Draft 2024 Infrastructure Strategy

Executive summary

Planning for change is an essential business practice — to identify potential risks and to ensure we are well placed to make the most of our opportunities.

The purpose of this strategy is to consider how our infrastructure assets will continue to support our community and our economy over the next 30 years. Changes over this time period are likely to include:

- population growth slightly above the midpoint of Statistics NZ Regional population projections based on recent development;
- opportunities to use technology and increasing automation to be even smarter and more connected;
- making our infrastructure more resilient to climate changes and natural disasters.

Our overall approach to asset management is to maintain flexibility wherever possible, enabling us to take action when circumstances change, our knowledge improves and as technology develops.

Council's major strategic priority for infrastructure is to:

- maintain our target levels of service and make improvements where required;
- extend our infrastructure as efficiently as possible to meet demand;
- access various funding sources and ultimately maintain debt at a sustainable level.

Infrastructure summary

Key infrastructure challenges

This strategy identifies critical challenges for our roads, wastewater, water supply, stormwater, rivers and land drainage and community facility assets over the next 30 years, and the options for responding to them.

The key infrastructure challenges remain:

- to respond to the changes in population growth, distribution and age profile;
- meet changes to customers' expectations;
- meet changes to legislative requirements;
- the need to replace infrastructure which has reached the end of its useful life;
- the need to build resilience to natural hazards (including the effects of climate change and earthquakes).

Implications for our assets

Significant asset management challenges for each asset type are summarised below.

Roads:

- Increasing frequency and intensity of adverse natural events are significantly damaging the network. Emergency responses result in resource re-allocation, affecting delivery of planned business-as-usual activity, let alone a pro-active work plan.

- Intensive heavy vehicle movements associated with forestry, quarrying and other operations are causing damage to under-strength pavements and structures resulting in reduced asset lives and unacceptable safety and amenity issues.
- We are facing a bow-wave of renewal need in asphalt surfacing and chip sealing. This will need to be addressed in order to avoid damage occurring to underlying pavement assets and to maintain ride quality.
- Rapidly rising construction costs and inflation results in a reduced programme of work.
- Existing roading infrastructure design does not promote safe multi-modal transport options.

Water:

- Investment in new water treatment plants to comply with the NZ Drinking Water Standards and legislative changes in the Water Act 2021 and overseen by Taumata Arowai.
- The need for water demand management (particularly in Picton) to ensure the water sources can meet future demand.
- Continued development of a targeted and efficient renewal programme for up to $79.5M of water network over the next 30 years.

Wastewater:

- Meet increasing national standards and cultural sensitivities of effluent discharges to the environment.
- Anticipated growth in wastewater flows particularly industrial effluents from the wine industry.
- Continued development of a targeted and efficient renewals programme for up to $60.0 million of wastewater network over the next 30 years.
- Continuing to reduce the vulnerability of some older wastewater pipes to ground movement during an earthquake.
- Increasing likelihood of infiltration of stormwater into the wastewater network as a result of ageing pipe network and climate change.

Stormwater:

- The effects of urban growth and climate change on stormwater volumes.
- The need to improve the quality of stormwater discharges.
- Continued development of a targeted and efficient renewals programme for up to $71.0 million of stormwater network over the next 30 years.

Rivers and land drainage:

- The need to meet levels of service in areas where land use has been changed and development is occurring.
- The impacts of climate change on coastal storm waves, sea level rise and flood flows on the effectiveness of the existing land drainage system.
- Managing gravel extraction to ensure sustainability of the resource and good river management.

Community Facilities:

- Can adapt to meet needs that inevitably change over time.
- Facilities meet an evidenced and identified need within the community.
- Facilities should be developed to maximise usage of assets by many groups to ensure sustainability.

Preferred options for responding to these challenges

The Council's preferred options to address the challenges are summarised below.

Legislation

Changes in legislation particularly affect our water-related assets. We intend to complete existing water treatment plant upgrades for Renwick and Havelock and install treatment to Wairau Valley and Riverlands and point-of-entry treatment devices for each household in Awatere Rural to meet the Water Services Act and regulatory requirements of Taumata Arowai.

National guidance on environmental standards will continue to be provided through the National Policy Statements. In particular the National Policy Statement for Freshwater Management, National Coastal Policy Statement and the National Policy Statement on Urban Development Capacity. Local implementation of the policies will be through the Marlborough Environment Plan.

A Housing Business Capacity Assessment carried out in 2021 noted a potential shortfall in residential land in the long term (11-30 years). As a result Council has commenced a review of the Urban Residential 1 zone to consider opportunities for urban intensification and has been working with landowners on the periphery of Blenheim to consider further opportunities for residential rezoning. Council also has ongoing discussions with land owners of undeveloped zoned land about their development aspirations. These discussions are ongoing.

Improving the quality and the quantities of water used and discharged back into the natural environment will require ongoing investment in our wastewater and stormwater assets. Actions include:

- -progressive implementation of the Blenheim Stormwater Strategy and its extension to other urban areas in the region;
- upgrade of the Blenheim wastewater treatment plant to meet increasing volumes of wastewater particularly from the wine industry;
- upgrades across all wastewater treatment plants to comply with increasingly stringent standards for effluent discharge and to meet the cultural requirement to avoid or restrict the volume of waste returned to the aquatic environment;
- to deploy water demand management tools to promote more efficient water supply, reduce leakage and ensure water resources are sustained for future generations.

Renewals

For all types of assets, the preferred option is to implement a proactive, planned renewals programme and invest in more condition assessment technology, field data collection and data management. This will enable informed decision-making on the most cost effective timing of renewals.

Enhanced condition assessments will be particularly valuable for our underground assets.

Resilience to climate change and natural hazards

Ongoing investment in our resilience plan will ensure roads are reopened as soon as possible after a major natural event or other disruption.

Council will soon begin a review of the core Wairau River Floodway Management Plan. The review will examine the current level of service, customers' expectations and land use changes. It will also model flood flows under different conditions so that the range of effects that may result from climate change and sea-level rise can be more accurately predicted.

Building infrastructure to the latest standards and with the most suitable materials increases resilience to flood events, earthquakes and changes in the climate. We are also prioritising the replacement of pipework and other assets made of older materials that are susceptible to natural hazards or have deteriorated more quickly than anticipated.

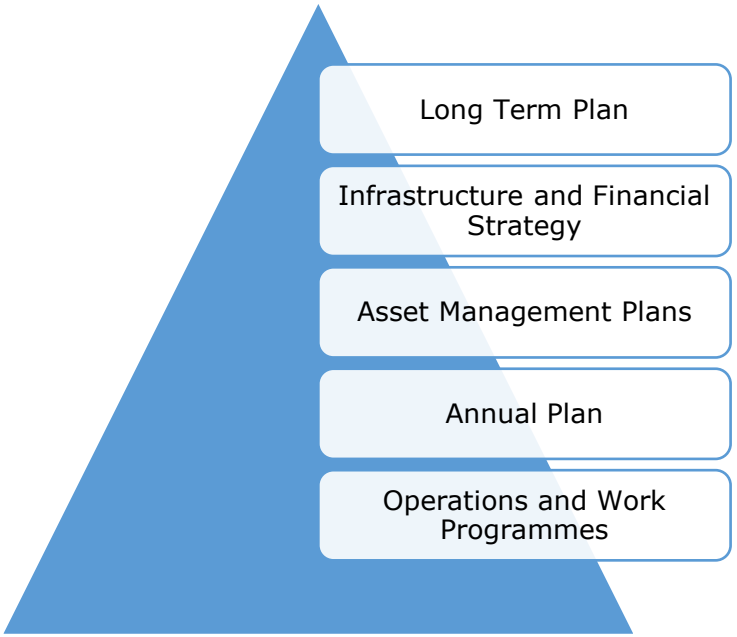
Our financial planning is another way we will ensure we can recover as quickly as possible from emergency events. Ensuring we have reserves, flexible capital programmes and insurance to meet the expected losses. Our financial strategy addresses mechanisms to ensure access to sufficient funds in the event of an emergency.

Strategic planning

There are a number of documents that make up the Asset Management System which enables the successful delivery of this strategy.

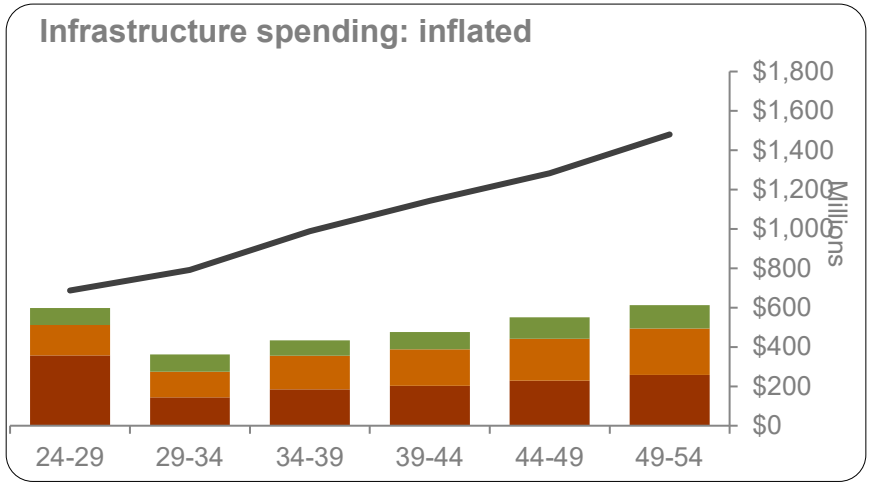
Engagement and Significance Policy

The following diagram demonstrates the hierarchy of this documentation:



Financial implications

This graph provides an overall picture of the proposed capital and operating expenditure for our infrastructure over the next 30 years.



Introduction

Why infrastructure matters

We often take for granted the infrastructure we rely on for the very basics of everyday life — clean water from the tap, a readily available flushing toilet and a safe drive to work or school. We tend not to think about how infrastructure works unless something goes wrong — roads are closed through land slips, homes or businesses are flooded, or there is a public health scare from contaminated water. That's when we realise how essential infrastructure is to all aspects of our lives.

This strategy covers the infrastructure owned and operated by Council that delivers the core services — roads, wastewater, water supply, rivers and land drainage, and urban stormwater drainage. Community facilities have also been included as they are important part of the fabric of the community.

An infrastructure strategy needs to answer three basic questions:

1. What are the significant infrastructure challenges over the next 30 years?

2. What are the main options for resolving those challenges and which of these is Marlborough District Council's preferred option?

3. What will it cost, and what does that mean for rates and debt?

In order to fully recognise the challenges faced by the region it is necessary to describe what Marlborough will look like in 30 years' time; consider the aspirations of the community and what we need to do differently to ensure infrastructure will still be meeting the needs of the people who will live here in 2054 and beyond.

We know the size and composition of the New Zealand population will be quite different. Climate change is almost certain to affect our daily lives. The massive advances of computer technology and automation will continue to change the way we work and live.

These questions will be answered in the three parts of this strategy as outlined below.

Part One – context, opportunities and key challenges

In this section Marlborough's unique combination of people, economy and environment are examined. The region is a wonderful place to live and work. The Council aims to enhance and develop the potential of the region to ensure the community is prosperous, healthy and educated; the lifestyle is attractive; the natural environment is protected and enriched and society is resilient to the inevitable challenges of the future. However we must consider recent changes to lifestyle, technology and the environment and identify trends that can be projected forward to try to understand what the region will look like in 30 years' time.

The economic environment will change as businesses prosper or decline. New employment opportunities will be created and different work patterns will emerge. Workers and their families will move in and out of the region in response to the opportunities. There will be many more elderly people who may, or may not, have retired from the workforce.

Both the ethnic composition and wealth distribution throughout the population will be different.

Lifestyles will change as computer based technology matures. Automated vehicles, Artificial Intelligence, 3D printers, robotic manufacture, and remote control through the 'internet of things' will almost certainly become commonplace.

Climate change will affect weather patterns, which will alter cultivation practices and the associated industries, building design, urban planning and many other aspects of daily life.

The fundamental Council infrastructure required to support the community — road transport, land drainage and water and wastewater services will

need to adapt to the changing environment. In some cases the infrastructure will evolve and adapt in response to the changes but often it will need to be planned and implemented in advance to keep the community safe and facilitate the new developments.

Over the next 30 years technology will provide new opportunities that have strong potential to positively affect the management of infrastructure.

Part One concludes with an outline of the key challenges facing our region's infrastructure, including:

- the need to replace infrastructure which has reached the end of its useful life;
- changes to legislative requirements;
- the response to climate change predictions;
- preparation for a major earthquake.

Part Two — Specific challenges, options and preferred solutions for each of our infrastructure assets

These chapters provide a more comprehensive summary of the significant asset management challenges for each asset type, the main options Council has to address these, and the implications of those options. Where possible, a preferred option is indicated.

The anticipated capital investment and the ongoing costs of operating infrastructure has been estimated. Financial information is provided in detail for each of the first ten years, and then in five year blocks after that. These forecasts also include the expected impact of price changes for projects over time expressed at current prices and adjusted for price inflation.

Part Three — Financial summary

This section takes the financial information from Part Two and combines it to provide an overall picture of how much money needs to be invested over the next 30 years. A timeline for that spending is included.

Infrastructure is the biggest proportion of Council spending (61%) and this strategy informs, and is closely aligned with, Marlborough's Financial Strategy 2024-2034. This Infrastructure Strategy will also inform our long term plans, asset management plans and annual plans.

Part One — Context, Opportunities and Strategic Challenges

Context and Opportunities – what sets our region apart

Our vision is that over the next 30 years Marlborough will become a globally-connected district; known for progressive, high-value enterprise and economic efficiency. Residents will enjoy an enviable lifestyle and natural environment. The region will achieve a world-wide reputation as a visitor destination. Marlborough will be 'smart and connected'.

Infrastructure has a key role to play in supporting this vision — including an abundant supply of drinking water direct from the tap; a clean, safe and sanitary environment; and the connectivity to safely link the region's communities together and to the outside world.

Marlborough is regularly recorded as one of the sunniest places in New Zealand. The good weather combined with the beautiful Marlborough Sounds, the Wairau and Awatere Valleys, a gateway to the Nelson Lakes National Park and the welcome awaiting at the numerous winery cellar doors makes the region a very popular destination for both national and international tourists. After a hiatus during the COVID pandemic tourist numbers have been increasing rapidly. Cruise ships regularly visit Picton with more than 5000 passengers aboard.

The Marlborough economy has a number of significant industries — wine production, farming, forestry and aquaculture — and a booming tourism sector. The GDP generated by these activities in 2023 is shown below.

In September 2023 Waka Kotahi - New Zealand Transport Agency (NZTA) published its Long Term Strategic View - Arataki. Their projections for the South Island were that the current economic drivers will remain consistent, with a continued emphasis on primary production. However regionally wine production and tourism are forecast to be the key growth areas.

Longer term, economic growth will be reliant on adding value to the raw primary products through manufacturing processes. In this respect the wine industry is well ahead, turning their raw material into a high value product. Marlborough wine is marketed as a high quality product and has achieved a premium status in international marketplaces.

The gross domestic product in Marlborough in 2023 is represented by the following:

- There are opportunities for aquaculture to increase the value of fish and seafood. The pharmaceutical and nutraceutical industries are also finding new markets for seafood-based products.
- The timber industry has the opportunity to manufacture boards, milled timber, joinery and other timber products to lift the value of the logs that are currently exported.
- Marlborough has a well-established engineering industry and is a national centre for aircraft maintenance. The wine industry has attracted stainless steel fabrication, irrigation and wastewater processing and other production engineering.
- New industries using computers and the internet do not need to be located in close proximity to traditional markets in busy cities. Employees in these fields are choosing to work remotely and some are relocating to Marlborough to take advantage of the enviable lifestyle.

Viticulture & Wine Production

New Zealand's wine exports continue to grow strongly and reached the $2.4 billion mark in 2023. This is significant for Marlborough as the region produces 81% of the New Zealand total output. Vineyards now occupy 29,654 hectares of land in the region and in 2023 produced 393,865 tonnes of grapes.

The statistics for 2023 show 1,511 people are employed in grape growing and another 1,355 in wine making. The industry continues to forecast an increase in future production which will create jobs for an even larger workforce.

There are a number of related infrastructure implications:

- Managing the additional liquid trade waste from the wineries.

- Increased stormwater runoff from changing land use to vineyards.
- Managing freshwater resources as demand increases for process and drinking water.
- Increased demands for flood protection as the value of the crop increases.
- Road traffic increases to transport both product and workers related to the industry.

The wine industry employs a large and growing number of seasonal workers. Specialist residential accommodation is being provided and much of it is sited on the outskirts of Blenheim. This creates new demand at the edges of the water and wastewater distribution networks, which was not anticipated at the time the services were designed and installed.

Tourism

International and domestic visitors are a vital element of our economy due to the demand they create for local goods and services — accommodation, food and beverages, retail and transport. This sector has been expanding rapidly as Marlborough's unique climate and wonderful environment attract visitors from around the world.

Aquaculture, seafood and fishing

Aquaculture, seafood and fishing make a major contribution to the local economy. Marlborough salmon and green lipped mussels are a luxury product valued around the world. It is estimated that around 553 people work specifically in seafood processing, and another 2,091 work in other agriculture and fishing support services.

There may be some potential to increase the productivity of aquaculture in the Marlborough Sounds but there is growing concern over the negative environmental consequences of intensive fish farming. Further expansion is likely to meet with some resistance.

There is growing recognition of the health benefits of fish oil and fish-based products. There may be more opportunity to add value and open new markets through developing pharmaceutical and nutraceutical products than on increasing sales of the traditional products. However, seafood processing typically uses large volumes of clean water and produces equivalent volumes of liquid waste. Meeting the additional demand for water supply and wastewater treatment may become a challenge.

Sheep and beef farming

Sheep and beef cattle farming continues to be a strong contributor to the regional economy, with an estimated 414 people working directly in stock farming. Many more workers are employed in the farm services sector, supplying everything from animal feed to tractor repairs to fencing services.

Remotely located farms rely on strong roads and bridges for access by heavy vehicles. Dairy farms are particularly reliant on constant road access to take the daily milk for processing.

Forestry

Forestry also contributes to the local economy and harvesting is expected to increase in the future. Maintaining roads and bridges in remote forestry areas which are strong enough to take the weight of larger, heavier vehicles is an infrastructure challenge for Marlborough.

As more tourists travel into the remote areas, maintaining safety for all the road users requires more consideration. Heavy vehicles travelling on unsealed roads also create large dust clouds. These can become both a hazard and a nuisance to other road users, visitors and the growing numbers of residents living on lifestyle blocks.

Population

In preparing the Long Term Plan Council has assumed population growth will occur at slightly above the Statistics New Zealand medium population growth projections. This estimate is based on better than national average economic forecasts and the actual regional growth that has occurred over recent years.

Many migrants are attracted to, and settle in, the larger cities. The elderly also tend to move to urban areas where social and medical services are more readily available. For both these reasons statisticians are predicting a general decline in rural provincial populations and growth in the major urban areas, especially Auckland.

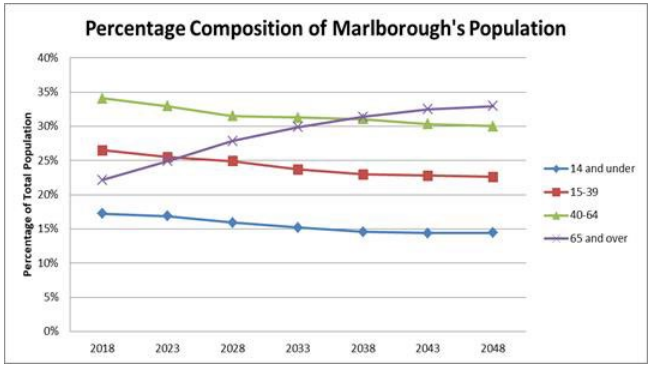
As one of the sunniest area's in New Zealand, our climate, beautiful environments and healthy economy will continue to attract people to our area. This helps to counterbalance the general trend of slowing population growth in provincial New Zealand. Planners are taking a conservative approach to these contradictory trends and the medium to high projection as a basis for planning future service provision in Marlborough. There are long lead-in times for major projects with public consultation, land purchase negotiations, resource consent approval and construction. Planning conservatively for medium/high growth also provides some future proofing for assets designed to have a useful life in excess of 80 years.

Marlborough has had an average annual increase in population by 7.2% over the last five years compared to 6.6% pa in New Zealand. This population increase is in line with medium to high projection rates produced by Statistics NZ and is driven primarily through net migration into the region.

The forecast population projections for Marlborough indicate some population growth over the next 20 years. More than 70% of this population live in Blenheim and approximately 14% in Picton and Renwick.

Marlborough's population is ageing. The Marlborough population is expected to have a significantly larger number of residents aged 65 years and older with other age groups experiencing declines in population levels. This is similar to many parts of New Zealand (and the Western world).

Graph 5.2 highlights the population projections by age groups.



Graph 5.2 Population projections by age, 2018-2048

The increasing elderly population and fewer working people need to be taken into consideration in financial planning, particularly when setting rates.

The trend for growing urban centres and fewer people living in rural areas is expected to continue, as older people generally prefer to live closer to the services provided in larger centres. The provision of infrastructure in smaller settlements and the method of funding may need to be considered in light of these projections.

Older people are also more likely to prefer smaller houses and sections within the urban centres. Providing for this market could lead to urban intensification through regeneration of the existing housing stock.

The current urban settlement pattern consists of an average of 10-11 properties per hectare. The Development Contributions Policy helps to encourage urban infill by offering reduced charges for the subdivision of small residential sections. Urban intensification would help to reduce further urban spread and subsequent extension to the linear infrastructure. Costs per connection would decrease and improve the affordability of these services.

The Development Contribution Policy forecasts that an additional 170 household equivalent units will be developed annually. Blenheim traditionally accounts for about 60% of all building consents for new dwellings, the remainder in the wider district.

Technology

Technological developments have the potential to change many elements of infrastructure over the next 30 years, including:

- driverless cars, reducing the need for parking spaces in urban centres and improving road safety. This would help to reduce risks associated with drivers who are unfamiliar with our roads;
- car sharing of driverless electric cars is expected to be at 37% in the US by 2035. Private car ownership may become rare as driverless cars are shared in car pools, houses will not require garages and suburban streets will become single lane roads with passing spaces as computers control navigation and avoid other cars;

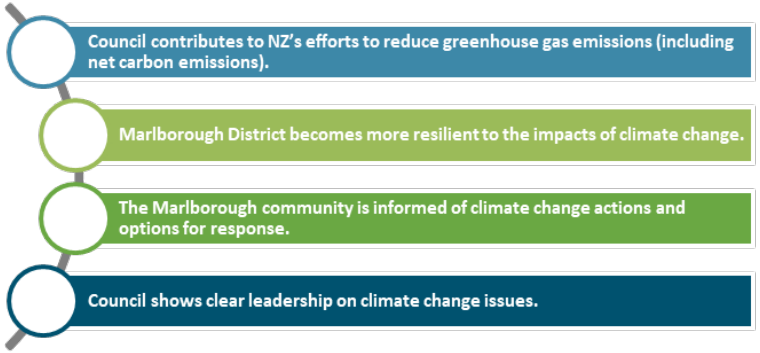
- micro-treatment and water recycling will become readily available;
- smart metering will enable people to use water and electricity more efficiently and suppliers can incentivise customers to reduce peaks in demand;
- infrastructure providers will have access to real time data to better understand their networks, including traffic flows and water use;
- 3-D printing will become commonplace changing retail and goods distribution industries;
- intelligent robotics will be used in underground inspections and works.

Climate Change

The climate is changing and the impact of this is constantly measured, monitored and assessed for the future impact that it will have on our infrastructure assets.

While the climate change predictions remain mostly unchanged from the 2021 LTP, our consideration and investigation into the impact of these predictions has improved. A Climate Change Working Group was established across the Council and a Climate Change Action Plan was adopted by Council in March 2020.

The Climate Change Action Plan has four main goals:



Carbon emissions inventory reports have been produced to assess our current level of emissions, the resiliency of these methods to reduce emissions and identify opportunities for future reductions. NIWA were commissioned to provide an initial Climate Change Projections and Impacts for Marlborough which was presented to Council in 2023. NIWA have now been engaged to carry out more detailed analysis so that all future planning can be based on the same climate change predictions.

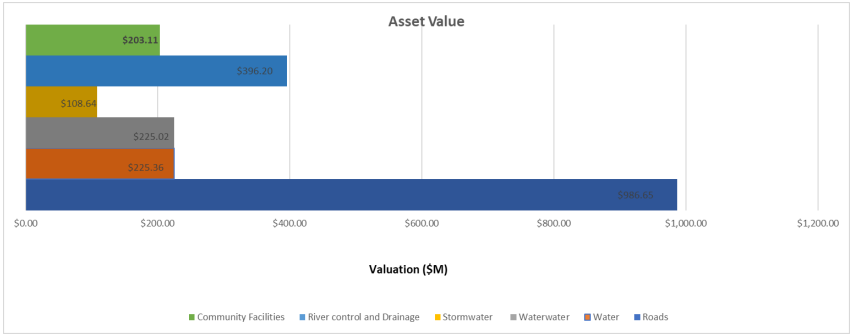
Climate change is a long-term influence that has been incorporated into the planning and design of long-life infrastructure. The effects and impacts climate change poses across the infrastructure assets are highlighted within this strategy.

The full Climate Change Action Plan forms the appendices for the Asset Management Plans.

Key infrastructure challenges

1. Infrastructure renewals

Marlborough District Council's water, wastewater, stormwater, roads, community facilities and flood protection assets have a combined asset value of around $2,145 million. The value of each asset type is:



Many of these assets have long life expectancies, but ongoing investment is required to maintain and eventually replace them when they reach the end of their useful life.

Each year Council aims to collect the amount required to cover the full cost of both maintaining these assets and replacing them when they wear out (depreciate to the point of replacement). This has been paused for the increased valuation resulting from the June 2023 revaluation of the Three Waters assets in 2024-25 and 2025-26. This step was undertaken in order to contain rates increases in the short term and to better understand the impacts of the new government's Local Water Done Well initiative. Depreciation costs are a big proportion (43%) of the rates collected each year.

Calculation of infrastructure depreciation is an accounting estimate for inclusion in the annual funding assessment. The rate of deterioration is a critical factor in the calculation but can be difficult to accurately predict. There are many influencing factors which often work in combination including: wear and tear, differential loads, the quality of workmanship during installation and maintenance, third party damage, weather and its effects on the networks, seismic activity, ground movement and technological change.

The buried pipe infrastructure and the sub-structure of roads present another challenge as they are not visible and therefore it is more difficult to assess their condition. Good quality asset condition information is essential to accurately estimate how long the asset will remain serviceable.

There is projected to be a large spike in water infrastructure renewal activity just beyond the 30 year planning horizon of this strategy (from 2053 –2063). This reflects the high level investment made circa 50 years ago when the region was growing rapidly. It is desirable to spread the cost in order to remove the peaks and create a smoother spending profile. Considerable efforts are being made to determine the accuracy of this projection so the renewal programme can be managed to meet this objective.

Similarly, there are many small bridges in Marlborough (often constructed of timber in rural areas) that were built as the road network was consolidated after the Second World War. Many were designed for lighter traffic and are reaching the end of their useful life. Speed and weight restrictions have been implemented to help extend their lives but a planned renewal programme is required.

It should also be noted that as more infrastructure is added to meet the demands of growth and higher levels of service, the cost of funding depreciation in future will increase and be reflected in ongoing rates collection. The costs of operations, maintenance, finance and insurance also increase.

2. Legislative Requirements

Council's management of infrastructure needs to comply with national legislation, policies and standards. The following documents set the direction for delivering quality services.

- The Local Government Act 2002 requires the adoption of a 30 year infrastructure strategy every three years.
- The Resource Management Act 1991 (RMA), National Policy Statement on Freshwater Management (NPSFM) and the New Zealand Coastal Policy Statement (NZCPS) include requirements to sustainably manage water use and discharges to coastal and freshwater water.
- Taumata Arowai was established as Crown Entity in March 2021 and is responsible for the implementation of the Water Services Act 2021.
- The Government Policy Statement on Land Transport (GPS) includes a hierarchy of roads in order to work towards national consistency for each road type throughout New Zealand.
- The Civil Defence Emergency Management Act 2002 (CDEM Act) requires lifelines utilities (which includes providers of roads, water supplies, stormwater and wastewater services) to ensure these services function to the fullest possible extent during and after an emergency (section 60).

Legislative Requirement - Implications For Our Assets

Roads

- The GPS may influence levels of service targets for Marlborough Roads.

Water

- Significant investment has been made in Blenheim, Picton, Seddon, Wairau Valley and Renwick and is being budgeted to upgrade the supplies to Awatere, Havelock and Riverlands to meet the current Water Services Act 2021.

- Meeting increased standards in the supply and delivery of drinking water in accordance with the Water Services Act 2021, whilst currently planning to meet the DWSNZ across all supplies.
- The fluoridation of water supplies continues to be a political issue which may also result in additional costs to Council.
- New water quantity requirements in the NPSFM and the Marlborough Environment Plan will be reflected in future water permits for public water supplies. Council will need to demonstrate efficient use of water when it applies for its next urban water supply resource consent for Blenheim after the existing one expires in 2030.

Wastewater

- The NZCPS will again influence the outcomes of the 2023 and 2024 consent applications for the Seddon and Havelock sewage treatment plants. The resource consent for the Blenheim wastewater treatment plant is due for renewal in 2025. Capital upgrades to the plants are underway to meet the expected consent conditions.

Stormwater

- Consolidation and updating of the stormwater resource consents is a primary objective of the Blenheim Stormwater Strategy. The NPSFM and NZCPS requirements will be reflected in the resource consent conditions. Stormwater quality control measures are being installed on new sub-divisions and expenditure will be required to upgrade some existing discharges to freshwater and the coast. Stormwater Management Area Plans are being developed for each catchment, starting in Blenheim.

3. Climate Change

The current advice from NIWA is outlined below.

Temperature: by 2040 temperatures are likely to be 0.5ºC – 1.5ºC warmer and by 2090 2.0ºC – 5.0ºC warmer compared to 1986-2005 temperatures. The number of days when the temperature exceeds 25ºC is increasing and the number of frosts are decreasing. By the end of the 21st century these very hot days could rise 65 days per year and frosts could decrease by 1-60 days per year respectively.

Rainfall: by 2090 summer rainfall is likely to be 9% higher. The incidence of extreme rainfall events and also droughts are both likely to increase. However, there will be some regional variation. Precipitation in the winter is likely to fall as rain rather than snow. This may increase river flows during the winter with subsequent potential for flooding. Less snow melt could decrease river flows during spring, reducing the water available for abstraction.

Wind: by 2090 the number of extremely windy days is expected to have increased by 2-10%. These increases will be seen as westerly's in the winter and north easterly's in the summer.

Sea level rise: relative to the 1995-2014 average mean sea level, it is anticipated by 2050 there will be a rise of 330mm and by 2130, a rise of 1670mm. Average sea level rose by 1.62mm per year.

Climate Change - Implications For Our Assets

The effects and impacts of climate change on our infrastructure assets are summarised below.

EFFECTS/IMPACTS	Temperature	Rainfall	Wind	Sea Level Rise
Roads	Longer sealing season	Closures and reduced reliability Increased maintenance costs Upgrading of road drainage and bridges	Closures and reduced reliability Increased maintenance costs	Storm surge damage at risk roads Low level roads unusable
Water	Shift in demand profiles	Shift in demand profiles Increased pressure on water treatment and aquifers	Shift in demand profiles	Salt water intrusion of groundwater bores
Wastewater	Change to treatment process	Increase likelihood of wastewater overflows through inflow and infiltration into the network	Evaluation of effect on oxidation ponds in treatment and health and safety	Blenheim and Havelock treatment plants seriously impacted Inability to irrigate using wastewater
Stormwater		More pressure on flood protection and overland flow paths		Change in flow characteristics
River and Land Drainage	Less snow melt reducing river flows in spring reducing water available for extraction	Higher river flows increasing likelihood of flooding events		Resistance to rivers and drains discharging in tidal zones

Roads

- Some road drainage may need to be upgraded.
- Bridges and culverts will need to be designed to cope with the increased flows.
- Slips are likely to become more frequent after heavy rain. Additional resources will be needed for road clearance and the securing of unstable hillsides . We will also need to proactively regrade and secure steep roadsides.

Water Supply

- Increased frequency and duration of droughts will put strain on the water sources particularly where aquifers are shared between public water supply and production water.
- Increased droughts will place additional demands on water treatment and reticulation plant.

Wastewater

- Marlborough's wastewater treatment plants can continue to operate with a 330mm increase in sea level rise, as is predicted to occur over the next 30 years. However, the existing wastewater treatment

plants will be seriously impacted by 700mm of sea level rise, which is predicted to occur by 2090.

- Rising water tables will affect Council's ability to continue irrigating land with treated wastewater from the Blenheim wastewater plant (when the land is too wet and/or the water table is high.)
- More frequent and intense storms will increase the risk of sewer overflows in urban areas via stormwater inflow and infiltration into the wastewater reticulation.

Stormwater

- More frequent high intensity rainfall events will place greater demands on the stormwater system. Urban drainage reticulation will be tested, detention areas will temporarily fill with stormwater and overland flow paths will need to be utilised.

Rivers and Flood Protection

- Council may need to dig larger drainage channels, increase the height of existing stop banks and provide added stopbank protection to cope with increased rainfall intensity.

  As the sea level rises, pumped outfalls are also likely to be required to assist with drainage of flat, low-lying land on the Lower Wairau Plain where we can no longer rely on gravity to achieve discharges to the sea.

4. Earthquakes

A significant earthquake in the next 50 years (on the Alpine Fault) has a 75% likelihood of occurring, and an 85% likelihood of it being a magnitude 8. This event could be 10 times more powerful than the November 2016 event, with shaking lasting up to six minutes (compared to up to two minutes during the Kaikōura earthquake).

To prepare for such a large earthquake, new infrastructure is being built to high standards and emergency power generation is provided for new plants. Council has also assessed the impact of a significant earthquake on roads, riverbanks and stopbanks.

Fault lines will need to be avoided when developing land and installing infrastructure. Slumping and liquefaction are also becoming more significant considerations when planning future urban development.

In 2018, Council reviewed its assumptions and expectations regarding the maximum probable loss to infrastructural assets as a result of a large earthquake. Consultants were employed to undertake a study of probable losses to the three water services (water supply, wastewater and stormwater) and river defence assets due to an earthquake with a 1:500 and a 1:1000 year return period. An estimate of damage to roading, insurance excesses and losses of rates revenue was also considered. An event of this magnitude was estimated to result in a $485 million loss to Council in 2018.

Currently central government meets 60% (above the excess) of infrastructure damage costs incurred from natural disasters. Local government is obliged to show prudent arrangements to meet the remaining 40% of costs. However, central government has indicated it is reluctant to continue this ongoing liability and may wish to pass greater responsibility to local authorities in future. The costs of additional risk mitigation could be considerable. Council holds $13 million of investments and has a facility with Westpac to provide immediate funds in the event of a disaster.

Earthquake - Implications For Our Assets

Roads

- Many roads particularly in the Sounds and rural areas are vulnerable to landslips.
- Major bridges have been surveyed and strengthened to resist earthquakes but may still be vulnerable to very large events.

Water

- The water treatment plants for Blenheim and Picton have been upgraded in the last ten years and are built to the latest standards for earthquake resistance. Emergency power generation is included. The treatment plants at Renwick and Havelock are less resistant until upgrade works are completed.
- New reservoirs have been built to be earthquake resistant and older reservoirs have been strengthened. Some damage from a very large event must be anticipated.

- There is 151kms of asbestos cement pipe with an estimated replacement cost of around $57 million with a life expectancy of less than 40 years.

Wastewater

- The wastewater treatment plants at Blenheim and Havelock are located on the coastal plain. Tsunami inundation is a risk. As is ground movement and liquefaction on river/coastal soils.
- Many pump stations have been upgraded to resist the effects of ground shaking but significant damage could be expected from a very large event.
- Modern plastic pipe materials are more resistant to damage from ground shaking. Around 126kms of pipe (valued at approx. $85 million) is over 50 years old.

Stormwater

- Around 26kms of stormwater reticulation with a combined replacement value of approximately $13 million is of the older 'brittle 'materials asbestos cement and earthenware.
- Ground movement may affect gravity pipelines laid to shallow gradients on the Wairau Plain.

Rivers and Flood Protection

- Many of the older stop-banks have not been constructed to modern engineering standards.
- The 2016 earthquake caused $2.4 million damage to existing stop banks and river edge protection through lateral spread and slumping.

Community Facilities

- Many of the local community halls are not constructed to modern earthquake resistance standards.
- Major memorials have been strengthened but some damage can be anticipated from a large event.

5. Spending and Funding Balance

One of the key infrastructure challenges is to address the tensions between spending and funding of core infrastructure.

The strategy is based on the following general principles:

- growth driven capital expenditure is funded by development contributions.
- capital expenditure to increase levels of service, e.g. improve quality of drinking water supply, is funded by borrowing.
- renewals capital expenditure is funded from revenue - rates and charges - set to recover depreciation expense and accumulated until spent. This funding source emphasises the importance to Council of continually fully funding depreciation on infrastructural assets.

The detail of financial management is described in the Financial Strategy. The Infrastructure Strategy and Financial Strategy align with each other.

The timing of expenditure with funding availability is an important outcome of the planning process. It is critical to ensure adequate funding is available to prevent delays in programmed works but avoid excess cash that will incur unnecessary funding costs. An analysis of Council's capital spending has shown that over the period 2018-2023, $55.5 million has been spent per annum. The strategy identifies major capital projects. The delivery of many of these projects will depend on a number of protracted processes – public consultation and agreement, resource consent approval, land-purchase and design and construction resource availability. In consideration of these constraints, Council is planning to provide capital funding of no more than $85 million plus Sounds roading per annum for the first three years of the LTP.

Part Two – Asset-Specific Chapters

Roads

For Marlborough to achieve its vision for the future, the infrastructure must be sufficient and functioning; achievable and sustainable with the resources available.

Roading Goals

- Increase delivery capability and capacity across the region.
- Improve safety and resilience of transport options.
- Build a sustainable transport system that is affordable.
- Implement the One Network Framework to support strategic and informed decisions-making.

Introduction

Council is responsible for the management of a transportation network that comprises 1532km of roads (916km sealed and 616km unsealed).

This is Council's largest infrastructure asset. The affordability of **renewals** is particularly an issue for roads, which have the highest replacement value ($1,041 million). Approximately $22 million has to be spent each year to address the effects of deterioration of the roads, bridges and associated assets. To achieve this, renewals are phased to ensure all areas are addressed on a cyclical basis based on the level of traffic they receive and technical review by engineering staff.

The Marlborough roads traverse some difficult terrain and this has influenced the design and character of the transport system. Of the 1531km, only 184km of that is urban, the rest is rural. Roads tend to be long and narrow, with few alternate options in many cases. Our roads are vulnerable to flooding and slips, as well as tidal inundation in the Sounds. As people and businesses become increasingly reliant on reliable transport links, building resilience against the uncertainties of **climate change** and large **earthquakes** will be a key challenge for this asset.

In future years the rural population and smaller townships are projected to decline. Changing **demographics** mean there will be a larger number of older people within the population which will increase the demand for better access and dedicated routes for mobility scooters and spaces to park them. Nuisance from dust on unsealed rural roads and waterway contamination at the numerous remaining fords are emerging challenges, along with the need for continuous improvement in road safety. The **level of service** for the roads and bridges will be adjusted to meet the new realities of road users.

There is an increasing demand for freight haulage. The success of Marlborough wines, timber production and the region's growing reputation as a tourist destination are all generating **growth** for road services.

While tourists and freight operators share the same network, they travel in different ways. Freight trips are often longer, time critical journeys while tourist journeys can be less time constrained with multiple stops. Both journey types need to be adequately provided for.

1. Specific Challenges

1.1. Adverse natural events are damaging below-par assets, making the road network unsafe

Marlborough has suffered multiple high intensity rainfall events over the last two years which have caused significant damage to the Marlborough Transport network. The largest event, in August 2022, caused over 2,750 faults and affected more than 500km of road.

The reinstatement of the network is a huge task and will take time.

An outcome of these storm events has been a rethink on the levels of service across the Sounds network. The PBC has identified the area where Council should build back stronger (improve the resilience) as well as areas which will have levels of service lower than existing.

1.2. Rapidly rising construction costs and inflation results in a reduced programme of work

The existing Network Outcomes Contract has seen an increase in cost fluctuations of 18% over of the first three years of the contract. The rapid increase in inflation has resulted in additional costs that have not been budgeted for previously. Future increases are currently predicted to be lower than what we have recently seen, however this still impacts on future budgets meaning an increase in costs for no change in level of service.

1.3. Emergency response to natural events result in the re-allocation of resources, affecting delivery of planned activities

We must improve the safety and resilience of our transport assets to meet the unpredictable damage caused as a result of natural events. However, we do recognise this is going to take time and our approach going forward requires a longer-term focus.

An unintended consequence, however, due to the reallocation of staff means that we continue to fall short of meeting national/local demands and expectations associated with levels of service and embedding new ways of working to enable better decisions to be made. This is further compounded by rapidly rising construction costs, resulting in us getting less than we had planned for.

To respond to these challenges, we need to continue to put our focus in to the recovery, renewal/maintenance work and address the strategic priorities. We have therefore developed this Land Transport Activity Management Plan (LTAMP) to reflect two programmes of work:

- Strategic and Major Capital Improvements
- Renewals and Maintenance

1.4. Existing roading infrastructure design does not promote safe multi modal transport options

Increasing environmental and social opportunities for people in the region is a defined benefit of our Investment Logic Map. To do this, we need to embed the One Network Framework and use this for strategic decision-making across the entire network.

The final priority will be to use the intelligence developed in initial Land Transport Activity Management Plan periods to seek the required funding to build a sustainable transport system. The work will commence in the 2031-2034 LTAMP period.

Project	LoS %	Growth %	Renewal %	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034
Bridges	0.00	100.00	0.00							$6.5M			
Cycle Facilities	100.00	0.00	0.00		$1.3M								
Cycle Facilities	100.00	0.00	0.00					$1.22M					
External Vested Assets	0.00	100.00	0.00					$6.24M					
Footpaths - concrete	50.00	50.00	0.00					$1.73M					
Footpaths - sealed	0.00	0.00	100.00	$0.9M									
Kerb and Channel	50.00	50.00	0.00					$0.9M					
Other buildings	100.00	0.00	0.00					$3.12M					
Other buildings	100.00	0.00	0.00					$3.12M					
Paved / Cobbled areas	100.00	0.00	0.00					$6.5M					
Pipelines	0.00	100.00	0.00					$9.88M					
Sealed pavement	0.00	100.00	0.00	$2.33M			$1.9M				$1.17M		
Renewals Bridges	0.00	0.00	100.00					$25.7M					
Renewals Drainage	0.00	0.00	100.00					$17.8M					
Renewals Footpaths (sealed)	0.00	0.00	100.00					$6.07M					
Renewals Pavement rehabilitation	0.00	0.00	100.00					$20.6M					
Renewals Sealed Road Surfacing	0.00	0.00	100.00					$61.96M					
Renewals Street Furniture	0.00	0.00	100.00					$0.4M					
Renewals Structures component replacement	0.00	0.00	100.00					$4.7M					
Renewals Traffic Services	0.00	0.00	100.00					$8.27M					
Renewals Unsealed road metaling	0.00	0.00	100.00					$25.3M					
Renewals Vehicle crossings	0.00	0.00	100.00					$0.8M					
Renewals: Cycle Path	0.00	0.00	100.00					$0.57M					
Sounds Future Access	100.00	0.00	0.00					$18.1M					
Sounds Future Access	0.00	0.00	100.00		$139.9M								
Renewals: Minor improvements	0.00	0.00	100.00							$7.75M			
Renewals: Minor improvements	100.00	0.00	0.00		$2.5M								
Renewals: Minor improvements	100.00	0.00	0.00	$2.37M									
Renewals: Minor improvements	0.00	0.00	100.00		$1.2M								
Sealed pavement	0.00	0.00	100.00	$0.17M									
Sealed pavement	100.00	0.00	0.00					$1.1M					
Sealed pavement	0.00	100.00	0.00					$1.5M					
Signs	50.00	50.00	0.00					$.45M					
Streetlighting	0.00	50.00	50.00					$0.4M					
Vehicle crossings	50.00	50.00	0.00					$0.3M					
Wharves	100.00	0.00	0.00				$7.6M						
Wharves	0.00	0.00	100.00					$0.8M					
Wharves	0.00	100.00	0.00					$0.27M					

Water

For Marlborough to achieve its vision for the future, the infrastructure must be sufficient and functioning; achievable and sustainable with the resources available.

Water Supply Goals

- The seven water supply schemes will comply with the quality standards of the Drinking Water Standards New Zealand.
- Flow and pressure of water supplied will meet the reasonable expectations of the community and be sufficient for fire-fighting purposes (except Awatere and Wairau Valley).
- As far as possible economic development will not be constrained from inadequate or unsuitable drinking water supply.
- The water supply will meet the statutory obligation under the Civil Defence Emergency Management Act to function as fully possible after an emergency event.

Introduction

The Council owns and operates seven water supply schemes — in Blenheim, Picton, Havelock, Renwick, Riverlands, Wairau Valley and Awatere (Awatere is further divided into the Seddon and Awatere Rural supplies). Around 82% of Marlborough residents have access to water through these schemes.

All of the key themes identified in Part One of this strategy are reflected in the water supply activity. **Growth** in demand for water, both for residential uses and for production (irrigation & processing water), has been steadily increasing. In particular, a predicted long-term 25% increase in wine production will increase demand for water.

There is a need to manage future growth in demand, particularly in relation to uncertainty about future **demographics** and **climate change**, to ensure the water sources remain at sustainable levels for all users. **Levels of service** have been set to ensure tap water from all Council supplies is safe for drinking. Building and running the treatment plants present **affordability** issues for small communities.

Much of the water reticulation infrastructure was installed during the 'baby boom' growth periods in the middle of the 20th century. These pipes will reach the end of their useful life over the next 30 years. The pipe materials used at that time are less resistant to ground shaking during earthquakes than the materials we have been using more recently. Continuing to manage an efficient and effective **renewals** programme that improves the **resilience** of the networks will be a key challenge.

Location/Asset Type	Mains (km)	Service Lines (km)	Meters	Back flow Preventor	Bores	Intake	Treatment Plants	Distribution Pump Stations	Booster Pump Stations
Awatere	146.6	6.9	549	39		1	1	1	3
Seddon	9.4	1.8	289	13			1	1	
Blenheim	213.3	89.3	766	561	9		2	2	4
Havelock	9.5	2.6	355	16	2		1	1	
Picton	62.7	17.7	204	140	3		2	1	4
Renwick	18.3	6.5	1,002	28	5		1	1	
Riverlands	12.3	1.6	141	74	3			1	
Wairau	3.5	0.4	62	7	1		1	1	
Total	**475.6**	**126.8**	**3368**	**878**	**23**	**1**	**9.0**	**9.0**	**11**

1. Specific Challenges For This Asset

1.1. Drinking water standards

Upgrades

The Picton water supply was upgraded to meet the Drinking Water Standards in 2017 with the completion of the Speeds Road Water Treatment Plant and continues to meet the standards today. Seddon water supply was upgraded to meet the standards in 2018. Wairau Valley was upgraded in 2023 and completion of Renwick's upgrade is expected in mid-2024 to meet the standards.

Currently Blenheim water supply is not chlorinated and Council has received direction from Taumata Arowai to chlorinate this supply along with the Riverlands supply and Rural Awatere.

Taumata Arowai has also given direction to have protozoa barrier treatment installed for Rural Awatere, Riverlands and Havelock.

The Awatere Rural system has a long-piped reticulation network serving a relatively small number of, mainly rural, lifestyle blocks. Much of the water is used for livestock drinking water or irrigation. A small disinfection plant installed at the point of entry into every home has been proposed as an alternative to centralised treatment for this area.

Private Water Schemes

The remaining 18% of the population access water individually or through privately managed schemes. An assessment of private water supplies was undertaken in 2019 to assess the potential effects and impacts changes to the DWSNZ may have to these supplies and to Council should we need to take responsibility for these. There were 40 schemes identified, serving a population of over 1,700 people that are not supplied by Council.

1.2. Water availability and consumption

Partly due to the warm and sunny Marlborough weather, our region has some of the highest per capita water usage in the country. The current demand for water in Renwick and Havelock, and projected demand in Picton, is putting considerable strain on the groundwater aquifers from which the water is taken. The National Policy Statement on Freshwater Management (NPSFM) requires allocation limits to be set to protect the sustainability of natural water sources. It is unlikely that Council will be able to significantly increase its current water allocations in future consent applications and may even have further limitations imposed. The table below shows the designation of consents for water sources in the Marlborough Region.

Supply Areas	Source	Daily Consent Limit (m^3)	Peak Summer Daily Demand (m^3)	Average Winter Daily Demand (m^3)	Consent Expiry
Blenheim	Bomford St	43,500	36,400	14,500	1/12/2030
	Middle Renwick				
Riverlands	Malthouse	7,700	6,100	1,327	1/07/2029
	Hardings Road				1/08/2024 (applied for)
Renwick	Terrace Road	5,000	3,650	1380	1/11/2028
	Conders Bend				1/11/2028
Awatere	Black Birch Stream	8,000	2,820	1550	15/12/2029
Havelock	Kaituna River Catchment	2,000	1,150	500	1/07/2037
Picton	Speeds Road	7,900	6,210	2,970	1/10/2050
	Barnes Dam				30/09/2032
Wairau Valley	Wairau River	480	264	52	1/03/2048

Groundwater

Saltwater intrusion detected in the Havelock bores is also an indication that more water is being abstracted from these than can be immediately recharged from the aquifer.

The water aquifer on the Wairau Plain was, in theory, over-allocated. In practice, not all users are using their permitted allocations. Considerable effort is being made to devise a system of re-allocation to allow consented volumes to be distributed equitably to meet the demands of current users, including Council's public water supply requirements.

The water levels in the Renwick bores regularly drop during the summer peak demand period, as water is pumped out faster than it is replaced. Three new wells have been drilled at Conders Bend to support the upgraded Renwick water treatment plant.

Alternative Water Sources

Investigations have been undertaken to find alternative sources of water for Havelock. Abstraction from the Pelorus River Valley appears to have the most potential. For Picton, the nearest viable source is the Tuamarina aquifer. The costs of developing and piping water from these new sources to the settlements is high. Water demand management strategies will delay, and possibly avoid, the need for this investment. Universal metering is a proven method to reduce demand. Other techniques such as leakage control, pressure management, public education and new technologies are less certain but can also result in more efficient use of water.

Increasing Wine Production

The success of Marlborough wines around the world is hugely beneficial to the region. However, increasing production through additional vineyard hectares, or enhanced processing to add value to the primary product, will increase demand for water resources. A new source and water treatment plant is being established in St Andrews to support this and meet the DWSNZ.

Climate Change

The eastern areas of Marlborough are predicted to experience longer periods of dry weather as a result of climate change. Water demand peaks during the dry spells as gardens are irrigated and swimming pools are topped up. Longer droughts will increase the frequency and duration of periods of high demand, with potential implications for both water sources and the water supply infrastructure.

Continuous sea level rise over the next 100 years is generally regarded as inevitable. This will affect the freshwater–saline balance in groundwater systems and may further restrict the capacity of the Havelock water bores to continue to supply freshwater to the community.

Demand Management

Renwick and Havelock are leading the way with meters fitted to household supplies and volume-based charging for water that was implemented in 2021. This has helped to reduce volumes of water used for urban irrigation and other high use activities. In future, smart metering combined with advanced telecommunications and remote control of household appliances will allow customers to take advantage of lower tariffs for water and electricity during periods of low demand. Levelling out the times of high and low demand for water will help reduce the capacity requirements of future infrastructure and assist with more efficient designs. Following review of this works programme, it will be implemented across other water supply areas.

The introduction of rules through a local amendment to the Code of Practice for Subdivision could be used to encourage developers to install low water use plumbing apparatus and 'grey-water recycling' systems to new housing. This is a useful tool to manage demand for both water supply and wastewater services. However, it is difficult to implement retrospectively and it will take considerable time to yield results.

1.3. Ageing infrastructure

The average age of the water supply network is getting older, yet the reticulation pipework continues to perform well with little evidence of the increased maintenance or burst frequency that might be expected from ageing assets. However, in order to avoid a deterioration of the level of service and unacceptable leakage a pro-active renewals programme will be required.

In addition, pipe rehabilitation and renewal using 'low-dig' techniques can significantly reduce the costs and disruption involved in replacing worn out pipes.

Installation of smart meters will make it much easier to identify where leaks are occurring in the water pipes carrying water between the mains and individual households.

Currently the specialist skills and equipment required to undertake these works are not readily available locally but are becoming more widespread in New Zealand. They will become more competitively priced as the market develops. The costs of deploying national/international specialist companies to the region to undertake contract works can be reduced by larger contracts, for example shared services contracts with other councils, or comprehensive contracts for one supplier.

1.4. Earthquake risk

We know from Christchurch's experience that some of the older pipe materials (particularly asbestos cement and cast iron) do not perform well following earthquake ground shaking and liquefaction.

New pipe materials such as PVC, and particularly polyethylene, are more resistant to ground shaking and ground deformation than the older, more brittle, materials. There is a considerable legacy of asbestos cement and cast-iron pipes that may be regarded as less resistant. This is particularly the case for the Awatere water supply as the scheme was first installed in 1947 when asbestos cement was a popular pipe material.

All the new water infrastructure — treatment plants, reservoirs, pump stations and pipelines are being built to the latest design standards. These performed well in the November 2016 earthquake and other previous events.

Older reservoirs at the Cloudy Bay Business Park and Wither Hills have been strengthened to increase their resilience. The main reservoirs have been fitted with automatic valves which close when they detect significant ground movement and prevent water from leaking away through ruptured pipes.

Impacts of Earthquakes

The new standards and materials will reduce the impacts of an earthquake. However, scientists are predicting the occurrence of a large event which will cause significant damage — partly because there is a legacy of older assets and partly because structures can be built to be earthquake resistant but cannot be made earthquake proof.

Insurance

Council constantly reviews its insurance strategy in the light of new scientific research, a changing infrastructure base and an ever-changing insurance market. Council prefers to avoid damage to the infrastructure through good engineering but there will always be a residual risk, and insurance can help to meet this financial liability.

2. Options to Respond to Each of These Identified Challenges, and Implications of These Options

2.1. Drinking water standards

Option	Implications
PREFERRED OPTION Complete existing water treatment plant upgrades for Blenheim, Renwick, Riverlands, Wairau Valley and Havelock, and install treatment point-of-entry treatment for each property in Awatere Rural.	***Benefits:*** All of the Council owned water supplies will meet the high standards for clean and safe drinking water. ***Costs:*** The combined capital costs of the water treatment plants for Blenheim, Renwick, Havelock, Riverland's, Rural Awatere and Wairau Valley is in excess of $56.8 million. To ensure the point-of-entry systems for Awatere Rural are regularly serviced, Council will need to implement an annual service programme. Sending a service engineer to individual properties will be an ongoing operational cost.
Consider alternatives to full compliance with DWSNZ on the grounds of affordability.	***Benefits:*** Reduces the financial burden on small rural communities. ***Costs:*** Public health risks. Reputational risk particularly amongst tourists and foreign visitors. The option to not meet the DWSNZ on the grounds of affordability may be removed upon implementation of the new standards.

2.2. Water availability and consumption

Options	Implications
Do nothing. Respond to water shortage issues as they arise, by introducing water restrictions during peak demand periods.	***Benefits:*** This option defers capital investment and allows for future flexibility to respond to changes in population growth and to wait until we have more information about the impacts of climate change on the length and severity of droughts in Marlborough. ***Costs:*** Additional operational costs in implementing and enforcing water restrictions. Potential for adverse impacts on public health, the economy, levels of service and reputation. This approach does not promote efficient water usage, which is an objective of the NPSFM, and may become mandatory in future.
PREFERRED OPTION Universal metering and other demand management techniques.	***Benefits:*** Water metering is a proven technique to reduce average water demand by approximately 25% and peak demand by around 30%. Other techniques (leakage control, pressure management, public education and use of new technologies) are less effective but can contribute to overall reduction in water use. ***Costs:*** The capital cost of installing meters in both Renwick and Havelock was $0.73 million; and is $2.7 million for Picton. The increased operational costs of meter reading and administration are approximately $165k per annum.
Amend the Code of Practice for Subdivision to include water saving techniques such as grey water recycling in all new homes.	***Benefits:*** New homes will be built with low use apparatus, grey water recycling and water conservation will become normal practice. ***Costs:*** Small additional costs to new house build costs but it will be a long time before sufficient houses are at the new standard to have a significant effect on communities' levels of water use. Retrofitting devices can be costly and difficult to implement.
Access alternative sources of water for Picton and Havelock.	***Benefits:*** Increases certainty of water supply for Picton and Havelock residents. This option would ensure water supply is not a limiting factor for future growth. ***Costs:*** Development of the Pelorus River abstraction piping and additional treatment is estimated to cost $12.5 million. Note: These estimates exclude consent application costs as well as annual operation and maintenance costs.

2.3. Ageing infrastructure

Option	Implications
Renew non-critical mains when failure rates become intolerable.	***Benefits:*** Ensures that only pipes that have reached the end of their useful life are replaced. ***Costs:*** Downstream customers will experience a deterioration in service as supply interruptions increase. Operation and maintenance costs will increase. Unpredictable renewals make budget and resource planning difficult. Unplanned work is more disruptive and expensive than a planned programme of renewals.
PREFERRED OPTION Implement a proactive, planned pipe renewals programme based on criticality and invest more in condition assessment technology, field data collection and data management.	***Benefits:*** Avoids unacceptable deterioration of the level of service and allows efficient, targeted investment in planned renewals works. Pipes are replaced based on their criticality, e.g. critical pipes are replaced before the end of their useful lives, non-critical pipes are replaced at or beyond their useful lives. ***Costs:*** Additional costs of pipe sampling, analysis and data collection to improve pipe and asset condition assessments and ensure well targeted renewals and efficient investment.

2.4. Earthquake risk

Option	Implications
PREFERRED OPTION Prioritise replacement of asbestos cement and cast iron pipes in areas where they have deteriorated more quickly than anticipated.	***Benefits:*** Will increase resilience to pipeline damage and assist with more rapid recovery following a large earthquake. ***Costs:*** The total value of the asbestos cement and cast iron water mains is around $92.0 million. To replace all pipes of these materials in the next 30 years it will be necessary to bring forward the replacement of 52kms of pipe at an approximate cost of $26 million.
Provide financial contingency to replace these pipes urgently if a significant earthquake occurs.	***Benefits:*** Recognises damage from any particular earthquake is difficult to predict and saves money to use in response to damage following actual events. ***Costs:*** Disrupted water supplies and longer restoration times will increase public health risks and reduce levels of service following an earthquake. Materials and resources will be in short supply, which means premium costs would apply to undertake restoration works. Emergency repairs followed by renewals will duplicate costs in some instances.

3. Most Likely Scenario

3.1. Drinking water standards

The most likely scenario is that the Council will complete the upgrade of water treatment plants to meet the requirements of the DWSNZ for all water supply areas. Havelock and Riverlands treatment plants are planned for completion in 2024-2026 for both at a cost of $9.0 million and $15.8 million respectively.

As an alternative to building a large treatment plant for the Awatere Rural supply to disinfect the water before it is distributed, it is more practical to install small treatment units to each dwelling at the point of entry of the supply pipe.

This approach will consist of around 280 small disinfection units. The installation cost of this has been estimated to be around $2.2 million. However, each unit will need to be regularly serviced and the costs of ongoing maintenance will increase.

Increased monitoring of the water quality supplied is also likely to be required. This might include installing chlorine monitoring points on the distribution system and taking additional tap samples for laboratory analysis. These additional costs are included in the operational cost projections in the following section.

The Council will wait for direction from central government on whether water fluoridation is required. In order to be prepared for that situation, Council will investigate the costs for installation of fluoridation dosing plant and the ongoing maintenance at all treatment plants. The overall costs are not likely to be very high.

3.2. Water availability and consumption

Universal metering has now been installed in Havelock and Renwick as a means of demand management. The most recent census has shown that growth in Picton has slowed significantly and a decision on metering can be delayed. It is probable that within the span of this strategy that metering will be adopted for all of Council's water supply schemes. Improving our knowledge on actual water usage and demand patterns will improve our understanding of our total leakage across our networks and to improve our water availability.

More active leakage detection, repairs and renewals are likely to be employed in all areas to reduce wastage and demonstrate efficient use of the resource.

Developments in technology in 'smart meters' and remote control of household appliances will allow customers to have more choices about how they manage their water consumption patterns. They will be able to understand their water usage and will be able to manage their use to reduce peak demands, allowing Council (and the community) to benefit from more efficient sizing of the supply infrastructure.

3.3. Ageing infrastructure

There will be a relatively small but growing water pipe renewals programme over the next 10 years which will increase significantly over the following 20 years as the aging pipe network begins to struggle to meet customers' expectations. Critical pipes and materials that are expected to perform less well in an earthquake will be prioritised for replacement.

Data collection on asset condition and performance is improving and is building into a more accurate picture of where renewals works can be most effectively targeted. More resources will be allocated to pipe condition assessments to inform the renewals programme.

3.4. Earthquake risk

Major new assets will be built to the current high standards of earthquake resistance. Networks will be designed with increased inter-connections to allow flexibility of supply in the event of earthquake damage. Additional strengthening will be retrofitted for critical assets and less resistant pipe materials will be replaced as part of the renewals programme. The residual risk will be mitigated with financial contingencies to meet the realistic costs of repair. The insurance sector has helped Council to calculate the 'maximum probable loss' from the most recent experience around the country and is assisting Council with its risk management plans.

4. Table of Major Projects for This Activity

A brief summary of upcoming projects for this asset is shown below and includes an indication of the main reasons for the projects. Many of these have multiple drivers that span the challenges identified in the earlier sections of this chapter.

The key 'drivers' of investment are:

- Growth — investment to provide additional capacity to cope with increased demand for the service due to population growth or increased usage.
- Levels of service — investment to improve the service customers receive.
- Renewals — investment to replace worn out or inefficient assets.

*Costs exclude overheads, financing and inflation.

Asset type	Project	LoS %	Growth %	Renewal %	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034
Awatere Rural														
Treatment Plant	Rural Point of Entry treatment	95	5		$2.15M									
Storage	Reservior Renewals, Replacements and Upgrades	40	13	47	$1.27M			$0.63M						
Pipelines	Pipeline Renewals, Replacements and Upgrades	2	17	81		$1.61M				$0.33M				$0.15M
Blenheim														
Land	Land purchase for Chlorination	100			$0.50M									
Pipelines	New Pipes to Treatment	70	10	20				$10.55M						
Pipelines	Pipelines Fire/Capacity upgrade	15	42	43	$1.99M			$1.01M			$0.43M			
Pipelines	Pipelines Meters and airvalves Upgrade	70	30						$17.38M			$0.08M		
Pump Stations	New Pump Station and wells Upgrade	70	10	20			$2.50M							
Pump Stations	Pump Station Andrew st & Middle Rd Generator Upgra	100				$0.07M			$0.22M					
Pump Stations	Pump Stations Wither Booster Upgrade	66	10	24				$2.32M						
Renewals Pipelines	Colemans Rd & Fulton St & Lakings Rd & Mowat St & Ward St Renewal			100			$5.06M							
Treatment Plant	Treatment of New Wells Upgrade	70	20	10					$8.99M					
Water Meters	New Metering			100		$0.30M								
Havelock														
Treatment	Treatment Plant Upgrades	63	29	8	$9.04M								$6.99M	
Pipelines	Pipeline Renewals, Replacements and Upgrades	43	37	20		$0.18M		$0.13M			$5.71M			
Picton														
Pipelines	Pipeline Essons Barnes Upgrade	100							$1.20M					
Pipelines	Pipeline Mainline and Press Upgrade	2	98				$0.50M							$13.30M
Pipelines	Pipelines Speeds Upgrade	91	9		$0.35M									
Pump Stations	Pump Station Booster Upgrade	91	9		$0.45M									
Treatment	Renewal Connections, Pipelines and Pump Stations			100					$0.66M					
Storage	Reservior Renewals, Replacements and Upgrades	70	30					$0.85M						
Treatment Plant	Speeds Water Treatment Plants Upgrade		100											$6.00M
Water Meters	Universal Water Metering Upgrade	70	20	10				$2.73M						
Renwick														
Renewals Pipelines	Renewals Pipelines			100	$2.10M									
Riverlands														
Pipelines	Pipeline from new wells Upgrade	80	20		$5.50M				$1.44M					
Treatment	Treatment Plant Upgrade	80	20		$10.30M									
Seddon														
Pipelines	Pipelines Upgrade	10	70	20		$0.34M								
Reservoirs	Second Seddon tank	20	10	70									$1.27M	
Southern Valleys														
Water Meters	New Metering			100					$1.00M					
Wairau Valley														
Pipelines	Pipelines Upgrade		100			$0.41M								
Flaxbourne Irrigation														
Pipelines	Irrigation scheme	100						$13.35M						

Wastewater

For Marlborough to achieve its vision for the future, the infrastructure must be sufficient and functioning; achievable and sustainable with the resources available.

Wastewater Goals

- Wastewater treatment plants will fully comply with current and anticipated discharge standards.
- Wet weather sewer overflows will not occur from storm events with a frequency of less 10-year ARI.
- Future treatment plant upgrades will be designed to avoid cultural offence by removing or reducing effluent discharges to the aquatic environment.
- The wastewater network will meet the statutory obligation under the Civil Defence Emergency Management Act to function as fully possible after an emergency event.

Introduction

With an asset value of $647 million, wastewater is the second largest asset group owned by Council.

The huge success of the Marlborough wine industry has created challenges for Council. During vintage there is a ten-fold increase in the discharge of trade effluent from the wineries. The total load on the Blenheim wastewater treatment plant is five times as much as normal. For a few weeks between March and May each year the wastewater treatment plant is required to process a load equivalent to the wastewater produced by 250,000 people. In terms of wastewater, Blenheim becomes the fifth largest city in New Zealand.

To meet this demand the treatment plant has undergone a number of upgrades. Capacity was significantly increased in 2009 with the addition of an advanced dissolved air flotation (DAF) treatment plant. Tertiary treatment wetland ponds (established in 2013/14) improve the quality of the final discharge and allows a portion of the final effluent to be returned to irrigate the land. Council will continue to collaborate closely with the wine industry to ensure additional wastewater processing capacity is available as production grows.

The discharge of human waste to the aquatic environment is a cause of cultural offence to the indigenous iwi. Council is working with local iwi to remove or minimise the discharges from treatment plants.

The following table provides a summary of the Council's wastewater systems.

Area	Sub Area	Treatment Plants	Biofilters	Pump Stations	Grinder Pumps	Mains (km)	Connections
Blenheim	Blenheim	1	3	43	67	213.2	10,382
	Grovetown				153	17.0	346
	Spring Creek			2		3.9	158
	Renwick			1		15.0	849
	Riverlands		1	5		12.1	119
Havelock		1		6		9.8	297
Picton		1		9		55.3	1,762
Seddon		1		2		7.9	276
TOTAL		4	4	68	220	334.2	14,189

The wastewater system collects and treats the wastewater from both domestic and industrial properties. Currently the treatment plants at Blenheim and Havelock are on low lying coastal plain that is vulnerable to liquefaction associated with earthquake shaking and tsunami. The design of treatment plants needs to be **resilient** to sea level rise and storm surges that may result from **climate change**. The Havelock wastewater treatment plant is currently in the process of being relocated to remove this risk.

As the wastewater reticulation ages, stormwater is able to seep into leaky joints. The **levels of service** are challenged when the ingress of stormwater into the wastewater system causes wastewater overflows during severe storms, with subsequent insanitary conditions and pollution of waterways. Reduction of stormwater infiltration and improved resilience of the pipe network to earthquake damage are two major benefits from a well targeted **renewals** programme.

1. Specific challenges

1.1. Growth in demand related to trade waste and urban development

There are a number of growth-related challenges for wastewater treatment.

Certain industries create large volumes of liquid waste with high organic content. These require far more treatment than normal domestic sewage and can quickly overwhelm the treatment capacity of a plant designed for an urban population. Blenheim wastewater treatment plant has undergone several major upgrades in recent years to cope with the demand from the wine industry. The upgrades have been planned and funded by the wineries. As growth continues, further upgrades are likely.

Council is committed to ongoing communications with industry representatives and individual businesses to ensure infrastructure is provided to meet demand and to overcome uncertainties about the required timing of upgrades, given that the popularity of Marlborough wines in the world market has led to very rapid growth in volumes. The funding methodology will be agreed at this time.

The smaller treatment plants at Havelock and Picton have limited capacity to deal with additional trade waste growth. This can be an issue for industries such as seafood and meat processing. Processing can add value to exports and create jobs, but early consideration needs to be given to the treatment of the associated liquid wastes.

The Marlborough Urban Growth Strategy has identified land for future growth pockets in each settlement. The land is often on the periphery of the existing settlements and requires new pipework and upgrades to the existing reticulation to accommodate the additional flows. For example, development to the west and north of Blenheim and further development in Waikawa requires careful design as these areas are a considerable distance from the treatment plants. These projects are currently in progress. Sequencing the order of development will assist in construction and ensure the system is installed in an efficient manner. Council's Development Contributions Policy has been updated to reflect these costs.

1.2. Renewals

The age profile of the wastewater network indicates that $25.1 million worth of pipes will reach the end of their useful life within the next ten years followed by a further $36.2 million worth of pipes in the following 20 years. Work is constantly being undertaken to assess the condition of pipes using CCTV and during reactive and planned maintenance tasks. Assumptions on life expectancy are reviewed annually during the valuation process based on specific network knowledge and national and international data that is available.

Council has implemented a proactive, planned renewals programme and have invested more in condition assessment technology, field data collection and data management to address the renewal challenges, which are described in more detail below. New installation and pipe rehabilitation techniques are becoming more commonplace, reducing the costs and disruption of renewal upgrades.

Earthquakes

The Blenheim and Havelock wastewater treatment plants are built on coastal plains. The areas are flat and low-lying and vulnerable to tsunami inundation. The land is also prone to liquefaction and ground deformation

which could have important consequences, as the flows through the plant rely on gravity flows along a shallow gradient. For this reason, the Havelock wastewater treatment plant is being relocated to a new site with less risk of damage. The new treatment plant should be commissioned by 2028.

Earthenware pipes are particularly vulnerable to ground movement. Asbestos cement and the older concrete pipes also perform less well. PVC plastic mains perform better. Polyethylene mains perform best of all, but these pipes do attract grease and fat which sticks to them, so they need to be cleaned more regularly.

Climate Change

Stormwater infiltration into the wastewater network becomes a more significant problem during storms and when groundwater levels are high. Climate change is likely to make this problem worse as storms are predicted to become more intense and frequent.

Hotter drier summers will have an impact on the bacteria and algae used in the wastewater treatment process, because they require dissolved oxygen in the wastewater to effectively process the waste into treated effluent. Dissolved oxygen decreases as the temperature of the ponds increases. Additional aeration plant may be required to increase the oxygen in the treatment ponds.

The Seddon wastewater treatment plant discharges to the Starborough Creek which can have very low natural flows. The impact of the discharge may be affected by a change in the volume and temperature of the receiving water.

The Blenheim wastewater treatment plant includes a facility to recycle a portion of the treated effluent to irrigate land. This is only permitted when the soil requires additional moisture and when the groundwater levels are low enough to prevent surface ponding. Longer, drier summers may prolong the irrigation season but rising sea levels may raise the groundwater levels, preventing irrigation.

Cultural Values

Iwi have a strong cultural relationship with the environment, and the disposal of human waste into the aquatic environment is of concern to them. Council is working with iwi on an Iwi Engagement Plan, and will continue to work with iwi on mutually acceptable solutions to wastewater management. A pipeline has been installed alongside the Picton Trunk Main upgrade. It will facilitate the recycling of treated effluent for irrigation at a later date. Further improved practices can be expected over time.

Infiltration & Inflow

The capacity of the wastewater system can be put under strain from the additional flow due to the ingress of stormwater through inflow or infiltration . Leaky joints in pipes and manholes, and accidental connections between stormwater and wastewater pipes, all contribute to the problem.

Finding the source of ingress can be time consuming and expensive. Progress is often frustrated as fixing one area is quickly replaced by infiltration from another area. It can also be difficult to identify if the leak is on the public pipework or within private property. Pipe renewal can be a more sustained solution than repairing individual leaks.

New Technologies

Similar to water supply assets, the adoption of new ‘smart’ technologies by residents will give them more choices about how they use water, and this is likely to smooth the peaks and troughs of wastewater flows, allowing for more economic designs. Grey water recycling and water-efficient appliances will counterbalance the increase in growth.

New treatment processes are being developed and high quality treated effluent discharges are becoming easier to achieve consistently. Many new treatment technologies are becoming ‘scalable’. It may become efficient for small businesses, and even domestic properties, to treat their wastewater. This will reduce both the strength and the volume discharged to sewer and enable recycling of a portion of the ‘grey water’ for use as irrigation or other low-quality uses.

2. Options and Implication

2.1. Increased demand related to trade waste

Options to address it	Implications of the options (financial and non-financial)
PREFERRED OPTION Ongoing communications with industry representatives and individual businesses to ensure infrastructure is provided to meet demand.	***Benefits:*** Local economy allowed to grow to meet the market and support local jobs and prosperity. ***Costs:*** Approximately $30.0 million upgrade to industrial part of the Blenheim wastewater treatment plant by 2030 based at it's current location. Ensure equitable funding mechanism is agreed with industries in advance, and ensure land availability, resource consent and cultural sensitivities are addressed at an early stage.
Do nothing. Cap effluent discharges once existing treatment capacity is reached.	***Benefits:*** No further investment in infrastructure required and certainty that levels of service can be maintained for existing customers. ***Costs:*** Economic development restricted, requiring industries to relocate.
Assist industries to develop on-site alternatives to disposal to the wastewater system.	***Benefits:*** Industrial development is not restricted by wastewater reticulation and treatment capacity. The costs of wastewater are borne by those responsible. ***Costs:*** Efficiencies of scale are lost and businesses could become less viable or relocate. Increased costs in monitoring.

2.2. Increased demand related to urban growth

Options to address it	Implications *of* the options (financial and non-financial)
Install conventional sewerage system on new sub-divisions and upgrade downstream	**Benefits:** Wastewater disposal was considered at the outset of the Urban Growth Strategy and selection of growth pockets. Relatively minor downstream upgrades required. Downstream upgrades will help to resolve some levels of service issues with inflow and infiltration. **Costs:** Some upgrades will lead to premature replacement of functioning assets.
Install non-conventional vacuum or grinder pump system.	**Benefits:** Lower flow volumes as less susceptible to inflow and infiltration consequently smaller diameter reticulation and reduced installation costs. Lower impact on downstream infrastructure. **Costs:** Increased mechanical infrastructure with subsequent on-going maintenance costs. Unproven modern technology.

2.3. Renewals

Asset renewals will assist Council to address the challenges associated with infiltration/inflow, climate change, earthquake risk and cultural values and the opportunities of new technologies.

Options to address it	Implications of the options (financial and non-financial)
Do nothing. Renew pipes as and when they fail.	***Benefits:*** Certainty of targeting pipes at the end of their useful life. Investment delayed as long as possible. ***Costs:*** Increased overflows and insanitary conditions. Older pipes remain vulnerable to earthquake damage. Costs of increased maintenance and unplanned works. Increased pumping and treatment of infiltration and inflow.
PREFERRED OPTION Implement a proactive, planned renewals programme and invest more in condition assessment technology,	***Benefits:*** Avoids unacceptable deterioration of the level of service. Prevents damage to the environment and public health risks from sewage overflows. Allows efficient, targeted investment in planned renewals works. Comprehensive condition grading will allow

Options to address it	Implications of the options (financial and non-financial)
field data collection and data management.	targeted renewals and an opportunity to 'smooth' the renewal expenditure. ***Costs:*** Additional costs of CCTV surveying, pipe sampling, analysis and data collection to improve pipe and asset condition assessments and ensure well targeted renewals and efficient investment.
Implement a pipe rehabilitation programme using a variety of rehabilitation techniques – patching, relining and renewals	***Benefits:*** Rehabilitation can be targeted at specific pipes or sections of pipe avoiding wholesale renewal costs. ***Costs:*** Very high-quality condition data required. Specialist techniques and skills may not be available locally and incur additional establishment costs. Many rehabilitation techniques are relatively recent and have not been tested over a prolonged time and have unproven durability.

3. Most likely Scenario

This section provides an overview of the preferred options, and what this means for levels of service, and for costs.

3.1. Growth related to urban growth

The provision of wastewater services was considered during the development of the Urban Growth Strategy and the Housing Assessment being undertaken at the time of writing this LTP. Servicing the identified growth pockets will be achievable with some downstream upgrades some of which are currently in progress.

On-site wastewater will be installed by the developer to an agreed services plan. Council will collect and distribute development levies to fairly allocate the costs of over-sized infrastructure that a developer may incur for the benefit of subsequent development.

The costs of downstream upgrades have been estimated and added included in a revised developer contributions model.

Conventional gravity wastewater with pump stations is preferred. Modern materials and installation quality will minimise inflow and infiltration problems.

Growth Related to Trade Waste

The continued success of Marlborough wines in national and international markets will drive up demand for increased grape processing capacity. The wine industry is rapidly becoming the dominant industry in the region and facilitating growth by the provision of wastewater treatment will contribute to the continued development and prosperity.

Close monitoring of effluent volumes and strengths is undertaken each year during the vintage. Liaison with representatives of the industry will assist with anticipating the timing of future upgrades to agree a funding mechanism from each of the contributory wineries in advance.

Feasibility studies have been undertaken to upgrade the processing capacity of the Blenheim wastewater treatment plant to meet the projected peak demand periods between March to May each year. An outline of treatment plant upgrades has been prepared. Detailed design and construction will be planned to meet the growth in demand.

3.2. Renewals

The useful service lives of infrastructure assets are considered annually during the valuation process. Condition data collected through CCTV, planned and reactive maintenance across the network validates this data.

Additional resources will be allocated for pipe condition surveys through CCTV in targeted areas and pipe sampling where maintenance takes place. Data is continually gathered to enhance the targeted renewals programme. Plans will be developed to manage the predicted peak in renewals from 2048 to smooth the peak once a prioritised assessment has been completed.

Modern 'low-dig' renewal and rehabilitation techniques will be assessed if they can be efficiently deployed and have a proven track record.

4. *Major Projects For This Activity*

A brief summary of upcoming projects for this asset and to explain the reasons for these choices, which expand on the categories of growth, renewal and levels of service in the table.

Asset type	Project	LoS %	Growth %	Renewal %	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034
Blenheim														
Pipelines	Alabama to Taylor/Dillons/Fulton/Purkiss/Burleigh Pipelines Upgrade	60	15	25			$4.42M							
Pipelines	Murphy/Adams/coleman/cherry Pipeline Upgrade	8	59	33					$0.68M					
Pipelines	Main Outfall Pump Station to Blenheim Sewage Treatment Plant 600 Concrete Upgrade	20	80		$0.25M	$1.73M								
Pipelines	Reclaimed Water Reticulation	80	20				$5.00M							
Pipelines	St Andrew Pipelines Upgrade	86	14			$0.90M		$0.15M						
Pipelines	Blenheim Pipeline Renewals incl EQ Repairs		10	90			$3.83M							
Pump Stations	Renewal and Upgrade Purkiss N Kingwell Moorings/Houldsworth/Clea	36	25	39			$3.23M							
Pump Stations	Battys Rd South 3000m3 chamber/Battys Rd South Pump Stations Upgr	20	80					$13.52M						
Pump Stations	Main Outfall Pump Station Pump Stations Renewal and Upgrades	25	25	50		$14.76M								
Pump Stations	Renewals Pump Stations			100					$1.38M					
Treatment Plant	Blenheim Sewage Treatment Domestic Upgrade	79	21		$5.00M			$23.24M						
Treatment Plant	Blenheim Sewerage Treatment Plant Domestic Consenting Upgrade	71	29				$2.55M							
Treatment Plant	Blenheim Sewerage Treatment Plant desludge	100							$4.50M					
Havelock														
Pipelines	Havelock Sewer Pipe Upgrade	80	20			$2.45M								
Pump Stations	Havelock Pump Station Upgrade	79	20	1		$1.86M								
Treatment Plant	Treatment Plant Upgrade	81	19			$15.40M				$6.03M				
Picton														
Pipelines	Pipelines Renewal and Upgrades	45	10	45				$3.43M						
Pump Stations	Picton Pump Stations Upgrade	35	30	35					$2.31M					
Treatment Plant	Picton Wastewater Treatment Plant Upgrades	56	43	1	$0.65M				$16.90M					
Renwick														
Pump Stations	Renwick Pump Station Upgrade		100							$1.60M				
Riverlands														
Treatment Plant	Blenheim Sewage Treatment Plant Industrial Upgrade	80	20			$20.60M								
Treatment Plant	Blenheim Sewage Treatment Plant Industrial Consenting	80	20				$1.38M							
Seddon														
Land	Land purchase for treatment	90	10		$5.20M									
Treatment Plant	Treatment Plant Upgrade	90	10			$17.58M								
Combined														
Connections	New connections across Region		100						$0.76M					

Stormwater

For Marlborough to achieve its vision for the future, the infrastructure must be sufficient and functioning; achievable and sustainable with the resources available.

Stormwater Goals

- The habitable floors of all properties within urban stormwater areas will not experience flooding from storms that, on average, will occur once in 50 years or less.
- All properties within urban stormwater areas will not experience flood water from storms that, on average, will occur once in 10 years or less.
- Discharges of urban stormwater will not cause a deterioration in the quality of the receiving water beyond the standards of the time.

Introduction

The stormwater infrastructure is a reticulated network of pipes, channels, pump stations and associated apparatus required to drain rainwater from residential, commercial and industrial properties and surrounding land. The service is predominantly focused on the urban areas where buildings and other structures disrupt the natural flow paths of surface water drainage and hard surfaces, such as roofs and roads, prevent rainwater from being absorbed into the ground.

Stormwater drainage relies on discharging rainwater to rivers and streams as well as man-made channels. As a unitary authority (with both regional and district council responsibilities), Council manages both the man-made stormwater pipes, drains and natural water courses. Close, coordinated management between stormwater management staff and rivers and land drainage staff is essential to achieve an effective and efficient drainage of surface waters. This arrangement was incorporated in the Blenheim Stormwater Strategy, which was adopted in 2012. The strategy provides an integrated and holistic approach to stormwater management with clearly defined objectives to manage the quantity and quality of stormwater across Blenheim.

The Stormwater Action Group (SAG) is a collaborative working relationship between Council's Rivers and Land Drainage, Stormwater and Operations departments and is proving to be an effective mechanism for implementing the stormwater strategy. The strategy is a detailed analysis of the stormwater issues for the town and is a fundamental element of infrastructure planning. The strategy groups many small drainage catchments throughout Blenheim into 11 Stormwater Management Areas (SMAs). Detailed, integrated action plans are being developed for each SMA which will meet the future requirements for growth in stormwater flows and quality standards.

The urban **growth** pockets identified to the north-west of Blenheim are in the headwaters of many local creeks. Development of these areas, coupled with increased rainfall from climate change, needs to be managed carefully to prevent negative consequences downstream. The Springlands Stormwater Management Area Plan (SMAP) has been developed and links all of the work done in this area.

Many of the spring-fed creeks passing through Blenheim, and upland streams passing through the smaller settlements, have high quality water and pristine aquatic habitats. Increased public concern over the quality of New Zealand waterways has been recognised through the National Policy Statement for Freshwater Management (NPSFM). New developments include low impact design techniques for on-site treatment of stormwater. Infrastructure may need to be retrofitted to ensure existing stormwater discharges meet the new **level of service** standards.

The expectation of more intense storms as a result of **climate change** must be accommodated through a combination of larger pipes, channels and pump stations, overland secondary flow paths and specially designed detention areas that will hold back the peak flows, preventing downstream flooding.

Similar to water and wastewater assets, much of the underground stormwater reticulation is reaching the end of its useful life and will need to be renewed. A very significant peak of around a third of the total asset value (of $86.0 million) is anticipated from around 2050 – just at the edge of the planning horizon of this strategy.

The following table provides a summary of Council's stormwater systems.

Area	Length mains (km)	Pump Station
Anakiwa	0.8	
Blenheim	143.1	2
Grovetown	0.8	
Havelock	2.9	
Okiwi	0.9	
Picton	30.7	1
Renwick	5.6	
Riverlands	6.9	
Seddon	1.2	
Sounds	0.3	
Spring Creek	3.6	
St Andrews	0.3	
TOTAL	**197.1**	

5. Specific Challenges For This Asset

5.1. Stormwater quantity

Urban Growth

The Marlborough Urban Growth Strategy has identified pockets of land to accommodate the expected demand for housing in the future. For Blenheim a land area of around 160ha was identified to the north and west of the existing town. The natural drainage for these areas is from west to east meaning that the stormwater will feed into streams that pass through the existing urban area and to some extent are part of the urban drainage infrastructure. Development in the headwaters of these catchments requires careful design to ensure there are no adverse effects downstream.

This became very apparent with the development of a large retail park and proposed residential development in an area that drains to Murphy's Creek. The downstream residents were very concerned over the increased input of stormwater and the potential for both flooding and deterioration of water quality. An independent arbitrator worked with Council and residents to resolve these concerns using a structured decision-making process. Over the course of 18 months a mutually acceptable solution was reached.

The solution included many features that may be expected to be included in future stormwater designs. