desired controls/requirements
- A static ratepayer base to fund Mackenzie District Council's contribution to the separate community based foul sewer budget

7.5 Demand Overview

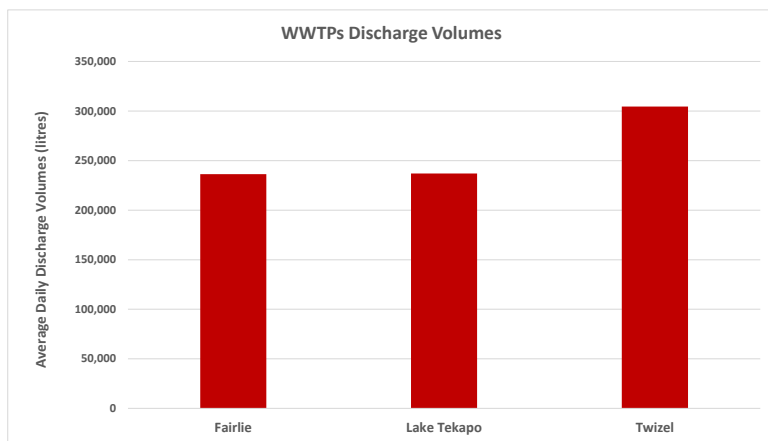
7.5.1 Current Demand

The following schemes have a public water supply and public wastewater collection system:

- Fairlie
- Lake Tekapo
- Twizel
- Burkes Pass



Figure 7-5: Average Daily Discharge Volumes

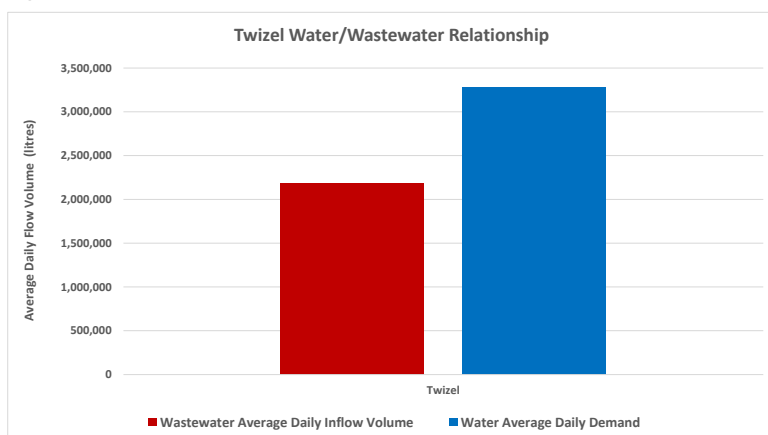


With the exception of water supplied for irrigation and unaccounted for water most water supplied by the Mackenzie District public water supply systems listed above is subsequently discharged into the wastewater reticulation. Changes in water consumption patterns are therefore likely to be largely reflected in corresponding changes in discharges to the wastewater system. An increase in water consumption is expected to generally follow population increase trends.

Industry standard guidelines indicate that wastewater flows are usually in the order of 70% to 80% of water demand flows. Water demand flows can be used for guidance on the extent of inflow/infiltration and or capacity requirements.

The Twizel average daily volume of wastewater inflow to the WWTP was 67% (2,189.3m³) of the water demand (3,276.8m³) in 2019.

Figure 7-6: Twizel Water/Wastewater Relationship



This (67%) is demonstrated by the above graph, indicating that there may be a significant amount of water used for other uses i.e. garden irrigation or significant losses.



7.5.2 Wastewater from other sources

Discharge from Septic Tanks - A formal process for septic tank operators exist. In Twizel discharge is at the manhole closest to the treatment plant and in Fairlie approved contractors have access to the treatment plant to discharge into the system. Currently Council will not allow the disposal of septic tank waste or waste from holding tanks to be disposed of at into the Tekapo sewerage network. This is due to the high sludge loading. This decision could be reviewed once the accumulated sludge has been removed.

7.5.3 Inflow/Infiltration

The rate of inflow and infiltration of rainwater into the wastewater network is a key factor in future wastewater demands. Most urban systems across New Zealand experience inflow/infiltration with stormwater making up between 20% to 40% of wastewater volumes. The I/I rate in MDC systems is estimated to be around 20%.

However, the inflow/infiltration will continue to contribute to the future wastewater volumes as the system continues to deteriorate with age. The inflow/infiltration rate will depend on the changes in climate conditions, which are expected to produce more intensive and frequent rainfalls.

The longer dry spells and higher temperatures (predicted climate change impacts – see Section 5.10) may lead to a decrease in infiltration and inflow into the wastewater system. However higher intensity rainfall events can increase inflow into the sewer as flooding around gully traps and manholes can occur. The actual effect of climate change on flows in the wastewater system cannot be quantified at this point.

Although infiltration/inflow strategies are expected to progressively reduce the entry of stormwater into the wastewater reticulation it has been assumed for the purposes of estimating the future demand for wastewater.

The Mackenzie District Council employ the following strategies to minimise inflow and infiltration:

- Investigate inflow and infiltration and develop programmes to reduce the entry of stormwater to the wastewater system in private properties (infiltration/inflow programmes)
- Repair or renewal of pipelines where there is excessive entry of stormwater and or groundwater through defects in the pipes
- Providing additional capacity in parts of the wastewater system

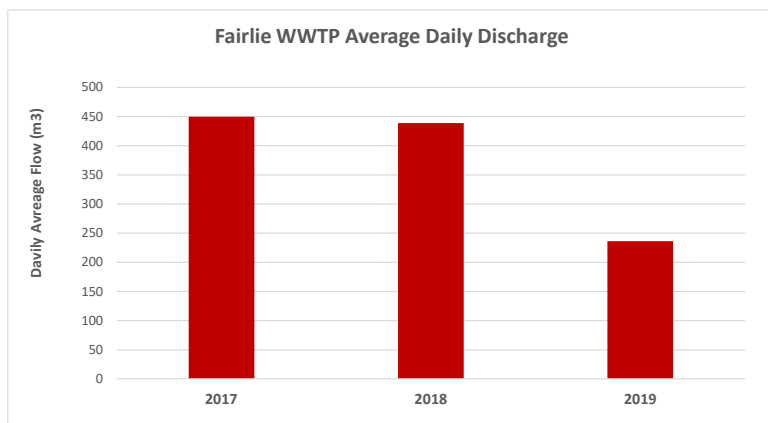
In recent years Council have performed a significant amount of smoke testing throughout the networks progressively identifying points of I/I and reducing I/I.

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 stormwater or ground water infiltration. During 2018/19 Council conducted an inflow/infiltration investigation focussing private drains that require repair to correct the inflow during rain events or infiltration of groundwater when the water table is high. As shown in the graph below there has been a significant reduction in average daily discharge volumes.

**Figure 7-7: Fairlie WWTP Average Daily Discharge**

In Tekapo we are aware of stormwater infiltration into the pipe network caused most likely by roof water being plumbed into the on property sewer pipework. Council has begun a programme (2012) to identify those offending properties and have their stormwater redirected to the appropriate location, with similar results.

There are minimal asset based demand options that do not have a significant cost attached.

Upcoming issues during the next ten years

3Waters Reform

The ongoing 3Waters reform will focus on the efficient and safe delivery of water services. Council will continue to collaborate with the Government and other local authorities in the region to consider future 3Waters service delivery arrangements that will improve the wastewater service landscape.

Oxidation pond sludge Levels

Oxidation ponds (Waste Stabilisation Ponds) in the district have been in operation for more than 30 years and have accumulated significant amount of wastewater sludge. These ponds are now nearing a period where the capacity of the facility is affected by the volume of sludge build up and require removal of the sludge. Options are being investigated for removing, dewatering and disposing of the sludge.

Desludging is programmed for 2021/22 for Fairlie, Tekapo and Twizel oxidation ponds and this work will be funded from the 3 Waters Stimulus package.

Once this work is complete, then they will not require surveying for sludge depth for at least 10 years and then at 3 yearly intervals until the it begins to effect the pond performance.

Fairlie – Since 2013 the oxidation pond was surveyed three yearly with the last survey in 2019. The average sludge depth was 0.50m and with a pond depth of 1.73m there is enough water depth to control odour. A liquid depth of 1m over the sludge is enough to control odour release. Whilst there is available water level remaining, Mackenzie's cold weather means there is a higher risk of failure. To mitigate this risk, it's best practice to clean the ponds out now.

Tekapo – Since 2013 the oxidation pond was surveyed three yearly with the last survey in 2019. The average sludge depth was 0.57m and with a pond depth of 1.67m there is enough water depth to control odour. A liquid depth of 1m over the sludge is enough to control odour release. Whilst there is available water level remaining, Mackenzie's cold weather means there is a higher risk of failure. To mitigate this risk, it's best practice to clean the ponds out now.



The present capacity of the Tekapo WWTP with the existing aerator assistance can meet a BOD demand for a population of approximately 1,800 people. Capacities are for monthly average populations because the load is buffered by the long retention time.

Should the population increase beyond 1,800, the capacity of the WWTP could be increased by installing additional brush aerators on the oxidation ponds and extending Pond 1A. This could increase the pond capacity to meet a BOD demand of 2,100 people.

For any further growth above 2,100 people, the Tekapo WWTP will require the addition of a dedicated aeration basin at the inlet with all oxygen being supplied by aerators. This can increase plant capacity to about 3,500 people. If the population of Tekapo increases above 3,500, alternative means of treatment and disposal will have to be investigated and new resource consents applied for.

The most pressing issue facing Tekapo is the disposal system. At the moment the disposal is generally adequate for the demand but during winter freezing periods there are ponding problems. Environment Canterbury has indicated their dissatisfaction and has issued a notice of non-compliance with the discharge consent as a consequence. Also, as demand increases in Tekapo the volume of effluent to be disposed of will also increase. An effluent disposal investigation is programmed for 2021/22.

Twizel - Council acquired land adjacent to the oxidation ponds and constructed rapid infiltration basins and consolidated the disposal in them. The basins were fenced for site security and the existing disposal trench abandoned. This retired the existing trench and consolidated the disposal on the 5.6ha site.

Twizel continues to show steady growth in holiday homes and in order to understand the total demand Council will model the network so that it will be better able to predict when pipes need to be upsized or aeration installed at the oxidation ponds to improve treatment and when a new rising main will have to be constructed directly to the oxidation ponds from the pump station in Mackenzie Park. This work was provisionally programmed for 2018/19, but will only be constructed if demand puts pressure on the current systems to the point they cannot cope.

Since 2013 the oxidation pond was surveyed three yearly with the last survey in 2019.

Burkes Pass -

The current population is small (and unlikely to increase substantially) and the existing pond appears to be more than adequate for continuation of wastewater treatment at Burke's Pass. However, the installation of public toilets in Burkes Pass during 2018 have had a significant impact on pond loadings. Council is investigating options to improve performance due to the extra loading created by the public toilets.

District wide – CCTV inspections are programmed for 2021/22.

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



| Strategy | Description |
|--------------------------------------|---|
| Inflow/Infiltration | Removal of stormwater ingress into the wastewater system through smoke testing, property inspections, CCTV and remedial action |
| Response time | Prompt response and rectification of reported blockages |
| 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 |
| Infiltration reduction | Continue infiltration reduction programme (IP 3) |

7.6.2 Non - Asset Based Demand Management

There are few options to affect reduced demand on the sewerage network that are not asset based. Loading on oxidation ponds can be reduced by requiring more on property treatment, in particular for high BOD loading industries.

Infrastructure Improvements

Fairlie - There are 6.9km of earthenware pipe in Fairlie. These were originally condition rated in 2000 as 4. Over the last number of years the sewer mains have been inspected through CCTV. A replacement programme will be developed based on the CCTV records, condition, criticality, etc. Current programming allows for \$3,000,000 over the period 2026/27. This programme should be reviewed on completion of the internal CCTV inspection and pipe grading in 2021/22. Replacement options include dig and relay with new pipe or in-situ refurbishment using relining techniques or pipe bursting.

Tekapo - There are 1.4km of earthenware pipe in Tekapo. These mains have been inspected by means of CCTV. If analysis of the CCTV records confirms significant deterioration, then the 1.4km of sewer main will be programmed for replacement or refurbishment. The replacement programme will likely be scheduled outside the term of this Plan. Replacement options include dig and relay with new pipe or in-situ refurbishment using relining techniques or pipe bursting.

Twizel – development of a network model is being developed in 2021/22. This will help Council determine the capacity of various networks and their ability to accept effluent from future development without overloading that network or confirm the need to upgrade that network.

The Twizel sewer network was constructed in the 1970s using the Asbestos Cement (AC) pipe. In Twizel there are no aggressive soils or groundwater surrounding the AC pipes so the deterioration is only from the inside. Nationally studies have shown that the deterioration model is very irregular throughout the networks where AC pipe is used so it is necessary to have a programme of sampling to get a better understanding when these pipes will have to be replaced and by default adjust the depreciation charged accordingly.

There is 21.3km of AC pipe in the Twizel sewer network and the current replacement cost (2020) of \$5.6m. Due to known performance of the AC pipe the base life of the pipe has been set at 80 years leaving a remaining life of 40 years. This figure is based on knowledge to date but further work should be done on a specific deterioration model for the gravity sewers in Twizel to more accurately predict the replacement date. Sections of the AC pipe renewal is provisionally programmed for replacement during 2026/27.



Rising Main: The sewerage network from the new subdivisions to the south of Twizel were not able to be gravity fed to the existing network and as such discharge to a new pump station on Batchers Road. Due to the low initial flows from this pump station, a rising main was constructed from it to the existing network on Ostler Road where the pumped effluent discharges. At some stage in the future, growth in the area will overload the 100mm rising main and a new main will have to be constructed directly to the oxidation ponds. As part of the COVID 19 recovery package Council have accelerated this work and the completion is programmed for 2021/22.

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 MDC 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 wastewater system through public education and advertising campaigns |
| Property inspections | Encouraging property owners to comply with Council's Bylaws and stormwater discharge requirements |

7.7 Future Capital Programme

The following table details proposed capital requirements for the period 2021/22 to 2030/31. It can be seen that the new capital is primarily driven by effluent disposal as a result of environmental compliance requirements.



Table 7-1: Future Capital Programme (Inflated)

| Project | Funding | 2021 -2031 LTP period | | | | | | | | | |
|--|---------|-----------------------|-----------|-----------|-------------|-------------|-------------|-------------|-------------|---------|---------|
| | | Financial Year | | | | | | | | | |
| | | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/30 | 2030/31 |
| 54 - Treatment | Growth | \$200,000 | \$517,500 | \$796,425 | \$8,179,500 | \$9,538,700 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 63 - Rising Main Mackenzie Park to Twizel WWTP - Design | Growth | \$14,690 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 64 - Rising Main Mackenzie Park to Twizel WWTP - Construct | Growth | \$990,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 65 - Lakeside WW pump station - Design/Construct | Growth | \$48,598 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 73 - Burkes Pass WWTP upgrade - baffles | Growth | \$50,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 29 - Sewer Reticulation - new | LOS | \$400,000 | \$258,750 | \$10,619 | \$545,300 | \$0 | \$1,153,600 | \$1,190,500 | \$1,229,800 | \$0 | \$0 |
| 31 - Pump Station Renewal | LOS | \$300,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 61 - Upsize foul sewer - Fairlie Golf Course | LOS | \$35,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 67 - Deer Fence ponds - Tek, Fle | LOS | \$15,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 72 - Burkes Pass WWTP upgrade - install outlet flowmeter | LOS | \$25,540 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 77 - WWTP monitoring equip - design & install | LOS | \$210,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 78 - WWTP Influent Screens Design - 3 Sites | LOS | \$22,525 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 87 - Connect Allandale Rd WW to Fairlie WW Network | LOS | \$45,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 95 - Stimulus Package - Programme Delivery | LOS | \$62,722 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Total | | \$2,419,075 | \$776,250 | \$807,044 | \$8,724,800 | \$9,538,700 | \$1,153,600 | \$1,190,500 | \$1,229,800 | \$0 | \$0 |

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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 wastewater 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 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 wastewater 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:

- CCTV inspections – are used to assess the condition of the piped collection system. This provides valuable information on whether the collection system is performing as expected or whether there is water ingress or potential contamination of the surrounding water table. This information is then used in the renewal plan
- Pump stations – the risk of overflows from pump stations includes consideration of the most likely receiving environment (surface water or groundwater). Maintenance and renewal programmes are aligned to ensure these risks are eliminated or minimised. All sewer pump stations have emergency storage to minimise the risk of overflows

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 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

8.3.3 Health and Safety

Council is responsible for providing a safe work environment for its staff and public. Council have aligned MDC Health and Safety practices with the Health and Safety at Work Act 2015. A Health and Safety committee meets regularly, and provides information to all council staff on their obligations in this matter. Council provides training in general and specific safety areas as required.



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

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

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

8.3.4 Business Continuity Plan

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

8.3.5 Civil Defence & Lifelines

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

Council is part of the Canterbury CDEM Group, which involves local authorities, emergency services and major utility operators and others working together to provide Civil Defence for the region.

The Canterbury CDEM Group Plan (June 2014 amended 2018) 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.

8.3.6 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.

8.3.7 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.

8.3.8 Alpine Fault 8

Project AF8 is a cutting edge risk scenario-based earthquake response planning project, informed by thorough earthquake source, expression, and consequences science. The focus of the project is New Zealand's South Island Alpine Fault. Project AF8 commenced in July 2016, with funding from the Ministry of Civil Defence & Emergency Management's Resilience Fund, and is managed by Emergency Management Southland on behalf of all South Island CDEM Groups.

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

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



The SAFER framework includes:

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

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

8.3.9 Pandemic Response – COVID-19

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

| Date | Event | NZ Government Response | MDC Response |
|------------|---|------------------------------|---------------|
| 11/02/2020 | World Health Organisation declares an official pandemic | | |
| 28/02/2020 | NZ first reported case | | |
| 18/03/2020 | | | |
| 21/03/2020 | | Alert Levels (1-4) announced | |
| | | | EOC activated |



| Date | Event | NZ Government Response | MDC Response |
|------------|-------|------------------------|---|
| 24/03/2020 | | Move to Alert Level 3 | |
| 26/03/2020 | | Move to Alert Level 4 | |
| 1/04/2020 | | | |
| 25/04/2020 | | | |
| 27/04/2020 | | Move to Alert Level 3 | |
| 14/05/2020 | | Move to Alert Level 2 | |
| 15/05/2020 | | | Economic & Community Recovery Action Plan |
| 10/06/2020 | | Move to Alert Level 1 | |

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

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

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

Council did not apply for Government funding for shovel-ready projects, instead opting to bring forward shovel-ready projects as part of MDC COVID-19 recovery including \$9.5m of water supply projects. Projects include the new Fairlie Water Treatment Plant and associated reservoir, replacing water pipes in Twizel and Fairlie and upgrading the Burkes Pass water supply treatment plant. In roading, prioritising key shovel ready minor and safety improvement projects, maximising available NZTA co-funding and low interest rates for Council's 49% share. The majority of these projects will be footpaths and shared-use paths to promote a fit and healthy community.

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

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

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

The response to COVID 19 provided a snapshot of how quickly our environment can change and how quickly we can adapt. People working from home. The uptake of technology. Change in



transportation patterns. Online sales and deliveries. Outdoor activities. Socio economic impacts and response. Furthermore, the incidence of a pandemic has the potential flow-on effect of the Council failing some of its non-financial reporting measures.

8.4 Resilience

MDC 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.

Council is not a member of LAPP, but have 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 2002 - Schedule 10, Part 1 (11) requires the Council to clearly define all the significant forecasting assumptions and risks that underlie the financial estimates, assumptions concerning the



useful life of significant assets and an estimate of the potential effects of the uncertainty on the financial estimates provided.

