



# Mackenzie District Council

## 30 Year Infrastructure Strategy

2018 - 2048

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# 1 EXECUTIVE SUMMARY

## 1.1 Introduction

This Infrastructure Strategy has been developed to provide Mackenzie District Council with a long term (30 years) strategic document for the effective planning and management of its infrastructure assets. It sets out what issues are currently and likely to impact on those assets and the costs associated with maintaining, operating, renewing and developing the asset.

This Strategic Plan specifically covers the following assets:

- Stormwater Disposal
- Wastewater Disposal
- Water Supply
- Roads and Footpaths

This strategy is prepared from information contained within the respective Activity Management Plans (AMP) for these activities and detailed asset data performance and condition is recorded in the Asset Registers. Whilst this strategy covers the next 30 years, the first 10 years' programmes both operational and capital flow into the 2018-28 Long Term Plan (LTP).

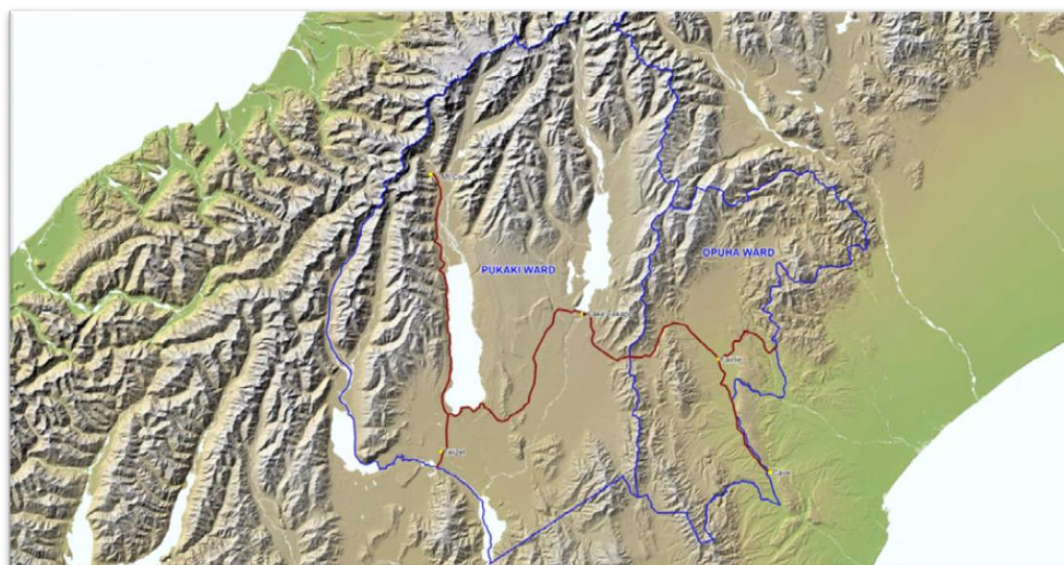
## 1.2 Background

The Mackenzie District is bounded in the north and east by the Timaru and Waimate Districts, in the south by the Waitaki District and to the west by the Southern Alps/ Westland District boundary. There are two wards: **Pukaki** which in effect takes in the Mackenzie Basin and **Opuha** being the remaining area to the west of a line following the upper reaches of the Hakataramea River through Burkes Pass to Mt Musgrove in the Two Thumb Range.

The land use is predominantly rural with high country farming in the Mackenzie Basin. This is changing over time as more irrigation becomes available and more intensive farming and cropping occurs in the Fairlie Basin.

The District has high visitor numbers due to the scenic and recreational opportunities which are generally derived from its outstanding natural features with people attracted to the lakes, mountains, ski fields, cycle trails and walking tracks.

**Figure 1 - Map of Mackenzie District**





## 1.3 Purpose of Strategic Planning

The purpose of the infrastructure strategy is to—

- a) identify significant infrastructure issues for Mackenzie District Council over the next 30 years; and
- b) identify the principal options for managing those issues and the implications of those options.

The Infrastructure Strategy outlines how the Mackenzie District Council intends to manage its infrastructure assets, taking into account the need to—

- a) renew or replace existing assets; and
- b) respond to growth or decline in the demand for services reliant on those assets; and
- c) allow for planned increases or decreases in levels of service provided through those assets; and
- d) maintain or improve public health and environmental outcomes or mitigate adverse effects on them; and
- e) provide for the resilience of infrastructure assets by identifying and managing risks relating to natural hazards and by making appropriate financial provision for those risks.

This strategy is a high level document that summarises the issues facing Mackenzie District over the next 30 years. The supporting detail is incorporated within the relevant AMPs for each of the respective activities.

## 1.4 Key Strategic Issues

The Council is proposing a number of important projects over the term of the Infrastructure Strategy. These projects are designed to ensure the Council is able to maintain (at a minimum) current levels of service, meet regulatory standards and community expectations, and manage pressures on key infrastructure.

### 1.4.1 Upgrade of Fairlie Drinking Water Supply

Council proposes to upgrade Fairlie's water supply to meet NZ Drinking Water Standards. This work is programmed for 2018/19, at a cost of \$900,000. This is a significant upgrade and will result in increased levels of service.

### 1.4.2 Installation of a new Reservoir for Fairlie Water Supply

Council proposes to install a new water reservoir to increase the storage capacity of the Fairlie Water Supply. This upgrade is proposed to be undertaken in 2025/26 with a budget of \$1,500,000. This increase to the capacity of the system will result in an improved level of service and increased resilience for the township in terms of its water supplies.

### 1.4.3 Identification, design and construction of a new permanent disposal site for the Tekapo Wastewater Treatment Plant

Given the upcoming period of growth and development that is forecasted for Tekapo, Council is cognisant of the need to assess and identify a new permanent disposal site for the Tekapo wastewater treatment plant. This will also involve design and installation of a new system to dispose of effluent, for the next 50 years. In advance of this, Council plans to undertake a significant strategic study of growth and development in its townships, including Tekapo, in 2018/19. The outcome of this strategic study will inform the future upgrade and relocation of this system. This will allow for growth and result in improved levels of service.

### 1.4.4 Compliance with the Land and Water Regional Plan

Council is preparing a Stormwater Management Plan for our township stormwater discharges, as required by the Canterbury Land and Water Regional Plan. It is anticipated that this will result in the requirement for improved treatment at some of the discharges from stormwater networks in Fairlie, Tekapo and Twizel. Whilst specific improvements will arise from the Management Plan, budget of \$60,000 has been allowed for the installation of

treatment facilities from 2022-2028. Upgrades to the stormwater systems as required by the Management Plan will result in increased levels of service.

### **1.4.5 Roading Maintenance**

Council considers it essential to maintain our roads to current standards. This approach ensures our roads do not require costly rebuilding if allowed to deteriorate, thereby avoiding increased costs in future. The Council's roading budget is the largest of our activity budgets.

Over the next ten years, the Council's maintenance budget is largely 'business as usual', with minor increases in some areas. We consider we are able to address growth and pressure issues within the proposed maintenance budgets, to maintain levels of service.

We are able to do this in the face of increasing pressures on the network through the continuation of good asset management practice. This includes ensuring roads are not allowed to deteriorate, and reviewing our roading programmes and adjusting budgets to address the issues brought about by growth and development. We achieve this through making savings in some areas and increasing budgets in other areas. These adjustments in our programmes will mean we are able to address pressures in required areas with only a minor overall increase in the maintenance budget, to maintain current levels of service.

### **1.4.6 Roading Improvements**

As well as maintaining our present roading network, the Council is planning to undertake a number of roading improvement projects which are designed to address localised pressures from growth on the network. Examples of improvement projects include the provision of additional car parking, bus shelters, and improvements to intersections, footpaths, improving traffic flow and parking throughout the district. Most of these projects will result in increased levels of service.

These projects are known as 'low cost low risk' projects.

While these projects attract 51% co-funding from NZTA, our share of these projects is funded through a district-wide targeted roading rate.

Preliminary planning for the next ten-year period indicates the various programmes will range from an annual cost of \$90,000 to \$1.15m. Actual costs will depend on Council decisions as to which programmes are undertaken, and this may include further site specific consultation with communities.

Fully funding all identified projects would require an increased level of borrowing, with a consequent impact on rates.

Therefore for reasons of fiscal responsibility and prudence, and after consultation with ratepayers, Council has allocated an annual budget of \$300,000 for these projects (\$144,000 being our share). This manages the impact on ratepayers, but it also means some projects have to be prioritised and some may be delayed. However it appropriately manages the impact on ratepayers in terms of funding the improvements.

One of the other potential consequences of allocating an annual budget of \$300,000 is that delays in some of the proposed works may mean additional expenditure in maintenance of existing roads such as Godley Peaks Road, if improvement projects such as seal widening are undertaken later on in the LTP period.

## **1.5 Assumptions**

The Mackenzie District has experienced significant growth over the past three years and growth is projected to continue. It is significant that building activity and the associated demand for Council infrastructure has increased beyond the level that population change would indicate. This strategy is prepared on the basis that there will be stronger growth than resident population forecasts but that recent growth peaks will abate to some degree.

Continued growth is anticipated in the district, particularly in Tekapo and Twizel. Our current systems have generally coped with the present level of growth, but there is a need to plan for increased pressure on infrastructure from future development and predicted increases in visitor numbers. Council plans to undertake a

significant strategic study in 2018/19 for each of our townships which will review pressures and address growth issues. This will enable appropriate planning for infrastructure needs, to ensure our systems are able to meet future demand.

It is also assumed that the existing resource consents held by Council can be renewed for those takes and discharges without extra conditions being applied that will add significantly to the management costs and also not require significant upgrades.

In Twizel, the oxidation pond discharge will be consolidated to an in-ground disposal system on land adjacent to the current site. It is anticipated that ownership of the land required will have transferred to Council by the start of this LTP period.

In the transportation area it is assumed that there will continue to be intensification in the agricultural sector over the life of this strategy. This intensification is due in part to the implementation of resource consents for irrigation, as well as general on-farm intensification. This as a consequence puts pressure on the existing infrastructure.

Growth in this area is from the following:

- Land use intensification
- Forestry
- Grain Production
- Tourism
- Lifestyle

It is also assumed that the co-investment rate from New Zealand Transport Agency (NZTA) will remain at the base rate of 51% following the latest review.

Council is still uncertain about the effect that NZTA’s One Network Road Classification (ONRC) system will have on its roading network and while we are aware of the progress towards implementation it is not possible to be definitive within this document. While it is not expected to impact on the present funding round in the initial period covered by this Strategy, in the longer term this uncertainty remains a potential risk to the delivery of a safe and efficient roading network.

## 1.6 Stormwater

### 1.6.1 Asset Summary

Asset Type	Unit	Quantity
Pipelines	km	18,2
Manholes	each	248
Open Drains	m	6,180
Treatment Area	m2	22,851

This strategy has been prepared on the basis that there will be no significant change to the normal operation over most of the stormwater assets. However, Environment Canterbury’s Land and Water Regional Plan requires “*that where the discharge is from an existing local authority network, demonstration of a commitment to progressively improve the quality of the discharge as soon as practicable but no later than 2025*”. This means that some existing stormwater discharges are likely to have to be progressively upgraded to improve discharge quality. There is a requirement to develop a Stormwater Management Plan that identifies and plans for progressively upgrading those discharges that are deemed to require improvement. This plan is being developed at present, and Council has made provision of \$60,000 in upcoming budgets to implement any required upgrades as a result of that planning.

In the last year there have been significant stormwater treatment facilities built in Tekapo to collect and treat the stormwater from the commercial area and Lakeside Drive to allow for future development.

## 1.7 Wastewater

### 1.7.1 Asset Summary

Asset Type	Unit	Quantity
Pipelines	m	83,380
Manholes	each	883
Treatment Plants	each	4

This strategy has been prepared on the basis that there will be no significant change to normal operations over most of the wastewater assets with some exceptions.

- Tekapo Oxidation Pond discharge – an alternative effluent disposal site has been developed to allow for growth and changing climatic conditions in Tekapo. Longer term there needs to be a review of the current location of that facility to determine if it is sustainable for the foreseeable future. In 2018/19 Council will undertake a strategic planning exercise that will determine the future growth for Tekapo and ultimately position how the town will be serviced by the wastewater network.
- Twizel Oxidation Pond discharge – an effluent disposal system consisting of rapid infiltration basins will be developed immediately to the south of the site. The existing disposal trench will be decommissioned. An application for resource consent to approve this was lodged in 2015 but subsequently put on hold until Council had acquired the necessary land to allow construction of those basins. This required land is in final stages of being acquired and the application has been re-activated.
- Fairlie and Tekapo sewer network – the original network was laid in 1940 and 1955 respectively, using earthenware pipe that is condition rated between 3 and 4. *Condition 3* is defined as requiring regular maintenance. *Condition 4* is defined as requiring review for possible replacement or upgrade. Council is completing a CCTV inspection of these at risk pipelines with a view to preparing a replacement programme based on the observed condition. It is expected that the rate of deterioration is such that the network will have to be substantially replaced over the life of this strategy and funding has been allowed for this.

## 1.8 Water Supply

### 1.8.1 Asset Summary

Asset Type	Unit	Quantity
Pipelines	km	242
Service lines	km	15
Tobies	each	2,759
Hydrants	each	449
Valves	each	863
Plants - Urban	each	4

### 1.8.2 Operation

This strategy has been prepared on the basis that there will be no significant change to normal operations over most of the water supply assets, with some exceptions.



- Fairlie – The water supply treatment plant will be upgraded to comply with the Health (Drinking Water) Amendment Act (2007). The upgrade is programmed for 2018/19. The completion of the replacement programme of the concrete water pipes in 2020/21 will see a reduction in maintenance costs associated with pipe failures.
- Tekapo –There are 5895m of asbestos cement (AC) water pipes at Tekapo. This strategy includes a programme of investigation to determine their condition and allow for replacement.

It is probable that new legislation will be passed that will place responsibility for water fluoridation with District Health Boards. At the time of writing this strategy it is unclear whether this change will lead to a requirement to fluoridate drinking water supplies in our district. Any move to introduce fluoride is likely to be contentious and this strategy has been formulated on the basis that the status quo will remain.

### 1.8.3 Renewals

The biggest issue facing the three communities in the next thirty years is the need to replace AC water mains. There is 45km of AC pipe in the district; 14km in Fairlie, 5.9km in Tekapo and a further 25km in Twizel. AC pipe is affected by both internal water and external soil conditions. External stresses such as soil conditions, quality of installation, additional loadings, and maintenance have a significant effect on the useful life of underground assets. The inherent variations of in-situ conditions and subsequent rate of deterioration make it difficult to accurately formulate a renewals priority programme without a sampling regime.

The recent sampling and testing programme for Twizel has confirmed the level of deterioration and the associated risk. This strategy provides for continuation of a district wide sampling and testing programme in Tekapo and Fairlie, to further our understanding of the level of deterioration and the associated risks in those towns.

Council is cognisant of the importance of maintaining this asset in good condition and has committed to a full replacement programme in Twizel over 20 years. This programme began in 2016 and to date 2.4km of the 24.7km has been replaced.

Using lessons learned in Twizel, other AC networks are being analysed for deterioration. This strategy allows for the replacement of the AC water mains in Tekapo and Fairlie during the period of 2036-2045. This timing will be confirmed or amended depending on the outcome of the proposed sampling programme.

## 1.9 Transportation Including Footpaths

### 1.9.1 Asset Summary

Asset Type	Unit	Quantity
Pavement - Sealed	km	519
Pavement Unsealed	km	213
Footpaths	km	58.1
Culverts	m	17,950
Bridges	each	99
Signs	each	5,670
Streetlights	each	1,145

Funding will continue to be a challenge in maintaining a satisfactory level of service for the users of Mackenzie's roading network. The major portion of cost to maintain the network is associated with resealing of the sealed portion of the network and re-metaling of the unsealed roads. This strategy sets a conservative approach. This means keeping a tight rein on maintenance budgets, while still ensuring we include enough to avoid backlogs and to maintain appropriate levels of service and operating conditions for vehicles.

Council is still uncertain about the effect that NZTA's One Network Road Classification system will ultimately have on co-funding availability. This risk is recognised in the strategy but the operational focus on efficient management and prudent stewardship has been maintained in activity planning. Our understanding is that the objective of the One Network Road Classification system is to promote efficient management of the national road network. Mackenzie District road maintenance costs are low by national standards and it is expected that the planned activity will be generally supported by NZTA.

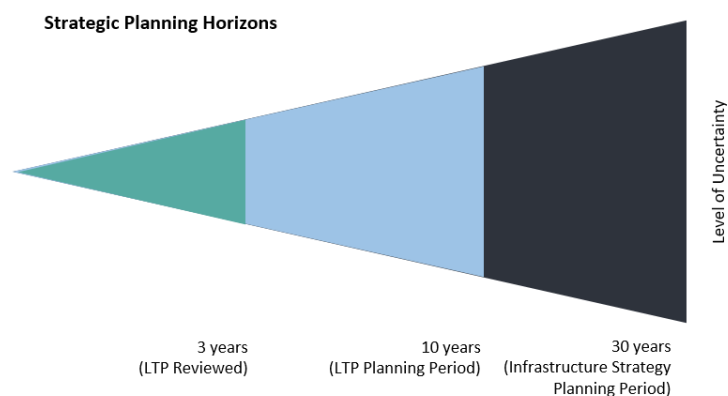
The strategy includes a modest bridge replacement programme and this is expected to be fundable by NZTA. The potential exception is the Cass River Bridge. This structure would be expensive to replace due to the location and span of the structure. As the public road ends 800m on the north side of the bridge it may be considered uneconomic by Council and NZTA to replace. Consultation with all parties will be required prior to bridge failure and removal, to assess the need and look at options to replace it and fund that replacement.

## 2 INTRODUCTION

This is Mackenzie District Council’s second Infrastructure Strategy. It has been prepared from Council’s 2018 suite of AMPs and the LTP of which it forms part.

The issues discussed reflect the current legislative environment and the communities’ priorities across the district.

The financial forecasts are estimates and the reliability of the forecasts decreases beyond ten years and towards the thirty year planning horizon.



### 2.1 Strategy Layout

The strategy document sections and corresponding Local Government Act 2002 (LGA) sections are tabled below:

**Table 2.1.1 - Strategic Layout**

Strategy Section	LGA 2002 (Section 101B)
Executive Summary	
Identifies the purpose of the Infrastructure Strategy and the core infrastructure included in this strategy	2(a) and 6
Describe the district/city and illustrate the linkage between strategic documents	2(a)
Describe the core infrastructure, its condition and performance while recording the significant assumptions, risks and mitigation	2, 3(e), 4 (c) & (d)
Discuss the emerging issues that will impact on the core infrastructure assets	3 (b) to 3(e)
Discuss Council’s response to the emerging issues and the significant decisions to be made during the term of this strategy	2(b), 4(b)
Identifies the response options for the significant issues and documents the benefits, cost, when and funding source	2(b); 3(a) to (e) & 4(a) to (c)
Identifies the costs associated with the actions proposed	4(a)

### 2.2 Purpose

The purpose of this strategy is to identify significant infrastructure issues for our district and the principal options for managing those issues. The strategy covers the areas of:

- Stormwater Disposal
- Wastewater Disposal
- Water Supply
- Roads and Footpaths

This information forms the backbone of the AMPs for these activities that then flow into the 2018-28 LTP.

## 2.2.1 Background

Section 93 of the LGA requires that every local authority must have a LTP which covers a period of not less than 10 consecutive financial years. Section 101A states that every local authority must also prepare a Financial Strategy for all of the consecutive years of the LTP.

Council's AMPs have generally looked out ten years, but with some critical assets the review period has been extended out beyond thirty years.

Section 101B of the LGA states:

- (1) A local authority must, as part of its long-term plan, prepare and adopt an infrastructure strategy for a period of at least 30 consecutive financial years.

The stated purpose of the Infrastructure Strategy is to:

- a) Identify significant infrastructure issues for the local authority over the period covered by the strategy; and
- b) Identify the principal options for managing those issues and the implications of those options.

Section (6) defines infrastructure assets as including:

- a) existing or proposed assets to be used to provide services by or on behalf of the local authority in relation to the following groups of activities:
  - i. water supply;
  - ii. wastewater and the treatment and disposal of sewage;
  - iii. stormwater drainage;
  - iv. flood protection and control works;
  - v. the provision of roads and footpaths; and
- b) any other assets that the local authority, in its discretion, wishes to include in the strategy.

The Office of the Auditor General expanded on the definition of a good infrastructure strategy as follows.

*An Infrastructure Strategy should stand alone as a key piece of information. Its role in bridging the gap between strategic and operational planning means it is best produced early, setting the direction for more detailed asset management planning.*

*...it is not enough to discuss issues. It is important to be clear what approach is being taken to address the issues and why.*

*... significant issues should be:*

- *linked to the significant infrastructure issues and options that have been identified;*
- *few in number – some infrastructure might not have any significant decisions required;*
- *explicit; and*
- *linked to genuine options with approximate costs/benefits for the alternatives.*

(Office of the Auditor General, 2017)

This provides direction beyond legislative compliance to a document that is more strategic and narrative.

## 2.3 Mackenzie District Core Infrastructure Assets

The core Mackenzie District Infrastructure Assets included in this strategy are tabled below:

**Table 2.3.1 - Mackenzie District Infrastructure Assets**

Asset	Description	Replacement Value	% of total
Water	Water extraction, treatment and distribution	\$22.7M	17%
Wastewater	Wastewater collection, treatment and discharge	\$15.2M	11%
Stormwater	Stormwater collection and discharge	\$5.5M	4%
Roads and footpaths	Roads (arterial, collectors, local; curbs and gutters), bridges, footpaths	\$94.7M	68%

Asset	Description	Replacement Value	% of total
<b>TOTAL</b>		\$138.1 M	100%



### 3 MACKENZIE DISTRICT

Renowned for its breath-taking mountain views, turquoise blue glacier lakes and rivers, its wide tussock landscapes in the high country, green rolling hills in the basin and its clear starry nights, the Mackenzie District has always been an attraction for people to visit, live and do business.

In contrast to its small population (4,300 as at 2013 census) the area of the district is large, comprising 745,562 hectares and covers 7,339 square kilometres of diverse landscape. Named in the 1850s after James Mackenzie, a Scottish-origin shepherd and sheep thief, the Mackenzie District is located in the middle of the New Zealand's South Island.

The extreme forces of nature created significant landscape features which form some of the district's natural boundaries. The Main Divide of the Southern Alps has New Zealand's highest mountain "Aoraki/Mount Cook" (3,754m) in the north-west and the Two Thumb Ranges in the south-east. Little Mount Peel is on the district's eastern extent and Lakes Ohau and Benmore border the district in the south-west.

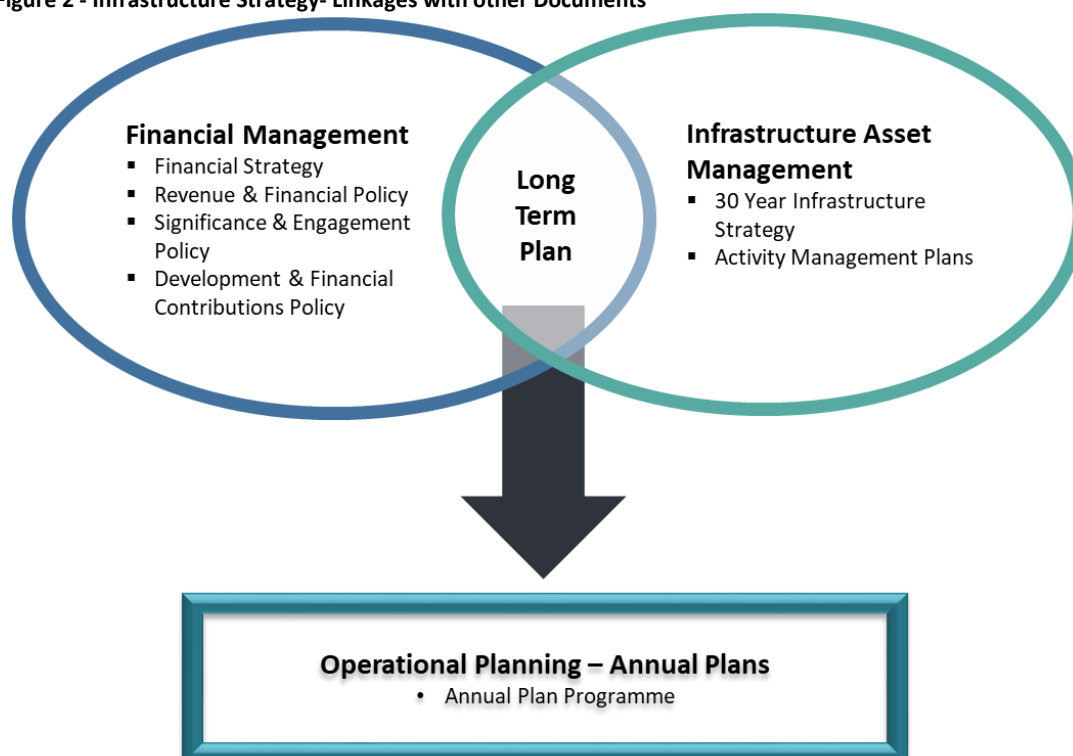
Mackenzie is a district of contrasting seasons with clear snowy winters and long, hot summers. Autumn is known for being a festival of colour. Wild flowers and seas of lupins bloom throughout the district in spring.

Although dominated by agriculture and farming, the diverse landscape is a paradise for outdoor enthusiasts with hiking and cycle trails, skiing, rock and mountain climbing, kayaking and hunting, fly fishing, salmon farms, pleasure boating, golf, horse trekking and star gazing.

Renowned for the clarity of its sky and freedom from light pollution, the Mackenzie area was declared a gold-level International Dark Sky Reserve (IDSR) in 2012 by the International Dark-Sky Association (IDA).

#### 3.1 Linkage with Other Documents

Figure 2 - Infrastructure Strategy- Linkages with other Documents



Council has through its Significance and Engagement Policy identified the following as 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.

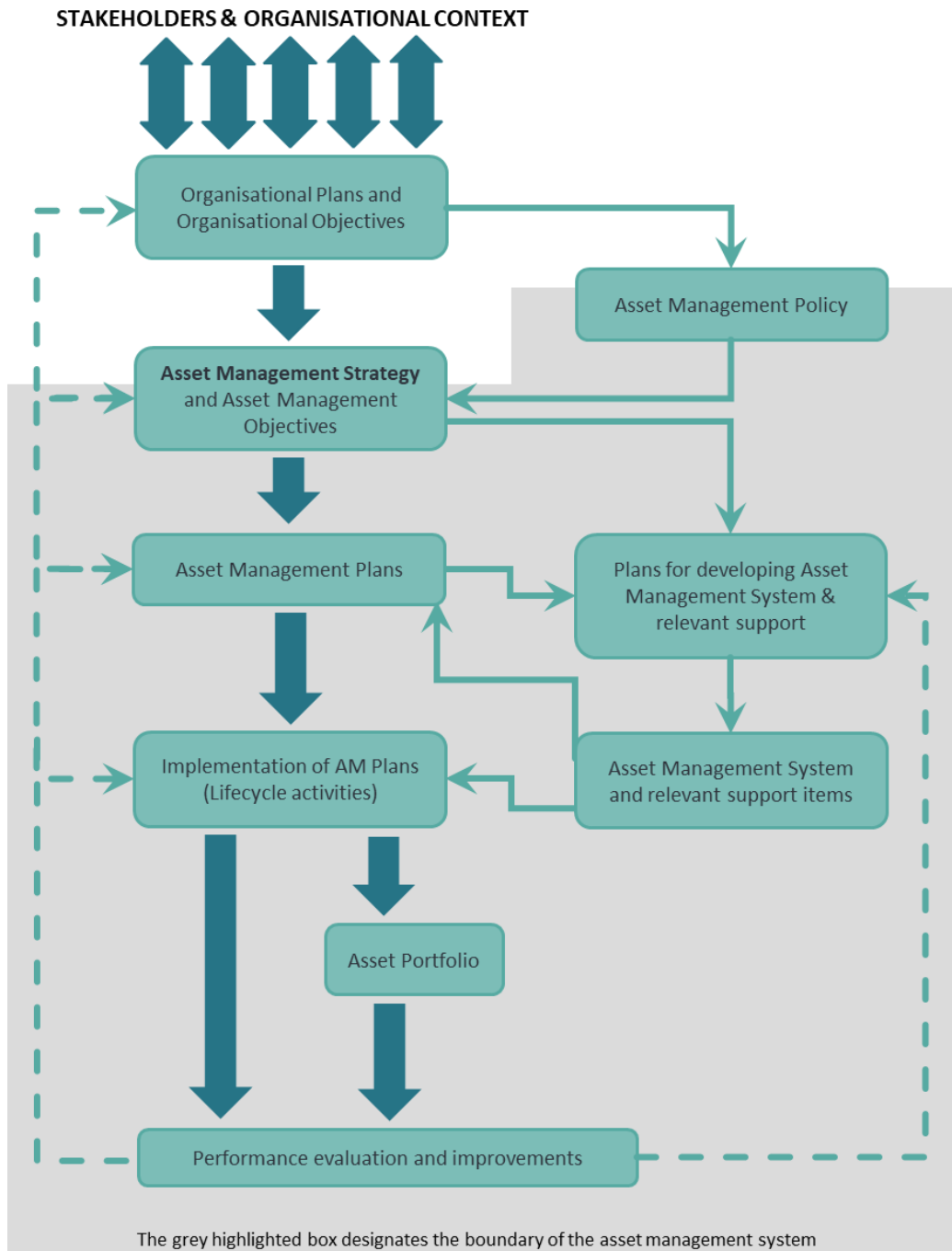
- The wastewater reticulation and treatment systems at Burkes Pass, Fairlie, Lake Tekapo and Twizel.
- The stormwater reticulation systems at Fairlie, Lake Tekapo and Twizel.

The purpose of the policy is—

- to enable the local authority and its communities to identify the degree of significance attached to particular issues, proposals, assets, decisions, and activities; and
- to provide clarity about how and when communities can expect to be engaged in decisions about different issues, assets, or other matters; and
- to inform the local authority from the beginning of a decision-making process about—
  - the extent of any public engagement that is expected before a particular decision is made; and
  - the form or type of engagement required.

This strategy is part of the process in identifying issues, providing clarity around them and informing the community and decision makers about the options available.

As well as being a strategic document associated with the LTP, the Infrastructure Strategy is integrated into the asset management system.



### 3.2 Mackenzie District Council

The Council operates from two offices in Fairlie and Twizel, offering local government services dealing with:

- Planning & Regulation
- Asset Management
- Finance & Administration
- Community Facilities.

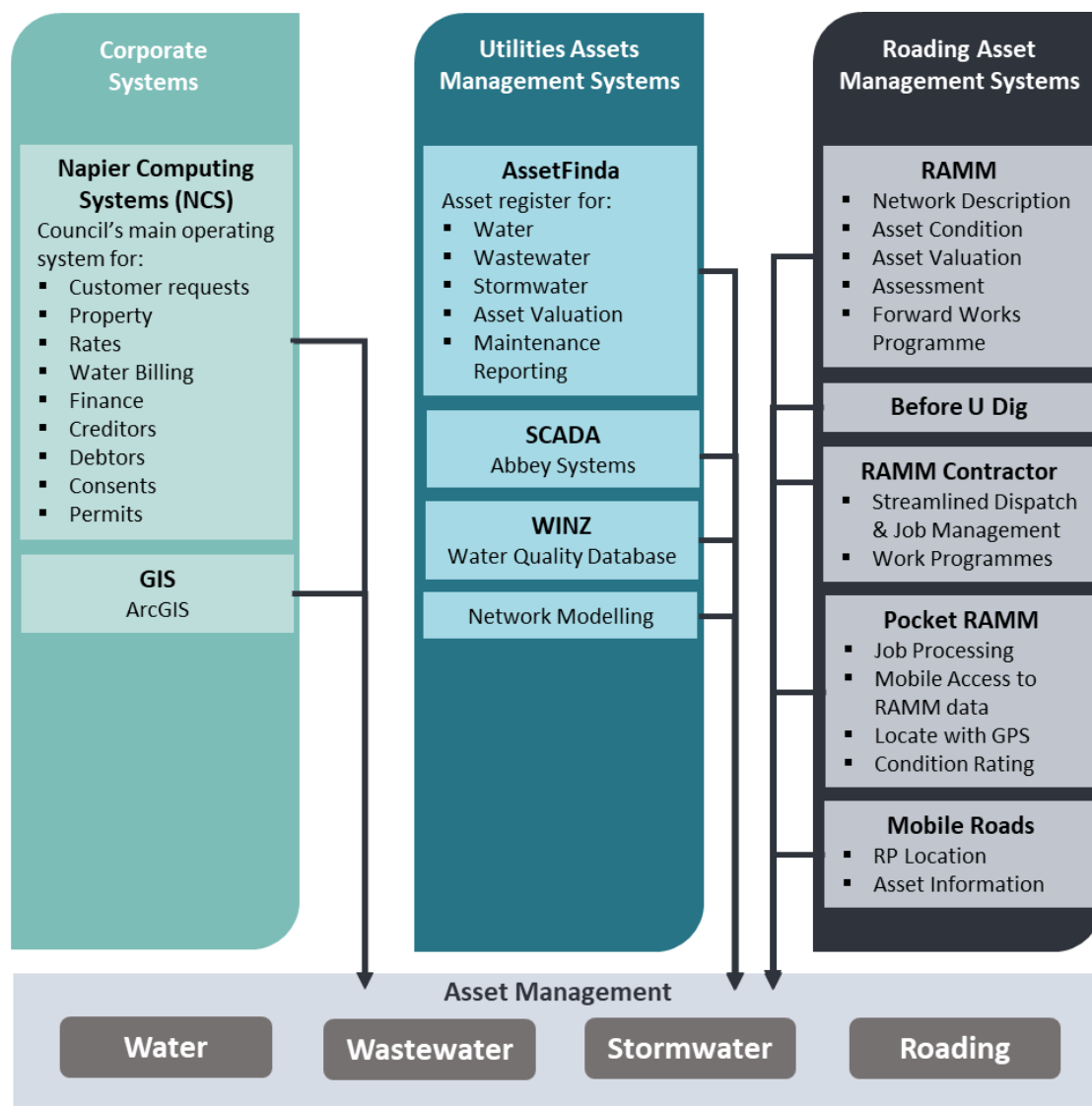
The Council has six councillors elected from two wards and the Mayor, elected at large.

There are three Community Boards (Fairlie, Tekapo and Twizel), comprising four elected members and one appointed Councillor representative. This provides an ongoing level of dialogue with the community.

## 4 CORE INFRASTRUCTURE

### Information 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 three waters (water, wastewater and stormwater) and roading. The information and data systems available to Council staff are shown below and discussed within this section.



### Three Waters (water, wastewater and stormwater)

Council uses AssetFinda 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 the 3waters networks issues.

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. This is faster, easier and more accurate.

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

**Asset Reporting:** There are a 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, which create a flexible interface. The iPad App gives real-time access to data in the field. This enables Council staff to view, analyse, edit and add data, capture images, run inspections, and complete works requests from in the field.

Council uses AssetFinda to manage the following:

- Water
- Stormwater
- Wastewater

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

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.

The table below gives the assessed data confidence quality of the Council’s Assetfinda data tables as described in the 2017 Water, Wastewater, Stormwater and Solid Waste Assets Valuations at July 2016 report.

Data Confidence Levels

Valuation Element	Water Supply	Wastewater	Stormwater
Asset Registers or Databases	G	G	G
Attribute Details	G	G	G
Asset Categorisation	H	G	G
Optimisation Information	A	A	A
Useful Lives Information	G	G	G
Unit Rates	G	G	G

The Data Confidence Levels are as follows:

VH	very high confidence	H	high confidence	G	good confidence
A	average confidence	P	poor confidence		

## Roading

The Road Assessment and Maintenance Management (RAMM) system is the main information system used in the management of the road network. RAMM contains a schedule of all roads in the network and information on carriageway widths, surfacing types and ages, pavement composition, bridge data, footpaths, street lights, traffic volumes and loadings and road condition data.

Currently the bridge asset is managed under a professional services contract by DCL Consulting. They use the RAMM database to manage the asset.



The information held on RAMM is continually being updated and improved following the completion of roading maintenance and renewal treatments, capital improvements, traffic counts and road rating condition assessments. The use of RAMM or an equivalent asset management system is mandatory to obtain financial assistance from NZTA.

The table below gives the assessed data confidence quality of the MDC RAMM and spread sheet data tables as described in the “Roading Asset at 1 July 2016” report.

#### Data Confidence Levels

Valuation Element	Pavement	Footpath	Structures	Drainage	SWC	Signs	Lights
Asset Registers or Databases	H	G	H	H	G	G	G
Attribute Details	G	G	G	H	A	H	G
Asset Categorisation	VH	H	VH	H	H	H	G
Optimisation Information	H	G	H	H	H	H	H
Useful Lives Information	A	G	A	A	A	A	A
Unit Rates	H	H	G	G	G	A	G

The Data Confidence Levels are as follows:

VH	very high confidence	H	high confidence	G	good confidence
A	average confidence	P	poor confidence		

## 4.1 ASSET DESCRIPTION

Across all our towns the capacity of their respective reticulation networks are sufficient for the existing zoned land that they service.

### 4.1.1 Water Supply

#### General

Mackenzie District operates four public water supplies in the following townships:

- Burkes Pass
- Fairlie
- Tekapo
- Twizel

Along with treatment and reticulation infrastructure, resource consents to take water are vital. The term of these consents is key to forward planning and can often determine the timeframes for upgrades.

## Resource Consents

Scheme	Consent Number	Expires
Burkes Pass Water Supply	CRC971594	29 October 2032
Fairlie Township	CRC040921	19 August 2044
Tekapo Water Supply	CRC971414	13 August 2033
Twizel Water Supply	CRC042741	20 August 2047
Pukaki Airport		

The Pukaki Airport water take consent has lapsed. Staff are working with Environment Canterbury to have it reactivated. The water supply to the airport will be connected to the Twizel supply, but Council will seek that the resource consent will remain in place to allow the continuation of water take for other uses.

All these resource consents will require renewal during the life of this strategy unless Environment Canterbury changes its rules to allow any of these activities to be permitted. This is unlikely and allowance has been made to re-apply for them prior to their expiry date.

## Current Condition

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

## Current Performance

The water supply networks are generally performing well with a few leakage problems in Fairlie. These are generally due to older concrete pipes with perished rubber sealing rings. Specific condition for each asset is not currently measured but, as noted above, representative sections of the network are inspected and the results extrapolated across the network. There is good condition information for water supply assets with the majority of assets graded at 2<sup>1</sup> or better (89%). Only 3% of the network is graded as having a rating of 4<sup>1</sup> and no asset is graded as requiring replacement. However, Fairlie has a programme to replace all the pipework installed in the 1940s as this has defective rubber sealing rings allowing significant leakage.

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

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

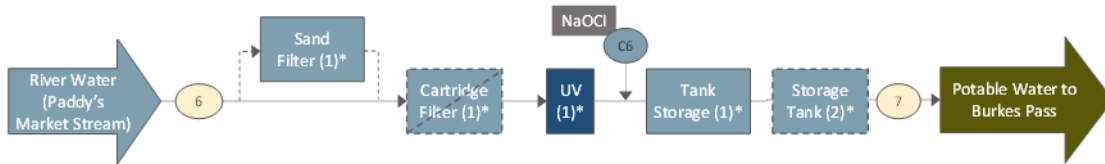
### 4.1.1.1 Burkes Pass

## Treatment

The Water Safety Plan for Burkes Pass has been approved by the MoH. Implementation of this plan will require future improved treatment. Currently the treatment is by proportional dosing with Sodium Hyperchloride solution.

The likely improvement is detailed below.

<sup>1</sup> Condition Rating: 1 = **Very Good Condition** - Only normal maintenance required  
2 = **Minor Defects Only** - Minor maintenance required (5%)  
3 = **Maintenance Required to Return to Accepted LOS** - Regular maintenance required (10-20%)  
4 = **Requires Renewal** - Significant renewal/upgrade required (20-40%)  
5 = **Asset Unserviceable** - Over 50% of asset requires replacement



### Reticulation

No significant change expected to the normal operation of this activity. Council has confirmed that this supply is to be delivered on a “restricted” basis with all properties receiving 1,800 litres of water daily into each property owners’ own on-site storage tank. The trunk main from the intake to town is scheduled for replacement in 2019/20 at a cost of \$40,000 and a solar panel will be installed the following year to power the SCADA system.

This town like others in the district is experiencing some growth. The ability to supply services will limit that growth and will be something developers will have to investigate as part of their projects.

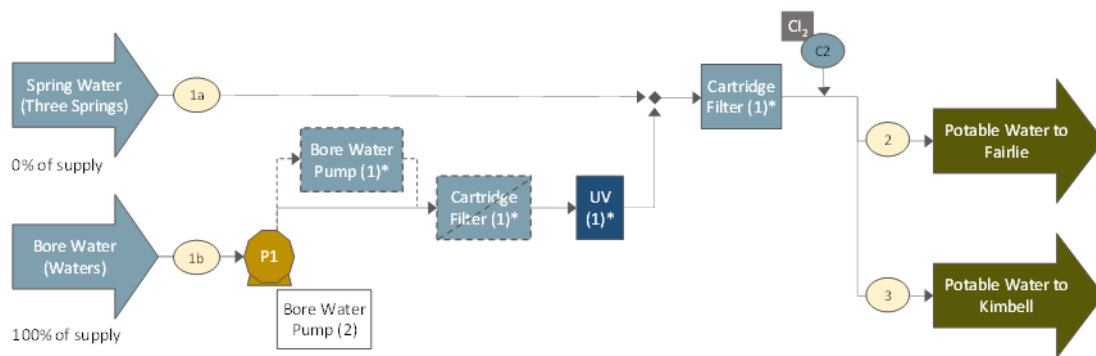
#### 4.1.1.2 Fairlie

### Treatment

The Fairlie Water Supply does not currently meet the requirements of the Health (Drinking Water) Amendment Act (2007). Investigations have been undertaken on another spring to the west of the current source to monitor the turbidity of the flow over time. After two years monitoring the turbidity has remained generally below 1 Ntu and as a consequence has been assessed as 3 log credits, meaning it will not require extra filtration to meet the DWS.

With the preparation of the revised Water Safety Plan it is recommended that the source for Fairlie water supply be relocated to the new spring approximately 570 metres west of the current intake and that design and construction be undertaken in 2018/19 that will meet the DWS. The estimate for the upgrade of this supply to meet the DWS is \$900,000. This is based on positive outcomes of the current monitoring programme of the new spring source.

Council has been working with a water treatment supplier to develop a package treatment plant that will be able to supply water to Fairlie at the consented flow rate of 28l/sec. The proposed treatment flow diagram is shown below.



### Reticulation

No significant change is expected to the normal operation of this activity. Scada will be installed to monitor the new treatment plant at the time of its construction to comply with the NZ Drinking Water Standards. The resource consent for the water take from Three Springs Creek expires in 2044, and \$50,000 has been allowed for consent renewal in 2043/44.

Fairlie embarked on a replacement programme of its old concrete pipe network in 1998 and have generally spent \$100,000 per year on this initiative. The replacement programme will be complete by 2020/21 at the current rate of \$120,000 per year.

## Plant and Equipment

The Nixons Road booster pump station has an upgrade programmed for 2018/19 at a cost of \$10,000. This will include telemetry and new controller (Process Logic Control computer or PLC).

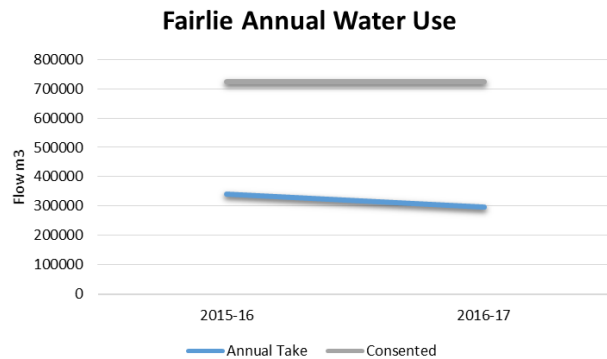
The current storage for Fairlie is 140m<sup>3</sup> which provides only a few hours storage. This is supplemented by the gravity head on the delivery pipeline (541m<sup>3</sup>).

Consideration has been given to constructing a new reservoir in 2025/26 at a cost of \$1,500,000. The decision to proceed with this or not will depend on the effectiveness of the new treatment and the growth demand for Fairlie. At this stage, unless a water hungry industry is established in Fairlie it is unlikely that the existing reservoir will have to be replaced.

## Demand

This graph shows the total annual flow for Fairlie for the last two years as compared to the consented take.

Taken annually there is no concern with the ability to supply water to Fairlie over the long term. However the consent requires flow demand management in periods of low flow in the Opihi River. This requires the imposition of hosing restrictions.



### 4.1.1.3 Tekapo

## Treatment

No significant change is expected to the normal operation of this activity.

## Reticulation

No significant change is expected to the normal operation of this activity.

The resource consent for the Tekapo water take expires in 2033 and \$50,000 has been allowed in 2032 for the preparation and lodgement of a replacement consent. It is anticipated that the consent will be granted with similar conditions as the current consent. Of biggest concern is the 5,895m of AC pipe that will need sampling to confirm the remaining life of the asset. While to date there have been no breakages or need for repair, AC pipe in New Zealand has proven to have a relatively short life and a sampling regime is to be undertaken, similar to Twizel, to confirm that remaining life. At this stage it is expected that the pipes will continue to operate in the vicinity of a 80 year life, and \$1,120,000 has been allowed for in the period from 2036 to 2045 to replace these pipes. If sampling shows the need for early replacement, Council will consider bringing forward this programme as necessary.

Hydraulic modelling of the Tekapo supply indicates that as development proceeds further to the south, Council will not be able to supply a firefighting pressure and flow above the 745m contour on the east side of Tekapo and above the 750m contour on the west side without extra boosting.

On the west side, an appropriate solution would be installation of a pump system into a new reservoir that will provide both a domestic and firefighting supply from that reservoir to the land above the 750m contour. This land is in private ownership. At the time of any development of that area by the landowner, it would be appropriate that they provide the network to provide this supply.

On the east side the existing inline booster in Lochinver will provide the required pressure and flow above the 745m contour.

## Plant and Equipment

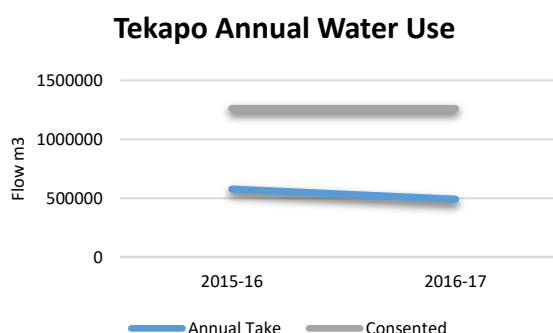
The Tekapo water supply headworks will require replacement, which is estimated to be required in the period 2026-30. This will replace chlorination equipment, turbidity monitor, PLC and pumps at a cost of approximately \$90,000.

The in-line booster pump and controls installed in Lochinver Ave will also have to be replaced during 2031-35 at a cost of \$10,000.

### **Demand**

This graph shows the total annual flow for Tekapo for the last two years as compared to the consented take.

Taken annually there is no concern with the ability to supply water to Tekapo over the longer term, but the amount of irrigation for large scale landscaping will have to be carefully managed.



#### **4.1.1.4 Twizel**

With the upgraded Twizel water treatment plant (completed in 2015) the most pressing issue continues to be the deterioration of the AC pipe network. This will, over time, see an increase in the maintenance costs associated with accelerated pipe failures. Costs are not likely to be significant, but budgets will need to be reviewed if there is a significant increase in failures. With AC pipe replacement this trend will be reversed. Council initiated a full replacement programme in 2016.

### **Treatment**

The Twizel water supply was upgraded in 2014/16. The work involved a complete rebuild of the pump set that provides water at pressure to Twizel and improved treatment so that water provided complies with the Health (Drinking Water) Amendment Act (2007). No significant change is expected to the normal operation of this activity now that this project is complete. Scada telemetry was installed in 2015 as part of the head works upgrade.

At the same time the reservoir was relined and covered.

### **Reticulation**

There was 25.5km of Asbestos Cement (AC) pipe in Twizel (2.0km is privately owned), all installed in early 1970s. AC pipe is affected by both water and soil conditions and this causes premature failure of the asset. Several samples have been analysed to predict the remaining life of these pipes. Whilst there have been few actual failures to date, the analysis shows that the AC network is at risk of failure from now to 2040 and all the AC pipe should be replaced by 2040. The cost to replace the AC pipe network is \$4,050,000. A replacement programme based on a predictive failure model from the various pipe samples has been prepared.

The model takes into account the following:

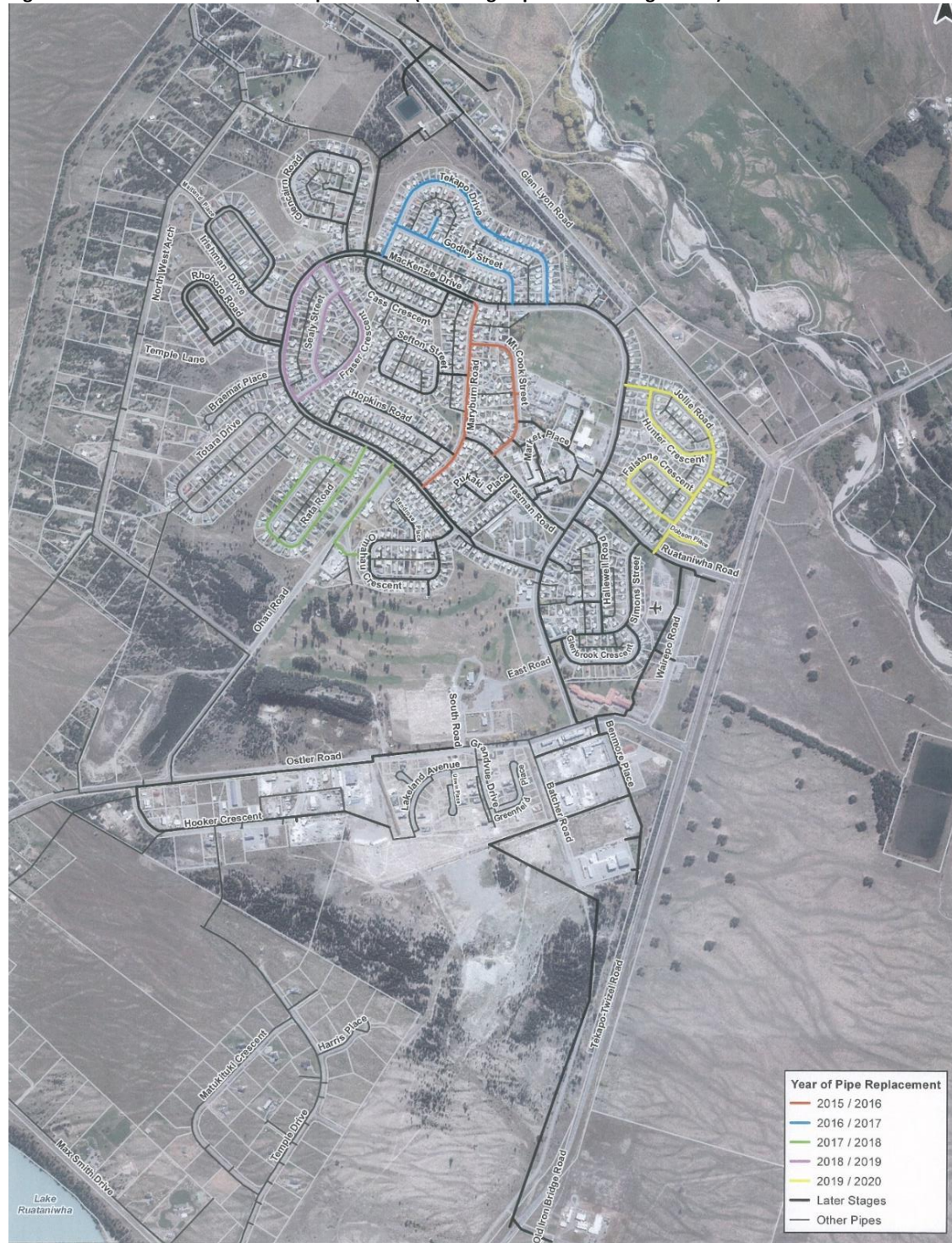
- Existing and future demand
- Roading replacement programme, both footpath and roadway
- Ability to fund
- Availability of contractors
- Refurbishment method

Council understands the importance of maintaining this asset in good condition and has committed to a full replacement programme in Twizel over 20 years. This ongoing programme was initiated in 2016, and to date 2.4 km has been replaced.

Recent replacement using “pipe bursting” techniques has shown a significant reduction in the replacement rate per metre, with the added benefit of significantly less disruption to the community.



**Figure 3 - Asbestos Cement Water Pipe – Twizel (including Replacement Programme)**



**AC Water Pipes - 20 Year Renewal Strategy for Twizel**  
Short Term (1-5 Years) AC Water Supply Renewals

Property boundaries, 20m contours, road names, rail line, address & file points sourced from Land Information NZ. Crown Copyright reserved. Property boundaries accuracy: +/- 2m urban areas, +/- 10m in rural areas. Census data sourced from Statistics NZ. Postcodes sourced from NZ Post. Assets, networks, water and drainage information shown is approximate and must not be used for detailed engineering design. Other data has been compiled from a variety of sources and its accuracy may vary, but is generally +/- 1m.

MAP PRODUCED BY:  
MaxKenzie District Council  
Main Street  
FAIRLIE, NZ

ORIGINAL MAP SIZE: A3  
DATE: 13/11/2014  
AUTHOR: jama



The replacement programme will be reviewed over time as pipes start to fail, and also to fit in with footpath resurfacing and any programme for the roll out of Ultra Fast Broadband.

### Plant and Equipment

The three well pumps will require replacement at about 15-20 year intervals depending on pump running hours. These pumps cost \$13,000 each and the oldest will be replaced during the period 2026-2030, with the remaining

two replaced in 2031-2035. One pump is 10 years old, the second is 2 years old and the third was installed new in 2017.

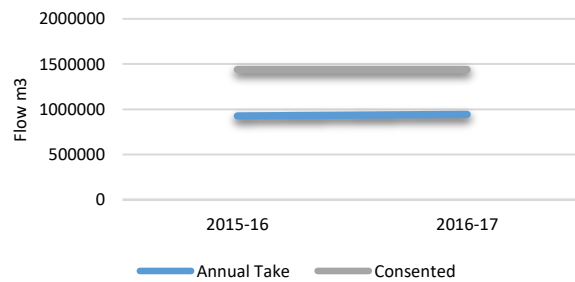
The headworks (pumps in particular) being installed on the Twizel water supply will have reached the end of their economic life within the period of this strategy and will have to be replaced. This is estimated to be required during the period 2026-30, at a cost of \$175,000. The Magflo meter and the Turbidity meter will also need replacement in 2031-35 at a cost of \$40,000.

### Demand

This graph shows the total annual flow for Twizel for the last two years as compared to the consented take.

Taken annually there is no concern with the ability to supply water to Twizel over the longer term. However the consent requires flow demand management in periods of low flow in the Twizel River. This requires the imposition of hosing restrictions. The amount of irrigation for large scale landscaping will have to be carefully managed.

**Twizel Annual Water Use**



### Growth

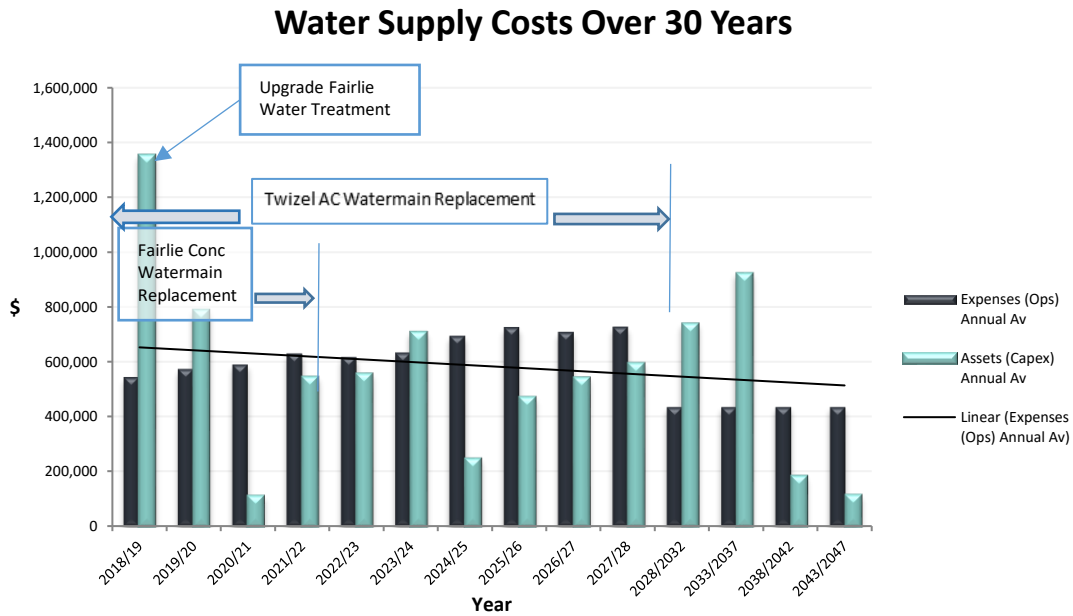
With the steady growth of Twizel to the west, the impact of Plan Change 15 allowing for low density residential areas and the Council policy of only supplying water on a restricted basis may delay the need for a large trunk water main to be laid into this area. However this will need to be monitored over time as development and demand increases in this area. Reports provided to Council by Opus International Ltd have recommended the construction of a 300mm trunk main from the headworks to the Residential 4 zoned land west of Twizel. The cost of this is estimated at \$315,000. This work could be funded in part or wholly by developers by way of financial contribution. There is some pressure from developers that these areas be developed as “on demand”. To achieve this a booster will have to be installed in the system to provide the domestic and fire fighting flows required. If this was to proceed, consideration should be given to the installation of water meters in those areas, to assist with reducing the water demand.

The area to the west of Twizel known as The Drive is zoned Residential 4 and Rural Residential 1. These zones allow for low density sections. Council has determined that this area is to be serviced by an on-demand water supply. Previously in times of high demand, the flow and pressure dropped off markedly to the point where water flow was non-existent. An in-line booster pump was installed in 2015/16 to address this problem.

As noted above, developers often add significant areas of landscaping to new developments in order to enhance sales opportunities. This results in demand on the Council system, for irrigation to get landscaping established and maintained. The amount of irrigation for large scale landscaping will have to be carefully managed to ensure the water demand is not putting Council’s water take at risk.

#### 4.1.1.5 District Wide Water Supply Costs

The following graphic summarises the actions proposed over the thirty year strategy period.



#### 4.1.2 Wastewater

##### General

The Council operates four wastewater schemes:

- Burkes Pass
- Fairlie Township
- Tekapo
- Twizel

Along with treatment and reticulation infrastructure, resource consents for treated wastewater are vital. The term of these consents is key to forward planning and can often determine the timeframes for treatment upgrades.

##### Resource Consents

Scheme	Consent Number	Expires
Fairlie Township – Air Discharge	CRC992647	17 Dec 2038
Fairlie Township – Discharge To Land	CRC992608	17 Dec 2038
Tekapo Oxidation Pond Discharge	CRC042914	18 March 2040
Twizel Oxidation Pond Discharge	CRC042915	08 June 2020
Burkes Pass Wastewater Treatment Plant	CRC992607	07 June 2040
Lake Pukaki Information Centre Wastewater Disposal	CRC950264	19 Dec 2030

All of these resource consents will require renewal during the life of this strategy unless Environment Canterbury changes its rules to allow any of these activities to be permitted. This is unlikely and allowance has been made to re-apply for them prior to their expiry date. The new Twizel Oxidation Pond Discharge application has been lodged with Environment Canterbury to allow the consolidation of the discharge.

### **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.

### **Current Performance**

The four sewer networks are performing well with limited blockages. These are generally tied 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 Wastewater assets with the majority of assets graded at 2<sup>2</sup> or better (88%). Only 1% of the network is graded as having a rating of 4<sup>2</sup> and no asset is graded as 5<sup>2</sup> (unserviceable).

#### **4.1.2.1 Burkes Pass**

No significant change is expected to the normal operation of this activity as the oxidation ponds were constructed in 2000 to current environmental treatment standards, with discharge to land. It is intended to install SCADA telemetry in 2018/19 at a cost of \$15,000. The resource consent for the discharge from the oxidation ponds expires in 2040, and \$50,000 has been allowed for consent renewal in 2039.

It is assumed that the growth in Burkes Pass will be relatively minor and no upgrade of the plant will be required.

#### **4.1.2.2 Fairlie**

##### **Treatment**

We expect no significant change to the normal operation of this activity. The oxidation ponds were upgraded in 2002 to current environmental treatment standards, with discharge to land. As a consequence they generally operate very well within guidelines.

Regular monitoring of sludge depth has shown that there has been an 18% increase in volume of sludge over the last 3 years. To address this continuing build-up of effluent and return pond number one to full operation, \$189,000 has been allowed in 2020/21 to remove sludge build-up.

It is assumed that the growth in Fairlie will be relatively static and no further upgrades to the plant will be required.

The resource consent for the discharge from the oxidation ponds expires in 2038. \$50,000 has been allowed for consent renewal in 2036/37.

##### **Reticulation**

There are 7,100 metres of earthenware pipe in Fairlie. These were originally condition rated in 2000 as 4 and 5.

The condition of these Condition 4 and 5 sewers is being re-evaluated to develop a prioritised replacement programme. This work is currently underway and if CCTV inspection confirms the results of earlier inspections with further deterioration, then it is likely that all of the 7,100m will have to be replaced. In anticipation of that result, we have allowed for a replacement programme starting in 2023/24 with completion by 2032. Approximately

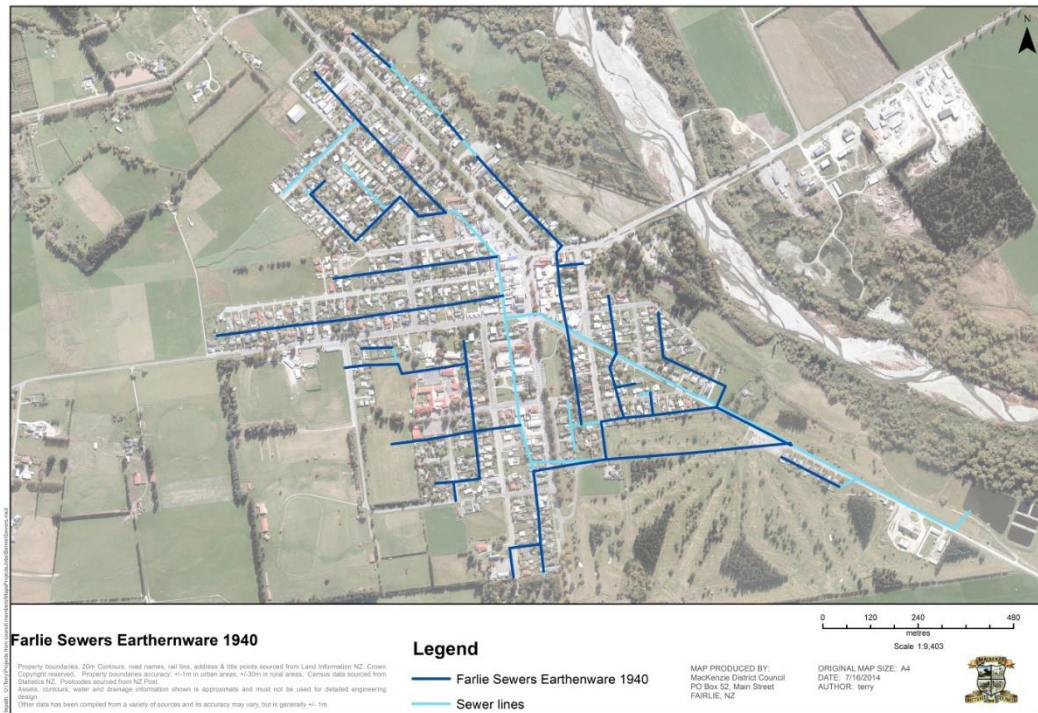
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<sup>2</sup> Condition Rating: 1 = **Very Good Condition** - Only normal maintenance required  
2 = **Minor Defects Only** - Minor maintenance required (5%)  
3 = **Maintenance Required to Return to Accepted LOS** - Regular maintenance required (10-20%)  
4 = **Requires Renewal** - Significant renewal/upgrade required (20-40%)  
5 = **Asset Unserviceable** - Over 50% of asset requires replacement



1200m will be replaced or rehabilitated every year at a rate of \$250,000. Deterioration can take the form of cracked pipes leading to effluent leakage into the surrounding ground, or ground water intrusion which puts excessive pressure on the disposal system and provides less effective treatment. However there is no impact on levels of service, as the pipes will continue to convey sewage even if in deteriorated condition.

Replacement options include dig and re-lay with new pipe, or in-situ refurbishment using relining techniques or pipe bursting.



### Plant and Equipment

The aerator at the Fairlie treatment plant is presently being replaced and this will see a reduction in maintenance costs going forward.

The controller for the soakage basin will require replacement, estimated to be required in the 2026-2030 period. \$15,000 has been allowed for the replacement.

The recently upgraded Camp Ground pump station will require replacement of the pumps in 2026 at a cost of \$4,000.

The Eversley Reserve properties are serviced by E-One wastewater pump systems. All the pumps will require replacement during the period of 2031-35 at a total cost of \$76,800 for the 28 pumps.

Funded depreciation will be used to fund these replacements.

### 4.1.2.3 Tekapo

#### Treatment

The Tekapo wastewater network system continues to perform well with the exception of the disposal field (discussed below). The construction of the two pump stations, trunk mains and rising mains in 2005 set the town up well for the growth it is now experiencing. The oxidation ponds were upgraded in 2001 and are able to treat effluent from increased population and visitor numbers. Council may need to consider increasing aeration in the future if the ponds show signs of failing.



Recent issues with the performance of the disposal field are being addressed by Council at present. While the disposal system was generally adequate for the demand, problems during winter freezing periods were occurring and resulted in Environment Canterbury issuing a notice of non-compliance with the discharge consent. The Council was also aware that as demand increases in Tekapo, the volume of effluent to be disposed of will also increase. The Council reviewed all of its disposal options, and as a result are currently undertaking works to install a new trickle irrigation system on the slope overlooking the existing oxidation ponds. This option requires pumping to a higher elevation and discharging on a face above the oxidation ponds. This system will likely serve the community for the next 5 – 10 years.

Council is planning to undertake a significant strategic study in 2018/19 which will consider growth and development in the district's three towns and in the rural area. The outcomes from this will inform Council's infrastructure and planning programmes. The location of future residential growth in Tekapo will form part of this study, including consideration of new residential development spreading south of the town. This would bring it in proximity to the present oxidation ponds.

If high quality development surrounding the oxidation ponds is proposed, it is likely that reverse sensitivity issues could encourage the Council to relocate the oxidation ponds. Future planning would involve an evaluation of alternative locations for the ponds, securing any new site by land purchase if required, and placing a designation over the land for purposes of effluent disposal.

\$15,000 has been allowed in 2018/19 to install telemetry at the Camp Ground Pump Station. The resource consent for the discharge from the oxidation ponds expires in 2040. \$50,000 has been allowed for consent renewal in 2036/37.

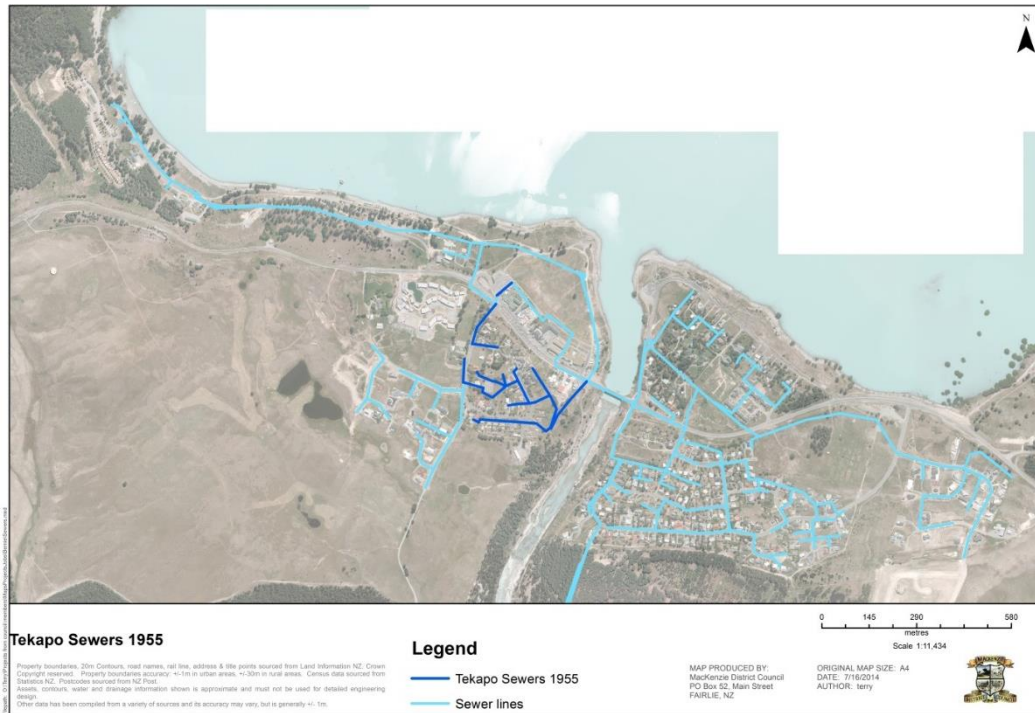
Regular sludge depth surveys monitor the build-up of sludge in the ponds. The current effluent depth is 0.53m and it is likely that the sludge will have to be removed sometime around 2025.

There are 1,600 metres of earthenware pipe in Tekapo. These were originally condition rated in 2000 as **3**. A rating of 3 means '**Maintenance Required to Return to Accepted Level of service - Significant maintenance required (10-20%).**'

It is intended to re-evaluate these sewer mains and then develop a prioritised replacement programme from that re-inspection. If the CCTV inspection confirms the results of earlier inspections with further deterioration, then the 1,600m of sewer main will be programmed for replacement or refurbishment.

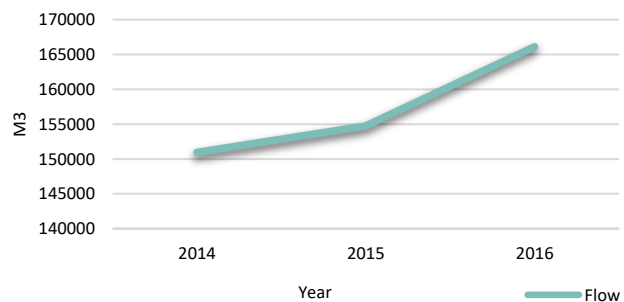
If there is significant deterioration then replacement will need to be scheduled for 2031-35 and \$408,000 has been allowed in that period. Deterioration can take the form of cracked pipes leading to effluent leakage into the surrounding ground or ground water intrusion which puts excessive pressure on the disposal system and less effective treatment.

Replacement options include dig and re-lay with new pipe or in-situ refurbishment using relining techniques or pipe bursting.



The present works to relocate the disposal field and pump effluent to a higher elevation and discharge on a face above the oxidation ponds are considered a medium-term solution (5-10 years). A more permanent location with in-ground disposal may need to be identified and that site designated, if the strategic work planned for 2018/19 supports growth to the south of Tekapo. It will be important to monitor the annual outflow to the disposal field to anticipate when it is nearing capacity and plan for its replacement.

### Tekapo Effluent Disposal



### Plant and Equipment

It is highly likely that the aerators that have been in service since 2001 will need to be replaced within the next ten years. They have had bearings and motors replaced but the other componentry is showing signs of corrosion. \$124,000 has been allowed for their replacement in 2021.

The Flygt pumps in the two main pump stations will have reached the end of their effective lives during the period of 2026-2030 along with the control panels. Costs associated with this replacement are four pumps at \$132,000 and two control panels at \$10,000 per site.

The Camp Ground Pump Station in Lakeside Drive is programmed for full replacement in 2020 including telemetry at a cost of \$100,000.

#### 4.1.2.4 Twizel

### Treatment

No significant change is expected to the normal operation of this activity. The oxidation ponds were constructed in 1970 to serve a design population of 6,500 (current population is 1,137), with the exception of the current disposal system. The current disposal is to ground by way of a 1.6km long trench. Environment Canterbury did not consider this best practise when Council applied to renew the consent in 2004 and as such granted a 10 year

consent with a strong indication that an application to continue this discharge at the end of that period would be unlikely to be granted.

Council has an agreement to acquire land adjacent to the oxidation ponds and construct rapid infiltration basins and consolidate the disposal in them. This will retire the existing disposal trench. This project has been accelerated and is planned for completion by 2019/20. The budget for this work is \$900,000.

We have allowed \$45,000 to install SCADA telemetry in at the various pump stations and oxidation pond over the period 2016-20.

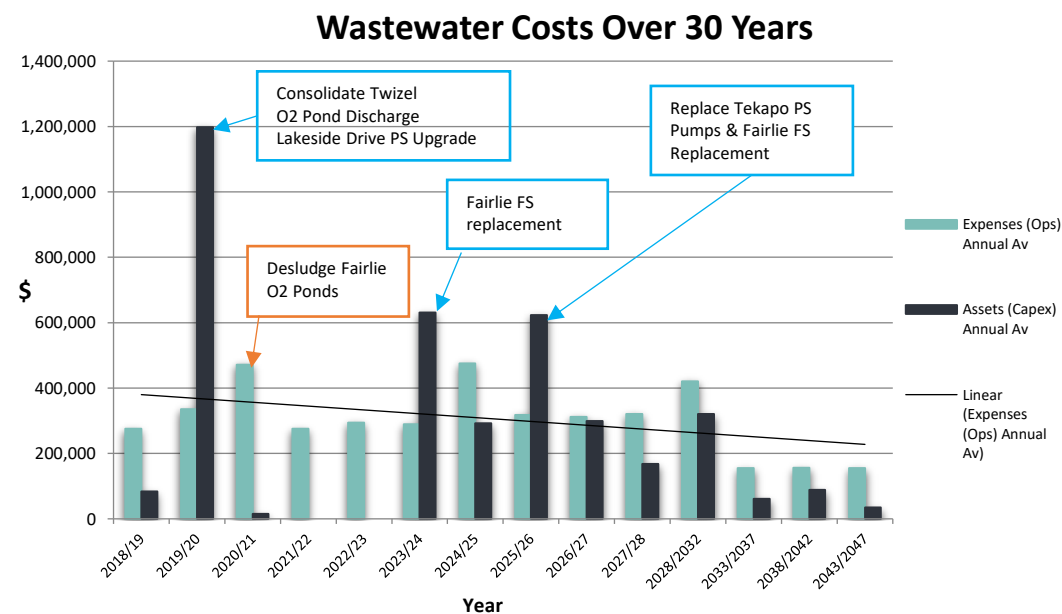
The Twizel oxidation ponds require regular monitoring of sludge level build up and will eventually require removal of that sludge. \$3,000 has been allowed in 2020 to repeat the sludge depth survey and \$200,000 for de-sludging the primary pond in 2025 if required.

### Plant and Equipment

Mackenzie Park wastewater pump station pumps and control panel will reach the end of their economic life and will have to be replaced in the period from 2036-2040. Pukaki Airport wastewater pumps should not need replacement during the life of this strategy.

#### 4.1.2.5 District Wide Wastewater Costs

The following graphic summarises the actions proposed over the thirty year strategy period.



#### 4.1.3 Stormwater

##### General

The Council manages stormwater networks in Fairlie, Tekapo and Twizel. Each of these schemes are subject to resource consent conditions imposed by Environment Canterbury.

Environment Canterbury’s Land and Water Regional Plan became operative in 2015, and requires improvements in operations to minimise the environmental impact.

Clause 5.93 states:

*The discharge of stormwater from a community or network utility operator reticulated stormwater system onto or into land or into or onto land in circumstances where a contaminant may enter water, or into groundwater or a surface water body is a restricted discretionary activity provided the following conditions are met:*

- 1. For a discharge that existed at 11 August 2012, an application for a discharge permit is lodged prior to 30 June 2018, or at a later date as agreed between the reticulated stormwater system operator and the CRC; and*
- 2. A stormwater management plan has been prepared to address the management of stormwater in the catchment and is lodged with the application; and*
- 3. The discharge will not cause a limit in Schedule 8 (Region Wide Water Quality Limits) to be exceeded.*

Also Clause 4.17 notes the following:

*Where the discharge is from an existing local authority network, demonstration of a commitment to progressively improve the quality of the discharge to meet condition (c) as soon as practicable but no later than 2025.*

Council is currently preparing a Stormwater Management Plan for the district as required by the Regional Plan. It is likely that there will be a need to install improvements on the small non-consented discharges particularly in Fairlie and Tekapo. These are typically 150mm diameter pipes that discharge water from a road sump onto land or into a water course. The improvement works are budgeted for in the period 2022-28. An overall budget of \$60,000 has been allocated, but until the plan is complete and approved we will not know the extent of the works required.

This will also necessitate an operational increase in maintenance and compliance monitoring of \$10,000 annually and \$20,000 every five years for heavy maintenance.

### Resource Consents

Scheme	Consent Number	Expires
Tekapo - Sealy Street Discharge	CRC042748	18 February 2040
Tekapo - Hamilton Drive Discharge	CRC 146447	24 September 2039
Tekapo – Domain Discharge	CRC 141077	23 December 2049
Twizel Stormwater Discharge	CRC042742	18 February 2040
Pukaki Airport Stormwater Discharge	CRC084922	09 September 2043

All these current resource consents will require renewal during the life of this strategy unless Environment Canterbury changes its rules to allow any of these activities to be permitted. This is unlikely and allowance has been made to re-apply for them prior to their expiry date.

### Current Condition

Council rates the condition of the stormwater pipelines but does not rate the condition of open drains or treatment sites as these are above ground and readily visible. There is an ongoing inspection and maintenance regime under the routine maintenance contract.

### Current Performance

Performance issues for drainage control assets relate to:

- coverage (i.e. are there open water tables or ponding areas that could be serviced by pipe drains or formed channels?)
- improving drainage where storm events cause flooding problems
- stormwater entrance capacity to culverts
- conformity with standards (kerb and channel in all urban streets)

Overall the performance of drainage assets is adequate. The main concern is coverage with a number of urban streets without any kerb and channel. Most existing drainage assets are performing well and have been adequately designed. Some swale drains are still being developed.

#### **4.1.3.1 Fairlie**

No significant change is expected to the normal operation of this activity, however there will be cyclic maintenance on some treatment facilities.

It is planned to internally inspect the Regent/Sloane Street storm water pipe in year one of the LTP (2018/19). As this is an old timber lined drain running through the rear of the Kindergarten section, there is a risk that it could collapse leaving an accessible opening. With the higher than normal risk associated with this section of pipe budget has been allowed of \$40,000 to replace it. The results of CCTV inspection will determine if and/or when this work will proceed.

#### **4.1.3.2 Tekapo**

No significant change is expected to the normal operation of this activity, however there will be cyclic maintenance on some treatment facilities.

##### **4.1.3.2.1 Lochinver Discharge**

Every five years, depending on the results of soil tests, any bare areas will be re-vegetated and contaminated soils replaced at a cost of \$10,000 each time. An annual extra cost of \$500 has been provided for increased maintenance and compliance monitoring.

##### **4.1.3.2.2 Town Centre Discharge**

This treatment facility was constructed in 2014/15 and requires regular maintenance to ensure it performs as designed. Allowance has been made to re-vegetate bare areas and replace contaminated soils every five years. This cost is likely to be \$10,000 per cycle.

An annual extra cost of \$2000 has been provided for increased maintenance and compliance monitoring.

##### **4.1.3.2.3 Lakeside Drive Discharge**

This treatment facility was constructed in 2016/17 and requires regular maintenance to ensure it performs as designed. An annual extra operating cost of \$2000 has been provided for increased maintenance and compliance monitoring from 2018/19.

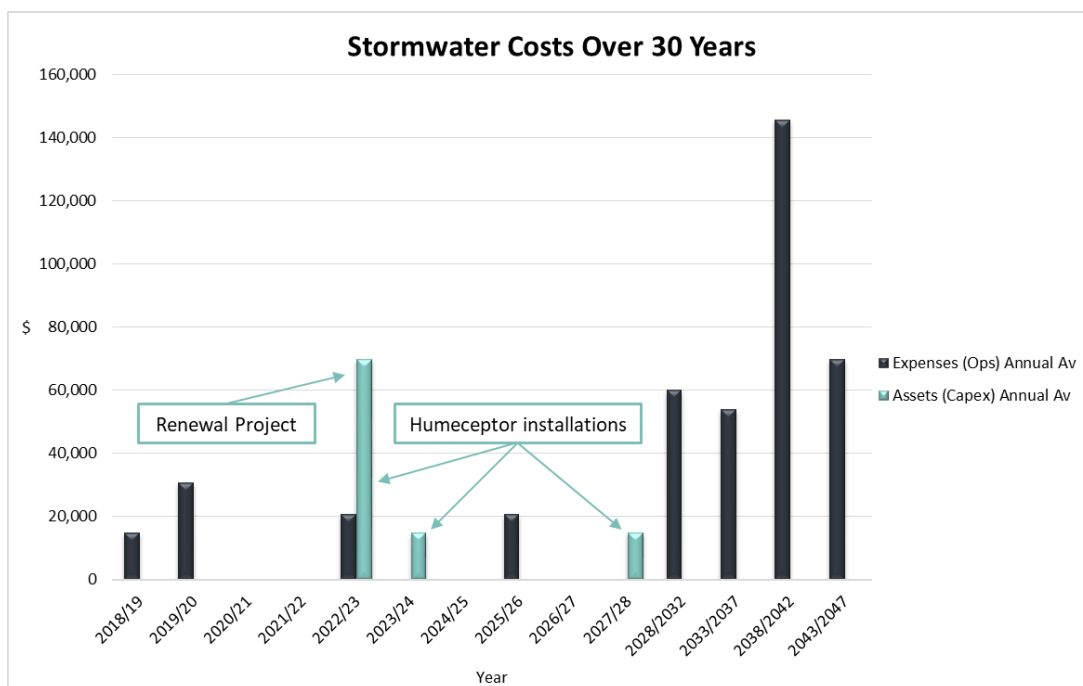
Every five years, depending on the results of soil tests, any bare areas will be re-vegetated and contaminated soils replaced at a cost of \$10,000 each time.

#### **4.1.3.3 Twizel**

No significant change is expected to the normal operation of this activity, however there will be cyclic maintenance on some treatment facilities.

#### **4.1.3.4 District Wide Stormwater Costs**

The following graphic summarises the actions proposed over the thirty year strategy period.



#### 4.1.4 Roads & Footpaths

##### General

The Council manages roading networks across the district including in Fairlie, Tekapo and Twizel.

The network is made up of (as at 2017):

Asset	Number
Sealed Roads	213km
Unsealed Roads	519km
Bridges	99ea
Footpaths	58.1km
Streetlights	1,145ea

There are a number of activities within the roading activity that require resource consents from Environment Canterbury. These are detailed below.

## Resource Consents

Scheme	Consent Number	Expires
ROADING - Twizel River	CRC971431	15-Jan-32
ROADING - Lochaber Road	CRC980696	04-Feb-33
ROADING - Clayton Road Bridge	CRC980697	04-Feb-33
ROADING- Clayton Settlement Road	CRC980698	04-Feb-33
ROADING - Clayton Road Bridge	CRC980699	04-Feb-33
ROADING- Lochaber Road Bridge	CRC980700	04-Feb-33
ROADING- Lillybank Road Bridge	CRC980701	04-Feb-33
ROADING -Haldon Road Bridge	CRC980702	04-Feb-33
ROADING - Tengawai River	CRC980703	04-Feb-33
ROADING - Orari River, Lochaber Road Bridge	CRC980704	04-Feb-33
ROADING - Macauley River Ford	CRC980705	04-Feb-33
ROADING - Snow River Bridge	CRC980706	04-Feb-33
ROADING- Glen Lyon Road	CRC001191	09-Mar-35
ROADING- Cass River Ford Maintenance	CRC054668	16-Dec-40
ROADING- Pareora River	CRC062058	18-Oct-41
ROADING –Stoneleigh Road	CRC064164	14-Dec-41

All these resource consents will require renewal during the life of this strategy unless Environment Canterbury changes its rules to allow any of these activities to be permitted. The Canterbury Land & Water Regional Plan Clause 5.139 states “The use and maintenance of structures, excluding dams, on, in or under the bed of a lake or river are permitted..” , subject to certain conditions being met.

## Asset Condition and Performance

The basis of the lifecycle management plans is the current condition and performance of the asset. These allow comparison with the prescribed level of service, and from this a gap analysis can be completed to determine future work requirements.

Council has implemented RAMM Contractor and Pocket RAMM, and is utilising this to undertake more formal condition and performance analysis of the network. Historically, Council relied on the practical experience and knowledge of the engineering staff to provide a gauge of the network’s overall performance. This knowledge is still used extensively, and is very valuable for planning purposes. Regular condition surveys of the asset components are undertaken and results recorded within RAMM. Intermediate and long term planning of asset renewal is based on the results of these surveys, the performances obtained compared to that desired, and the remaining expected life of the asset component.

### 4.1.4.1 Sealed Pavement Maintenance and Resurfacing

The expected life of a seal is dependent on whether it is a first coat or reseal, what type of seal (e.g. single coat or two coat, large or small grade chip), and the amount of traffic using the section of road. Based on a Councils sealed pavement length a target average annual reseal length of approximately 8% could be regarded as the average



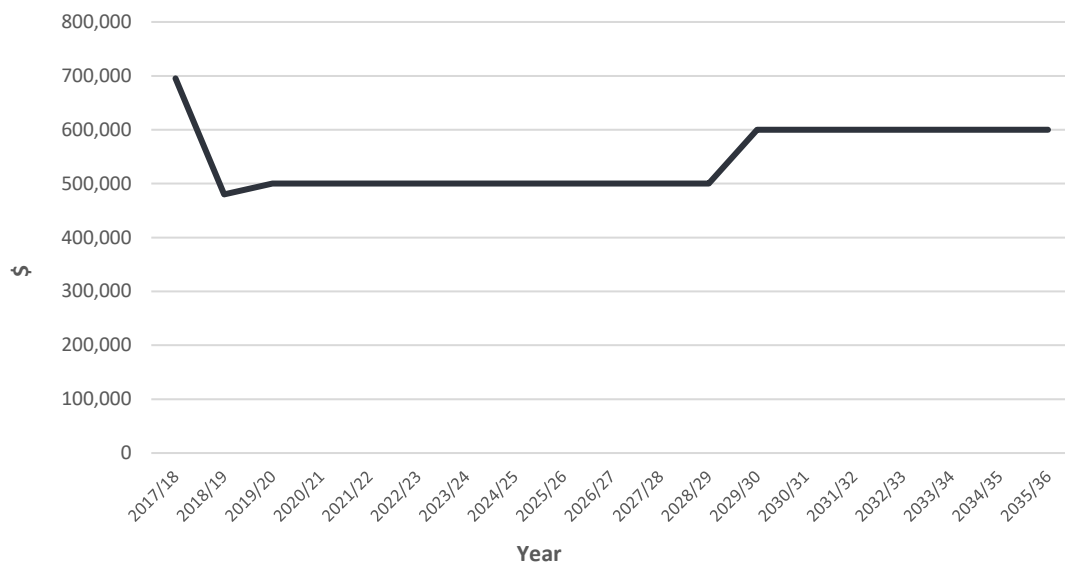
annual need. Actual resurfacing over the last 10 years had been less than this amount to fit in within approved budgets.

Following a full review of our seal histories using an average default reseal life of 18 years and 8 years for first coats, completed when preparing the initial Infrastructure Strategy in 2015, Council funded an additional \$300,000 on top of the approved NZTA budget to address an identified back log of resurfacing (i.e. where the existing seal age is older than the agreed default seal lives).

As a result of this funding injection and favourable contract rates for resurfacing, the back log has largely been eliminated.

As can be seen in the figure below, as long as low tender rates can be achieved by leveraging off the Aoraki Roads collaboration (a collaboration between Mackenzie, Timaru, Waimate, and Ashburton District Councils) Council should be able to meet its resurfacing programmes over the next ten years with an annual allocation of \$500,000.

**Figure 4 - 20+ Year Resurfacing Forward Works Programme**



It should be noted that this is a 'best case' scenario that does not allow for early failure of any seal or inflation. It is also modelled on extensive work completed when preparing the Roding AMP for 2013/14.

#### 4.1.4.2 Unsealed Pavement Maintenance and Metalling

Council's unsealed road metalling budget is split between maintenance metalling (a light application of metal to bare patches to hold the road until a wearing course can be constructed) and wearing courses (where a layer of suitable material with mechanical interlock is laid and compacted to produce a relatively smooth finish).

Over the last several years staff have carried out regular gravel loss surveys at different sites on the network. This work is ongoing with other sites added as necessary. This has provided good data on how our gravel roads perform over time.

Lilybank Road is showing a loss of 17mm off the crown of the road in any one year. This means that while there is sufficient loose material to grade around, the fines left in the material are not adequate to keep a good 6% crossfall. This results in more corrugations, potholes, and loose material and a lesser quality driving surface, as well as increased maintenance costs. Analysis of the results of gravel loss surveys has indicated that to keep the unsealed road network as "a safe, efficient, convenient and comfortable roading network to ensure appropriate property access and freedom of travel for all people" (2015-2025 LTP), Council needs to apply approximately 25,000m<sup>3</sup> of wearing course and maintenance metal to its unsealed roads annually.

Council continues to undertake local source material trials on sections of our network that typically had either high heavy vehicle usage resulting in accelerated gravel loss, high dust generations and/or associated complaints, or inadequate subgrade strength. So far the trials are proving very successful with reduced grading schedules, no

deflection due to heavy vehicle loading, little to no metal loss and very low dust generation. Staff are monitoring these sites and regularly recording set cross sections to monitor gravel loss, asset performance and maintenance expenditure.

While it is too early to consider rolling this construction practice out over an extended area of the unsealed road network, preliminary results show potential for significantly lower lifecycle maintenance costs. Any benefit from these trials could be rolled out during the 2018-21 National Land Transport Programme (NLTP).

Although some roads lose an average of 17mm of material from the crown in any one year, consumption of the asset is not totally realised due to the inherent strength of the subgrade. This means that when traffic wear through the wearing course, there is still a trafficable surface but Council is left with a surface that cannot be graded to restore the shape of the road. This results in a significantly reduced level of amenity and increased maintenance costs. Conversely a number of our roads have very weak subgrades with CBR's of less than 7 (effectively top soil). These roads are not designed to carry heavy vehicles, and during extended wet periods or during the middle of winter when these roads are at their weakest, severe pavement failures such as that shown here is the result.

Staff work closely with the New Zealand Defence Force, ratepayers, the Road Transport Association and other known heavy vehicle road users to ensure that Braemar Road and others like it are not accessed by heavy vehicles when the roads are at their most fragile.



**Braemar Road – Frost Heave July 2012**

Council is addressing growth and pressure issues on the unsealed network through the continuation of good asset management practice. This includes continuing to manage roads with the aim of preventing deterioration, and reviewing our roading programmes and adjusting budgets to address the issues brought about by growth and development. We are budgeting an increase to put more metal on our unsealed roads of \$150,000 per annum, and increasing our grading and repair of unsealed roads by \$100,000 per annum. This will provide for maintenance of current levels of service.

#### **4.1.4.3 Pavement Rehabilitation**

Historically in any one year, sealed road pavement rehabilitation has been as a result of damage caused by winter freeze/thaw conditions. Godley Peaks Road, Braemar Road, Lilybank Road and Haldon Road have been the most at-risk roads in the district.

The Council has made substantial improvements to drainage in sections that are known to cause issues. This has abated the need somewhat, but there is still a general requirement to carry out rehabilitation on sections of these four roads.

There has been an expectation from central government to have all roads capable of handling High Performance Motor Vehicles (HPMV) as this is in the national economic interest.

With weaker pavements and increasing numbers of Heavy Commercial Vehicles (HCVs) across the network, Council will need to monitor any emerging trends in increasing pavement failures and plan for appropriate pavement rehabilitation with a view to avoiding reactive expensive repairs.

Land use intensification has resulted in an increase in HCVs across the network. Some of the direct impacts are detailed below.

There is a 30 year forestry cutting plan for Mt Cook Station that will see extensive logging over fragile unsealed roads every year during that period. Mt Cook Station has recently been sold but for planning purposes it is assumed that the forestry operation will continue.

Implementation of a number of water take consents for irrigation in the Mackenzie Basin are anticipated, and this will drive a significant change in intensification. As a consequence the number of HCVs using roads such as Godley Peaks Road has increased significantly. The council has asked for increased funding from NZTA to enable the current

level of service to be met. The Cass River Bridge is weight restricted and all HCVs have to use the adjacent ford through the river.

Dairy conversions may continue in the region. This will change the traffic flows in and around these properties, including the extra tanker traffic.

Council will have to allow for this extra rehabilitation requirement on both its sealed and unsealed road network as an on-going requirement.

#### 4.1.4.4 Bridge Renewals

There are 99 bridges in the district with a combined length of 1,986m. They range from small, simple timber structures to multi-bay modern steel and concrete structures. Generally the district’s bridges are in good order. The bridge stock is structurally inspected on a rolling three year cycle, with some “at risk” structures inspected annually.

The Council has a robust Bridge Replacement Strategy (2010-2050) which details bridges due for replacement or complete removal. The replacement strategy is reviewed regularly as part of the annual structural inspection. This may have the effect of accelerating the replacement of various structures or conversely extending their remaining useful life.

Any new bridges constructed within the district will be HPMV compliant.

#### 4.1.4.5 Bridge Replacement Strategy

Bridge No	Bridge Name	Replacement Timeframe	RUL (Years)	Costing Parameters			Replacement Cost	Year	Notes
				Length	Width	Rate/m2			
1	Otama Road	3 - 10	8	6	2.7	\$5,403.00	\$77,400	2023	Replace (possibly with a box culvert)
13	Coal Pit Rd No 2	10 - 15	10	12	4	\$3,910.00	\$208,000	2025	Replace (new bridge)
26	Goodmans	3 – 10	5	17	2.1	\$3,910.00	\$169,500	2020	Don’t replace (leave structure for emergency access)
41	Clayton Settlement	20+	35	66	2.8	\$3,910.00	\$838,700	2050	Replace (new bridge)
58	Single Hill	3 - 10	5	12	2.6	\$3,910.00	\$143,100	2020*	Replace (new bridge) or divest
78	Cass River	10 – 15	15	124	2.8	\$3,910.00	\$1,600,000	2030	Replace (new bridge)
87	Black Birch Stream	10 – 15	15	6	3.2	\$4,030.00	\$89,500	2030	Replace (new bridge)
89	Mowbray Road	20+	25	8	3.2	\$4,030.00	\$119,300	2040	Replace (box culvert)

\*Note: Single Hill Bridge is not on Council road reserve but is on private land. Any discussions about its future will be held directly with the landowner.

#### **4.1.4.6 Cass River Bridge**

The bridge over the Cass River on Godley Peaks Road was built by the land owner of Godley Peaks Station and subsequently taken over by Council. It is made up of three spans with a total length of 124m. Council has this weight restricted to 3000kg Gross Vehicle Weight and 2000kg per axle, with a posted speed of 10km/h. The current estimated cost to replace this is \$1,600,000. The bridge provides access to Godley Peaks Station, and the formed road ends some 800m past the end of the bridge.

Council has commissioned a full assessment of the options around replacement or closure of the Cass River Bridge. Council is reluctant to fund the “local share” of the replacement cost and it may be problematic to get funds from NZTA to also replace this structure at what is really the end of the road. The weight restriction of 3000kg causes some issues for the station at the end of the road. It is intended to carry out some pile testing to confirm the weight restriction, which may have the effect of either lifting the weight limit or reducing it. If the limit was to go much below the 3000kg then closure would be imminent.

#### **4.1.4.7 Street Lighting**

The Council fully endorses and supports the protection of the Aoraki Mackenzie International Dark Sky Reserve, which is the world’s largest such reserve and the first to be declared with gold tier status, the highest that can be accorded. The Council is committed to considering any impacts on the reserve when managing its assets, including its street lighting programme.

Over the last 10 years, urban development has added an additional 34% lights to the network and it is assumed that there will be an ongoing increase in these assets. The existing street lights have a remaining life of between 2 years and 20 years. NZTA has provided a special subsidy rate for the replacement of standard luminaires with LED fittings, and Council is presently working on reviewing suitable options for the replacement of all current light fittings to take advantage of the subsidy. The District Plan has specific provisions that are designed to protect the night sky in the Mackenzie Basin. The replacement fittings will comply with District Plan requirements.

There are no plans to add additional lighting other than that vested to Council from various developments within the district.

#### **4.1.4.8 Footpath Resurfacing**

Normally Council would resurface its chip seal footpaths on a 10 to 12 year cycle, budgeting \$109,000 annually for this work. However Chorus have advised that they intend to roll out broad band to Fairlie, Tekapo and Twizel in 2024-26. As a consequence there will be little or no maintenance carried out on the footpaths in these towns until the completion of this project. If needed, Council could borrow to fund the rebuild of all footpaths affected by the broad band roll out on completion, so that the district is left with a good fit for purpose footpath network. Council will work with Chorus on this programme as appropriate.

It is likely that resurfacing will continue with a flexible seal coat using grade 6 chip from the Blackhead Quarry in Dunedin. This dark chip is effective in showing the footpath demarcation.

With traffic regularly parking on the footpaths in Twizel and the refuse collection truck resulting in stress on the pavement surface, these seals generally only have a life of approximately 10 years.

The Transportation Strategy currently underway will be reviewing footpath linkages, in particular safety footpaths, including if they are required and their location.

## 4.2 Assumptions and Risks

The Council has adopted the following significant forecasting assumptions, in developing its LTP and strategies.

**Table 4.2.1 - Significant Assumptions**

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
<p><b>Population Growth</b> It is assumed that growth in the district's population will generally be consistent with the medium projections issued by Statistics NZ in December 2016, which are that the district's population will grow by a little over 4 percent from 2018 to 2028 (from 4680 to 4880 people). It is not expected that this level of population growth will have any significant impact on demand for infrastructure or services.</p>		✓		<p>Population change occurs within the district at a higher or lower rate than predicted.</p>	<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 deliver some services to existing service levels.</p>	<p>Council will continue to monitor population measures within the district and respond to meet needs where possible.</p>
<p><b>Demographic Changes</b> Most population growth within the Mackenzie District is expected to be at older ages (55+ years), with the proportion of over 65s living in the district projected to be slightly higher than the NZ average.</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>		✓		<p>Demographic changes occur at a higher or lower rate than expected.</p>	<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>	<p>Council will continue to monitor demographic changes within the district and respond to meet needs where possible.</p>

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
<p><b>Household Changes</b> 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.</p>		✓		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.
<p><b>Dwelling Numbers</b> 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.</p> <p>Growth in demand for private holiday accommodation is predicted to have an impact on the availability of residential housing. However, the large proportion of unoccupied dwellings in the district, particularly in Tekapo (75%) and Twizel (66%), is not anticipated to change or increase significantly.</p>		✓		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.
<p><b>Tourism Growth</b> It is assumed the average growth in international visitors to Mackenzie District will be at least equivalent to, or greater than, the growth in international visitors forecast for New Zealand over the coming ten years (an average increase</p>		✓		Change to tourism occurs at a rate significantly above or below the growth levels assumed.	Increases in projected visitor numbers may place pressure on supporting services and infrastructure. Conversely, a drop in tourism to the district may mean that service activities have overinvested.	Council will continue to monitor tourism numbers to the country and district and respond to meet needs where possible.

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
<p>of 5.4% per annum). This is based on current data which indicates growth in international visitors to Mackenzie District is occurring at a rate higher than the national average and forecast growth.</p> <p>It is also assumed growth in domestic visitors to Mackenzie District will continue to occur at a rate similar to international visitor numbers. However, there is more uncertainty around this assumption based on the lack of current domestic visitor survey data.</p>						
<p><b>Climate Change</b> It is assumed that climate change is happening, and the Council will take into account the predicted impacts of climate change as it plans, builds and renews its infrastructure.</p> <p>The impacts are expected to be relatively minor within the period covered by the Long Term Plan, but increasing in the future.</p>			✓	<p>There is a risk that climate change will happen more quickly than expected and require changes to the Council's activities.</p>	<p>If climate change happens more quickly, the 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 intergenerational effects on land use decisions, environmental policy and infrastructure decisions e.g. relying on undersized assets and resources in highly vulnerable parts of the district.</p>	<p>Council activities will build appropriate mitigation responses into resilient infrastructure development.</p> <p>The Council will continue to monitor climate change science and the response of central government and adapt its response where required.</p>

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
<p><b>Natural Hazards / Local Natural Disasters</b> It assumed that there will be no major adverse events during the period covered by this Long Term Plan.</p> <p>Note: the district is at risk from natural hazards such as flooding, earthquake, and storms. These events can occur at any time, without warning.</p> <p>While events may occur at any time, Council's planning will focus on operational resilience and Emergency Management.</p>	✓			<p>A major adverse event occurs resulting in a significant impact on the district and Council's services.</p>	<p>A disaster has the potential to cause significant, unbudgeted impact on the Council and the community.</p> <p>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.</p>	<p>The Council seeks to mitigate this risk through its Civil Defence, Risk Management and Insurance Policies.</p> <p>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.</p> <p>Central government has a role in disaster recovery after a natural disaster.</p>
<p><b>New Technologies</b> 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.</p>			✓	<p>Technologies may become available which significantly change the demand for or provision of services.</p>	<p>Inefficient or ineffective provision of services in the traditional manner when other alternatives maybe available.</p>	<p>Council will regularly monitor existing and proposed technologies as they relate to service provision.</p>
<p><b>Service Delivery Modes &amp; Contracts</b> 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.</p> <p>Council will continue to consider collaboration opportunities and assess changes to service delivery on a case by case basis.</p>		✓		<p>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.</p>	<p>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.</p>	



Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
<p><b>Planning Horizons</b> 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.</p>			✓	The planning horizon for growth and asset life services differ from that assumed.		
<p><b>Legislative Demands</b> As an organisation that is created and derives its powers from statute, changes to legislation have a direct impact on the way we conduct our business. The speed and scale of review of legislation depends largely on the policy direction and priorities of the government of the day.</p> <p>While we anticipate changes to the Resource Management Act 1991 and Local Government Act 2002 during the life of this Long Term Plan, we have assumed that these and any other changes to legislation will not have a significant effect on our business.</p> <p>The LTP assumes that existing legislation will remain in place and that the structure and responsibilities of the Council will remain the same over the period covered by the plan.</p> <p>It also assumes the Council will remain an independent unit of local government during the next 10 years.</p> <p>The Council sees merit in continuing with shared services where this allows more efficient use of skills and resources.</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, and the</p>

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
						mechanisms required to fund any new services.
<p><b>Legislation Change – Development Contributions</b></p> <p>It is recognised that the ability to levy financial contributions under the Resource Management Act 1991 will be revoked, effective from 18 April 2022. Council will then recover development contributions. For financial forecasting purposes the Council has assumed that development contributions will provide a similar level of funding and outcomes to financial contributions when this change occurs.</p>			✓	The ability to levy development contributions is not comparable to existing financial contribution provisions.	Council does not recoup costs associated with meeting infrastructure demands of development.	Council will review its Development Contributions and Financial Contributions policy prior 18 April 2022. This work will involve clearly determining the demand for services and the costs of meeting that demand.
<p><b>Inflation</b></p> <p>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.</p>			✓	Inflationary costs in some areas may increase at a rate different to that forecast.		<p>In preparing the LTP, the Council is required to use best estimates in determining the level of costs to be budgeted in the future. As a result, Council is required to account for the effect of price changes or inflation that is expected to occur over the ten year period.</p> <p>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.</p> <p>Some types of costs (eg roading and transport costs) have been subject to fluctuations in recent years, so it</p>

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
						is inherently difficult to predict trends with accuracy. However, these costs will be mitigated through the annual plan process where the annual adjustment can be made.
<p><b>Interest Rates and Borrowing</b> 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). 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>	Any exposure to interest movement will be managed by a preference for a higher percentage of fixed term rates.
<p><b>Sale or Transfer of Assets</b> It is assumed throughout this plan that we will retain ownership of our significant assets and continue with the current Council Departments.</p>			✓	That the objectives whether financial or non-financial of holding strategic assets are not achieved.	Should specified returns not be attainable, we would review our investment. Such a review may have a financial impact.	Any decision to sell or partially sell would be significant and a full proposal with options to be considered would be provided to the community for feedback as part of a special consultation process.
<p><b>Timing &amp; Level of Capital Expenditure</b> 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	If projects do not occur as planned, capital expenditure in any year may differ from that forecast and delay may also change the cost of individual projects.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
				<p>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><b>NZTA Subsidy</b> 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 are:</p> <ul style="list-style-type: none"> <li>• a further change in subsidy rates and/or size of the programme in years 4-10. This plan assumes Council will maintain or expand its spend through additional unsubsidised work.</li> <li>• the NZTA subsidisable programme may differ from what has been assumed, which may impact the Council's spend in future years.</li> <li>• The funding impact of the One Network Road</li> </ul>	<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>If Council wanted to continue its roading programme, other funding sources such as rates would need to be utilised.</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			
				Classification (ONRC) is as yet unknown.		
<b>Resource Consents</b> 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.
<b>Asset Revaluations</b> The Council has a policy of revaluing its buildings, land and infrastructural assets on a three yearly basis. The Long Term Plan assumes that the book values of the relevant assets as at the revaluation dates will be increased by inflation rates as per the BERL inflation forecasts as described in the Inflation assumption above.			✓	Inflationary costs in some areas may be different from that forecast. The condition of the assets may be different to that assumed and the value of the asset may differ accordingly.	There may be a higher or lower asset value and a lower or higher depreciation charge.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.
<b>Sources of Funds for the Future Replacement of Assets</b> 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 is used to fund renewals and is 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.	
<b>Useful Lives of Assets</b> The useful lives of assets have been assumed as set out in the following table, which matches the		✓		Assets last longer than the lives assumed, or assets deteriorate at a	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

Assumption	Level of Uncertainty (High/Medium/Low)			Risk	Impact of variation to assumption	Management of risk
	H	M	L			
depreciation policy under the Statement of Accounting Policies:				faster rate than the lives assumed.		programmes adjusted to minimise the chance of asset failure. In the event of assets wearing out earlier than anticipated, capital projects could be brought forward. This may affect borrowing and depreciation expenses. Negative impacts are likely to be at least partially offset by some assets lasting longer than estimated. Mitigation may also involve reprioritisation of the capital expenditure programme.

Operational assets	Depreciation method	Life (years)
Plant and machinery	Straight line	5-10
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	10-100
Street signs	Straight line	13
Resource consents	Straight line	Over the life of the consent

Operational assets	Depreciation method	Life (years)
Street lighting	Straight line	20-40
Bridges	Straight line	80-100
<b>Stormwater</b>		
Lines	Straight line	100
Manholes	Straight line	100
Open drains	Not depreciated	-
<b>Wastewater</b>		
Mains	Straight line	60-80
Pumps	Straight line	15
Oxidation ponds	Not depreciated	-

Operational assets	Depreciation method	Life (years)
Box culverts	Straight line	100
Manholes	Straight line	80
<b>Water supplies</b>		
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

## **4.2.1 Assumptions**

### **4.2.1.1 General**

As noted above, this strategy is based on the philosophy that Mackenzie District Council will remain a viable unit of local government in its own right and that it will continue to own, manage and operate the 3 waters (water, wastewater and stormwater) infrastructure.

Even though there may be some form of shared service arrangement with neighbouring Councils, Mackenzie will continue to manage and maintain the road network and the 3 waters (water, wastewater and stormwater) networks.

### **4.2.1.2 Levels of Service**

An analysis of the \$9.57 million (2017 dollars) expenditure proposed for 33 projects valued at >\$50,000 shows that 30% of the expenditure is directed at improving the level of service for the three waters (water, wastewater and stormwater) in Fairlie, Tekapo and Twizel. These improved level of service projects are:

- Fairlie water treatment
- Improved stormwater treatment in Fairlie, Tekapo and Twizel
- Connection of the Pukaki Airport water supply to Twizel
- Twizel oxidation pond disposal consolidation including new screens
- Fairlie Reservoir
- Ongoing water main replacement in Twizel

The roading infrastructure maintains the current levels of service over most of the activity. The exception to this could be the replacement of seven weight restricted bridges. If renewed they will all be able to take Class 1 traffic loading, which is an improved level of service. It is uncertain whether the Cass River Bridge will be replaced. If it is not then this will be a reduced level of service. If Goodmans Bridge is not replaced, this will also be a reduced level of service.

## **4.2.2 Public Health and Environmental Outcomes**

Section 101A of the LGA requires Council to identify how it intends to maintain or improve public health and environmental outcomes. At the high level relevant to the 3 waters (water, wastewater and stormwater) and transportation, these issues are related to wastewater disposal, potable water supply and access. The details of Council's intentions are included within this document and the relevant AMPs, and are summarised below.

### **4.2.2.1 Wastewater Disposal**

Fairlie, Burkes Pass, Tekapo and Twizel already treat their effluent to a high level and dispose of it to ground. Council does not consider there is a need to increase the level of treatment unless there is unexpected growth in any one of those communities. The current trickle irrigation effluent disposal at Tekapo periodically comes under pressure to cope with the volume to be disposed of and during freezing periods. This is being addressed by the construction of an additional disposal field.

In Twizel the consolidation of the disposal system into a Rapid Infiltration Basin located adjacent to the ponds will reduce the extent of the discharge and ensure it can operate below the freezing level of the soil during winter, which is likely to result in a benefit to the surrounding environment.

### **4.2.2.2 Water Supply**

All urban water supplies in Mackenzie District meet the Health (Drinking Water) Amendment Act 2007 as they all have approved Water Safety Plans that:

*identify the public health risks (if any) associated with that drinking-water supply; and*

identify critical points in that drinking-water supply; and  
identify mechanisms for—

(A) preventing public health risks arising in that drinking-water supply; and

(B) reducing and eliminating those risks if they do arise; and

(iv) include information about the estimated costs and benefits of the mechanisms referred to in subparagraph (iii); and

(v) set out a timetable for managing the public health risks that have been identified as being associated with that drinking-water supply.

From section 69Z, Health Act 1956

The upgrade to Twizel’s water supply is complete and this provides potable water to the township that meets the Health (Drinking Water) Amendment Act 2007.

The water supply to Tekapo already meets the standard so no improvements are necessary. For both these supplies official confirmation is required from the Ministry of Health that they comply. Council will go through a process of obtaining this confirmation early in the LTP period.

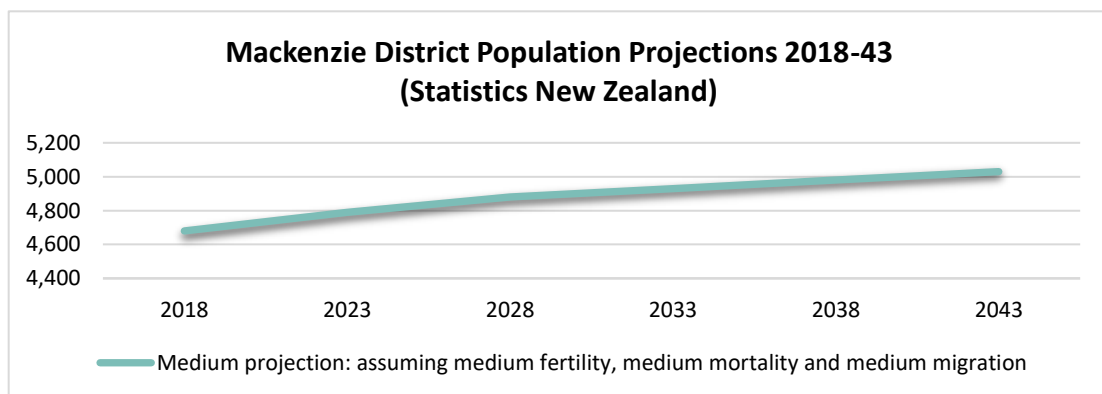
The Council has been monitoring the turbidity of a new spring west of the existing Fairlie water supply source over the last two years, to confirm that it will remain clear. This has proved to be the case, along with no protozoa being recorded in the system following a year of testing. As a consequence it is planned to shift to this site and build a new treatment plant in 2018/19. On completion the water supply will meet the DWS. The upgrade is budgeted at \$900,000.

### 4.2.3 Access

Access is an important part of the public health of a community as it allows for efficient delivery of all services associated with public health. Council intends to maintain the current level of service on the district’s roading network, unless NZTA reduce funding through the One Network Roding Classification and thus fund to a lower level of service. This could impact on the communities’ ability to easily and efficiently access those necessary health services.

### 4.2.4 Population

It is assumed that growth in the district’s population will generally be consistent with the medium projections issued by Statistics NZ. The following graph predicts relatively static population growth over the period to 2043.



The effect of population growth is discussed in greater detail in the Emerging Issues section of this strategy.



## 4.2.5 Development

Analysis of the future urban and rural/residential subdivision over the next 10 years shows an average of 20 sections every second year along with associated infrastructure, to be vested in Tekapo, 192 sections being vested in the next three years with an average of 46 every two years in Twizel, thereafter. The value of infrastructure to be vested in that time is projected to be:

Year 1 to 3 \$1,700,000  
Year 4 to 6 \$4,900,000  
Year 7 to 10 \$1,500,000

Future development is difficult to predict as it depends solely on market demands and developer confidence.

During 2015/17, 5km of sealed road and 4.8km of unsealed road was vested in Council. While developers have to construct this to Council's standard before vesting, the ongoing maintenance costs have to be allowed for.

Initially it was assumed that the level of development experienced during 2015-18 would slow down to about a third of this but this has proved not to be the case. We have modified our projections to allow for this growth.

## 4.2.6 Change in Land Use

Change in land use is ongoing and something that is hard to predict. The following factors influence those land use changes.

- Tourism
  - Mt John: Tourism along with the International Dark Sky Reserve are putting increasing pressure on Godley Peaks Road as people travel to the top of Mt John.
  - Lake Alexandrina: As with Mt John this is also a popular area for visitors. The challenge is ensuring tourists remain on the correct side of the road, along with the associated wear of the sealed and un-sealed pavements.
  - Haldon Camp: This is on the shore of Lake Benmore and puts high summer traffic numbers on Haldon Road.
  - Ski Fields: During opening season, traffic on the feeder roads can increase by 1200%.
  - Alps2Ocean Cycle Trail: This relatively new attraction is starting to put increased demands on Mt Cook Station Road and Hayman Road. It also creates conflict with other road users such as the logging operations. Plans are underway to progressively move this trail off the road carriageway.
- Tenure Review
  - There are a number of high country stations that are going through tenure review. Historically this has involved part of the station passing into the public estate and being opened up for access. There is a higher expectation from the Department of Conservation (DoC) and other road users that better access be made available with no extra funding from either NZTA or DoC. Staff are working with DoC to try to minimise this effect so significant allowance has been made for this.
- Meridian Shoreline Protection
  - Lake Pukaki continues to erode the various shorelines around it and puts Hayman Road and Mt Cook Station Road at risk from that erosion. Meridian Energy has an agreement that they are responsible for that erosion and they rectify it at their cost.
- Land Use Intensification
  - Council anticipates an increase in primary production as the result of on-farm intensification and irrigation consents being implemented.
  - There is the possibility of further dairy conversions in the Fairlie Basin.
  - There is a 30 year forestry cutting plan for Mt Cook Station that (if continued by the new owners) will see extensive traffic over fragile unsealed roads every year during that period.
  - There is increased use of the high country roads by the NZ Defence Force for training.

There is difficulty in predicting where this demand might be over the next 30 years. It is therefore important to monitor usage, development and trends, and plan for these as early as knowledge becomes available and effects are better understood.

As an example, the average annual daily traffic on Clayton Road has almost doubled in the last 12 years from 289 to 419, with the percentage of HCVs remaining constant at 24%. Thus the number of HCVs has also almost doubled. This intensification is expected to continue.

## 4.2.7 Funding

All budget projections have allowed for inflation (August 2017).

### 4.2.7.1 Three Waters (water, wastewater and stormwater)

In the process of producing this Infrastructure Strategy and the underlying supporting plans, Council has considered the following:

- Alignment with the Community Outcomes in the LTP
- Council priorities in terms of the overarching aim for delivering core services
- The need to manage the assets at a Core (3 Waters - water, wastewater and stormwater) level in accordance with appropriate asset management best practice
- Delivering cost effective services that are efficient, effective and appropriate
- Providing an appropriate level of resilience

This Infrastructure Strategy is supported by a previous Council study on water supply and wastewater assets, which used 2009 pipe construction costs and industry standard base lives to look out eighty years.

This work allowed Council to ascertain where the peaks in replacement expenditure of these assets are, by community. Council modelled this expenditure and in 2015 made the decision to amalgamate each of the four urban water supplies, wastewater schemes and stormwater networks in to single urban schemes for water, sewer and stormwater. This means that the cost of providing the 3 waters (water, wastewater and stormwater) infrastructure across the townships is funded universally across the users of those services. The Council is able to set priorities on key capital expenditure for the networks as a whole, and bring more resources to manage the networks.

### 4.2.7.2 Land Transport

To fund roading operational and capital expenditure, Council receives a percentage of the cost as a subsidy from New Zealand Transport Agency (NZTA). The co-investment rate is based on recent review of the NZTA Funding Assistance Rates.

The Council has been informed by NZTA that the co-investment rate going forward will be as follows:

Maintenance, Operational and Renewal Expenditure	51%
Low Cost Low Risk Projects	51%

The roading programme is funded from Council's own resources and a co-investment from NZTA. NZTA's contribution is limited to the approved land transport programme it is prepared to financially support. Council may compensate for any reduction by increasing the amount of unsubsidised work it undertakes.

Council has budgeted \$300,000 annually from the NZTA work category "Low Cost Low Risk" for isolated roading improvements.

It is likely that further funds will be sought from NZTA to implement the projects that are identified by the current work around the Transportation Strategy.

## **4.2.8 Risk and Uncertainties**

### **4.2.8.1 Transportation**

Council's risk is the roading programme may contract further due to the reduction in subsidy rates and/or under co-investment by NZTA that will inevitably reduce the programme.

Council is still uncertain about the effect that NZTA's "One Network Road Classification" system will have on its roading network and while we are aware of the progress towards implementation it is not possible to be definitive within this document. This remains a potential risk to the delivery of a safe and efficient roading network.

### **4.2.8.2 Three Waters (water, wastewater and stormwater)**

This identifies a significant amount of renewals and new works over the life of the strategy. It assumes that the capital works programmes will be funded by existing reserves, made up of funded depreciation accumulated over time, financial/development contributions, internal borrowing and external borrowing.

These are critical assets that will have a significant impact on service delivery, including fire suppression, if not replaced before they completely fail.

### **4.2.8.3 Insurance and Risk**

There are numerous active faults within Mackenzie District and surrounding areas. Of these, some of the most significant in terms of potential lifeline impacts include the Ostler and the Irishman Creek Fault Zones in the Mackenzie Basin. Both fault zones have the ability to generate significant earthquakes. The Alpine Fault on the District's northern boundary has the ability to generate the largest earthquakes and the greatest spread of damage which could severely impact Council's lifelines.

The Council holds \$3,000,000 in cash reserves and has a strong balance sheet to enable it to borrow to meet its local share obligations. Council also insures its above ground assets such as water tanks and reservoirs. It is unlikely Council would obtain insurance for underground assets. It is essential that Council continues to maintain the cash reserve or put in place an insurance regime to replace/complement it, if it changes its current policy.

## **4.2.9 Useful Lives of the Infrastructure Assets**

The assumed useful lives of the assets used in preparing this strategy are outlined in section 5.5 above.

## 5 EMERGING ISSUES

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

### 5.1 Growth and Demand for Services

#### 5.1.1 Introduction

The Mackenzie District has experienced significant growth over the past three years and this is projected to continue in the immediate future. It is significant that building activity and the associated demand for Council infrastructure has increased beyond the level that population change would indicate. This dynamic appears to be driven by investor confidence in the tourist and holiday destination potential of the Mackenzie Basin which shows no sign of abating.

Infrastructure demand has been considered using general demand criteria, population growth, dwelling growth and land development ability.

District Plan constraints will most likely limit medium term demand for infrastructure in Tekapo. Longer term demand will be dictated by the extent to which rural land is able to be rezoned for residential purposes. The environmental significance of the Mackenzie Basin and diversity of community views around appropriate land use create significant uncertainty in relation to the potential for rezoning of rural land. In 2018/19 Council intends to undertake strategic planning which will involve community consultation and a review of development needs and options. This will include seeking to formulate a firm direction for rezoning land around Tekapo. This strategy has been formulated on the basis that existing District Plan constraints will remain.



(Photo: Stuff.co.nz)

#### 5.1.2 Population

Population growth is expected to follow the medium projection issued by Statistics NZ in December 2016.

It is anticipated that over the next ten years (2018-28) Mackenzie District will have a growth in population of around 13%, to 4,880. The population is then expected to reach 5030 in 2043. The percentage of annual growth for the district is expected to be lower than overall growth in the NZ population from 2018 – 2048.

## Projected Population of the Mackenzie District 2013-2043

MACKENZIE DISTRICT																
Table 1 Summary of population projections, 2013(base)-2043 update																
Year <sup>(1)</sup>	Population <sup>(2)</sup>	Population change		Births <sup>(3)</sup>	Annual crude birth rate <sup>(4)</sup>	Deaths <sup>(5)</sup>	Annual crude death rate <sup>(4)</sup>	Natural increase	Population age distribution(%)			Median age (years) <sup>(6)</sup>	Projection assumptions			
		Number	Average annual rate (%)						0-14	15-64	65+		Net migration <sup>(7)</sup>	Total fertility rate <sup>(8)</sup>	Life expectancy at birth (years) <sup>(9)</sup>	
Estimated																
2013	4300	290	1.4	250	11.9	110	5.5	130	20.0	64.0	16.0	41.8	160	2.18	81.0	84.7
<b>High projection: assuming high fertility, low mortality and high migration</b>																
2018	4790	490	2.2	280	12.4	140	6.1	140	20.2	62.4	17.3	40.6	350	2.23	81.4	84.8
2023	5040	240	1.0	290	12.0	150	6.2	140	21.0	59.6	19.4	41.1	100	2.25	82.7	85.9
2028	5250	220	0.9	280	11.0	170	6.4	120	20.5	58.0	21.5	41.9	100	2.26	83.9	87.0
2033	5450	200	0.8	280	10.5	180	6.7	100	19.6	57.4	22.9	42.8	100	2.27	85.2	88.1
2038	5650	200	0.7	300	10.8	200	7.3	100	19.0	56.6	24.4	43.3	100	2.28	86.3	89.1
2043	5860	210	0.7	330	11.6	220	7.8	110	19.2	56.6	24.2	42.8	100	2.28	87.3	90.0
<b>Medium projection: assuming medium fertility, medium mortality and medium migration</b>																
2018	4680	380	1.7	270	11.9	140	6.3	130	20.0	62.6	17.4	40.7	250	2.15	81.0	84.4
2023	4790	120	0.5	270	11.4	150	6.5	120	20.5	60.0	19.5	41.3	0	2.13	82.1	85.4
2028	4880	80	0.3	250	10.3	170	6.9	80	19.7	58.6	21.7	42.2	0	2.10	83.1	86.3
2033	4930	60	0.2	240	9.6	180	7.3	60	18.7	58.1	23.2	43.3	0	2.08	84.2	87.3
2038	4980	50	0.2	240	9.8	200	8.0	50	18.0	57.2	24.7	44.1	0	2.07	85.1	88.1
2043	5030	50	0.2	260	10.5	220	8.6	50	18.1	57.3	24.5	43.9	0	2.07	86.0	88.8
<b>Low projection: assuming low fertility, high mortality and low migration</b>																
2018	4560	260	1.2	250	11.5	150	6.6	110	19.8	62.8	17.4	40.8	150	2.07	80.5	83.9
2023	4550	-10	-0.1	250	10.8	160	6.9	90	20.0	60.4	19.5	41.5	-100	2.01	81.3	84.7
2028	4490	-50	-0.2	220	9.6	170	7.4	50	18.9	59.4	21.8	42.6	-100	1.94	82.2	85.5
2033	4410	-80	-0.4	190	8.8	180	8.0	20	17.7	59.0	23.3	43.8	-100	1.88	83.0	86.2
2038	4310	-100	-0.5	190	8.9	200	9.0	0	16.9	58.1	25.0	45.0	-100	1.85	83.7	86.9
2043	4200	-110	-0.5	200	9.4	210	9.7	-10	17.0	58.4	24.6	45.0	-100	1.85	84.3	87.4

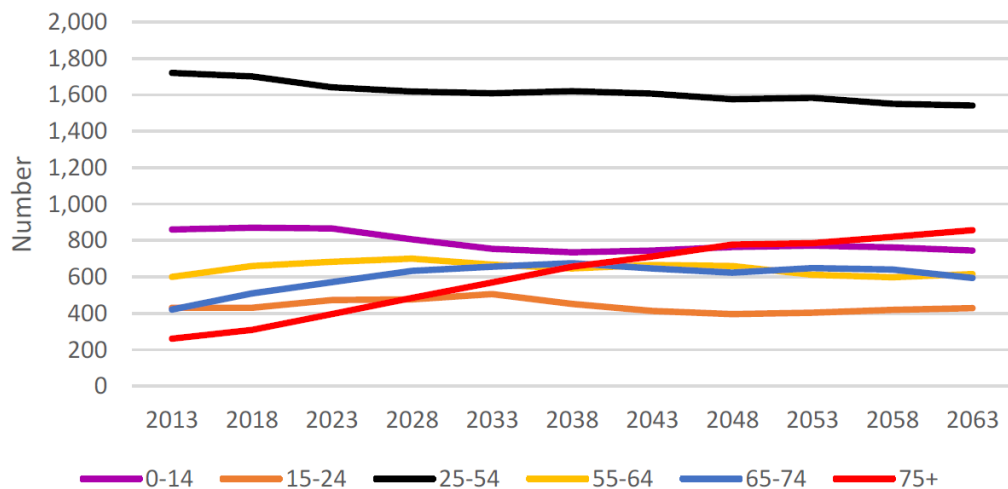
(1) All data is for the five years ended 30 June except population, population age distribution and median age which are at 30 June.  
(2) The projections have as a base the estimated resident population of the area at 30 June 2013.  
(3) Live births registered in New Zealand to mothers resident in the area occurring during the five-year period.  
(4) Per 1,000 mean population.  
(5) Deaths registered in New Zealand of people resident in the area occurring during the five-year period.  
(6) Half of the population is younger, and half older, than this age.  
(7) For the five years ended 30 June 2013, net migration is the estimated population change minus the estimated natural increase, where the estimated population change is the estimated resident population at 30 June 2013 minus the estimated resident population at 30 June 2008.  
(8) The average number of live births that a woman would have during her life if she experienced the age-specific fertility rates of the given period. The historical total fertility rates are not derived using conventional fertility methods but are merely modelled on the total number of registered live births for each area. Therefore, these modelled total fertility rates should not be used as a precise measure of subnational fertility or of fertility differentials between areas.  
(9) The average length of life of a newborn baby if they experienced the age-specific mortality rates of the given period. The historical life expectancies at birth are not derived using conventional life table methods but are merely modelled on the total number of registered deaths for each area. Therefore, these modelled life expectancies at birth should not be used as a precise measure of subnational mortality or of mortality differentials between areas.

**Note:** These projections were released in December 2016 and refer to boundaries at 1 January 2017.  
Owing to rounding, individual figures do not always sum to the stated totals.

**Source:** Statistics New Zealand

Population ageing is a noticeable trend across New Zealand. In 2014 Council commissioned a report from Natalie Jackson Demographics which showed that, in keeping with trends elsewhere, projections indicate significant structural ageing of the district's population under all projection variants, with the proportion aged 65+ years increasing from 15.9% in 2013 to 25.7% in 2033 under the medium variant. Structural ageing continues across the remaining period but at a slower pace, with those proportions reaching 30.3% in 2063.

### Medium



Projected Numbers by Broad Age Group for Mackenzie District, 2013-2063

### 5.1.3 Households and Dwellings

A 'household' is either one person who usually resides alone, or two or more people who usually reside together and share facilities (such as for eating, cooking, or a living area; and bathroom and toilet) in a private dwelling. Council anticipates a growth in household numbers that is consistent with the population growth trajectory, shown above in section 4.2.4. Changes to household composition will also generally reflect 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.

However, it is a different picture for numbers of dwellings in the district. A 'dwelling' is a building or structure (or its parts) that is used, or intended to be used, for human habitation. Dwellings can therefore include motels, hospitals and prisons.

Current and projected increases in dwelling numbers are significantly higher than corresponding population changes. The following shows the usually resident population figures and the proportion of households to unoccupied dwellings:

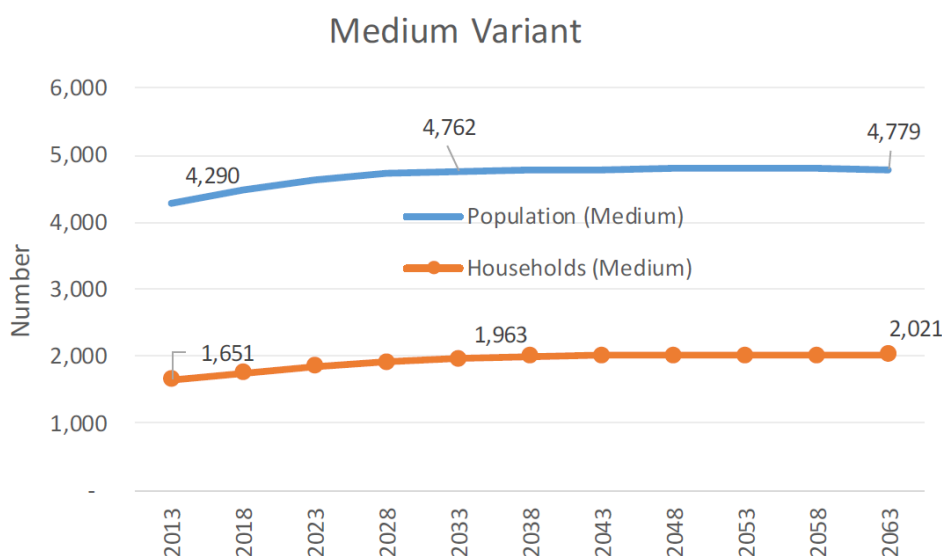
Demographic indicators	Population (Usually resident)	Households (Occupied Dwellings)	Unoccupied Dwellings
Fairlie	696	324	78 (19%)
Tekapo	369	207	249 (55%)
Twizel	1,137	513	765 (60%)
Other areas / Rural	2,098	774	57 (7%)
<b>TOTAL</b>	<b>4,300</b>	<b>1,818</b>	<b>1,149 (44%)</b>

Key Demographic Indicators. Source: Statistics New Zealand – 2013 Census

The Mackenzie District is unique in that the district has a significantly high proportion of non-resident ratepayers. This is most noticeable in the townships of Tekapo and Twizel. This should be considered when viewing trends for building consents within the district, noting that not all dwellings will be used as permanent residences. A consequence of this is a marked change in population of townships (most notably Twizel) during peak times. Fluctuations in population levels throughout the year can pose challenges for activities such as traffic and waste management. There is also a growing number of private dwellings being made available as short term accommodation rentals.

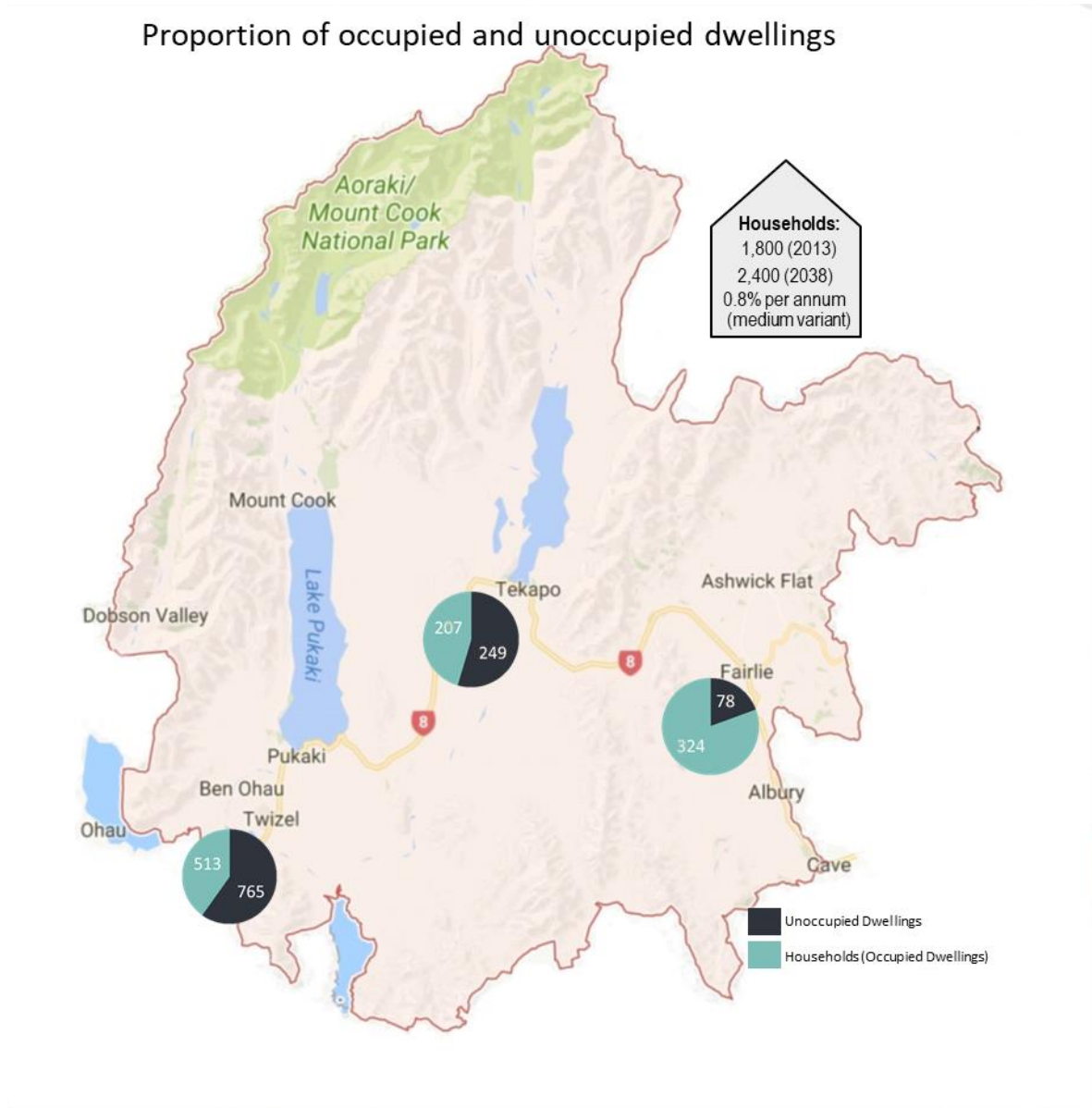
The implication of this is that demand for infrastructure will be higher than long term population increase would indicate and that unanticipated structural change (driven by tourism and investor demand) may drive markedly higher demand for additional dwellings and a consequent requirement for extended infrastructural services.

Projected Population and Projected Households for Mackenzie District by Projection Variant, 2013-2063:



# Mackenzie District Population Households & Dwellings

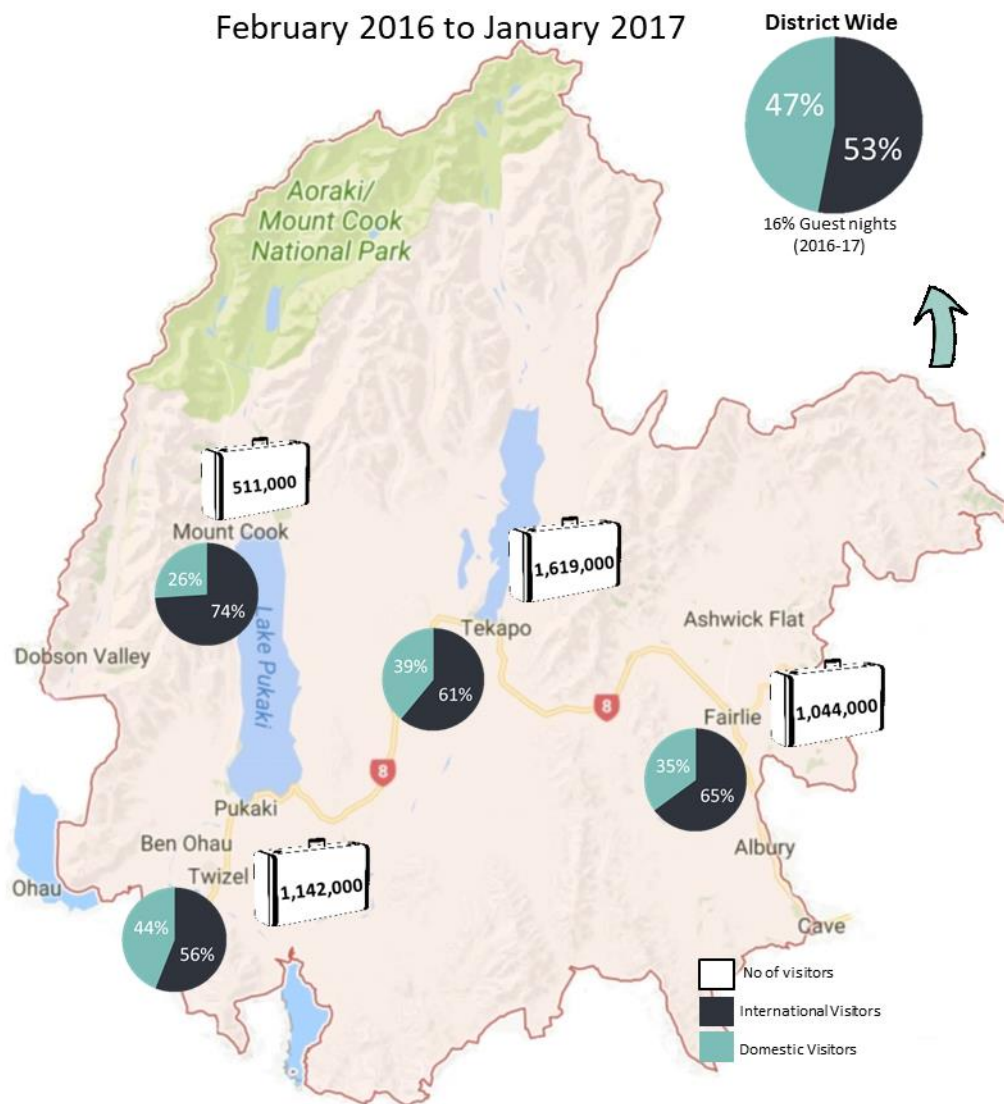
Proportion of occupied and unoccupied dwellings





# Mackenzie District Visitors

February 2016 to January 2017



Note: Visitor numbers are estimates based on cellphone data. Cellphone data does not record actual visitor numbers to the District as it can include repeat visits per visitor and visitors passing through an area without stopping. Domestic visitors are more likely to stay in one location for longer periods in both private and commercial accommodation, while international visitors are more likely to visit each of the townships and stay in short-term commercial accommodation, increasing the number of their recorded visits.

### 5.1.4 Visitors

Visitor numbers are a significant factor in infrastructure planning in the Mackenzie District. There are significant differences between the resident population and visitor population numbers. The growth in dwelling numbers outlined above is ultimately sustained by the visitor demand.

Visitor numbers to the district are high and are growing strongly in terms of both historical levels and in relation to other regions of New Zealand. Tekapo is the most popular destination, with over 1.6 million visitors in 2016/17. Guest nights rose 16% to 782,050 for the year ending June 2017 compared with the year ending 2016.

If current tourism levels continue it will create sustained demand for infrastructure primarily through development of additional non-residentially owned dwellings.



(Photo:Stuff.co.nz)

### 5.1.5 Land use changes and trends

There is a significant amount of community interest in the environmental values of the Mackenzie Basin. This has generated a high degree of complexity in relation to environmental planning within the district. A number of the Environment Court decisions associated with Council's Plan Change 13 (PC13) have introduced constraints that may limit the conversion of rural land for residential or other development.

This is not expected to impact on the availability of land for subdivision and in turn the demand for infrastructure in the short term. The area of residentially zoned land at Twizel and Fairlie is considered adequate to meet demand for the foreseeable future. The area of land available for development at Tekapo is sufficient for immediate needs. Current zone boundaries and planning limitations on development in the rural zone could have an impact at Tekapo in the medium term if the current extraordinary demand continues.

Council is proposing to undertake strategic planning work across the district's 3 towns in 2018/19. This would be undertaken in consultation with each community to determine suitable development objectives for the townships. The question of development pressure and urban spread at Tekapo will be addressed within this work and the community objectives may be carried through to the District Plan review. This could have implications for Council's infrastructure systems but it is not possible to predict the extent or nature of these until any District Plan alterations are identified.

This strategy has been compiled on the basis that the current District Plan zone boundaries will be maintained.

## 5.2 New Technologies

New technology is becoming available within all infrastructure areas and adoption is essentially a continuous process. Some innovations such as the use of increased fines content aggregate on unsealed roads improve the quality of service provided (in this case lowering dust levels) while others such as pipe bursting for water main replacement provide cost reductions.

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

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

## 5.3 Changing Government Priorities and Legislative Environment

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

The NIP provides the following vision for New Zealand's infrastructure:

*By 2045 New Zealand's infrastructure is resilient and coordinated and contributes to a strong economy and high living standards.*

The impact of changing government priorities is most commonly felt by Council either as alterations in legislation or changes in the availability of funding.

The key legislative changes that have impacted on this strategy are:

- The New Zealand Drinking Water Standards, which require higher standards for our drinking water supplies;
- The National Policy Statement on Fresh Water, which has influenced the Canterbury Land and Water Regional Plan which will require increased standards for stormwater discharges over the life of the strategy;
- Mandatory reporting standards which require additional data collection and reporting obligations associated with operational activities.

The major funding influence from central government is the NZTA co-funding arrangement. This provides a significant portion of Council revenue and is a significant factor in determining the capital and maintenance programme for our road network. Over the past several years NZTA has not accepted the full extent of the Council's proposed work programme which has placed pressure on our maintenance programme and limited capital development.

Staff are continuing to work with NZTA to promote an increase in our co-funded programme. The primary objective for additional funding over the life of this strategy is to allow additional capital spend for car park and road safety improvements.

As noted above, the roading programme is jointly funded from NZTA but also from Council's own resources. Council is cognisant of prudent budgeting and the impact on rates, and has budgeted \$300,000 annually from the NZTA work category "Low Cost Low Risk" for isolated roading improvements. ~~It will be consulting with ratepayers as part of the 2018-28 LTP on whether Council should borrow to undertake additional programmes over and above this, if more co-funding from NZTA is available. Council proposes to seek a mandate from ratepayers to carry out these additional programmes. As additional spend will have an impact on rates, it is one of the key issues to be consulted on in the Council's Consultation Document.~~

Central government has established a contestable fund to support small to medium sized councils establish new tourist related infrastructure. Our council has been successful in securing funding for community infrastructure such as public toilets, but as yet has not received funding for roads or three waters services (water, wastewater and stormwater). Council will continue to seek funding contributions through NZTA and the Tourism Infrastructure Fund ~~where it is appropriate to do so. if it receives a mandate to do so through consultation on the LTP. If supported by ratepayers, it will consider debt funding Council's share if these applications are successful.~~ However for roading or the three waters services (water, wastewater and stormwater), in light of the lack of success in securing this funding previously it is considered that additional funding is unlikely and the default position of this strategy is that road maintenance and capital budgets will remain close to current levels.

## 5.4 Climate Change

Climate change is a critical consideration in the Council's long term planning. This Council uses guidance from central government, based upon the best available climate science, to support its planning.

### 5.4.1 Climate Change Projections

The Ministry for the Environment (MFE) has prepared an overview of how the climate in the Canterbury Region is likely to change and what implications this will have.

It is noted that projections of climate change are dependent upon future greenhouse gas emissions which are uncertain. A degree of uncertainty is therefore expected within each of the projections. The regional projections prepared by MFE are a range of values from a low emissions to high emissions future. The projected changes are calculated for 2031-2050 (referred to as “2040”) and 2081-2100 (“2090”) and are relative to the 1986-2005 period (“1995”), referred to as the baseline historical climate. RCP8.5 climate change scenario modelling is based on a ‘business as usual’ approach with very high greenhouse gas emissions by 2100 relative to 1750.

### 5.4.1.1 Temperature

Compared to 1995, it is anticipated that temperatures will rise 0.7°C to 1.0°C by 2040 and 0.7°C to 3.0°C by 2090. Warming is expected to be greatest at higher elevations, with most significant increases in summer/autumn.

Scenario estimates of seasonal increases within the region by 2090 relative to the 1995 levels are projected as follows:

Spring	Summer	Autumn	Winter
0.6°C to 2.6°C rise	0.6°C to 3.0°C rise	0.7°C to 3.0°C rise	0.7°C to 3.3°C rise

**Projected changes in mean temperature (in °C) for summer (Dec-Jan-Feb) and winter (Jun-Jul-Aug) by the end of the 21st century.**

The greatest impact of climate change is likely to be experienced firstly by changes in extremes rather than changes in mean conditions. Temperature extremes are anticipated to change at a higher rate for maximum temperature as compared to minimum temperatures.

### 5.4.1.2 Rainfall

Rainfall is expected to vary locally within the region, with the largest changes in rainfall expected to be seasonal rather than annual.

Whilst other areas within the region will experience a decrease in rainfall, by 2090 it is projected that rainfall in Tekapo will increase by 6 to 28 per cent. Scenario estimates of seasonal rainfall changes in Tekapo by 2090 relative to the 1995 levels are projected as follows:

Spring	Summer	Autumn	Winter
6 - 13 per cent increase	2 - 5 per cent increase	2 less - 5 per cent more	6 - 28 per cent increase

Rainfall extremes, as opposed to temperature, are anticipated to increase at both ends of the spectrum with an increase in heavy rainfall and more dry days expected.

It is anticipated that there will be an increase of dry days (daily precipitation less than 1mm) in inland South Island (up to 10 or more dry days per year). There will also be an increase in extreme daily rainfalls.

### 5.4.1.3 Snowfall

Across the region, it is likely that a significant decrease in seasonal snow will occur. 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 region. Area which currently receive snow are likely to see increasing rainfall as the snowlines rise to higher elevations due to increases in temperatures. In river catchments where winter precipitation is largely reliant on snowfall which is stored until the snowmelt season, it is anticipated that there will be an increase in winter flooding, correlating to the shift to rainfall in these catchments.

#### 5.4.1.4 Drought

Due to extreme weather conditions increasing in frequency, and a general decrease in rainfall/less frequent rainfall, it is anticipated that the frequency and severity of drought will increase, most markedly in already dry areas of the district.

#### 5.4.1.5 Wind

The frequency of extremely windy days in Canterbury by 2090 is expected 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.

### 5.4.2 Implications for Mackenzie District

As with the rest of the region, the Mackenzie District will likely experience effects of climate change. Climate change is not expected to create new hazards, but it may change the frequency and intensity of existing risks and hazards, as well as introduce some long-term shifts in climate patterns across the country. For example, the district has previously experienced extremes of drought and floods and it is anticipated that these may occur with greater frequency and severity.

A number of infrastructure management functions can be affected by climate change. These activities are considered below.

Function	Key climate influences	Possible effects
Water Supply	<ul style="list-style-type: none"> <li>– Reduced mean annual rainfall</li> <li>– Increased mean annual temperature</li> <li>– Increased frequency and severity of drought events</li> <li>– Increased frequency &amp; severity of extreme weather events (rainfall)</li> <li>– Reduced snowfall / retreating snowline &amp; resulting reduction in snowmelt (alpine water catchments)</li> </ul>	<p>Reduced security of supply:</p> <ul style="list-style-type: none"> <li>• reduction in reliable availability of water from both groundwater and surface water sources, with the possibility of increasing regulatory restrictions on water abstraction.</li> </ul> <p>Contamination of water supply:</p> <ul style="list-style-type: none"> <li>• Increased frequency of extreme weather events may result in infiltration and contamination of water.</li> </ul> <p>Traditional snow-melt catchments will become dependent on rainfall as snow line retreats, which is anticipated to be less reliable and more extreme and will lead to an increase in winter floods and decrease in year-round flow.</p>
Wastewater	<ul style="list-style-type: none"> <li>– Reduced mean annual rainfall</li> <li>– Increased mean annual temperature</li> <li>– Increased frequency &amp; severity of extreme weather events (rainfall)</li> </ul>	<ul style="list-style-type: none"> <li>• More intense rainfall (extreme events) will cause increased inflow and infiltration into the wastewater network.</li> <li>• Wet weather overflow events will increase in frequency and volume.</li> <li>• Longer dry spells will increase the likelihood of blockages and related dry-weather overflows.</li> </ul>
Stormwater	<ul style="list-style-type: none"> <li>– Increased frequency &amp; severity of extreme weather events (rainfall)</li> </ul>	<ul style="list-style-type: none"> <li>• Increased frequency and/or volume of system flooding, increased surface flooding and stormwater flows.</li> <li>• Increased peak flows in streams and related erosion</li> <li>• These events, coupled with increasingly frequent winter floods will result in changes in flood plains and a greater likelihood of damage to properties and infrastructure.</li> </ul>
Roading	<ul style="list-style-type: none"> <li>– Reduced mean annual rainfall</li> </ul>	<ul style="list-style-type: none"> <li>• Increased gravel loss from metalled roads, due to an increase in the frequency and</li> </ul>

Function	Key climate influences	Possible effects
	<ul style="list-style-type: none"> <li>– Increased mean annual temperature</li> <li>– Increased frequency and severity of drought events</li> <li>– Increased frequency of extreme wind</li> <li>– Increased frequency &amp; severity of extreme weather events (rainfall)</li> <li>– Reduced number of frost nights</li> <li>– Reduced snowfall / retreating snowline</li> </ul>	<p>severity of drought events and increased frequency and severity of wind events.</p> <ul style="list-style-type: none"> <li>• Flood damage to roads and bridges from extreme weather events.</li> <li>• Impacts on road safety from flooding of infrastructure or from increased extreme wind events, particularly to high sided vehicles.</li> <li>• Reduced damage to roads from frost heave due to a decreased number of frost nights.</li> <li>• More frequent tar melt from increased temperatures.</li> <li>• Adjustments to culverts etc. to allow for peak flows during extreme weather events.</li> </ul>

The Council will take into account the predicted impacts of climate change as part of its infrastructure management processes. This will include design and construction standards, mitigation (such as insurance), and risk-informed management. Section 6.4 below details Council’s approach to managing infrastructure resilience.

## 5.5 Ageing Infrastructure

Management of ageing infrastructure is closely aligned with the discussion of system resilience above. The key aspect is the recognition of time induced failure mechanisms and initiation of a suitable response to minimise cost and disruption to the community. Underground pipe networks represent the greatest risk because of their extent and inaccessibility.

The three key aspects for effectively managing ageing infrastructure are to ensure the organisation has sufficient knowledge of asset status, that funding is available and that remedial work is actioned in a timely manner.

Council has a programme in place for recovering and testing pipe samples from the asbestos cement water main network and is initiating camera inspection of the sewer network to confirm the status of our gravity sewers. Our knowledge of pipe asset condition is considered to be good for water mains. The planned inspection programme will increase our knowledge of sewer condition.

Funding is clearly a critical requirement for replacement of deteriorated infrastructure. Council fully funds depreciation on all water supply, sewer and stormwater infrastructure covered by this strategy, which ensures that adequate funds will be available for replacement in the long term. Council’s balance sheet strength is sufficient to ensure immediate and emergency funding requirements can be met from reserves or through moderate levels of borrowing.

A work programme is currently underway for the replacement of asbestos cement water mains. This was initiated in 2015/16 and is projected to continue to 2035/36. Replacement of concrete water mains has been underway since 2000 and is anticipated to be completed in 2020.

## 5.6 Additional matters

### 5.6.1 Havelock North Inquiry

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

## 5.6.2 Fluoridation

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

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

	Twizel	Fairlie	Tekapo
Capital Costs <sup>1</sup>	351,200	278,700	299,700
Operating Costs <sup>1</sup>	21,500	4,000	7,000

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

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

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

## 5.6.3 Mackenzie Park Wastewater Pump Station

The current rising main from Mackenzie Park pump station is a 100mm diameter pipe connecting to the existing gravity mains in Ostler Road, This is an interim position with the final design having a separate 200mm diameter rising main discharging directly into the oxidation ponds. It is suggested that Council monitor and review the growth in discharge flows from that pump station every five years to ensure that the discharge is not causing surcharge from any openings in the gravity mains. If there is evidence of surcharge problems, the new rising main will have to be programmed for construction. The indicative cost to complete this work is \$300,000.

Indications are that this may be required sooner than expected due to the level of development in the catchment area for this pump station. The rising main will be funded by developers.

As part of the land purchase and consolidation of the discharge project, it is intended to establish easements over the adjacent private property to allow this work to proceed in the future without any impediments. The location and area required for these easements has already been agreed to by the landowner.

## 5.6.4 Water Metering

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

## 5.6.5 Rainwater Collection

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



## 6 THIRTY YEAR STRATEGY

It is necessary that foreseeable community needs and environmental impacts are reflected in a defined strategy to ensure that Council can provide cost effective local infrastructure for households and businesses.

### 6.1 The Organisations' Priorities

Council's priorities are to:

- Manage the impacts of population growth and investor demand
- Meet legislative compliance e.g. drinking water standards
- Manage infrastructure to maximise resilience within community affordability constraints
- Maintain integrity of infrastructure through robust maintenance and replacement programmes.

### 6.2 Asset and Service Management Strategy

Council has adopted an asset management policy. This defines the appropriate level of asset management planning in line with the discussion contained in the International Infrastructure Management Manual (2015). The policy definitions are as follows:

Water	Intermediate
Wastewater	Intermediate
Stormwater	Core
Roads & Footpaths	Intermediate

**Core** is defined as:

Sufficient information to complete asset valuation (basis attributes, replacement cost and asset age/life) and support prioritisation of programmes (critically).

Asset hierarchy, identification and attribute systems documented.

Metadata held as appropriate.

**Intermediate** is defined as:

A reliable register of physical, financial and risk attributes recorded in an information system with data analysis and reporting functionality. Systematic and documented data collection process in place.

### 6.3 Cost Effective Delivery of Services

Section 10 of the LGA outlines the purpose of local government. This includes a requirement to meet the current and future needs of communities for good-quality local infrastructure and local public services in a way that is most cost-effective for households and businesses.

In the 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

Management and operational decision-making for infrastructure systems is almost entirely incremental so achievement of efficiency and effectiveness targets is determined by process management. Benchmarking is used, where appropriate, to illustrate performance and provide feedback for overall governance control.

Planning is achieved through strategic and operational documentation which includes this document, Activity and Asset Management Plans, Operational Plans, Operating Procedures and budget documentation. These area specific documents are supported by a large number of organisational policies, processes and systems that enable organisational operation.

Physical implementation of objectives is achieved through activation of resources. Council uses a range of supply agreements and internal provision to ensure that appropriate capacity is available to undertake all tasks. This ranges from consultant input to upgrade designs through contract operations to supply of consumables. The overall operation is managed by specialist professional staff.

Monitoring of operational performance is tracked through a number of activity specific parameters, asset management practices and detailed budget control. Performance reviews are undertaken with NZTA, industry groups (eg Water New Zealand), Regional Council (resource consent reporting) and central government (eg water test results and mandatory reporting standards).

Elected Councillors maintain overall governance control through formal planning (Long Term and Annual Plans) and reporting (Committee Reports, budget reviews and the Annual Report). In addition Councillors maintain effective informal governance oversight through their strong connections within the local community.

## 6.4 Infrastructure Resilience

Customers have a high expectation of continuing functionality and service delivery. Resilience is based on a design philosophy which acknowledges that failure will occur. Resilience requires early detection and recovery, but not necessarily through re-establishing the failed system.

The two key circumstances which could lead to service disruption are unrecognised gradual deterioration and sudden event (often emergency) damage.

Underground pipe networks are the most susceptible of Council’s infrastructure to unrecognised deterioration with bridges and culverts also being somewhat susceptible. Programmes are in place to inspect critical assets (such as bridges) and for sampling of asbestos cement water mains. Programmes are being initiated to build on previous camera inspection and smoke testing of sewers to confirm structural condition and identify potential network faults. Increased flow and pump monitoring is being initiated with SCADA development that will allow improved analysis of system performance (sewer and water).

Infrastructure systems within our district are physically extensive. Economic constraints limit our ability to improve resilience through capital upgrade or design redundancy and this in turn makes them susceptible to sudden event damage. Council recognises this constraint and measures have been put in place to mitigate the threat through operational and financial arrangements.

Council’s operations and maintenance contracts have robust equipment and personnel location requirements for each of the townships. This enables appropriate responses to be made in floods and snow events and will also support more serious civil defence response.

Council also holds a minimum of \$3.0m in accessible cash funds to enable quick and efficient repairs to infrastructure following a significant emergency event.

## 6.5 Evidence Base

Council acknowledges there are limitations with its data that affect decision-making. A commitment to improving data collection and analysis is set out below.

**Table 6.5.1 - Data Improvements**

Activity	Data to be collected	Value this data provides
Roading	Missing attribute data. This should be identified in RAMM, prioritised and added where able	Identifies the full description of the asset to enable more informed decisions on its value and replacement
Water supply	Flow data for each scheme to be recorded.	This will allow water use trending to be analysed to ensure supplies continue to meet the community’s needs.

Activity	Data to be collected	Value this data provides
Wastewater	Discharge data for each scheme to be recorded.	This will allow trending to be analysed to ensure the Councils ability to discharge effluent is not compromised and that the system meet the community's needs into the future.

The approach to data collection and management is discussed in the respective AMPs and budgets included where appropriate.

## 6.6 Significant Decisions Required

Taking a long term view to the management of infrastructural assets, the Council needs to make key decisions in a timely manner. In addressing needs and pressures in the various communities, the following key decisions have been identified.

Key Decision	Indicative Timeframe
<p>In 2016 Council commissioned a Transportation Strategy. Council is presently working on implementing the strategy and using it to guide future programmes. The Transportation Strategy identified similar themes across the three township communities:</p> <ol style="list-style-type: none"> <li>1) Access from state highway</li> <li>2) Local access</li> <li>3) Parking</li> <li>4) Traffic circulation</li> </ol> <p>It will be important to identify early any proposed street layouts and possible parking areas so that District Plan amendments align and also other developments or sales of Council owned land do not impede the implementation of the strategy.</p>	2017- 2025
<p>Tekapo Oxidation Ponds – This is related to a bigger strategic study to be undertaken in year 1 of the LTP (2018/19), to determine the future direction of development in Tekapo. Issues to be canvassed include where the town might expand to, possible proximity of new residential development to the oxidation ponds, and potential for reverse sensitivity issues eventually requiring their relocation. At the moment there is sufficient capacity for the existing zoned land.</p>	2029 onwards

### 6.6.1 Transport:

Visitor growth pressures particularly in Tekapo are having an impact on the traffic circulation and parking, including bus parking. These matters are outlined in the Transportation Strategy.

Outcomes of further investigation and consultation processes will have to be agreed to and locked in for the long term. Council-owned land that is earmarked for parking should be retained, along with easy access to it. Where there may be a planned road realignment, that corridor should be protected to ensure it is available when required.

It will also be important that once Council confirms the details of the works required, it keeps the community aware of the long term goals and timeframes so that the potential for unreasonable expectations within the community does not arise.

There are less significant issues facing Twizel and Fairlie, but the same comments apply about determining the outcomes required and cementing in the opportunity to give effect to those outcomes in the future.

### 6.6.2 Wastewater:

The wastewater network in Tekapo was upgraded to meet the expected demand in 2005. This upgrade has ensured that the network is well able to accommodate the unprecedented growth Tekapo is currently experiencing and

that is expected to continue. However the oxidation pond discharge, although upgraded in 2001, was not coping with the volumes of effluent required to be disposed of. Council is presently constructing a revised system that will handle the increased wastewater effluent flows. In the medium to long term this new system may have to be relocated away from town to a more suitable site.

Following the completion of the strategic planning work planned for 2018/19, if it is decided that Tekapo should expand to the south, residential properties will overlook the oxidation ponds and reverse sensitivity issues will drive an expectation that they will be relocated. It will be essential for Council to continue to review its options for treatment and disposal at Tekapo to acquire land along with easements and access corridors so that a long term permanent solution can be planned for.

Twizel has infrastructure designed for 6,500 people so it is able to cope with the growth pressures it is experiencing.

## 7 SIGNIFICANT INFRASTRUCTURE ISSUES

Section 101B of the LGA states:

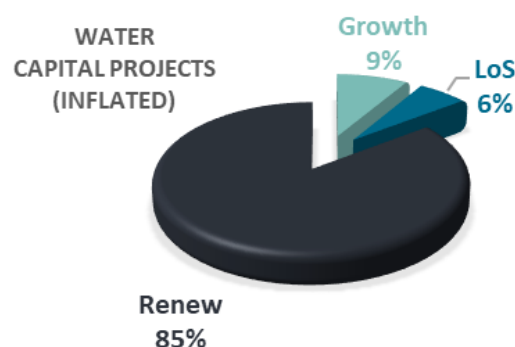
- (2) The purpose of the infrastructure strategy is to—
- (a) identify significant infrastructure issues for the local authority over the period covered by the strategy;
  - and
  - (b) identify the principal options for managing those issues and the implications of those options.

In developing this 30 Year Strategy Council identified anticipated significant infrastructure issues over the 30 years and considered each significant action and the benefits of the action. The significant infrastructure issues faced by the Council with the benefits and costs are tabled below.

### 7.1 Water

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

The Mackenzie District Council maintains a modern, clean, safe and reliable water supply that is of high quality, affordable and efficiently used.



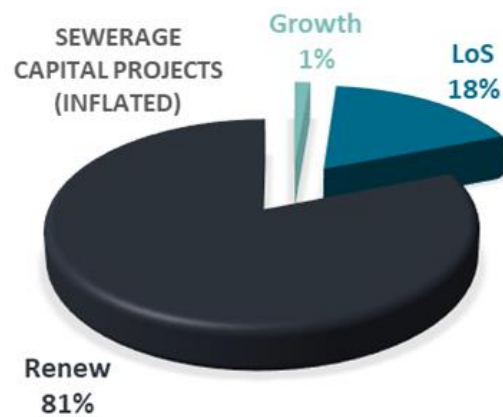
Issue – Compliance with Drinking Water Standards - Fairlie	
Main Options	Implication of Options
Option 1 -	Upgrade Fairlie's water supply to meet the NZ Drinking Water Standards. This involves shifting the intake from the existing source some 800 metres further west. Analysis of the water source indicates the ability to achieve 3 Log Credits, thus only requiring UV and Chlorination due to very low turbidity in the source water.
Option 2 -	Do nothing. This is not a viable option as the MOH requires compliance with the NZDWS and the current treatment does not meet required treatment standards.
Time period	2018-2019
Cost	\$0.9m (2018)
What is the benefit	Growth and increased Levels of Service
Assumption	This is based on the new source confirming the ability to provide 28 l/sec flow rate. Initial test pumping has confirmed this but has been carried out with the new gallery in place.

Issue – Insufficient Storage of Treated water - Fairlie	
Main Options	Implication of Options
Option 1 -	Construct a new reservoir on the Fairlie water supply.
Option 2 -	Do nothing. The current reservoir has served the town very well over many years and will continue to do so for some time. However if there is increased demand then the few hours' storage will be inadequate even though it the supply is fed by a continuous gravity supply.
Time period	2025-26
Cost	\$1.5m (2018)
What is the benefit	Growth and increased Levels of Service
Assumption	

## 7.2 Wastewater

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

The Mackenzie District Council manages and maintains wastewater systems to provide the community with a safe and healthy environment through the appropriate treatment and discharge of its wastewater.



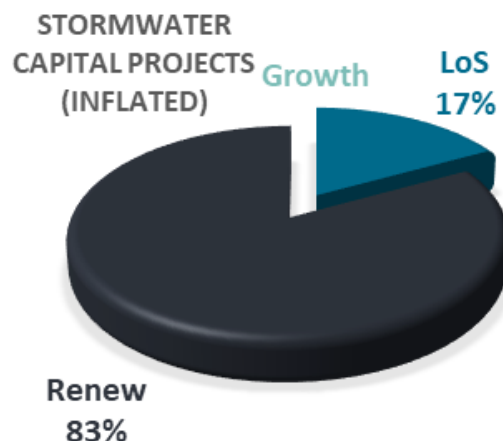
**Issue – Potential for increased effluent flows coming from the Tekapo wastewater treatment plant and issues associated with growth.**

Main Options	Implication of Options
Option 1 -	<p>Identify a new permanent disposal site, and design and install the system to dispose of the effluent for the next 50 years.</p> <p>Council is presently constructing a new disposal field adjacent to the existing site. This will address the problem in the short term and is an interim measure only.</p> <p>Location and scheme assessment is still to be completed so no estimates can be provided. How this issue will be addressed will depend on the outcomes of the Council's strategic planning work which is programmed to start in Year 1 of the LTP (2018/19).</p>
Option 2 -	Do nothing. This is unlikely to address the longer term issues associated with growth.
Time period	2029 onwards
Cost	
What is the benefit	Growth/LoS/Renewal
Assumption	Option 1 assumes that an appropriate site can be identified, that infiltration testing confirms that and that Council is able to obtain a discharge consent on that site.

### 7.3 Stormwater

Council’s goal for the stormwater activity over the next ten years is:

Our stormwater system is being continually maintained and improved to make Mackenzie a safer and healthier place to live. The network includes: open drains, pipes, treatment basins and detention basins.

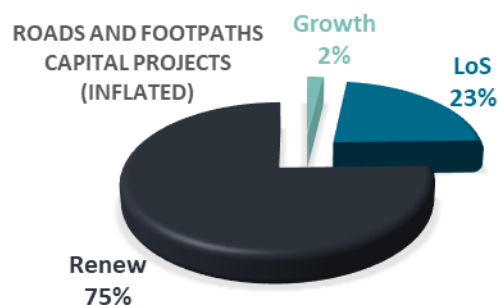


Issue – Canterbury Land and Water Regional Plan - Compliance	
Main Options	Implication of Options
Option 1 -	<p>The Council is preparing a Management Plan prior to lodging a discharge permit application in order to comply with Rule 5.93 of the plan. It is anticipated that this will lead to improved treatment at some of the more significant discharges from the various stormwater networks in Fairlie, Tekapo and Twizel.</p> <p>Those improvements will arise out of the plan, but budget has been allowed to install cyclonic separation devices on four outfalls.</p>
Option 2 -	Do nothing. Whilst this an option it is not deemed realistic due to the strategic direction central government is taking on protection of water quality.
Time period	2020 - 2029
Cost	\$ 87,000 (2018)
What is the benefit	Increase in Levels of Service
Assumption	It is anticipated that most but not all outfalls will require treatment and the installation of a “Humeceptor” or similar will be the appropriate level of treatment due to the confined nature of each of the outfalls.

## 7.4 Roads and Footpaths

Council’s goal for the roads and footpaths activity is:

To provide a safe, affordable, sustainable land transport system that fully meets the environmental, economic and social needs of the district.



### Issue – Pressures on our Transport network due to growth, land use intensification and tourism growth.

Main Options	Implication of Options
Option 1	<p>At the moment there are issues across the district both within the urban and rural areas that may drive increased levels of service to address maintenance and safety issues. Proposed projects to address these issues come under the NZTA work category “Low Cost Low Risk” for isolated roading improvements. These are being worked through as part of our Transportation Strategy where specific improvements will be identified. Estimated costs to fund these projects vary each year, with the maximum potentially being \$1.05m in year 2 of the LTP.</p> <p>Option 1 is for Council to budget a flat figure of \$300,000 annually (\$144,000 being our share) for “Low Cost Low Risk” roading improvement projects. This avoids significant rates rises over the period of the LTP, and gives ratepayers certainty regarding the level of funding of these projects. However it means that projects will have to be prioritised and some delayed.</p> <p>In terms of maintenance, the Council will match what NZTA will co-fund to undertake required maintenance to maintain current levels of service. The maintenance budget will be unaffected.</p>
Option 2	<p>That Council borrows to co-fund/match NZTA funding for all “Low Cost Low Risk” roading improvement projects as they are proposed. This would more quickly address issues of pressure on parts of the road network from increased use and growth in the district. However it would result in larger rates rises across the ten years of the LTP. Council sees value in the improvements but due to the impact on rates, for reasons of fiscal responsibility and prudence and following consultation with ratepayers, it decided against this option.</p> <p>In terms of maintenance, the Council will match what NZTA will co-fund to undertake required maintenance to maintain current levels of service. The maintenance budget will be unaffected.</p>
Time period	2018 - 2028
Cost	as above
What is the benefit	Growth/LoS/Renewal
Assumption	That the land use intensification and tourism growth continues at similar levels to current.



## 8 FINANCIAL ESTIMATES

Section 101B of the LGA states:

(4) The infrastructure strategy must outline the most likely scenario for the management of the local authority's infrastructure assets over the period of the strategy and, in that context, must—

(a) show indicative estimates of the projected capital and operating expenditure associated with the management of those assets—

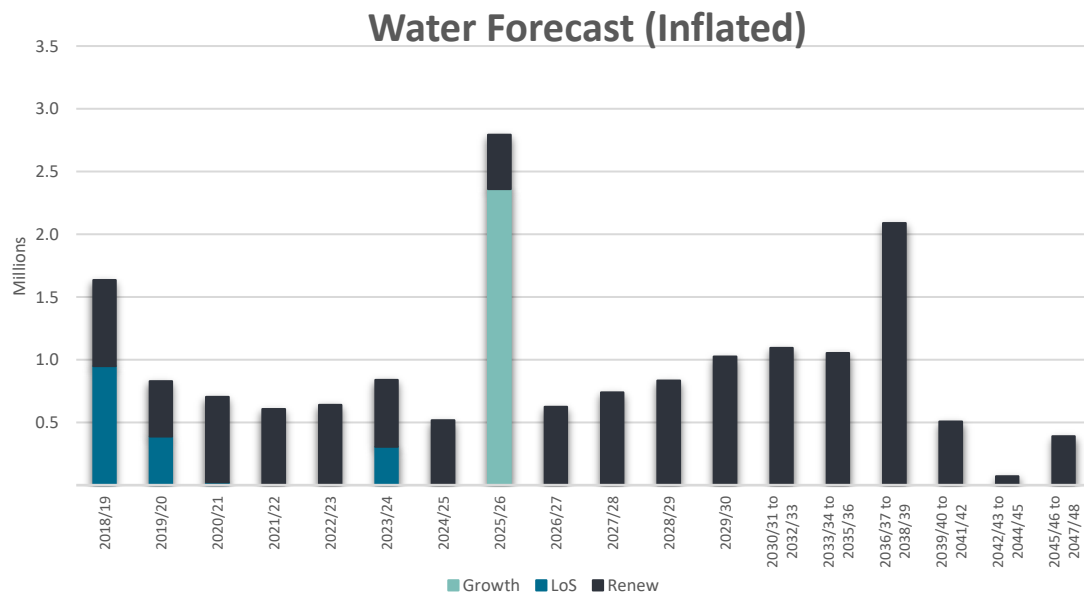
(i) in each of the first 10 years covered by the strategy; and

(ii) in each subsequent period of 5 years covered by the strategy.

### 8.1 Water

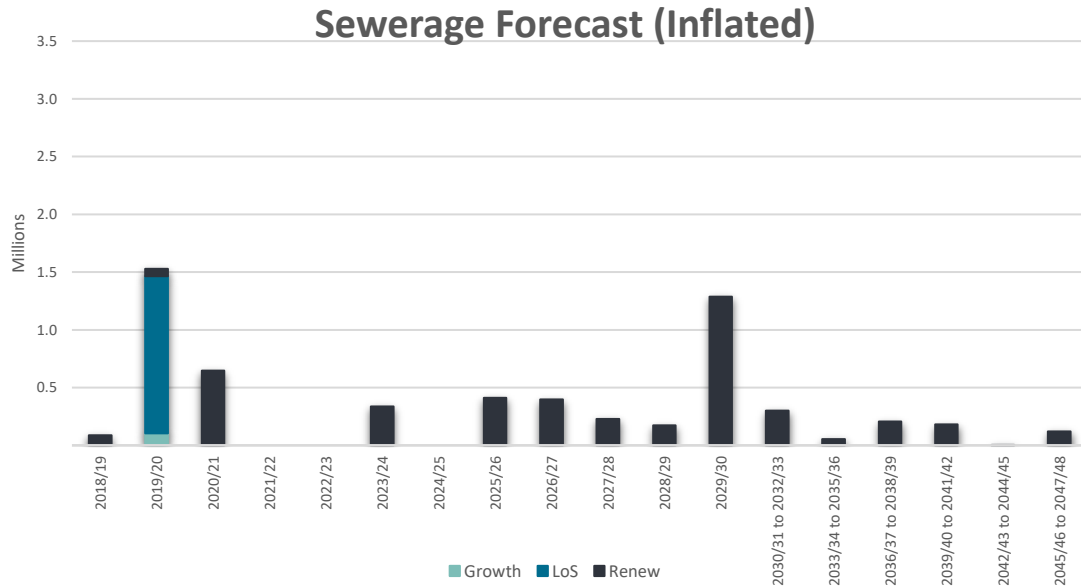
The projected capital expenditure associated with the water infrastructure assets are graphically represented below:

Figure 5 – Projected Capital Expenditure – Water



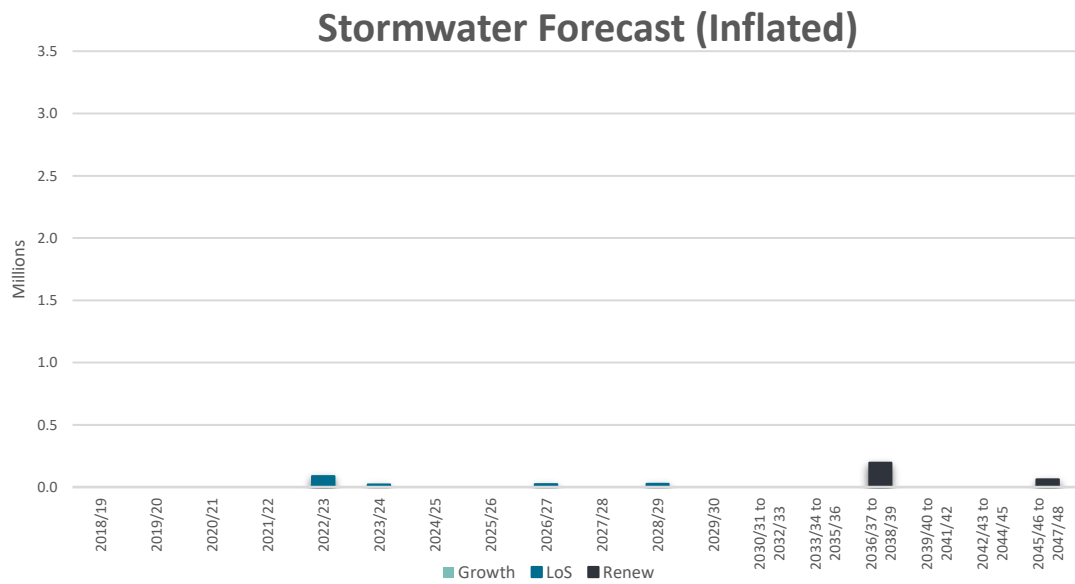
## 8.2 Wastewater

Figure 6: Projected Capital Expenditure – Wastewater



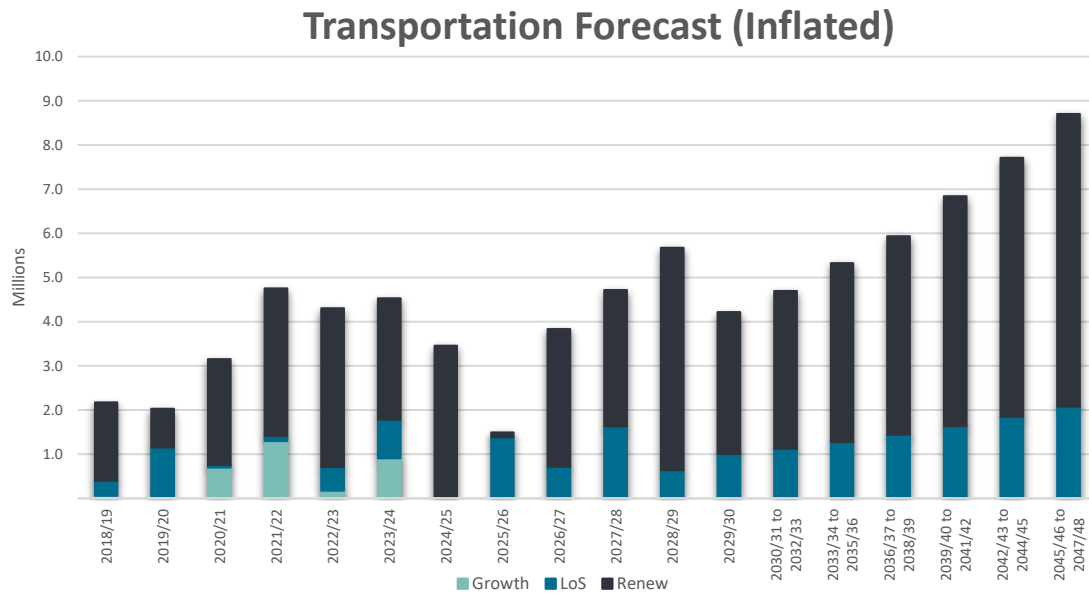
## 8.3 Stormwater

Figure 7: Projected Capital Expenditure – Stormwater



## 8.4 Roads and Footpaths

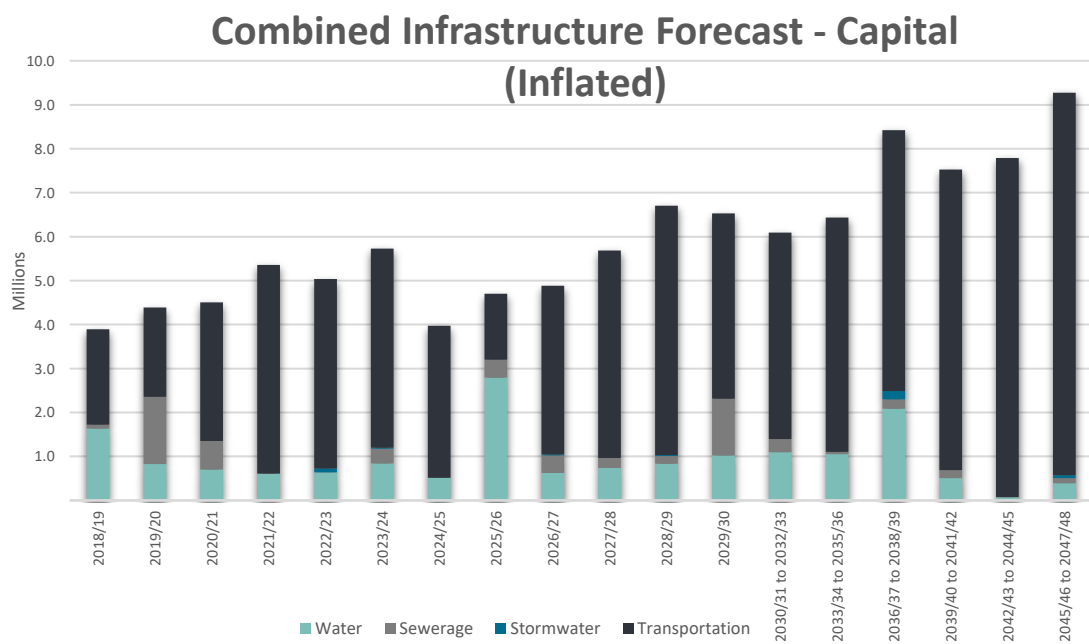
Figure 8: Projected Capital Expenditure – Roads and Footpaths

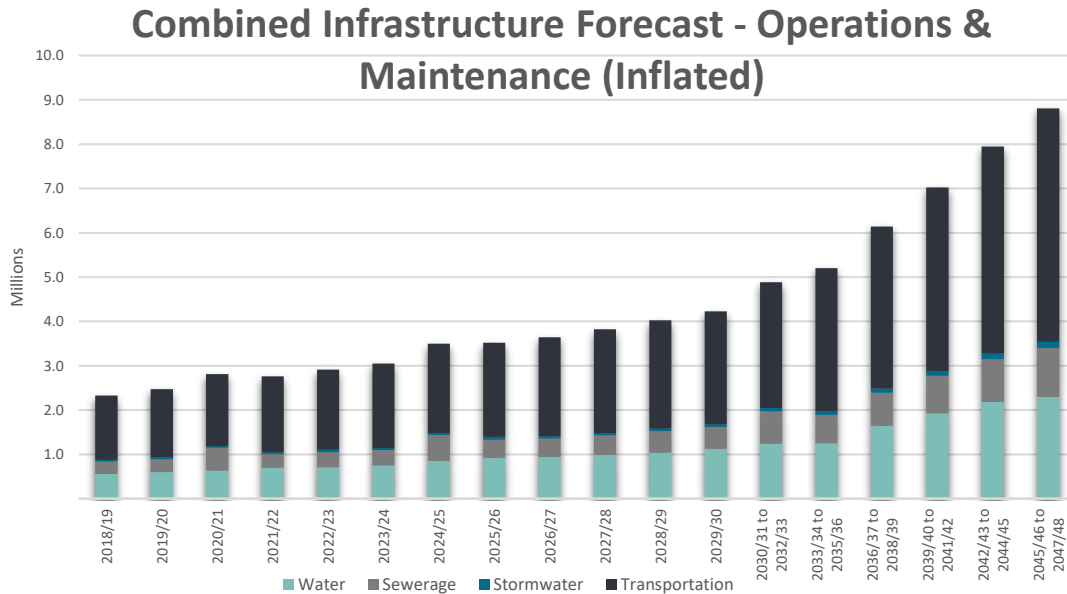


## 8.5 Total Expenditure

The projected capital expenditure associated with the significant infrastructure assets are graphically represented below:

Figure 9: Projected Capital Expenditure- Infrastructure Assets





## 8.6 Depreciation of Assets

Council fully funds depreciation on all water supply, sewer and stormwater infrastructure covered by this strategy, which ensures that adequate funds will be available for replacement in the long term.

The balanced budget provisions of the LGA (s100) allow a council to not fully fund all expenditure (including depreciation) provided it can demonstrate that it is financially prudent to do so. The Council has previously decided not to fully cash fund the depreciation cost of various assets. Council has resolved that it will not cash-fund depreciation on certain assets for a variety of reasons, the most significant of these being where Council believes it will receive money from third parties to help fund any asset replacement. The most important of these third parties is the NZTA which co-invests in the roading network. Council therefore only funds the local share of roading depreciation costs.

## 8.7 Financial Impacts of the Infrastructure Strategy

This Infrastructure Strategy identifies that the District over the next 30 years must provide for increases in capital and operating expenditure on its infrastructural assets, in order to maintain current levels of service to our communities. Population growth is not expected to significantly impact on our infrastructure, but visitor and tourism growth, land use development, and increasing environmental and health standards are all factors which will result in increased requirements on our assets. Continuing to meet our communities’ expectations while managing the impacts of these factors is the challenge for the Council.

As outlined in this strategy, we are facing a number of necessary infrastructure projects including water supply upgrades, pipe renewals, wastewater treatment and stormwater management upgrades. In its LTP the Council is proposing a ten-year budget that maintains current levels of service across all activity areas, and provides for these works. There will be an increase in levels of service associated with five projects in the 3 waters area which involve necessary upgrades to meet environmental or health standards or will result in savings in the medium to long term.

These projects require significant capital expenditure, and the Council is proposing to borrow to fund much of this work. For the 3 waters services, repayments, depreciation and operational costs are funded through targeted rates from those that receive the service. Roading is funded through a district-wide targeted rate.

In setting the budget the Council has had to make choices about what it can fund, to ensure that rates rises remain stable and that our communities can afford this key infrastructure. One of the key issues identified for consultation with the community was the level of roading funding that should be provided.

As a result of this consultation, the Council has budgeted an amount of \$300,000 per annum to fund 'low cost low risk' roading projects. NZTA provides 51% co-funding for projects of this type. This Infrastructure Strategy identifies that there are a number of areas where the district is experiencing growth and subsequent pressure on the roading network in both urban and rural areas. Provision of \$300,000 each year in the budgets is prudent in that it avoids significant rates rises over the period of the LTP. However it also means that improvement projects will have to be prioritised and some will be delayed. Pressures could be more quickly addressed by undertaking more roading projects, but this would had to have been funded by additional borrowing, which was not supported.

The LGA requires the Council in its Financial Strategy to assess whether it has the ability to provide and maintain existing levels of services and meet additional demands for services within the rates and debt limits set out within the Financial Strategy. Our assessment is that we do have the ability to maintain the existing levels of service and to meet additional demands for service within the rates and debt limits set out in the Financial Strategy.

## 9 APPENDIX

### 9.1 Project List

Below is a list of significant projects for the 2018-2048 period:

Activity	Town	Area	Year	Work Type	Cost (2018)
<b>Wastewater</b>					
	Burkes Pass	Wastewater	2039/40 to 2041/42	Consent Renewal	\$50,000.00
	Fairlie	Wastewater	2021	Desludge Oxidation Ponds	\$189,000.00
	Fairlie	Wastewater	2023-26	Earthenware pipeline replacement programme	\$250,000.00
	Tekapo	Wastewater	2021/22	Lakeside Drive PS Upgrade	\$99,000.00
	Tekapo	Wastewater	2020/21	Aerator Renewal	\$78,000.00
	Tekapo	Wastewater	2024/25	Desludge Oxidation Ponds	\$150,000.00
	Tekapo	Wastewater	2025/26	Pumps replacements-Sealy & Domain	\$132,000.00
	Twizel	Wastewater	2019/20	Consent Renewal	\$60,000.00
	Twizel	Wastewater	2019/20	Consolidate Disposal	\$900,000.00
	Twizel	Wastewater	2023/24	Upsize Rising Main	\$300,000.00
	Twizel	Wastewater	2026/27	Pump Renewal – Mackenzie Park	\$50,000.00
<b>Water Supply</b>					
	Burkes Pass	Water	2031/32	Consent Renewal	\$50,000.00
	Fairlie	Water	2018/19	Treatment	\$900,000.00
	Fairlie	Water	2019/20 to 2022/23	Pipeline Renewals	\$120,000.00pa
	Fairlie	Water	2018-20	Eversley Reserve upsize water mains	\$148,000.00
	Fairlie	Water	2025/26	New Reservoir	\$1,500,000.00
	Tekapo	Water	2029/30	Rebuild Headworks	\$90,000.00
	Tekapo	Water	2031/32	Pipeline Renewals	\$100,000.00
	Tekapo	Water	2032/33	Consent Renewal	\$50,000.00
	Tekapo	Water	2036/37	Pipeline Renewals	\$120,000.00
	Twizel	Water	2018/19	Bore Meters	\$70,000.00
	Twizel	Water	2018/19 to 2035/36	Pipeline Replacements	\$220,000.00pa
	Twizel	Water	2018/19	Connect Pukaki Airport to Twizel	\$250,000.00

Activity	Town	Area	Year	Work Type	Cost (2018)
<b>Stormwater</b>					
	Fairlie	Stormwater	2027/28	Treatment	\$15,000.00
	Tekapo	Stormwater	2022/23	Treatment	\$30,000.00
	Twizel	Stormwater	2023/24	Treatment	\$15,000.00
<b>Roading</b>					
	District	Roading	Annual	Resurfacing	\$500,00.00 pa
	District	Roading	Annual	Un-sealed Roads Maintenance Metalling	\$650,000.00pa
	Council	Roading	Annual	Low Cost Low Risk Projects	\$300,000.00
	Council	Roading	Annually	Transportation Strategy Projects -	\$500,000.00pa ave