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

GROWTH ASSUMPTIONS

| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|--|--|--|
| | H | M | L | | | |
| <p>Population Growth</p> <p>It is assumed that growth in the district's population will generally be consistent with the medium projections developed for Mackenzie District Council in 2020.</p> <p>These indicate a growth rate of around three percent year on year, with population projections of 6,561 in 2030 and 9,050 in 2050.</p> | ✓ | | | Population change occurs within the district at a higher or lower rate than predicted. | <p>A significant, consistent decline in population may adversely affect Council's ability to set rates at a level affordable to the community.</p> <p>A significant, consistent increase in population could adversely affect Council's ability to meet some service levels.</p> | Council will continue to monitor population measures within the district and respond to meet needs where possible. |
| <p>Demographic Changes</p> <p>Most population growth within the 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.</p> <p>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.</p> | ✓ | | | Demographic changes occur at a higher or lower rate than expected. | <p>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.</p> | Council will continue to monitor demographic changes within the district and respond to meet needs where possible. |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|--|---|--|
| | H | M | L | | | |
| Younger workers (20-30 years) will make up a considerable portion of the population employed in the tourism market. | | | | | | |
| 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. |
| 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 (60%) and Twizel (52%), 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. |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|--|---|---|--|--|---|
| | H | M | L | | | |
| Distribution of development across the district The pattern of growth will be consistent with the spatial planning used to inform the District Plan Review The pattern of growth will be guided by the next generation district plan which will be operative in 2022. Understanding of the growth pattern will be sufficient for infrastructure planning | | ✓ | | Development will be more focused in one area than another Growth will occur at a rate that differs from infrastructure planning and provision | Provision of infrastructure will not align with development | Guide development through the district plan, and track development levels |
| Tourism Numbers It is assumed that visitor numbers will return to pre-COVID-19 numbers around 2022/23, and from that point visitors to Mackenzie District will be at least equivalent to the growth level experienced pre-COVID-19. It is also assumed growth in domestic visitors to Mackenzie District will be significantly higher than pre-COVID-19 while international travel is limited. | | ✓ | | Change to tourism numbers and composition 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. |
| COVID-19 Borders will remain closed to tourists/casual travellers for a further twelve months, at which point limited tourism will resume. From 2021 to 2030 tourism activity will progressively return to 2020 levels | | ✓ | | Borders will remain closed for a significant period, | Economic activity and international migration will be limited, affecting population and business growth. | Council will continue to track trends and provide for the wellbeing of the community. Investment will be advanced to support employment and prepare infrastructure for the future. |



ECONOMIC AND FINANCIAL ASSUMPTIONS

| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|---|---|---|---|--|--|
| | H | M | L | | | |
| Economic activity, income levels and affordability It is assumed that there will sufficient economic activity and incomes within the district to support Council activities | | ✓ | | Service provision becomes unaffordable | If there is insufficient economic activity and incomes of district residents are businesses are strained, it would be difficult for Council to fund the range of activities it is responsible for | Economic activity is tracked and the funding impact strategy is reviewed in line with the economic circumstances |
| 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. Local Government Cost Adjustor Forecasts Three scenarios | If inflation rates are higher than forecast in the financial model this will mean that either additional money will be required, or planned work is reduced to fit the fiscal envelope. If the work is not reduced this could mean using additional reserves, increasing debt or increasing rates. | In preparing the LTP, Council is required to use best estimates in determining the level of costs to be budgeted and to account for the effect of price changes or inflation expected over the ten year period. Council has endorsed the 'mid-scenario' rates produced by BERL (September 2020) 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 |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|---|---|---|--|--|---|
| | H | M | L | | | |
| <p>Interest Rates and Borrowing</p> <p>Borrowing costs are assumed to be as included in Financial Forecasts.</p> <p>Council assumptions on interest rates are based on the Official Cash Rate (OCR) plus an appropriate margin. For the life of the LTP the borrowing rate is assumed to range from 1.7% to 2.4%. That rate will be used for calculating interest rates and will be adjusted annually.</p> | | ✓ | | Forecast interest rates are higher or lower than forecast. | <p>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.</p> <p>The level of works and services rates levied is dependent in part on the interest rate used in Council's internal funding policy.</p> | <p>mitigated through the annual plan process where the annual adjustment can be made.</p> <p>Any exposure to borrowing interest movement will be managed by a preference for a higher percentage of fixed term rates.</p> |
| <p>Waka Kotahi (NZTA) Financial Assistance</p> <p>The Long Term Plan assumes that the subsidy from New Zealand Transport Agency will be 51% across all activities for the life of the Long Term Plan, and that these subsidy rates will remain at this level until the Funding Assistance Rate is reviewed.</p> | | ✓ | | <p>Council's risk is the roading programme may reduce due to a number of factors. These include</p> <ol style="list-style-type: none"> 1. a further change in subsidy rates and/or size of the programme in years 4-10. This plan | <p>The roading programme could be reduced from what is shown, due to limitations on the amount of work NZTA is prepared to financially support. Expenditure may differ in any year from that forecast.</p> | <p>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.</p> |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|---|---|---|---|---|---|
| | H | M | L | | | |
| | | | | assumes Council will maintain or expand its spend through additional unsubsidised work. 2. the NZTA subsidisable programme may differ from what has been assumed, which may impact the Council's spend in future years.. | If Council wanted to continue its roading programme, other funding sources such as rates would need to be utilised. | |
| Dividends received – Alpine Energy Ltd It has been forecast that the dividend based on Council's shareholding will be \$123,000 per year. This value could change from year to year based on Alpine Energy decisions. | | ✓ | | The dividend could be less than that anticipated, | A lower dividend would reduce this funding source, meaning greater reliance on other revenue sources or reduction in expenditure. | While a level of funding is expected, the financial strategy will consider if this revenue stream is lost |
| Development and Financial Contributions Costs associated with growth will be partially funded through development and/or financial contributions | | ✓ | | Council does not recoup costs associated with meeting infrastructure costs associated with growth | The ability to fund infrastructure costs will fall on ratepayers alone. | Council will review its Development Contributions and Financial Contributions policy as part of the Long Term Plan/Infrastructure Strategy process. |
| Waste levy The waste levy will be progressively increased to \$60/tonne, at the same | | | ✓ | That the cost and revenue associated with | That increased waste levy costs will discourage responsible disposal of | Sufficient explanation to the community about the costs and benefits |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|--|--|--|
| | H | M | L | | | |
| time opportunity to receive funding for waste minimisation education and initiatives will increase | | | | the change is inappropriate | waste, and illegal dumping will increase That funding of programmes will not be available for waste minimisation education and initiatives in Mackenzie district. | |
| 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. A proposal with with options would be provided to the community for feedback as part of a special consultation process. |
| 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 appropriate sources as detailed in Council's Revenue and Financing Policy. | | | ✓ | A particular funding source is not available. | Depreciation funds renewals funded mainly through rates and user charges. Should other sources of capital funding such as subsidies or development / financial contributions differ from levels forecast in a particular activity, Council is able to access borrowings through its central treasury function. | |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|---|---|---|
| | H | M | L | | | |
| 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. ✓ | | | | <p>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.</p> <p>Transport projects seeking subsidy will need a Business Case approach to NZTA which may change originally anticipated outcomes.</p> | <p>If projects do not occur as planned, capital expenditure may differ from forecast. Delays may change the cost of individual projects and defer planned borrowing. This will impact on rates increases. Delayed renewals could lead to an increase in maintenance costs.</p> <p>Any significant delay will have a negative Impact on the delivery of future capital programme due to a limited number of resources Council has available to deploy in any one year.</p> | <p>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.</p> <p>High level of vigilance over capital delivery to Executive level, resulting in timely corrective actions if required</p> <p>Regular reporting to Council on the programme so Council has full visibility of programme, milestones, and tracking</p> <p>Programme is prioritized by vulnerability and criticality to ensure projects that would lead to loss of service or additional costs are top of the list</p> <p>Regular market assessments undertaken including critical supply chains to ensure programme is realistic and deliverable</p> <p>Council have the ability to value engineer the project if it exceeds estimates.</p> <p>In addition, the Council has contracted external project managers to oversee the</p> |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|---|---|---|--|---|---|
| | H | M | L | | | |
| | | | | | | |
| programme and project management and delivery of key 3 Water projects. | | | | | | |
| Asset Revaluations Council has a policy of revaluing its buildings, land and infrastructural assets on a three yearly basis. The LTP assumes that the book values of the relevant assets as at the revaluation dates will be increased by per the inflation assumption. | | | ✓ | 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. |
| Planning Horizons and Asset Lifecycles 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. | There is insufficient planning to guide decision making and investment | LTP and IS are thoroughly developed relevant to District issues |
| 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 than 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 |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|------------|---|---|---|------|-----------------------------------|---|
| | H | M | L | | | |
| | | | | | | 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. |



| Assets | Depreciation method | Life (years) |
|------------------------------------|---------------------|--------------|
| Buildings | Straight line | 13-80 |
| Computer hardware | Straight line | 3-10 |
| Computer network cabling | Straight line | 10 |
| Furniture and fittings | Straight line | 10 |
| Heritage assets | Straight line | 60-150 |
| Land | Not depreciated | - |
| Motor vehicles | Straight line | 5 |
| Office equipment | Straight line | 5-10 |
| Light plant and machinery | Straight line | 10-25 |
| Plant and machinery | Straight line | 10-25 |
| Resource recovery parks | Straight line | 10-33 |
| Flood protection and control works | Not applicable | - |
| Landfills | Straight line | 30-50 |
| Village projects | Straight line | 5-80 |

| Assets | Depreciation method | Life (years) |
|-----------------|---------------------|--------------|
| Stormwater | | |
| Lines | Straight line | 60-150 |
| Manholes | Straight line | 150 |
| Open drains | Not depreciated | - |
| Wastewater | | |
| Mains | Straight line | 60-80 |
| Pumps | Straight line | 15 |
| Oxidation ponds | Not depreciated | - |
| Box culverts | Straight line | 100 |
| Manholes | Straight line | 80 |

| Assets | Depreciation method | Life (years) |
|-----------------------|---------------------|--------------|
| Alps 2 Ocean cycleway | Straight line | 50 |
| Formation | Not depreciated | - |
| Surfacing | Straight line | 0-17 |
| Land under roads | Not depreciated | - |
| Roads and footpaths | Straight line | 6-80 |
| Formation | Not depreciated | - |
| Sub-base | Not depreciated | - |
| Base course | Straight line | 75-100 |
| Surfacing | Straight line | 0-17 |
| Kerb and channelling | Straight line | 10-10 |
| Street signs | Straight line | 13 |
| Street lighting | Straight line | 20-40 |
| Bridges | Straight line | 80-100 |
| Resource consents | Straight line | 10-33 |

| Assets | Depreciation method | Life (years) |
|-----------------------|---------------------|--------------|
| Water supplies | | |
| Piping mains | Straight line | 60-80 |
| Pumps | Straight line | 25 |
| Service lines | Straight line | 80-100 |
| Hydrants | Straight line | 80 |
| Valves and air valves | Straight line | 80 |
| Meters | Straight line | 25 |
| Reservoirs | Straight line | 80 |



GOVERNMENT, LEGISLATION AND REGULATION ASSUMPTIONS

| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|---|---|---|---|---|--|
| | H | M | L | | | |
| <p>Legislative Change and Regulatory Reform</p> <p>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 legislation review depends largely on the policy direction and priorities of the government of the day.</p> <p>Reform of the Resource Management Act 1991 will proceed in 2021-22. A new legislative framework will include the Natural and Built Environments Act, the Climate Change Adaptation Act, and the Strategic Planning Act. The Strategic Planning Act is intended to integrate functions under the RMA, Local Government Act 2002, Land Transport Management Act 2003 and the Climate Change Response Act 2002 so changes are also expected with those Acts. It also assumes the Council will remain an independent unit</p> | | | | <p>The impact of government legislation is more or less than expected.</p> <p>New legislation is enacted that alters the activities Council undertakes or provides.</p> | <p>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.</p> <p>Where legislative changes require Council to provide additional services or increased levels of services, this may impact fees and charges for cost-recovery activities.</p> | <p>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.</p> <p>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,</p> |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|--|---|---|
| | H | M | L | | | |
| of local government during the next 10 years. | | | | | | and the mechanisms required to fund any new services. |
| Legislation Reform – Water Services While it is assumed that that there will be change to the ownership and delivery of Three Waters in the next ten years, Council is not able to predict with absolute certainty what those changes will be. It is unlikely that details will be known earlier than mid-to-late 2021. This LTP has been developed on a business-as-usual basis for the delivery of Three Waters; but the change is very likely to occur over the mid-term (3-5 years). The replacement value of all Three Waters assets total \$90.7 million (as of 30 June 2020). Planned capital projects will be valued at \$52.6m at the end of the LTP. The major capital projects are the \$4.8m sewerage reticulation upgrade and \$18.1m waste water treatment plant upgrade. In addition currently underway we have \$7.4m water treatment projects underway (20/21 and 21/22). ¹ | ✓ | | | Legislation changes under urgency in parliament that must be implemented and transitioned to over a period of time | Changes are required to be implemented more quickly than anticipated and the changes are mandatory rather than voluntary. | Council closely monitors any and all developments, and responds accordingly |

¹ All values are inflated values



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|--|---|--|
| | H | M | L | | | |
| 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. |

ENVIRONMENT ASSUMPTIONS

| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|---|---|---|--|--|--|
| | H | M | L | | | |
| Climate Change Climate change is already impacting how our communities live and function and these impacts are expected to increase in magnitude and extent over time. Impacts include increases to mean temperature, with corresponding reductions in snow and frost days. We anticipate an increase in the frequency and severity of extreme weather events. | | | ✓ | <p>There is a risk that climate change effects are not understood and appropriate action taken.</p> <p>There is a risk that Council actions will not be consistent with community opinion.</p> | <p>If climate change happens more quickly or in a different way to that projected; Council may need to carry out work on its infrastructure assets.</p> <p>Council's business units may not recognise climate change in the delivery of their services. Decisions made now without this consideration may have</p> | Climate change assumptions are factored into Council strategies and plans including the District Plan Review and Infrastructure Strategy. Council activities will build appropriate mitigation responses into resilient infrastructure development including the improved water storage in Fairlie, water metering, the establishment of the emergency operations centre |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|--|---|--|
| | H | M | L | | | |
| | | | | | intergenerational effects on land use decisions, environmental policy and infrastructure decisions e.g. relying on undersized assets and resources in highly vulnerable areas. | reserve fund and Council's risk management work through the Canterbury Emergency Management Group. Council will continue to monitor climate change science and the response of central government and adapt its response where required. |
| Natural Hazards / Local Natural Disasters The district is at risk from natural hazards such as flooding, earthquake, and storms. These events can occur at any time, without warning. It assumed that there will be no major adverse events during the period covered by this Long Term Plan beyond Council, Regional and National capabilities. ✓ 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 | 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. Council will progressively build a reserve to fund the local share of Emergency Works applications to NZTA |



| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|---|---|---|---|--|---|---|
| | H | M | L | | | |
| Civil Defence and Emergency Management CDEM functions will continue to be provided across the district, via the Canterbury Regional Group | | ✓ | | CDEM structures and planning are not appropriate for application to Mackenzie | The response to an event would not be suitable | Ongoing involvement in CDEM planning and governance |
| Insurance Council will hold a reserve fund of at least \$3 million to respond to emergencies and that this will be adequate for immediate requirements | | | ✓ | A major event will have significant financial implications that are beyond Council's ability to fund | It is assumed this will be adequate to meet the portion Council needs to fund – this is highly variable | A review is proposed on the insurance of assets and the suitability of a reserve fund as 'self-insurance' |
| Earthquake prone buildings There are no earthquake prone buildings affecting strategic transport routes There are no unknown earthquake risks associated with Council owned buildings. Council's building control responsibilities can be delivered through normal management and operational processes | | | ✓ | Actions required by Council have not been allowed for | Processes are required, that would put additional workload on staff | Actions assigned to staff |

LEVELS OF SERVICE AND SERVICE DELIVERY ASSUMPTIONS

| Assumption | Level of Uncertainty | Risk | Impact of variation to assumption | Management of risk |
|------------|----------------------|------|-----------------------------------|--------------------|
|------------|----------------------|------|-----------------------------------|--------------------|



| | (High/Medium/Low) | | | | |
|--|-------------------|---|---|---|---|
| | H | M | L | | |
| Level of Service It is assumed the level of service expectations of the community will remain similar to current level, or change progressively over time. | ✓ | | | That there is a rapid change in expectations | Service provision may not be able to be adapted quickly to meet changes |
| 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. Council will continue to consider collaboration opportunities and assess changes to service delivery on a case by case basis. | | ✓ | | Maintenance contracts may be re-tendered during the plan period. If maintenance and service contracts are consolidated and/or re-tendered there is a possibility contract prices will be higher than anticipated. | 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. |



OTHER ASSUMPTIONS

| Assumption | Level of Uncertainty (High/Medium/Low) | | | Risk | Impact of variation to assumption | Management of risk |
|--|---|---|---|---|--|--|
| | H | M | L | | | |
| 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 or 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. |
| Collaboration and Shared Services Opportunities for joint initiatives will continue to be explored (e.g. Waste Management Service Delivery, Aoraki Roding Collaboration, Water Services review). District and Community Board Autonomy will remain similar to the current level. | | ✓ | | Council is not sufficiently represented in decision making | Council is unable to provide services that are fit for purpose or efficiently | Council will engage in and commit to combined initiatives for the benefit of Mackenzie residents. |
| Te Rūnanga o Ngāi Tahu and ngā papatipu rūnanga Council has established and enduring relationships with Te Rūnanga o Ngāi Tahu (TRoNT) and the three papatipu rūnanga whose rohe (area) include the Mackenzie District: Te Rūnanga o Arowhenua, Te Rūnanga o Waihao, and Te Rūnanga o Moeraki. | | | ✓ | Engagement and consultation is not effective and appropriate for the relationships | Decision making does not include Maori as required under legislation; or as is appropriate for the wider Mackenzie community | There is ongoing dialog with Te Rūnanga o Ngāi Tahu and ngā papatipu Rūnanga |



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 MDC 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 a 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

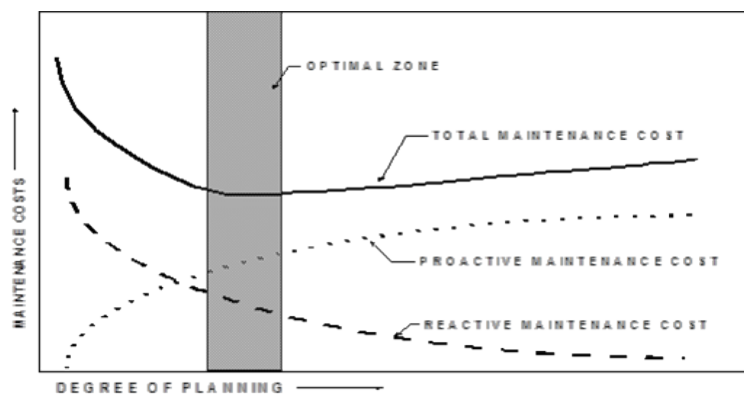
Two categories of maintenance are carried out:

- **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 asset 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 manages the Wastewater 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 |
|--|---|---|----------------------------|
| 1240 - Utilities Services Contract 2020-2025 | 5 years plus potential 5 year extension dependent on mutual agreement | Water Supplies The contract includes the complete operation and maintenance of the following water supplies <ul style="list-style-type: none"> • Fairlie • Lake Tekapo • Twizel • Burkes Pass • Allandale Wastewater Systems The contract includes the complete operation and maintenance of the following waste water systems <ul style="list-style-type: none"> • Fairlie • Lake Tekapo • Twizel • Burkes Pass • Mt Cook Lookout Stormwater System The contract includes the complete operation and maintenance of the following stormwater system <ul style="list-style-type: none"> • 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 either by CCTV or whenever a pipeline is excavated for repair and rated for condition |
| Past Maintenance Costs | Contractor's database | Pipelines are inspected by the Contractor whenever a pipeline is excavated for repair and report on the condition of that section of pipe is provided to the 3 Waters Manager |
| Past History | MDC staff and records | On going review of maintenance cost associated with various sections of pipe are used to predict failure etc. |

9.3.3 Maintenance and Operational Strategies

Wastewater 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

Wastewater maintenance is achieved by employing the following asset strategies:

Table 9-5: Asset Strategies

| Asset | Activities | Comment |
|-------------------------------------|---|---|
| Treatment | Inspection | Weekly and as appropriate |
| Pump Stations | Inspection | Weekly and as appropriate |
| Pumps | Tested | As appropriate |
| SCADA | Check signal | Yearly |
| 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 condition/age/material etc. are sampled during repairs |
| Low grade/ Low Points | Cleaning | As appropriate |
| Manholes | Condition inspection | During maintenance and as required |
| Connections | Inflow inspection | Programmed smoke testing |
| Unplanned Maintenance | | |
| 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 | |



| Asset | Activities | Comment |
|-------|--|---------|
| 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 condition assessment of critical drainage assets are required after each heavy downpour to assess the number of culverts, drains and sumps affected by blockages.

The 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 wastewater assets 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 MDC specifications contained in the utility services maintenance contract.

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

Maintenance Programme

The majority of the wastewater 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 wastewater system to ensure the quality and longevity of the asset |
| 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 |
| Monitoring Planned vs Unplanned Maintenance | The mix of Planned vs Unplanned Maintenance will be analysed periodically to allow optimising of the activities |



| Strategy | Description |
|---------------------------|--|
| 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 wastewater system, controlling operations and increase the knowledge of the asset operation therefore enabling efficiencies to be introduced |
| Effluent Quality | Routine sampling of effluent quality to comply with Resource Consent requirements |
| Sludge Monitoring | Annual sampling of sludge depth to monitor operational performance of ponds |

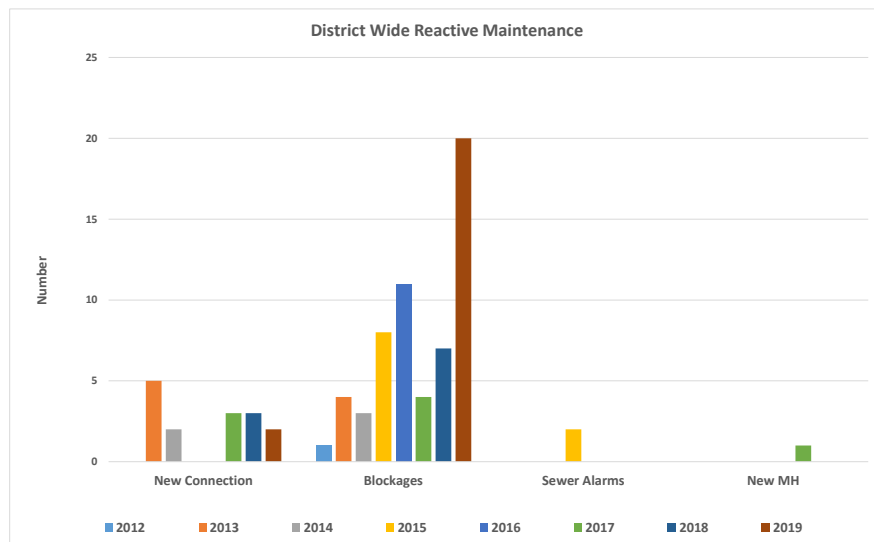
9.3.4 Current Condition

Council rates the condition of the wastewater pipelines and manholes. There is an ongoing inspection and maintenance regime under the routine maintenance contract. Council has a programme of internal inspection of the pipeline by CCTV to also monitor and record condition and performance. This information is used to estimate the condition of similar types of pipe in similar ground conditions. Council has programmed a full CCTV inspection of all sewer mains in 2021/22.

9.3.5 Current Performance

The four sewer networks are performing well with limited blockages. These are generally fat and wipes which get stuck to tree root intrusion. Specific condition for each asset is not currently measured but internal inspections of representative sections of the network are carried out and the results extrapolated across the network. There is good condition information for Foul Sewer assets with the majority of assets graded at 2 or better (88%). Only 1% of the network is graded as having a rating of 4 and no asset is graded as 5 (unserviceable). All pipe networks will be re-evaluated for condition and performance following the CCTV inspection noted above.

Figure 9-2: District Wide Reactive Maintenance



The above reactive maintenance records show that blockages have increased from 2014 to 2016, then dropped back and increased over the last three years. The increase in blockages is associated with an increase in a number of areas:



- wet wipes
- campervan discharges
- tourists

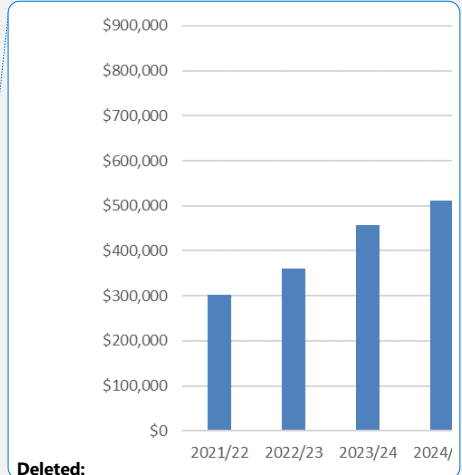
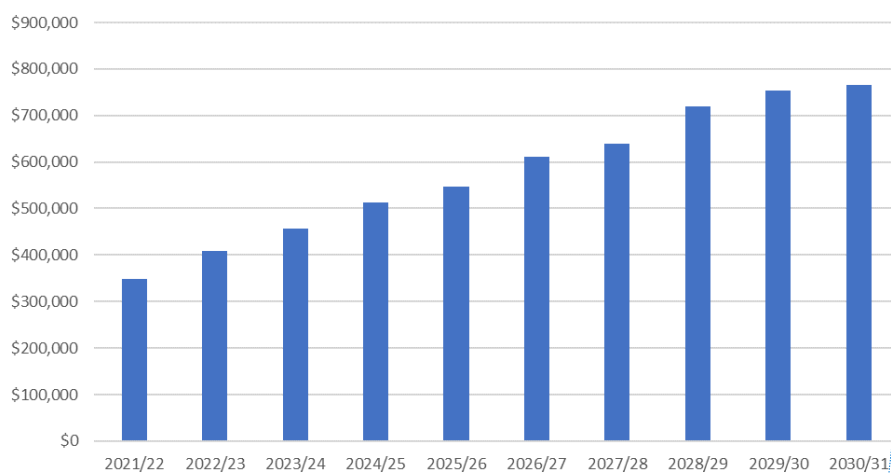
Reactive maintenance records are considered during renewal planning.

9.3.6 Operation and Maintenance Costs

The average annual operation and maintenance costs for the next 10 years is \$576,140 (inflated). The year by year operation and maintenance costs are shown in the figure below.

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Figure 9-3 Operation and Maintenance Costs (inflated)



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9.3.7 Manuals and procedures

Formal procedure manuals for treatment and pump stations have been developed, providing Council's Engineers and Contractors with documented emergency, operations and maintenance procedures required for Council's wastewater assets (IP 5). These are regularly reviewed to ensure documents and processes stay current.

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 sewer surcharge.

Standards



The MDC standards for replacement infrastructure are based on NZS 4404:2010. The O&M Contract specify Approved Materials.

9.4.1 Renewal Strategy

There is currently no documented renewal strategy for the wastewater assets. The maintenance strategies employed provides a basis for such a strategy, and as the maintenance strategies are refined the renewal strategy will be formalised. As noted in 9.3.5, a renewal strategy will be developed following the full internal inspection of the network.

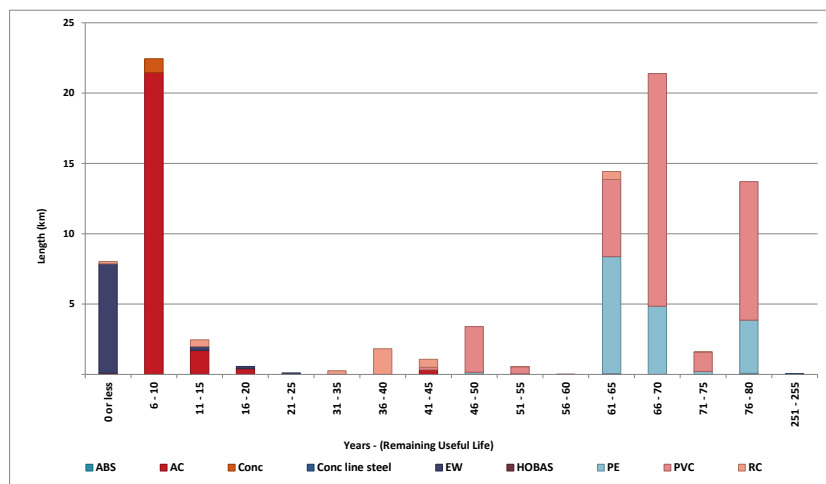
No formal criticality assessment has been documented, but Council engineers use practical experience and skilled application of staff and service providers in consideration of critical assets. This allows for different strategies to be applied depending on priority. For example, a “run to failure strategy” 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.

Currently the primary driver for replacement of an asset is the overall condition and remaining economic life of the asset with the condition of the asset informing the final decision for renewal.

9.4.2 Projected Renewals

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

Figure 9-4: District Wide Projected Renewals



Whilst the above figure identifies the pipe renewal programme based solely on age, it does not provide insights on the actual condition of the pipes. It is widely known that a renewal profile should consider age, condition and asset criticality.

Currently the Council has a very low level of blockage or issues within the wastewater reticulation caused by network pipe failure. The predominate recorded reason for network blockages is fat, roots and foreign material finding its way into the network. When we consider the age of the pipeline network, a proportion of the network is reaching the end of its useful life over the course of the 2021/31 Long Term Plan (noting that 61% of the network is under 30 years old). Council has taken a prudent approach

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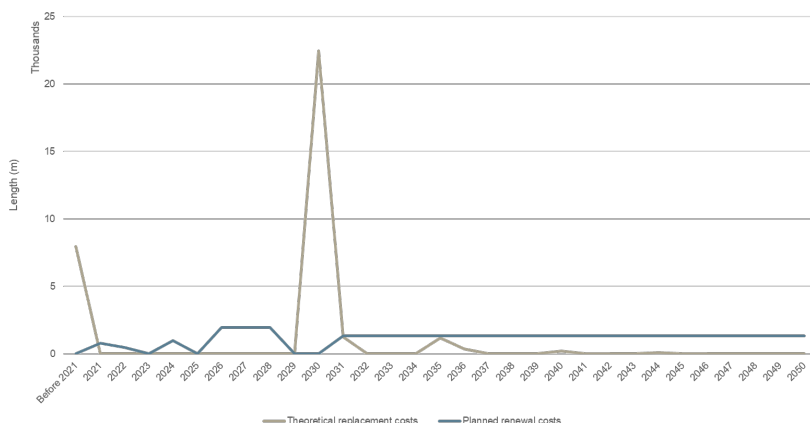
by investing in an increased Closed-Circuit Television (CCTV) program and condition assessment (undertaken in accordance with Water New Zealand's 4th edition of the New Zealand Gravity Pipe Inspection Manual, 2020) to improve its knowledge of the condition of the reticulation. This data collection and assessment process will align with best industry practise and the results will be analysed alongside age and asset criticality data to get a better profile for replacements going forward.

Both anecdotal and recorded network failure history indicates that Council has time to undertake this analysis and it is prudent to do so to target future investment based on sound data and analysis. Until this data is collected (March/April 2022) Council has allowed for a minimum level of renewals (2021/22 has \$400,000 allocated) for cases identified through the CCTV process and are urgent or renewals required for other reasons such as significant root intrusion or 3rd party damage where Council cannot identify the responsible party.

By 30 March 2022 Council will have assessed a further 13 kilometres being all of the priority pipelines. This amounts to 34% of the network over 30 years old and with the previous CCTV information collected, 74% of this older portion of the network will have had a physical condition assessment undertaken.

An indicative programme has since been put together based on the above information and spans across the next 30 years. Figure 9-5 illustrates the difference between the projected and planned renewal profiles. As shown, the large replacement projected for 2030, has been spread across the next 30 years, concentrating on the replacement of AC pipes first and any other parts of the network which were identified during the CCTV assessment.

Figure 9-5 District Wide Projected Renewals vs planned renewals²



9.4.3 Deferred Renewals

There is no deferred work associated with the wastewater system.

9.4.4 Planned Renewals

The planned renewals for the next 10 years are listed in the Table below. This summarises the renewals for each wastewater system. The specific details are discussed within each individual wastewater system in Appendix A – Individual System Description.

All schemes include projects such as SCADA and revaluation, etc.

² Planned renewals are recorded below as sewer reticulation in [Table 9-7](#).

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Table 9-7: Planned Projects (Inflated)

| Project | Fund ing | 2021 -2031 LTP period | | | | | | | | | |
|--|-------------|-----------------------|------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|-------------|
| | | Financial Year | | | | | | | | | |
| | | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029 /30 | 2030 /31 |
| 54 – Treatment | Growth | \$200,000 | \$517,500 | \$796,425 | \$8,179,500 | \$9,538,700 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 63 - Rising Main Mackenzie Park to Twizel WWTP - Design | Growth | \$14,690 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 64 - Rising Main Mackenzie Park to Twizel WWTP - Construct | Growth | \$990,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 65 - Lakeside WW pump station - Design/Construct | Growth | \$48,598 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 73 - Burkes Pass WWTP upgrade - baffles | Growth | \$50,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 29 - Sewer Reticulation – new | LOS | \$400,000 | \$258,750 | \$10,619 | \$545,300 | \$0 | \$1,153,600 | \$1,190,500 | \$1,229,800 | \$0 | \$0 |
| 31 - Pump Station Renewal | LOS | \$300,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 61 - Upsize foul sewer - Fairlie Golf Course | LOS | \$35,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 67 - Deer Fence ponds - Tek, Fle | LOS | \$15,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 72 - Burkes Pass WWTP upgrade - install outlet flowmeter | LOS | \$25,540 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 77 - WWTP monitoring equip - design & install | LOS | \$210,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 78 - WWTP Influent Screens Design - 3 Sites | LOS | \$22,525 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 87 - Connect Allandale Rd VVW to Fairlie WW Network | LOS | \$45,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 95 - Stimulus Package - Programme Delivery | LOS | \$62,722 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Total | | \$2,419,075 | \$776,250 | \$807,044 | \$8,724,800 | \$9,538,700 | \$1,153,600 | \$1,190,500 | \$1,229,800 | \$0 | \$0 |

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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 or blockage due to tree roots or the like. 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 five to thirty years or so. It is proposed to commence sampling of the network and complete a deterioration model to determine more accurately the expected life. AC pipes have different rates of deterioration depending on the material that is flushed through them and the ground conditions that surround the pipe, thus the extended replacement period

Development Standards

MDC 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 wastewater asset. Details for specific assets are included in the following table.

| Asset | Comment |
|---------------|--|
| Pipes | Generally left in the ground or are removed in pieces as part of the excavation to lay the replacement pipe |
| Manholes | Depending on condition, re-used or taken out. |
| Pump stations | Generally removed and the hole filled in. Where possible components are reused, otherwise they are disposed to waste |

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 plants 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 Local Government Act 2002, which covers:

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

Under the Water 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.

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 Long Term Plan (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.

Council outlined the factors considered to be significant. These include:

- a) Affordability of key infrastructure, including implementation of the Drinking Water Standards.
- b) Levels of internal debt currently held by Council and plans to repay that debt over a 25 year period.
- c) Reduction in Central Government roading subsidy contribution.
- d) Property Sales.

Affordability of Key Infrastructure

Upgrades to sewerage and stormwater systems are also required in the Long Term Plan (LTP) period. While no significant change to the operation of most of the Council's stormwater assets is proposed, the Council is required to develop 'stormwater management plans' under the Land and Water Regional Plan, and stormwater discharges will be required to be progressively upgraded to improve discharge quality.

Changes to environmental standards, climatic conditions and growth will also require upgrades to some of the district's sewerage systems. Replacement of deteriorating infrastructure is also required over the term of the LTP.

10.1.2 Rating

The district's urban sewerage schemes vary in age and condition and there are some renewal costs over the next decade. This, combined with an increase in costs to meet environmental quality standards and ensure compliance with consents, leads to an additional financial burden of providing sewerage networks.

In previous years the urban sewerage activity was funded by each town separately through a targeted rate. This meant that each town faced rates rises when upgrades and replacements were required. The Council has now moved to a system of amalgamating the rates for the four urban water supplies across the townships in the district (harmonisation – refer to Section 10.1.3 below).

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 Harmonisation

During the 2015-25 LTP Council consulted with the community on harmonisation of infrastructure costs across the district. Council has done extensive forward planning and this showed that over the next 30 years each town in the district will need to upgrade and maintain much of its infrastructure. These projects come at significant cost. There were concerns that people who rely on a fixed income, such as a pension, might not be able to afford the spikes in rates that would happen in the future as these big projects were undertaken.

Council has decided to address this issue by spreading the costs of each utility across the towns so all users pay the same for each service. Every town will have the same level of service. This will spread the costs smoothly over time and insulate the towns from sudden costly rate increases when capital work is needed. It also ensures the sustainability of the district in the future.



10.1.4 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 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|--------------------------|------|------|------|------|------|------|------|------|------|
| % change (on prior year) | 3.5 | 2.6 | 2.7 | 2.9 | 2.8 | 3.2 | 3.3 | 3.4 | 3.1 |

BERL Mid Scenario Cost Adjustors

10.1.5 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.

10.1.6 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

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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.

Three Waters Stimulus Package

The Council has accepted crown stimulus grant funding for projects as part of the Three Waters Services Reform. The crown has committed approximately \$500m nationwide in tranche 1, and the MDC allocation is \$5.111m, of which \$2.560m has already been received by MDC as an advance payment. These stimulus projects are in addition to current LTP projects already underway.

10.2 Asset Valuation

The last valuation of the Water Supply infrastructural network and associated assets was undertaken as at 1 July 2019 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.

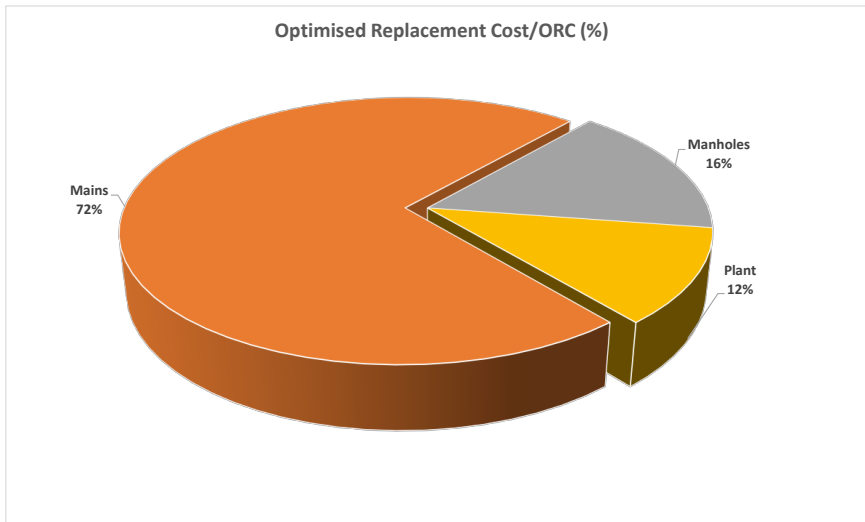
The valuation consists of an assessment of the replacement cost, depreciated replacement cost and the annual depreciation or decline in service potential of the network. The annual depreciation or decline in service potential is the amount the asset declines in value over a year as a result of the remaining 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 (\$) |
|------------|-------------------------------------|--|--------------------------|
| TOTAL | \$34,934,000 | \$21,553,195 | \$443,847 |

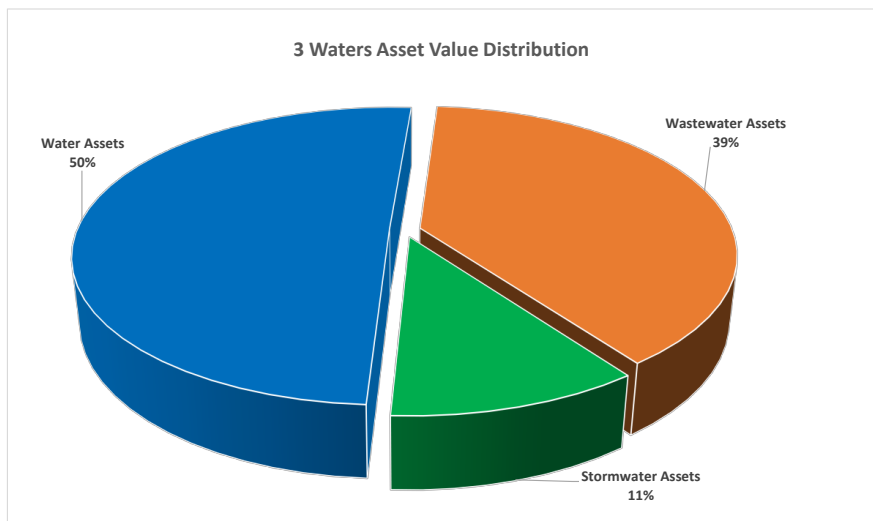
The total optimised replacement cost of the Wastewater Infrastructure was assessed to be \$34,934,000 as at 1 July 2019. The total optimised depreciated replacement cost was assessed to be \$21,553,195.

The annual depreciation has been determined to be \$443,847 per annum

**Figure 10-1: Asset Valuation**

The table and figure below shows the asset value distribution of the water, wastewater and stormwater assets.

| Water Replacement Costs | Wastewater Replacement Costs | Stormwater Replacement Costs |
|-------------------------|------------------------------|------------------------------|
| \$44,843,496 | \$34,934,000 | \$9,801,000 |

Figure 10-2: 3 Waters Asset Value Distribution

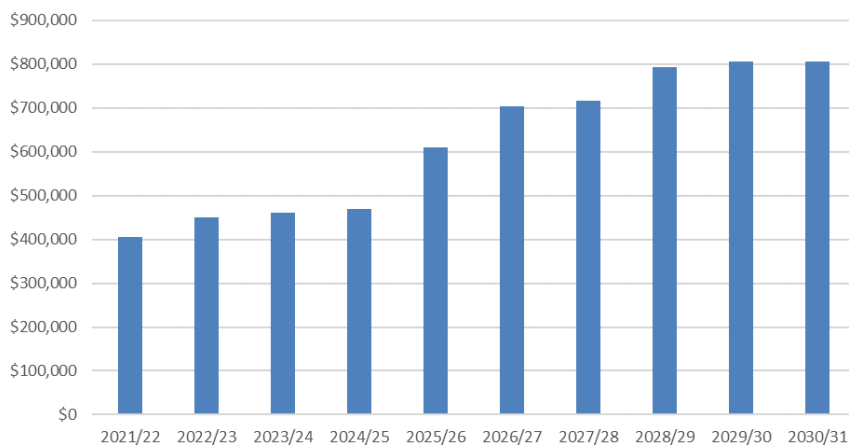


10.2.1 Depreciation

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. The annual depreciation for water assets has been determined to be \$404,688 per annum (in 2021/22) and increases over the 10 year period as the council takes on additional vested assets and capital projects are complete as shown in the figure below.

Figure 10-3 Annual depreciation (inflated)



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 MDC Improvements and Infrastructure Asset Valuation.

Borrowing costs were excluded from the valuation.

The primary data source for this revaluation was MDC'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) |
|-----------------|------------------------------|
| Mains | 60-80 |
| Pumps | 20 |
| Oxidation ponds | Not depreciated |
| Manholes | 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 Wastewater activity are tabled and graphically illustrated below:



Table 10-2: Future Financial Requirements (Inflated)

| Project | Funding | 2021 -2031 LTP period | | | | | | | | | |
|--|---------|-----------------------|------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|------------|------------|
| | | Financial Year | | | | | | | | | |
| | | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/30 | 2030/31 |
| 54 - Treatment | Growth | \$200,000 | \$517,500 | \$796,425 | \$8,179,500 | \$9,538,700 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 63 - Rising Main Mackenzie Park to Twizel WWTP - Design | Growth | \$14,690 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 64 - Rising Main Mackenzie Park to Twizel WWTP - Construct | Growth | \$990,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 65 - Lakeside WW pump station - Design/Construct | Growth | \$48,598 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 73 - Burkes Pass WWTP upgrade - baffles | Growth | \$50,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 29 - Sewer Reticulation - new | LOS | \$400,000 | \$258,750 | \$10,619 | \$545,300 | \$0 | \$1,153,600 | \$1,190,500 | \$1,229,800 | \$0 | \$0 |
| 31 - Pump Station Renewal | LOS | \$300,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 61 - Upsize foul sewer - Fairlie Golf Course | LOS | \$35,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 67 - Deer Fence ponds - Tek, Fle | LOS | \$15,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 72 - Burkes Pass WWTP upgrade - install outlet flowmeter | LOS | \$25,540 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 77 - WWTP monitoring equip - design & install | LOS | \$210,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 78 - WWTP Influent Screens Design - 3 Sites | LOS | \$22,525 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 87 - Connect Allandale Rd VVW to Fairlie WW Network | LOS | \$45,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 95 - Stimulus Package - Programme Delivery | LOS | \$62,722 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Total | | \$2,419,075 | \$776,250 | \$807,044 | \$8,724,800 | \$9,538,700 | \$1,153,600 | \$1,190,500 | \$1,229,800 | \$0 | \$0 |

¹Three Waters Reform Projects

Table 10-3: Three Waters Capital Projects (Inflated)

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/30 | 2030/31 |
|--------------------|---------------------|--------------------|--------------------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Water | \$11,395,421 | \$5,643,855 | \$1,011,991 | \$1,475,582 | \$957,237 | \$1,001,325 | \$1,015,497 | \$1,049,019 | \$1,084,675 | \$1,151,058 |
| Waste water | \$2,419,075 | \$776,250 | \$807,044 | \$8,724,800 | \$9,538,700 | \$1,153,600 | \$1,190,500 | \$1,229,800 | \$0 | \$0 |
| Stormwater | \$409,670 | \$414,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Grand Total | \$14,224,166 | \$6,834,105 | \$1,819,035 | \$10,200,382 | \$10,495,937 | \$2,154,925 | \$2,205,997 | \$2,278,819 | \$1,084,675 | \$1,151,058 |

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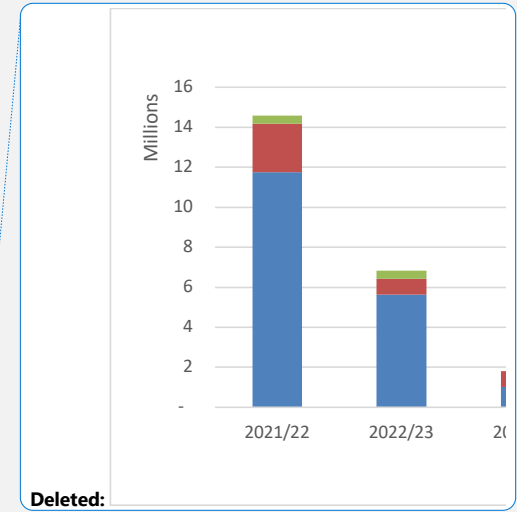
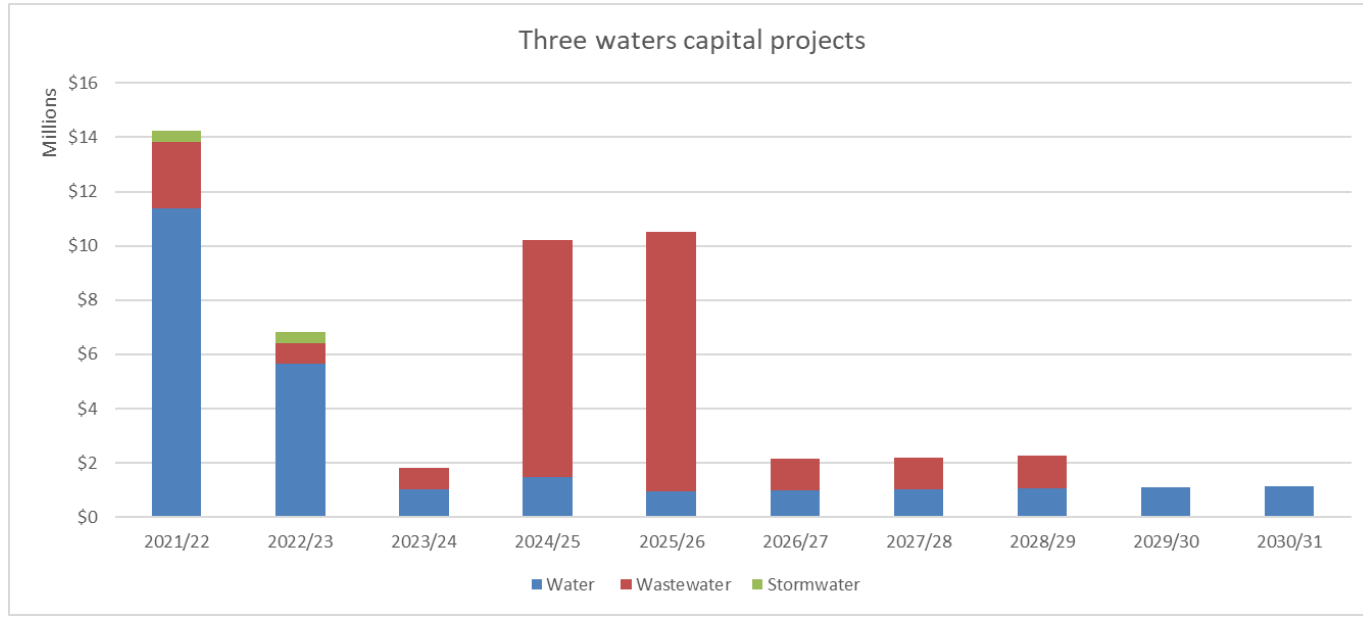




Table 10-4: Annual Net Cost – Funding Impact Statement

| Sewer | Annual Plan | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/2030 | 2030/31 |
|---|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/2030 | 2030/31 | |
| | | | | | | | (thousands) | | | | | |
| General Rates, uniform annual general charges, rates penalties | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Targeted rates | 715 | 823 | 990 | 1,048 | 1,228 | 1,433 | 1,670 | 1,737 | 1,933 | 1,921 | 1,920 | 1,920 |
| Subsidies and grants for operating purposes | 0 | 1,661 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fees & Charges | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Internal charges and overheads recovered | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local authorities fuel tax, fines, infringement fees and other receipts | 14 | 20 | 21 | 21 | 22 | 22 | 23 | 24 | 25 | 25 | 26 | 26 |
| Total operating funding (A) | 729 | 2,504 | 1,011 | 1,069 | 1,250 | 1,455 | 1,693 | 1,761 | 1,958 | 1,946 | 1,946 | |
| Applications of Operating Funding | | | | | | | | | | | | |
| Payments to staff and suppliers | 477 | 2,059 | 816 | 828 | 656 | 652 | 668 | 698 | 830 | 816 | 828 | 828 |
| Finance costs | 0 | 3 | 4 | 9 | 24 | 91 | 204 | 231 | 218 | 206 | 194 | 194 |
| Internal charges and overheads applied | 29 | 28 | 30 | 32 | 31 | 31 | 34 | 32 | 33 | 35 | 34 | 34 |
| Other operating funding applications | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total applications of operating funding (B) | 506 | 2,090 | 850 | 869 | 711 | 774 | 906 | 961 | 1,081 | 1,057 | 1,056 | |
| Surplus (deficit) of operating funding (A-B) | 223 | 414 | 161 | 200 | 539 | 681 | 787 | 800 | 877 | 889 | 890 | |
| Sources of Capital Funding | | | | | | | | | | | | |
| Subsidies and grants for capital expenditure | 0 | 1,519 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Development and financial contributions | 0 | 559 | 650 | 675 | 1,215 | 1,126 | 1,362 | 1,400 | 1,568 | 1,641 | 1,456 | 1,456 |
| Increase (decrease) in debt | 0 | -19 | 281 | 237 | 1,867 | 7,732 | -587 | -558 | -530 | -504 | -430 | -430 |
| Gross proceeds from sale of assets | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lump sum contributions | 458 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other dedicated capital funding | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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| Sewer | Annual Plan | | | | | | | | | | |
|---|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/2030 | 2030/31 |
| | | | | | | (thousands) | | | | | |
| Total sources of capital funding (C) | 458 | 2,059 | 931 | 912 | 3,082 | 8,858 | 775 | 842 | 1,038 | 1,137 | 976 |
| Applications of capital funding | | | | | | | | | | | |
| Capital expenditure | | | | | | | | | | | |
| To meet additional demand | 0 | 1,303 | 518 | 796 | 8,180 | 8,417 | 0 | 0 | 0 | 0 | 0 |
| To improve the level of service | 15 | 1,116 | 259 | 11 | 545 | 1,122 | 1,154 | 1,191 | 1,230 | 0 | 0 |
| To replace existing assets | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Increase (decrease) in reserves | 666 | 54 | 315 | 305 | -5,104 | 0 | 408 | 451 | 685 | 2,026 | 1,866 |
| Increase (decrease) of investments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total applications of capital funding (D) | 681 | 2,473 | 1,092 | 1,112 | 3,621 | 9,539 | 1,562 | 1,642 | 1,915 | 2,026 | 1,866 |
| Surplus (deficit) of capital funding (C-D) | -223 | -414 | -161 | -200 | -539 | -682 | -774 | -787 | -864 | -875 | -875 |
| Funding Balance ((A-B) +(C-D)) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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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 have been achieved. The following table details improvements achieved to date.

Table 11-1: 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 | Complete | June 2017 | |
| Undertake customer surveys with defined performance targets. | Completed | 2016 | Ongoing |
| Develop a model of the Twizel Sewer Network to determine what impact development will have on specific areas. | Ongoing | June 2017 | This is due for completion in 2021/22 as part of the 3 waters stimulus package |
| Conduct a research study, to determine the impact of the Land and Water Plan as produced by Environment Canterbury as it applies to MDC. | Ongoing | June 2017 | |
| Complete a Customer Survey, including local industry, to establish any changes in customer expectations as they relate to demand on the network. | Completed | 2016 | On going |
| 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 5.0 |
| 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 | |
| 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. | | | |
| | | | |

11.2 Improvement Plan Focus

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

- Protecting our communities from wastewater related health issues by providing community reticulated systems in agreed areas
- Protecting the natural environment
- Risk Management
- System knowledge update
- Investigating innovative ways to provide an efficient and cost effective wastewater collection and treatment system and ensure ongoing affordability of the wastewater 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 11-2: Current Improvement Plan

| IP # | Reference Section | Project Description | Timeline | Responsibility | Internal/External Resource |
|------|------------------------|--|----------|----------------|----------------------------|
| IP 1 | Section 4.9 | Develop a formal documented criticality assessment | | | |
| IP 2 | Section 5.2.3 | Develop hydraulic network models | | | |
| IP 3 | Section 7.6.1 | Continue infiltration reduction programme | | | |
| IP 4 | Section 8.3 | Develop Risk Management Schedule including all associated documents | | | |
| IP 5 | Section 9.3.7 | Develop & maintain Operation and Maintenance Manuals (ongoing) | | | |
| IP 6 | Section 6.9.6 | Provide a mechanism for prosecution of illegal septage disposal during the next bylaw review | | | |
| IP 7 | Section A4.7 | Investigate options for Burkes Pass wastewater treatment | | | |
| IP 8 | Section A2.611.6A2.6.3 | Tekapo Wastewater Treatment – Issues & Options | | | |



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 or totally inappropriate. 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 Long Term Plan 2021-31 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 2023. 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 3 Waters Manager.



APPENDIX A INDIVIDUAL SYSTEMS DESCRIPTION

A1 Fairlie Wastewater System

A1.1 Overview

| Description | | Quantity |
|---|------------------------------------|---|
| Population Served 2020 % of district served by community wastewater system | | 693 (900 during holidays) 31% |
| Type of Collection | | Gravity |
| Properties | Able to connect | 527 |
| | Connected | |
| | residential | |
| | commercial | |
| | industrial | |
| Total Connected | | 474 |
| History | Original scheme installed in | 1938 |
| Demand | Average Dry Weather Flow (design) | 3.14 l/s (271 m ³ /day) |
| | Peak Wet Weather Flow (5.3 x ADWF) | 42.1 l/s (3,637.44 m ³ /day) |
| Length of reticulation | | 12.9km |
| Number of manholes | | 104 |
| Number of pump stations | | 1 |
| Treatment | Treatment | Oxidation ponds |
| | Disinfection | None |
| Disposal | | To land |
| Infiltration | | Extent unknown |
| Financial | Funding | Universal rate |
| | Annual maintenance cost (2015/16) | \$25,002 |
| | % of District Wastewater O&M | 21% |

A1.2 Key Issues for Service

| Issues | Resolution |
|---|--|
| Illegal dumping of septage at treatment plant | CCTV cameras at the treatment plant |
| Consent compliance | Reduce high faecal count through improved treatment efficiency and increased monitoring of DO, COD & BOD |
| Pond sludge levels | Milliscreen at intake to improve treatment |
| | Monitor, consider options and desludge |



A1.3 Overview & History

The Fairlie wastewater system was first constructed in 1938 using earthenware pipes with cement joints. The Initial Oxidation ponds were constructed in 1971 and then upgraded in 2002.

The five soakage basins were constructed in 2004 to remove the discharge from the Opihi River. Now all effluent either evaporates or discharges to ground.

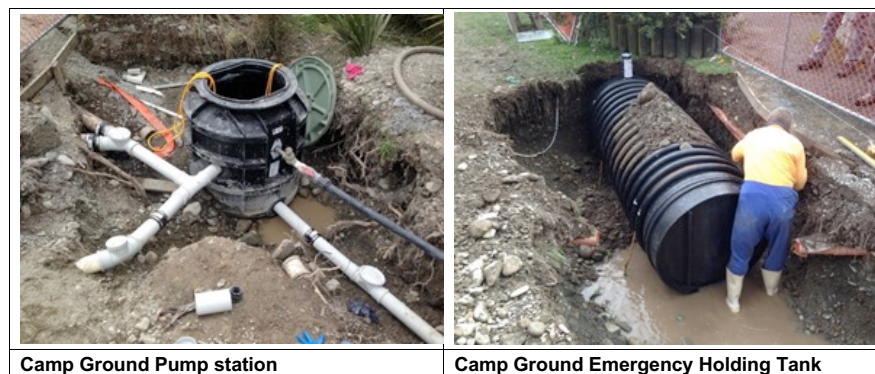
Extensions of pipelines over the years have been mainly in PE and uPVC.

Foul Sewer Oxidation pond and disposal system is located on Talbot Road.

A1.3.1 Reticulation

There are 6.9km of earthenware pipe in Fairlie. These were originally condition rated in 2000 as 4. Over the last number of years the sewer mains have been inspected through CCTV. A replacement programme will be developed based on the CCTV records, condition, criticality, etc. Current programming allows for \$877,000 over the period 2022/23 to 2027/28 starting with \$250,000 in 2022/23 and concluding with \$127,000 in 2027/28. Replacement options include dig and relay with new pipe or in-situ refurbishment using relining techniques or pipe bursting.

Figure 11-1: Fairlie Installations



Generally speaking, all of the systems in Fairlie are in a good state of repair and if they are maintained and renewed regularly, and at the appropriate times, they can be expected to last indefinitely, without any significantly abnormal costs having to be incurred.

A1.3.2 Pump Stations

There is only one pump station in Fairlie. This collects the effluent from the Camping Ground and pumps it via a rising main into the gravity system.

The original Camp Ground Pump Station was decommissioned and a new EOne pump system was installed in 2014. The system installed was a Model 2014iP 1100 x 2000mm supplied by Ecoflow Ltd.

The pump station has two EOne 0.75 kW submersible grinder pumps and an alarm panel as part of the package. The Duplex station is rated for 4000litres per day. With both pumps running it pumps 1.2 l/s.

A1.3.3 Treatment Plant

The initial oxidation ponds were constructed in 1971 and then upgraded in 2002 with the dividing up of the secondary pond with solid bunds and filter paths at the ends. This was to control the flow paths through the ponds. The soakage basins were constructed in 2004.



The effluent enters the ponds in the south west corner travelling a long flow path to exit the pond system at the north east corner.

The treated effluent then enters the soakage system to finally discharge to ground via the soakage basins. The five soakage basins are automatically rotated in the following sequence:- Basin 1 – 3 - 5 – 2 then 4.

Figure 11-2: Fairlie WW Treatment Plant



Primary pond – 1.098ha

Maturation ponds (5) – 0.60ha

A1.3.4 Flow and Loading Estimations (Original Design)

Flow and loading monitoring is now in place for the discharge. However, the following assumptions were used during the investigation and design of the wastewater treatment and disposal investigation.

Loadings

Allowing a standard contribution of 75g BOD/person/day and a population of 1,000 then an average loading of 75 kg/day is expected. This is a reasonable estimation because the town is largely residential with some commercial properties which are typically quite stable contributors. The 75g BOD/person/day is an upper value with a range of 60-75 being used in assessments elsewhere. The large number of school children arriving to town each day, relative to the base population supports the use of the upper value.

Flows

Significant infiltration is expected. A good approach for estimation of flows is given by the Christchurch Drainage Board Design Manual. This approach was used in the Status Report, assuming a population of 800. As a design population of 1,000 has been chosen, the flows have been reworked with this increased population.

The Average Wastewater Flow (AWF) can be reliably approximated with an allowance of 270 l/day/person which gives a flow of 3.14 l/s. Determination of the Peak Wet Weather Flow (PWWF) and the Peak Dry Weather Flow (PDWF) can be achieved by the Christchurch Drainage Board method as shown in the table below:

**Appendix Table 1: Flow estimations (l/s)**

| | Area (ha) | AWF | P/A | PDWF | BI | SA | PWWF |
|--------------|-------------|-------------|-----|-------------|------------|-------------|-------------|
| Total | 70.3 | 3.14 | | 23.1 | 4.9 | 14.1 | 42.1 |

Notes:

AWF = Average Wastewater Flow

P/A = Peak to Average ratio which increases for smaller catchments

BI = Basic Infiltration which allows for sub-surface infiltration

SA = Storm Allowance which allows for surface infiltration (e.g. through manhole covers) and increased sub-surface infiltration

PDWF = Peak Dry Weather Flow

PWWF = Peak Wet Weather Flow

From the above table, wet weather and groundwater infiltration will have a significant effect on the flow rate. Fairlie has a remarkably consistent rainfall from month to month through the year with only April having a significantly higher precipitation than the other months. Hence the infiltration rate will be assumed as consistent when evaluating an Average Wastewater Flow (AWF). The AWF will be assumed to be the sum of the Average Sewage Flow and the Basic Infiltration or 8.04 l/s.

The minimum flow rate can be assumed to be less than the AWF of 3.1 l/s. The new system is operating effectively and we are experiencing no issues with it.

Two surveys have been completed approximately three years apart to monitor sludge levels within the ponds. Monitoring is ongoing. Installation of a milliscreen at the intake is considered to improve treatment and will lessen the rate of sludge build up.

Installation of a Milliscreen and desludging of the pond is programmed for 2021/22.

A1.4 Environmental Management

The following table list the resource consent associated with the Fairlie Wastewater System.

| Consent # | Description | Expiry Date | Allowable discharge |
|-------------|------------------------|------------------|----------------------------------|
| CRC992647 | Discharge odour to air | 17 December 2038 | Not applicable |
| CRC992608.1 | Discharge to land | 17 December 2038 | 650m ³ /day (average) |

The Fairlie wastewater treatment plant complies with the above resource consents for air and effluent discharge.

A weather station, connected to the SCADA, was installed at the treatment plant to monitor the temperature, rainfall and wind strength and direction.

A1.5 Demand

Detailed work was completed as part of the upgrade of the treatment facility in 2002. Reports for the Fairlie Oxidation Ponds state:

Allowing a standard contribution of 75g BOD/person/day and a population of 1000 then an average loading of 75 kg/day is expected. This is a reasonable estimation because the town is largely residential with some commercial properties which are typically quite stable contributors. The 75g BOD/person/day is an upper value with a range of 60-75 being used in assessments elsewhere. The large number of school children arriving to town each day, relative to the base population supports the use of the upper value.

Significant infiltration is expected. A good approach for estimation of flows is given by the Christchurch Drainage Board Design Manual. This approach was used in the Status Report, assuming a population

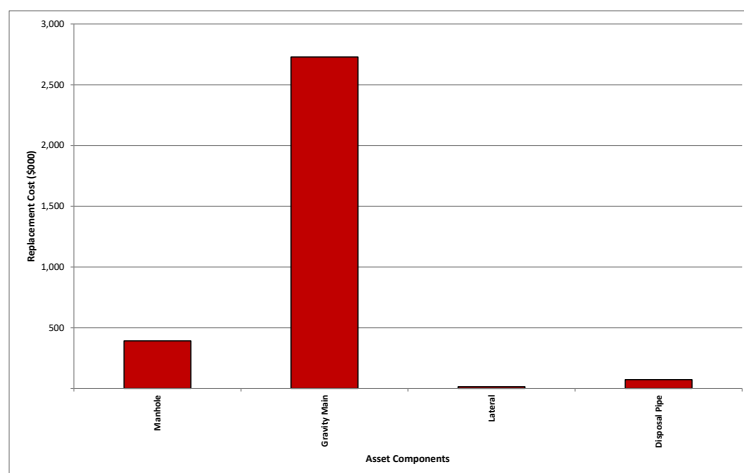


of 800. As a design population of 1000 has been chosen, the flows have been reworked with this increased population.

With a population of 717 (2006) at a peak holiday loading estimated at 900 then there is capacity in the treatment facility without further pre-treatment. Over winter problems can occur with high water tables causing increased infiltration in a number of locations these are private drains but regular monitoring of the known sites and smoke detection surveys will need to be carried out to locate any large infiltration and remedy it. This used to create an issue of non-compliance with our resource consent but the conditions were varied in 2008 to allow for discharge of the increased flows.

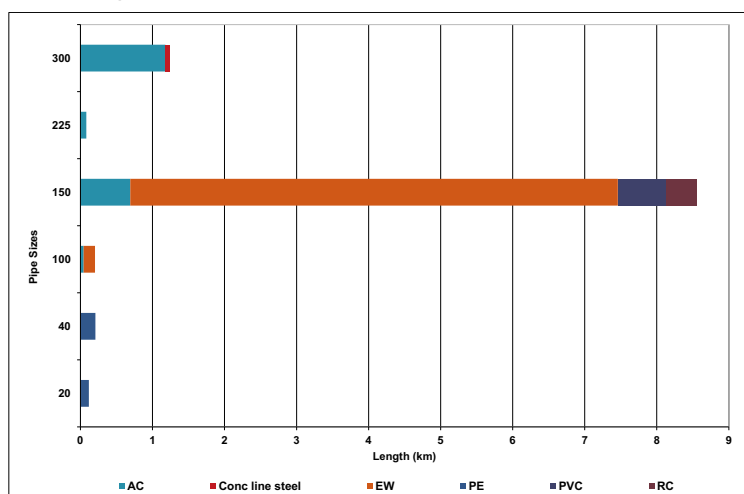
A1.6 Asset Details

Appendix Figure 1: Replacement Costs Reticulation



Gravity mains make up 85% of the total asset values.

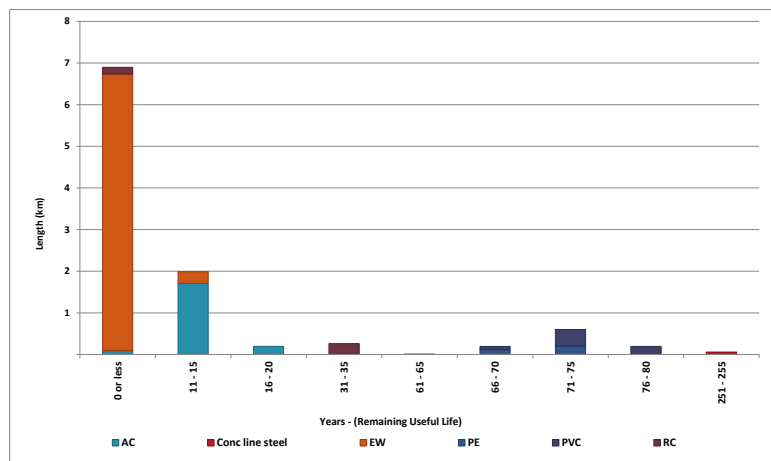
Appendix Figure 2: Wastewater Main Diameters





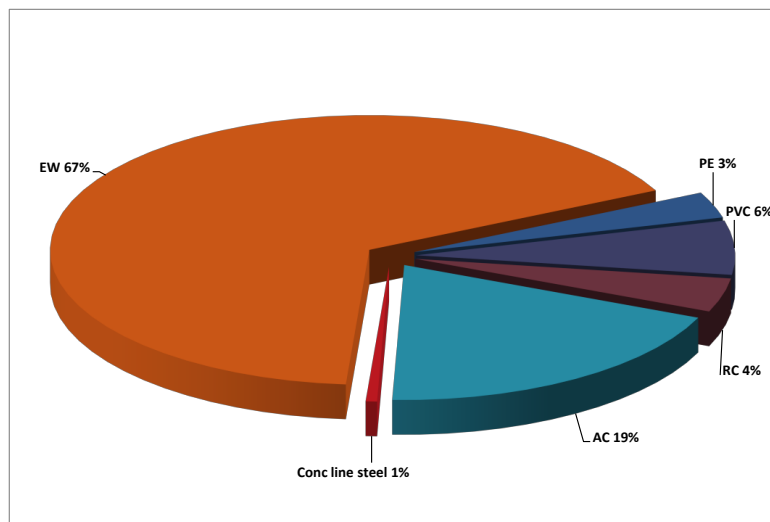
Ø150mm pipe make up 82% of the sewer main length. Of this 79% is EW. Ø300mm pipe make up 12% of the sewer main length.

Appendix Figure 3: Pipe Age Group Replacement Cost



There is 6.9km of pipe (mainly EW) that has reached the end of its expected useful life. There is 2km of pipe (mainly AC) that will reach the end of its expected useful life within the 11-15 year window.

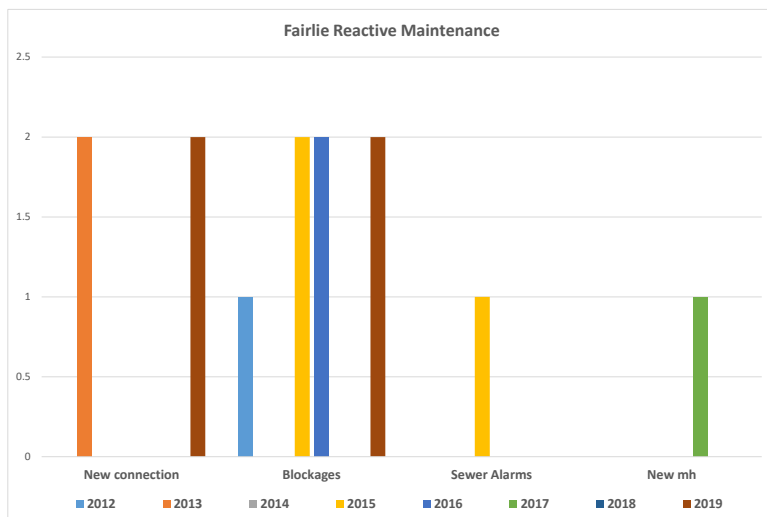
Appendix Figure 4: Sewer Main Material



The graph shows that 67% of the reticulation consist of EW and 19% of AC. The remainder is made up of PVC, Concrete and Concrete lined Steel



Appendix Figure 5: Reactive Maintenance



Reactive maintenance records consists of alarms, blockages, new connections and ne manholes. There were 2 blockages in 2015, 2016 and 2019.

The map displays the Fairlie Sewerage Network, with sewer lines color-coded by diameter in millimeters. The network is concentrated in the central urban area, following major roads like Main Street and connecting to various residential streets. A legend in the bottom left corner provides the key for the line colors.

| Sewerlines by Diameter_mm |
|---------------------------|
| 40 |
| 60 |
| 80 |
| 90 |
| 100 |
| 150 |
| 175 |
| 200 |
| 225 |
| 280 |
| 300 |
| 375 |

Streets shown include: Main Street, Church Street, Victoria Road, Mill Street, and many others. The map also shows the coastline and surrounding green spaces.

Digital map data supplied by TerraNova Ltd. Sourced from Land Information New Zealand (LINZ) (©TerraNova 2010)

This information has been taken from Mackenzie District Council databases and maps.
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.

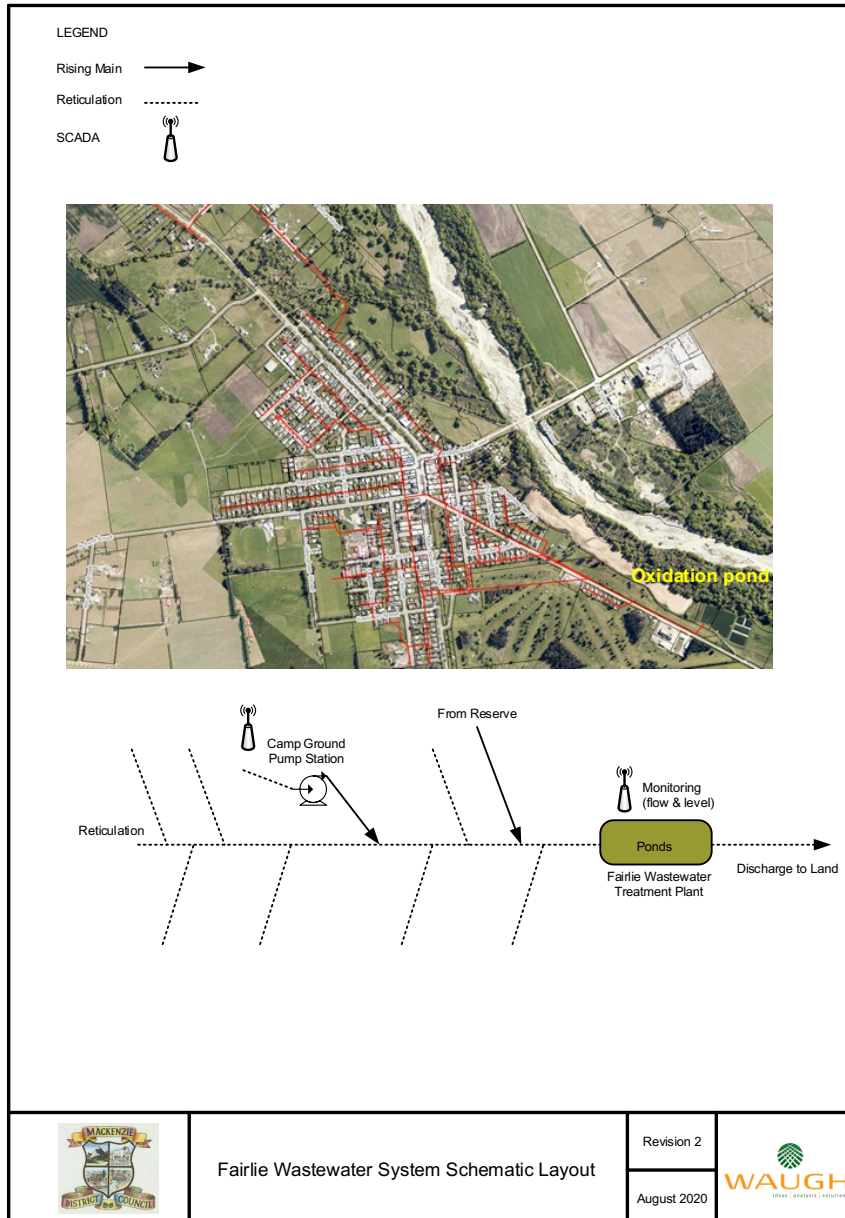
FAIRLIE SEWERAGE NETWORK

Council assets shown are indicative only
Check advice on asset location

Mackenzie District Council
GIS - MapInfo Ver 8.0
Version Control ##
Date: 02/09/2011



A1.8 System Schematic





A2 Lake Tekapo Wastewater System

A2.1 Overview

| Description | | Quantity |
|---|-----------------------------------|-----------------------------|
| Population Served 20** | | 369 (1,050 during holidays) |
| % of district served by community wastewater system | | 17% |
| Type of Collection | | Gravity and pumping |
| Properties | Able to connect | 687 |
| | Connected | |
| | residential | |
| | commercial | |
| | industrial | |
| TOTAL Connected | | 525 |
| History | Original scheme installed in | 1950's |
| Demand | Average Dry Weather Flow (design) | m ³ /day |
| | Peak Wet Weather Flow (4 x ADWF) | l/s |
| Length of reticulation | | 27.8km |
| Number of manholes | | 362 |
| Number of pump stations | | 3 |
| Treatment | Treatment | Oxidation Ponds |
| | Disinfection | None |
| Disposal | | To land |
| Infiltration | | Extent unknown |
| Financial | Funding | Universal rate |
| | Annual maintenance cost (2015/16) | \$55,545 |
| | % of District Wastewater O&M | 46% |

A2.2 Key Issues for Service

| Issues | Resolution |
|---|--|
| Disposal of effluent (consent limits) | Investigate, consider resolution options and implement |
| | New location & facility or upgrade existing |
| Capacity of Lakeside Drive Pump Station | Upgrade PS (Capital & Development Contributions) |
| Pond sludge levels | Monitor, consider options and desludge |

A2.3 Overview & History

The Lake Tekapo wastewater system was first constructed in the 1950's when Lake Tekapo served as a base for the Ministry of Works and New Zealand Electricity Department (NZED). The presence of these Government entities is now minimal and Lake Tekapo has become a popular tourist destination, with several resort hotels, restaurants, camping ground, residential area, etc. Recently the Tekapo township has seen a growth in subdivision with significant developments on both sides of the river.



Since the installation of the reticulation a variety of pipe materials have been used in the reticulation. The current oxidation pond was constructed during 1972 and located on Council land off Murray Place, with discharge by way of trickle irrigation to the south of the site.

A2.4 Reticulation

There are 1.4km of earthenware pipe in Tekapo. These mains have been inspected by means of CCTV. If analysis of the CCTV records confirms significant deterioration, then the 1,400m of sewer main will be programmed for replacement or refurbishment. The replacement programme will likely be scheduled outside the term of this Plan. Replacement options include dig and relay with new pipe or in-situ refurbishment using relining techniques or pipe bursting.

Generally speaking, all of the systems in Tekapo are in a good state of repair and if they are maintained and renewed regularly, and at the appropriate times, they can be expected to last indefinitely, without any significantly abnormal costs having to be incurred.

A2.5 Pump Stations

There are three Foul sewerage pump stations in Tekapo. Two recently constructed (Sealy St and Domain) constructed in 2005 using modern engineering design. They are both connected to the Fairlie office by telemetry, monitoring a range of functions. Both have eight hours over flow storage at peak flow.

The third one is the Lakeside Drive pump station and is connected to the telemetry. The pump station storage was upgraded during 2018.

| Sealy Street Pump Station (installed 2005) | | | |
|--|-------------|----------------|--------------|
| Duty Regime | Q max (l/s) | H total (m) | H static (m) |
| Initial stage | 77 | 31.4 | 24.6 |
| Future stage (3 rd pump) | 77 | 31.4 | 24.6 |
| Data on two pumps installed | | | |
| Make | | Flygt | |
| Model | | NP 3202.180 HT | |
| Outlet size | | DN 150 | |
| Impeller diameter | | 344mm | |
| Motor output rating | | 37kW | |
| Motor rated current | | 63A | |
| Motor poles | | 4 | |
| Motor efficiency | | 91% | |
| Motor power factor | | 0.90 | |
| Base frequency | | 57Hz | |
| Rated speed | | 1,475rpm | |
| Inground storage capacity | | 120,000 litres | |

| Domain Pump Station (installed 2005) | | | |
|--------------------------------------|-------------|-------------|--------------|
| Duty Regime | Q max (l/s) | H total (m) | H static (m) |
| Initial stage | 77 | 31.4 | 24.6 |
| Future stage (3 rd pump) | 77 | 31.4 | 24.6 |
| Data on two pumps installed | | | |
| Make | | Flygt | |



| Domain Pump Station (installed 2005) | | | |
|--------------------------------------|----------------|-------------|--------------|
| Duty Regime | Q max (l/s) | H total (m) | H static (m) |
| Model | NP 3202.180 HT | | |
| Outlet size | DN 150 | | |
| Impeller diameter | 344mm | | |
| Motor output rating | 37kW | | |
| Motor rated current | 63A | | |
| Motor poles | 4 | | |
| Motor efficiency | 91% | | |
| Motor power factor | 0.90 | | |
| Base frequency | 57Hz | | |
| Rated speed | 1,475rpm | | |
| Inground storage capacity | 120,000 litres | | |

| Lakeside Drive Pump Station (installed 1990 and upgraded in 2021 & again as part of Station Bay Stage 2) | | | |
|--|------------------------------------|-------------|--------------|
| Duty Regime | Q max (l/s) | H total (m) | H static (m) |
| Initial stage | 10.0 | 23.4 | 12 |
| Data on two pumps installed | | | |
| Make | Flygt | | |
| Model | 3127 | | |
| Outlet size | DN 100 | | |
| Impeller | 248 | | |
| Motor output rating | 4.2kW | | |
| Wet Well Chamber | 1800dia Class x pipe (4.4m length) | | |
| Ground Level | 715.6m | | |
| PS Invert Level | 711.0m | | |
| Discharge MH invert level | 723.25m | | |
| Rising Main | DN 100 Class C PVC-U | | |
| Rising Main Length | 354m | | |
| Inground storage capacity | 98,000 litres | | |

A2.6 Treatment Plant

The catchment west of the Tekapo river contains two pump stations, Lakeside Drive pump station and Domain pump station, with Lakeside Drive pumping to the Domain catchment. The catchment east of the Tekapo river contains one pump station, Sealy pump station. Both, Domain and Sealy pump stations, pump to the treatment plant located east of the Tekapo river.

The Sealy Street and Domain Pump Stations are equipped with two large submersible pumps (with provision for a third) and they operate automatically. The Lakeside Drive pump station conveys the sewage over a small rise, then it gravitates for approximately 800 m back down to the Domain pump, which pumps the sewage 1000 m to the treatment plant in a 200 mm diameter PE pipeline. The Tekapo sewage reticulation system was upgraded in 2004/05 to cater for the projected demand for the next 50 years.

The plant was first commissioned in 1972 and consisted of a single oxidation pond, which was overloaded by 2000. It was upgraded in 2002 to two oxidation ponds and three maturation ponds, which



discharge into two evaporation basins and now provides primary, secondary and tertiary treatment. Any overflow from the evaporation basins discharges via trickle irrigation on the vegetated slopes of the site.

The flow is split between two primary oxidation ponds, then recombines to flow through three maturation ponds in series. The increased area provided by the four additional ponds has increased the capacity of the treatment plant.

Figure 11-3: Lake Tekapo WW Treatment Plant



Primary ponds (2) – 0.42ha

Maturation ponds (5) – 0.30ha

This area has scope for extension. The system has been working reasonably well since the extensions to the irrigation in 2010 and the new arrangement allows for three different configurations of disposal. However, in recent times the system has not been as efficient as expected, especially during cold periods and concerns raised by ECan about oversaturation. A feasibility study will be conducted to ascertain the suitability of the existing treatment system compared to a new location and new treatment plant (IP 8).

A2.6.1 Flow and Loading Estimations (Original Design)

The facultative ponds (primary oxidation ponds) were sized on surface BOD loading rate according to temperature. The photo above shows the upgraded treatment plant surface areas for the ponds at the Tekapo WWTP.

Appendix Table 2: Pond size

| Pond data | |
|--------------------|---------------------|
| Previous pond area | 0.42ha |
| Current | |
| Pond 1A (existing) | 0.42ha {0.59ha (1)} |
| Pond 1B (new) | 0.47ha |
| Pond 2 (new) | 0.30ha |
| Pond 3 (new) | 0.10ha |

Deleted: 4



| Pond data | |
|---------------------|--------|
| Pond 4 (new) | 0.05ha |
| Pond 5 (new basins) | 0.03ha |

A freeboard of 0.6m has been provided for the Tekapo WWTP external bunds. Internal bunds at Tekapo have a freeboard of 0.2m. Overtopping of internal bunds at maximum storage levels will be infrequent and of minor consequence. Retention time in Pond 1A and 1B at ADF is approximately 35 days. Total retention time in all ponds is about 52 days.

Aeration improves oxygen transfer in primary ponds, allowing improved nutrient removal and micro-organism reduction (disinfection) by sunlight. Previously there was no aeration capability at the Tekapo WWTP.

Mechanical aeration has been adopted in the Tekapo primary ponds to increase the oxygen transfer during adverse weather (especially cold, still weather). Two floating, 2.2 kW brush aerators are now installed, located so that flow circulation is encouraged away from the outlet.

The pump data showed that wastewater flows into the Tekapo ponds fluctuate seasonally. This resulted in seasonal overloading of the original pond. Aeration of the new primary ponds provides increased oxygen transfer, allowing effective treatment of the increased wastewater flow.

The pond capacity can meet the BOD demand for a population of approximately 1,000 people (without aerator assistance). If the size of pond 1A is increased from 0.42 ha to 0.59 ha (as allowed for in the layout), the ponds can meet the demand for a population of approximately 1,300 people (without aerator assistance). The present capacity of the Tekapo WWTP with the existing aerator assistance can meet a BOD demand for a population of approximately 1,800 people. Capacities are for monthly average populations because the load is buffered by the long retention time.

Should the population increase beyond 1,800, the capacity of the WWTP could be increased by installing additional aerators on the oxidation ponds and extending Pond 1A. A 1 kW aerator capacity can meet the BOD demand for 300 people (with algae oxygen supply). Allowing for two 2 kW aerators on each of Pond 1A and 1B and a total pond surface area of 1.06 ha, the pond capacity could meet a BOD demand of 2,100 people. Installation of the additional pond aerators is programmed for 2023/24.

For any further growth above 2,100 people, the Tekapo WWTP will require the addition of a dedicated aeration basin at the inlet with all oxygen being supplied by aerators. Similar pre-treatment has been undertaken at the Oamaru and Blenheim WWTPs and can remove 40% of BOD. Therefore, these upgrades (extended Pond 1A, two 2 kW aerators and aeration basin with aerators) can increase plant capacity to about 3,500 people. If the population of Tekapo increases above 3,500, alternative means of treatment and disposal will have to be investigated and new resource consents applied for.

Installation of a Milliscreen and desludging of the pond is programmed for 2021/22.

A2.6.2 Pond construction

Rock Filters

In-bank rock filters have been constructed at the Tekapo WWTP, providing increased SS and nitrogen removal from the wastewater during summertime. The rock filters were designed on the basis of the horizontal velocity through the rock filter. The more conservative guideline value of 3m/hr was applied to achieve solids capture as per the Delft concept. The table below shows the rock filter sizing for various section of the WWTP.

Appendix Table 3: Rock filter sizing

| | |
|----------|------------------------|
| Pond 1-2 | None |
| Pond 2-3 | 3.00m |
| Pond 3-4 | >10m (full bank width) |

Deleted: 5

**Flow splitting**

The primary ponds at the Tekapo WWTP operate in parallel. Flow to these ponds is split, using manual valves located at the original manhole immediately prior to the original primary pond. The flow splitting structure divides the flow between the two primary ponds (Ponds 1A and 1B), as the ponds operate at two different levels, Pond 1A at 64.75m and Pond 1B at 63.50m. Flow is split as follows: 49% to Primary Pond 1A and 51% to Primary Pond 1B.

Inlet Scum Baffle

Scum baffles have been constructed around the inlet structures to trap scum and floatable material discharging into the ponds, minimising the scum formation across the pond surface. Trapped scum is removed weekly to minimise odour nuisance.

Pond liner

A pond liner minimises seepage from the new treatment ponds. This liner consists of a 200mm thick silt-clay material on the pond base and 300mm thick on the external pond bunds, over a geotextile base liner to minimise the loss of fines by seepage.

Embankment Structure

The pond banks were constructed using gravel/silt material available from the site. Rock rip rap protection against wave action has been adopted rather than the construction of a concrete wave band.

A2.6.3 Effluent Disposal

The Tekapo WWTP uses soakage to land for the final disposal of treated effluent. The disposal system is comprised of a two-cell evaporation basin system, located behind the Refuse Transfer Station. A single soakage basin was previously used for the disposal of the treated effluent and this formed the basis of the design of the upgraded system.

The original soakage basin overflowed from time to time, during extreme wet weather, and when the base became blinded by solids. The two new basins operate in parallel, with provision made to operate each individually (manual valves), so that the basins can be emptied and the accumulated solids dewatered, prior to disposal.

In periods of low evaporation and/or rainfall, the basins overflow to a slow rate irrigation land disposal system. The irrigation system is sited on the forested slopes south of the ponds and contours approximately 100 m across the slope. Discharge rates are dependent on water levels in the evaporation basins. Recently this system has not been as efficient, particularly in cold weather with concerns expressed by Ecan regarding the ponding. An alternative effluent disposal system was installed that pumps the effluent up to the slope surrounding the site and thus is able to share the load across both systems.



Increased vegetation is noticeable near the discharge points along the irrigation line. Flow monitoring of the irrigation system has been undertaken since 22 December 2003. The results of this monitoring have shown a range of flow rates from 400-500 m³/d.

A comparison of pump station flow rates and irrigation data for the monitoring period (December to April) show that a considerable percentage of flow is being evaporated prior discharge in the irrigation system.

A2.7 Environmental Management

The following table lists the resource consent associated with the Lake Tekapo Wastewater System.

| Consent # | Description | Expiry Date | Allowable inflow |
|-----------|-------------------|------------------|---|
| CRC042914 | Discharge to land | 17 December 2038 | 1,100m ³ /day (monthly mean) |



The Lake Tekapo wastewater treatment plant complies with the above resource consents for effluent discharge.

A weather station, connected to the SCADA, was installed at the treatment plant to monitor the temperature, rainfall and wind strength and direction.

A2.8 Demand

Detailed capacity calculations were completed as part of a significant upgrade of the treatment facilities in 2002.

The pond capacity can meet the BOD demand for a population of approximately 1,000 people (without aerator assistance). If the size of pond 1A is increased from 0.42 ha to 0.59 ha (as allowed for in the layout), the ponds can meet the demand for a population of approximately 1,300 people (without aerator assistance). The present capacity of the Tekapo WWTP with the existing aerator assistance can meet a BOD demand for a population of approximately 1,800 people. Capacities are for monthly average populations because the load is buffered by the long retention time.

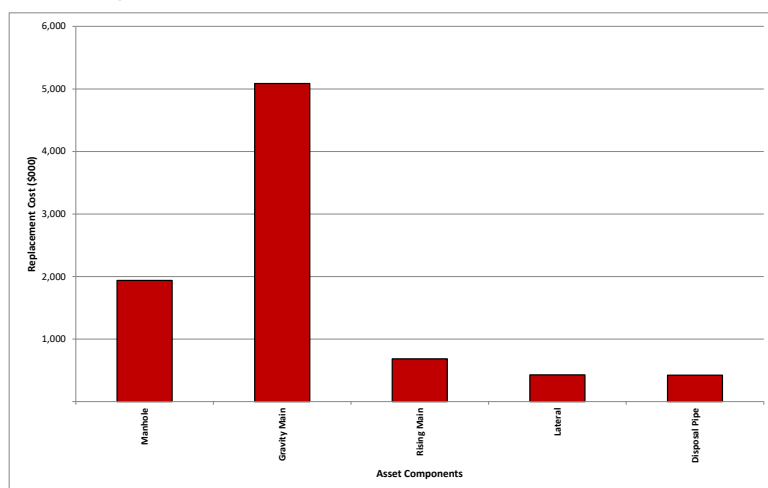
Should the population increase beyond 1,800, the capacity of the WWTP could be increased by installing additional brush aerators on the oxidation ponds and extending Pond 1A. A 1 kW brush aerator capacity can meet the BOD demand for 300 people (with algae oxygen supply). Allowing for two 2 kW aerators on each of Pond 1A and 1B and a total pond surface area of 1.06 ha, the pond capacity could meet a BOD demand of 2,100 people.

The upgraded pump stations and network, constructed in 2004 were sized to for an average size section of 400m² that would see the network able to provide the current level of service beyond 2025.

There is a reasonable increase in flow to the oxidation ponds during wet weather. The Community Board have approved a programme of smoke detection to identify any illegal connections to the sewer network, as this is the most likely source. Once located the property owner will be required to resolve the situation.

A2.9 Asset Details

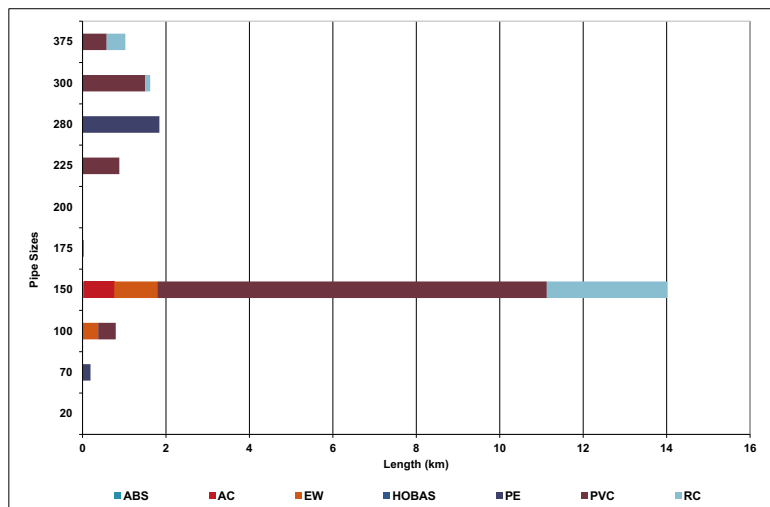
Appendix Figure 6: Replacement Costs Reticulation





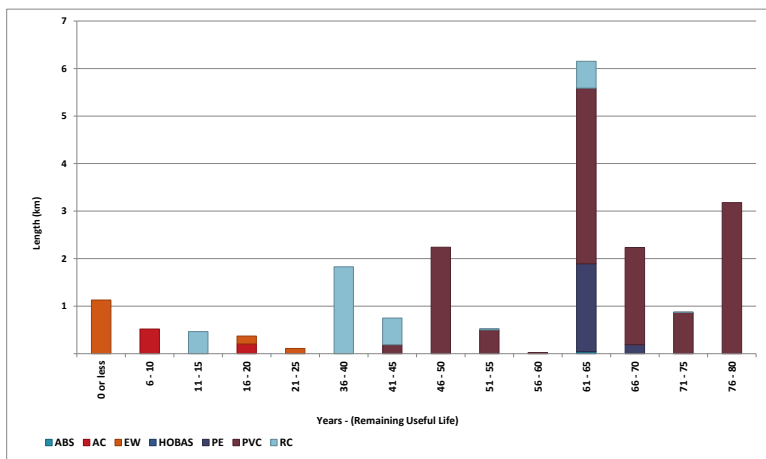
Gravity mains make up 59% of the total asset values.

Appendix Figure 7: Wastewater Main Diameters



Ø150mm pipe make up 69% of the sewer main length. Consisting mainly of PVC and Concrete. Pipe greater than Ø300mm pipe make up 13% of the sewer main length

Appendix Figure 8: Pipe Age Group Replacement Cost

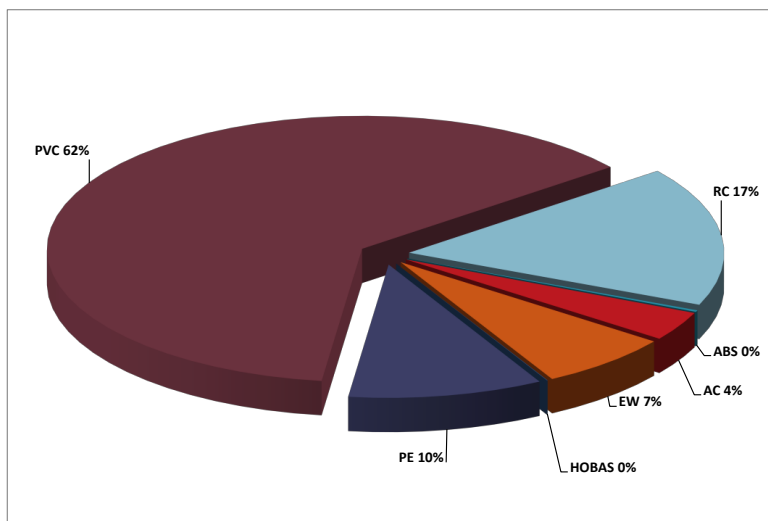


There is 1.1km of pipe (EW) that has reached the end of its expected useful life. There is 0.5km of pipe (AC) that will reach the end of its expected useful life within the 6-10-year window.



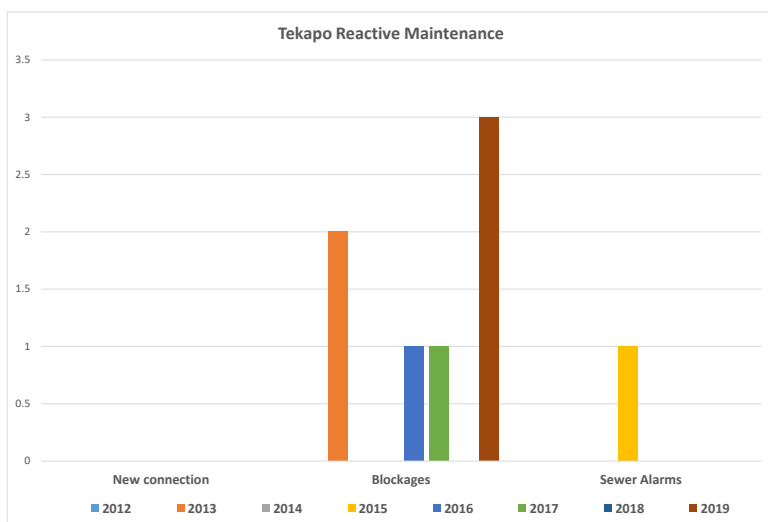
There is 0.5km of pipe (RC) that will reach the end of its expected useful life within the 11-15-year window.

Appendix Figure 9: Sewer Main Material



The graph shows that 62% of the reticulation consist of PVC and 17% of Concrete. The remainder is made up of PE, EW, AC, ABS and HOBAS.

Appendix Figure 10: Reactive Maintenance



Reactive maintenance consists of alarms and blockages
There was 1 blockages in 2016.



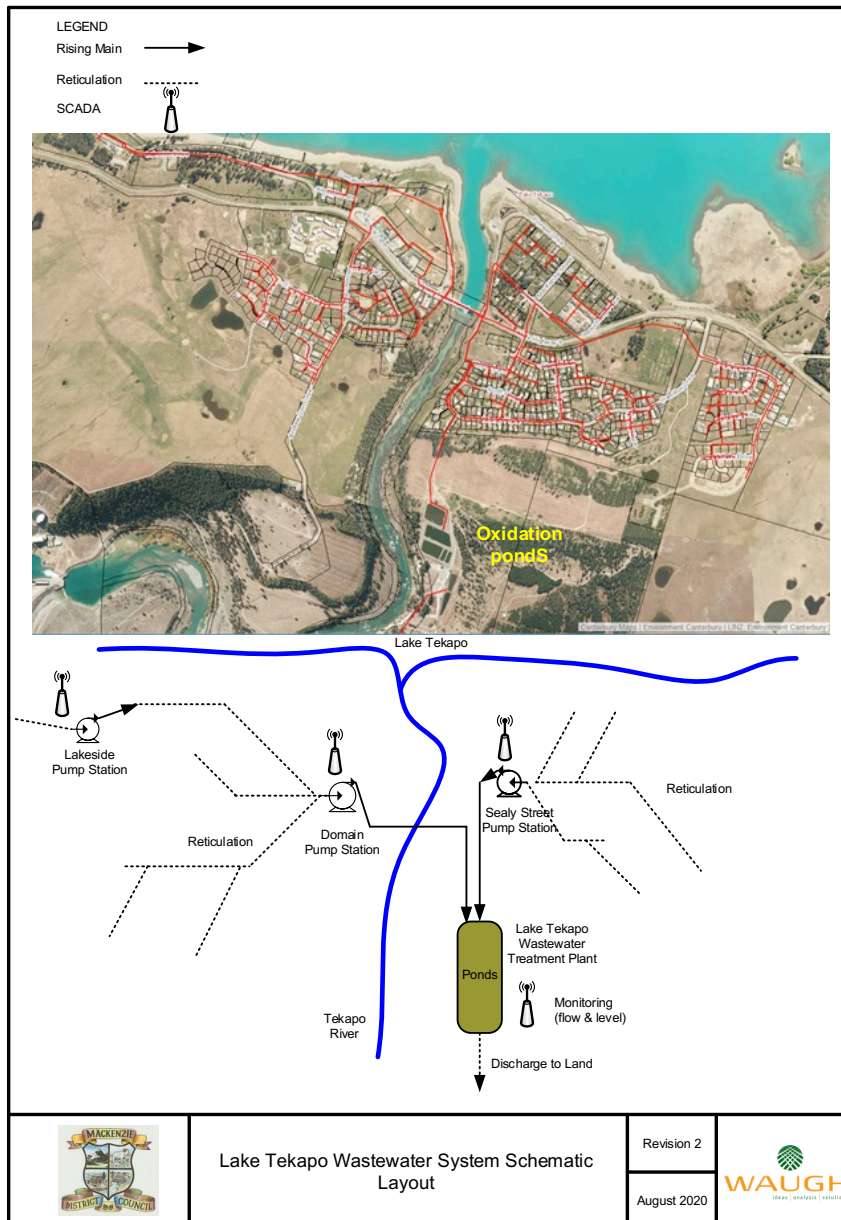


A2.10 Lake Tekapo Wastewater System Map





A2.11 System Schematic





A3 Twizel Wastewater System

A3.1 Overview

| Description | | Quantity |
|---|-----------------------------------|--------------------------------|
| Population Served 2013 | | 1,137 (10,000 during holidays) |
| % of district served by community wastewater system | | 51% |
| Type of Collection | | Gravity and pumping |
| Properties | Able to connect | 1,769 |
| | Connected | |
| | residential | |
| | commercial | |
| | industrial | |
| Total Connected | | 900 |
| History | Original scheme installed in | 1970's |
| Demand | Average Dry Weather Flow (design) | m ³ /day |
| | Peak Wet Weather Flow (4 x ADWF) | l/s |
| Length of reticulation | | 64.8km |
| Number of manholes | | 554 |
| Number of pump stations | | 2 |
| Treatment | Treatment | Oxidation ponds |
| | Disinfection | None |
| Disposal | | To land |
| Infiltration | | Extent unknown |
| Financial | Funding | Universal rate |
| | Annual maintenance cost (2015/16) | \$36,289 |
| | % of District Wastewater O&M | 30% |

A3.2 Key Issues for Service

| Issues | Resolution |
|-----------------------------|--|
| Condition of the AC pipe | Replace |
| Dumping of septage | Review wastewater bylaw to provide prosecution mechanism |
| Pond sludge levels | Monitor, consider options and desludge |
| Mackenzie Park Pump Station | Connect to treatment plant through new rising main |

A3.3 Overview & History

Twizel was a purpose built town constructed in the late 1960's and early 1970's. The design parameters for the oxidation ponds were for a population in excess of 5,000 persons. The whole of the original system is gravity flow and asbestos cement pipe has been used extensively for the sewers. In 2006 a pump station was built to service the Mackenzie Park subdivision. This pump station discharges to the sewer in Batcher Road.



The effluent from Twizel flows under gravity across State Highway 8 eastward onto land owned by the Council and discharges into oxidation ponds. From the oxidation ponds the treated effluent is discharged to ground through a series of infiltration basins. Discharge through the infiltration basins are operated through a rotational loading cycle.

The current system was upgraded during 2018 due to concerns around the efficiency of the previous disposal trench. This upgrade changed the discharge from the disposal trench to four infiltrations basins and included a new primary screen, dissolved oxygen meter, new inlet and outlet flow meters.

A3.4 Reticulation

The condition profile in the graph is based on the results of surveys undertaken from 1993 to 2010. Closed circuit television was used to video the wastewater pipes, with faults recorded and grades assigned to each fault depending on the severity and type of fault.

In general, all the systems in Twizel are in a good state of repair and if they are maintained and renewed regularly, and at the appropriate times, they can be expected to last indefinitely, without any significantly abnormal costs having to be incurred.

In Twizel there are no aggressive soils or groundwater surrounding the AC pipes so the deterioration is only from the inside. Nationally studies have shown that the deterioration model is very irregular throughout the networks where AC pipe is used so it is necessary to have a programme of sampling to get a better understanding when these pipes will have to be replaced and by default adjust the depreciation charged accordingly.

There is 21.3km of AC pipe in the Twizel sewer network and the current replacement cost (2020) of \$5.6m. Due to known performance of the AC pipe the base life of the pipe has been set at 80 years leaving a remaining life of 40 years. This figure is based on knowledge to date but further work should be done on a specific deterioration model for the gravity sewers in Twizel to more accurately predict the replacement date. The AC pipe renewal is provisionally programmed for replacement during 2026/27.

The South Island Rowing facilities includes a private wastewater system which pumps wastewater into the Twizel reticulation. The South Island Rowing pump station is monitored through Council's SCADA system.

A3.4.1 Pukaki Airport

A wastewater reticulation collecting wastewater from the development at the Pukaki Airport flows into the Pukaki Airport pump station. From the pump station the wastewater is pumped through a 1,100m long 75mm PE rising main to the Twizel reticulation. The pump station is connected to SCADA allowing monitoring and operational data captured in real time via telemetry.

A3.5 South Island Rowing The effluent from the South Island rowing complex is pumped up into the Council's network on the corner of Max Smith Drive and Ostler Road.

There are three pump stations in Twizel. One collects the effluent from the Mackenzie Park subdivisions and sections to the west of it and pumps it via a rising main into the gravity system in Ostler Rd. The second one pumps effluent from the Pukaki Airport into Twizel. The third is a private pump station, South Island Rowing, pumping into the Twizel reticulated network and connected to the Council SCADA system.

| Mackenzie Park Station (installed 2006) | | | |
|---|----------------|-------------|--------------|
| Duty Regime | Q max (l/s) | H total (m) | H static (m) |
| Initial stage | 11.5 | 7.5 | - |
| Data on two pumps installed | | | |
| Make | Flygt | | |
| Model | NP 3127.180 MT | | |
| Outlet size | DN 100 | | |



| Mackenzie Park Station (installed 2006) | | | |
|---|-------------|---------------------|--------------|
| Duty Regime | Q max (l/s) | H total (m) | H static (m) |
| Impeller diameter | | - | |
| Motor output rating | | - | |
| Motor rated current | | - | |
| Motor poles | | - | |
| Motor efficiency | | - | |
| Motor power factor | | - | |
| Base frequency | | - | |
| Storage | | Open in ground pond | |
| Pump controller | | Flygt FMC 200 | |
| Telemetry | | Abbey Systems | |
| Control | | Alan Bradley PLC | |

| Pukaki Airport Station (installed 2009) | | | |
|---|-------------|--------------------|--------------|
| Duty Regime | Q max (l/s) | H total (m) | H static (m) |
| Initial stage | 2.1 | 28.1 | - |
| Data on two pumps installed | | | |
| Make | | Flygt | |
| Model | | NP 3068.170-210 MT | |
| Outlet size | | DN 75 | |
| Impeller diameter | | - | |
| Motor output rating | | - | |
| Motor rated current | | - | |
| Motor poles | | - | |
| Motor efficiency | | - | |
| Motor power factor | | - | |
| Base frequency | | - | |
| Storage | | None | |
| Pump controller | | Flygt FMC 300 | |

Installation of a new rising main from the Mackenzie Park pump station directly to the oxidation ponds is programmed for 2021/22. This will significantly reduce flows in the current system configuration.

A3.6 Treatment Plant

The two oxidation ponds were constructed in the 1970's with a discharge to the Twizel River. This discharge has been discontinued and now discharges to ground via four infiltration basins. Each basin is in use for 7 days and then it changes to the next basin (1, 2, 3, 4), thus giving each basin a rest period of 21 days.

**Figure 11-4: Twizel WW Treatment Plant**

Pond 1 = 2.5ha

Pond 2 = 1.73ha

The original initial inlet that discharges into the centre of pond 1 has been reinstated and this has avoided having to relocate that inlet to the south west corner of pond 1 which will give the maximum flow path through the pond. A bund has been constructed (2010) in Pond 2, two thirds of the way across the pond to ensure the maximum retention time of the effluent within the ponds.

A3.6.1 Flow and Loading Estimations (Original Design)

The Twizel WWTP was commissioned in 1969 and treats domestic sewage, as well as small quantities of trade wastes from Twizel Township. The WWTP provides primary treatment of the influent in oxidation ponds before discharging effluent into four infiltration basins.

The Twizel ponds were originally designed in 1969 for a population of 5,000 assuming an average daily flow (ADF) of 1,818 m³/day and a peak flow of 5,455 m³/day. An ADF of 650 m³/d was predicted by CH2MBeca in the "Application for Resource Consent and Assessment of Environmental Effects for the Twizel WWTP" (June 2004).

Desludging of the ponds are programmed for 2021/22.

A3.7 Environmental Management

The following table list the resource consent associated with the Twizel Wastewater System.

| Consent # | Description | Expiry Date | Allowable discharge |
|-----------|-------------------|---------------|------------------------------------|
| CRC172311 | Discharge to land | 11 April 2053 | 1,500m ³ /day (average) |

The Twizel wastewater treatment plant complies with the above resource consent for effluent discharge. The resource consent is due to expire during April 2053.

Pond performance is affected by septage disposal. There are instances where contractors have disposed of septage in the reticulation to bypass the costs of approved disposal. The Wastewater Bylaw needs to include a mechanism to better manage septage disposal ([IP 6](#)).

A weather station, connected to the SCADA, was installed at the treatment plant to monitor the temperature, rainfall and wind strength and direction.



A3.8 Demand

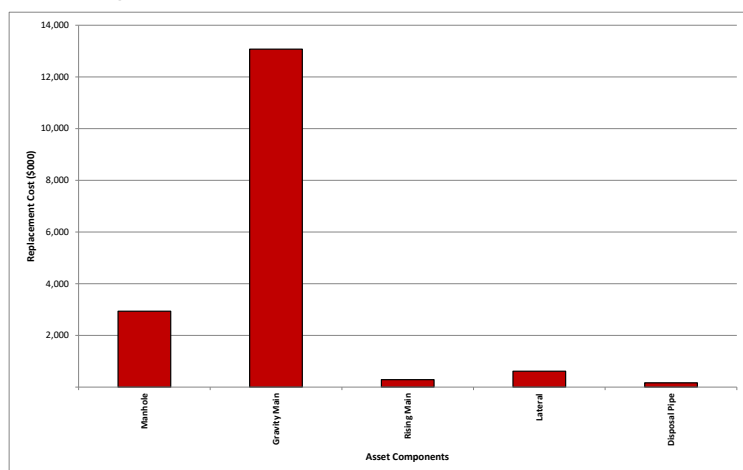
The Twizel ponds were originally designed in 1969 for a population of 5,000 assuming an average daily flow (ADF) of 1,818 m³/day and a peak flow of 5,455 m³/day. An ADF of 650 m³/d was predicted by CH2MBeca (June 2004) to be reached by 2025 with a population of 1,860. This shows that there are no capacity issues with the oxidation ponds.

Council acquired land adjacent to the oxidation ponds, constructed rapid infiltration basins and consolidated the disposal in them on the 5.6ha site.

Twizel continues to show steady growth in holiday homes and in order to understand the total demand Council will model the network so that it will be better able to predict when pipes need to be upsized or aeration installed at the oxidation ponds to improve treatment and when a new rising main will have to be constructed directly to the oxidation ponds from the pump station in Mackenzie Park. This work was programmed for 2018/19, but will only be constructed if demand puts pressure on the current systems to the point they cannot cope.

A3.9 Asset Details

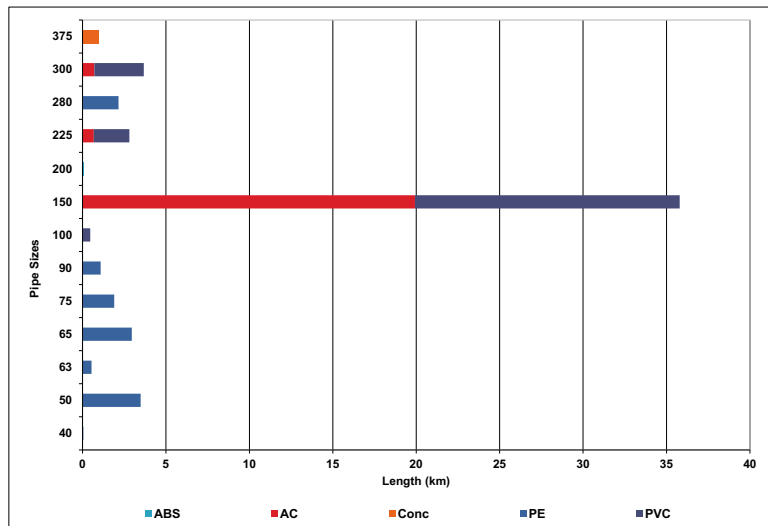
Appendix Figure 11: Replacement Costs Reticulation



Gravity mains make up 77% of the total asset values.

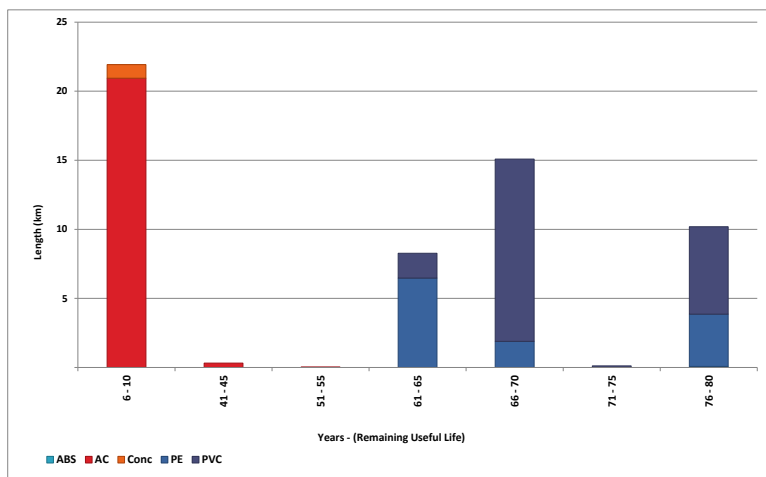


Appendix Figure 12: Wastewater Main Diameters

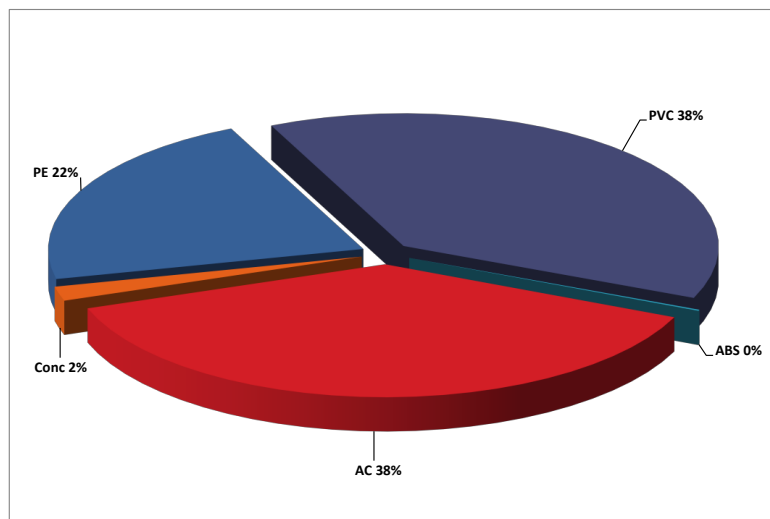


Ø150mm pipe make up 64% of the sewer main length (AC and PVC).
≥Ø300mm pipe make up 10% of the sewer main length.

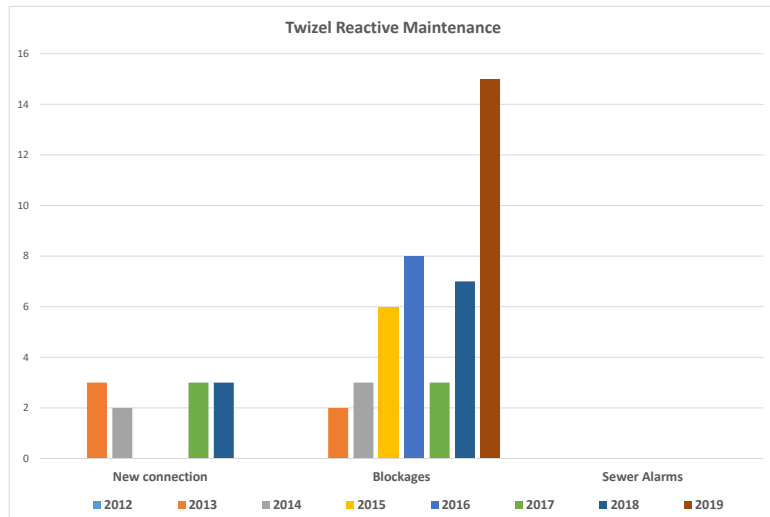
Appendix Figure 13: Pipe Age Group Replacement Cost



There is 21km of pipe (mainly AC) that will reach the end of its expected useful life during the 6-10 year window.

**Appendix Figure 14: Wasterwater Main Material**

The graph shows that 45% of the reticulation consist of AC and 35% of PVC. The remainder is made up of PE and concrete

Appendix Figure 15: Reactive Maintenance

Reactive maintenance consists of alarms, blockages and new connections.

Blockages show a significant increase over the last number of years.

The increase in blockages is associated with an increase in a number of areas:

- wet wipes
- campervan discharges

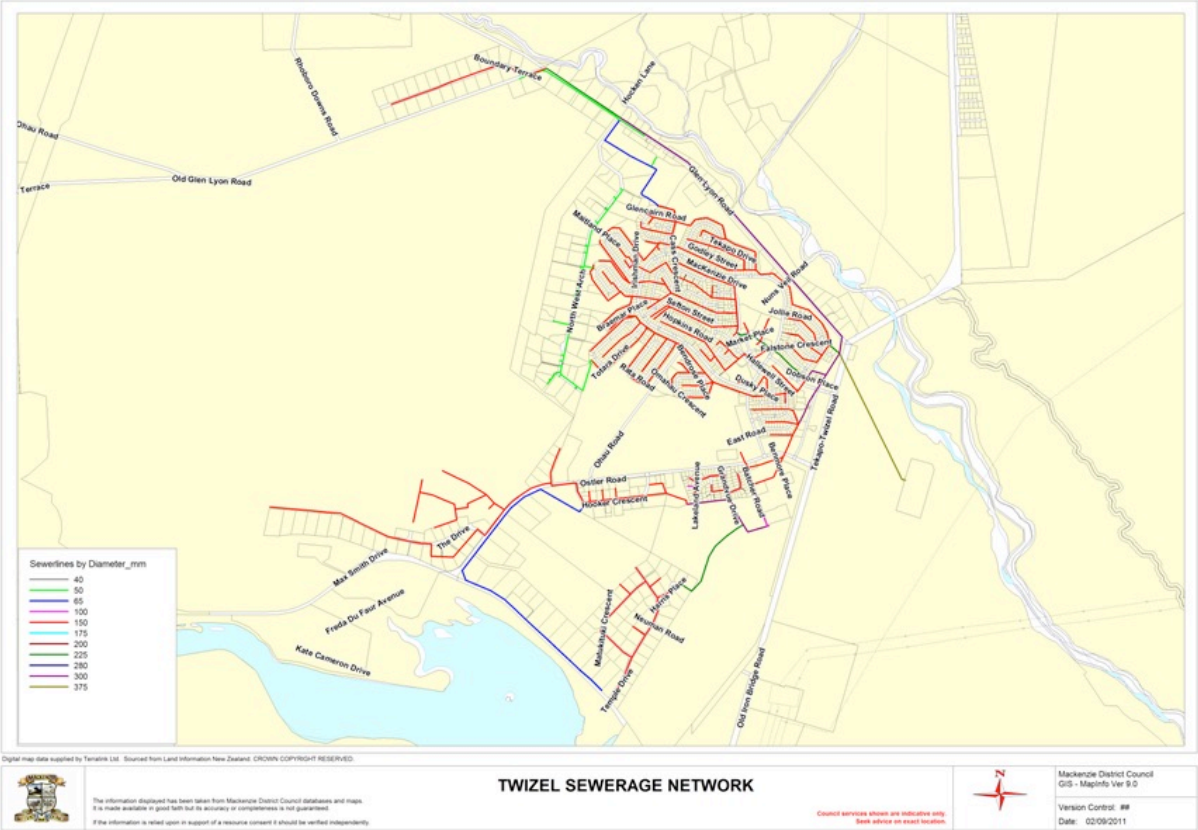


- tourists

There are no alarms recorded.

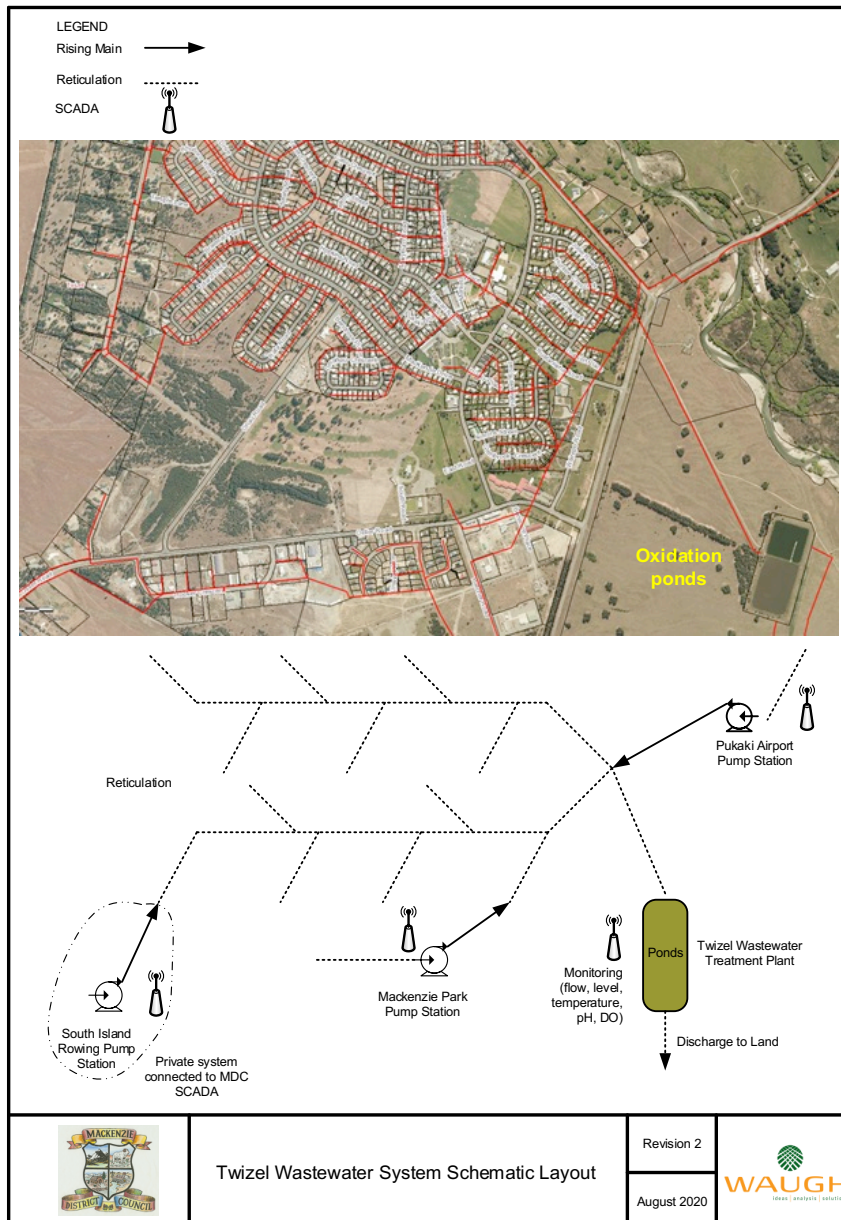


A3.10 Twizel Wastewater System Map





A3.11 System Schematic







A4 Burkes Pass Wastewater System

A4.1 Overview

| Description | | Quantity |
|---|-----------------------------------|-------------------------|
| Population Served 2016 | | 30 (60 during holidays) |
| % of district served by community wastewater system | | 1% |
| Type of Collection | | Gravity |
| Properties | Able to connect | 18 |
| | Connected | |
| | residential | |
| | commercial | |
| | industrial | |
| TOTAL Connected | | 18 |
| History | Original scheme installed in | 1990 |
| Demand | Average Dry Weather Flow (design) | m ³ /day |
| | Peak Wet Weather Flow (4 x ADWF) | l/s |
| Length of reticulation | | 1.6km |
| Number of manholes | | 17 |
| Number of pump stations | | - |
| Treatment | Treatment | Oxidation pond |
| | Disinfection | None |
| Disposal | | To land |
| Infiltration | | Extent unknown |
| Financial | Funding | Universal rate |
| | Annual maintenance cost (2015/16) | \$4,389 |
| | % of District Wastewater O&M | 3% |

A4.2 Key Issues for Service

| Issues | Resolution |
|--------------------|--|
| Consent compliance | High faecal count at discharge – investigate and consider options (aeration/additional pond) |
| | |

A4.3 Overview & History

The Burkes Pass wastewater system was built in 1990 to serve the existing town which is largely unchanged today.

The effluent from Burkes Pass flows under gravity across State Highway 8 eastward onto land owned by the Council and discharges into oxidation ponds. After passing the oxidation ponds the effluent discharges to ground via two irrigation pipelines that are spelled individually on a six month cycle.



A4.4 Reticulation

The condition profile in the graph is based on an assessment of the pipe network. With the pipe being uPVC and laid to the appropriate engineering standards fifteen years ago there is no reason to expect the pipe to be less than perfect.

However within ten years there should be a video inspection to confirm that there are no issues. This date will be bought forward if we start experiencing problems with the pipe system.

Currently the network performs as designed with no maintenance issues at all.

A4.5 Pump Stations

There are no pump stations in Burkes Pass Wastewater system.

A4.6 Treatment Plant

The treatment plant consist of a single oxidation pond.

Figure 11-5: Burkes Pass WW Treatment Plant



A4.6.1 Flow and Loading Estimations (Original Design)

Loadings

For oxidation ponds without mechanical aeration, the former MWD guideline value of 84 kg/BOD/ha/day is considered appropriate. This equates to 1,200 persons/ha for a mainly domestic catchment, which is the case for Burkes Pass.

$$1,200/\text{ha} \times 0.11 = 132 \text{ persons}$$

Therefore the Burkes Pass pond appears to be adequate for servicing the estimated current population of 45 persons, including any short term peak loadings.

Flows

| | |
|------------------------------------|-------------------|
| Estimated flow volume (domestic) | 8,250 l/day |
| Estimated flow volume (commercial) | 600 l/day |
| Total Flow | 8,850l/day |



A4.7 Environmental Management

The following table list the resource consent associated with the Burkes Pass Wastewater System.

| Consent # | Description | Expiry Date | Allowable discharge |
|-----------|-------------------|-------------|------------------------|
| CRC992607 | Discharge to land | 7 June 2040 | 8.1m ³ /day |

The Burkes Pass wastewater treatment plant complies with the above resource consents for air and effluent discharge. High faecal counts at the discharge are a concern and need further investigation and resolution. Options include but are not limited to aeration or additional pond ([IP 7](#)).

A weather station, connected to the SCADA, was installed at the treatment plant to monitor the temperature, rainfall and wind strength and direction.

A4.8 Demand

The current population is small (and unlikely to increase substantially) and the existing pond appears to be more than adequate for continuation of wastewater treatment at Burke's Pass. However, the installation of public toilets in Burkes Pass during 2018 have had a significant impact on pond loadings. Council is investigating options to improve performance due to the extra loading created by the public toilets.

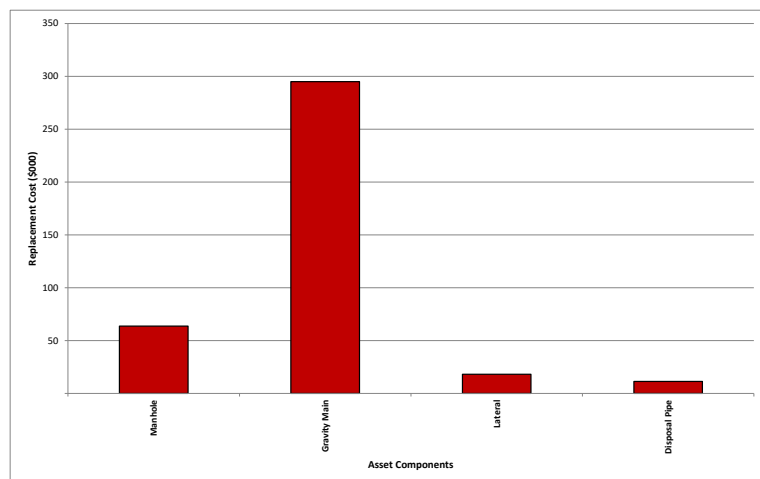
The pond is located on flat farmland, with strong prevailing winds (especially from the north-west in the summertime) so adequate wind mixing within the pond is expected.

As no data is available for the pond influent quality, an allowance of 70g BOD/person/day is assumed (former MWD guideline) for both the domestic and commercial wastewaters from Burke's pass. The total assumed BOD loading is, therefore, 3.2 kg/day for Burke's Pass.

The former MWD guideline of 84kg BOD/ha/day, when applied in this case, results in an allowable BOD loading of 9.24kg BOD/day for the single oxidation pond. The existing BOD loading on the pond is therefore well within the allowable BOD loading.

A4.9 Asset Details

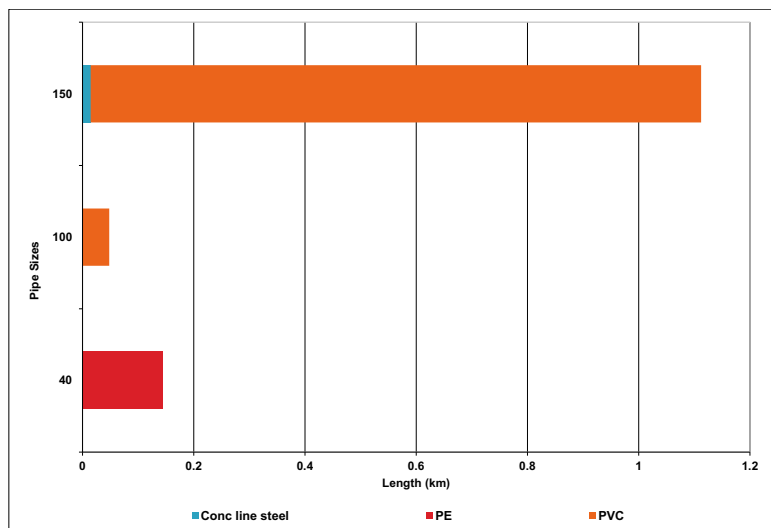
Appendix Figure 16: Replacement Costs Reticulation



Gravity mains make up 65% of the total asset values

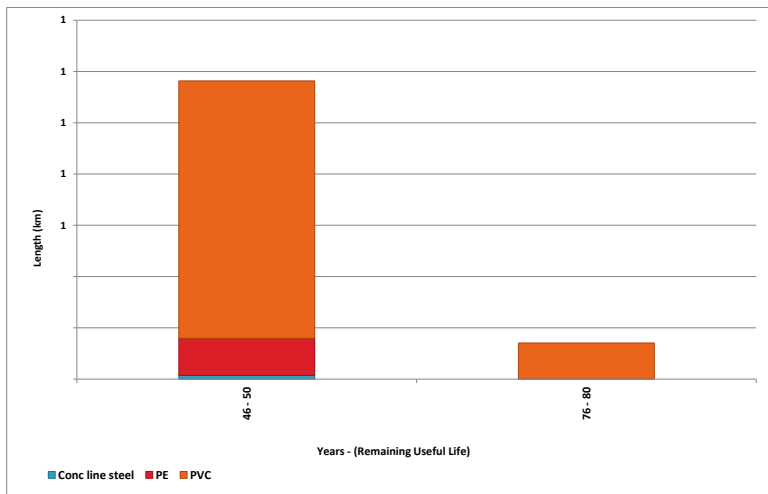


Appendix Figure 17: Wastewater Main Diameters



There is only Ø150mm pipe in the reticulation. This consist mainly of PVC

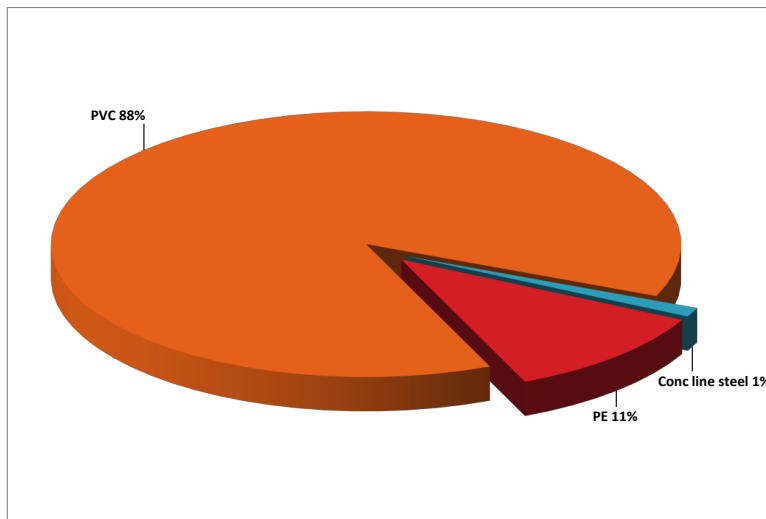
Appendix Figure 18: Pipe Age Group Replacement Cost



Most of the reticulation will reach the end of its expected life within the 46-50 year window



Appendix Figure 19: Sewer Main Material



The graph shows that 98% of the reticulation consist of PVC and 2% of Concrete lined Steel.

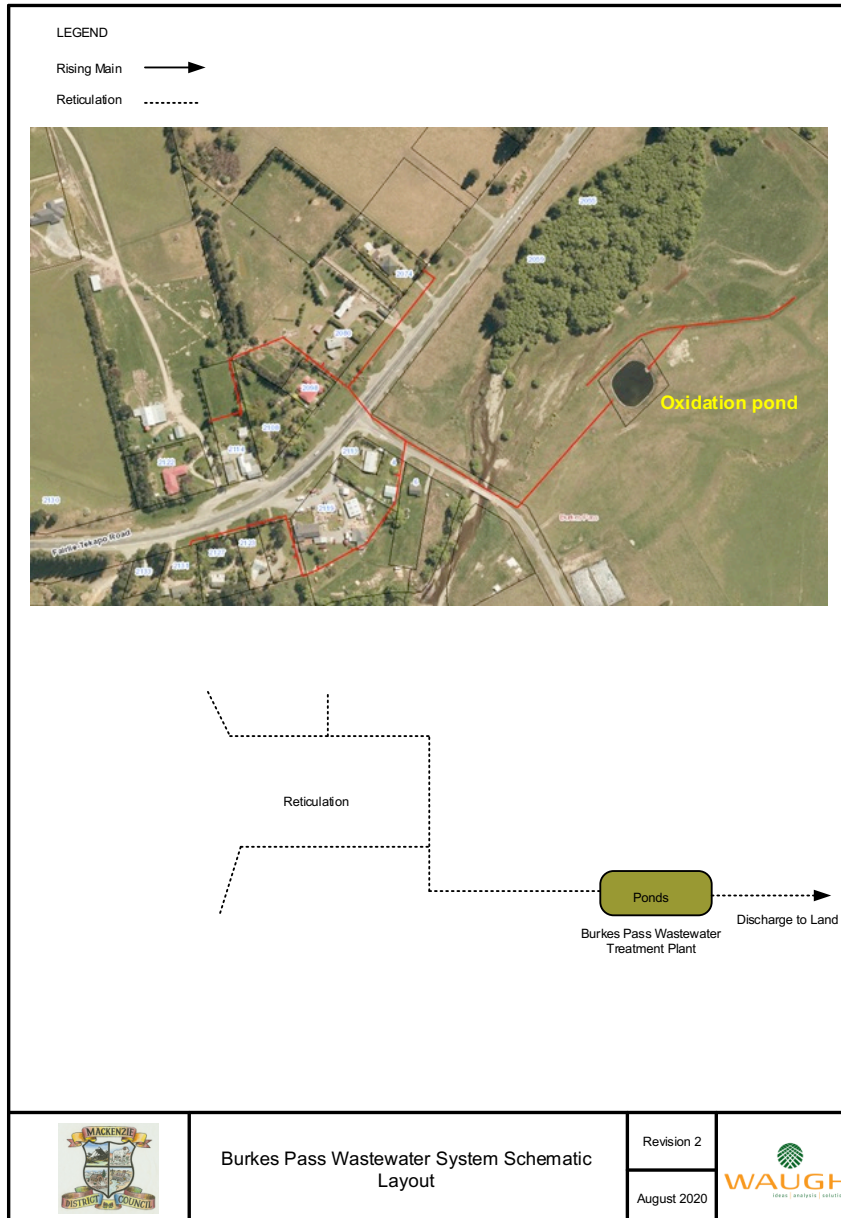
There are no reactive maintenance records for Burkes Pass Wastewater system.

A4.10 Burkes Pass Wastewater System Map





A4.11 System Schematic





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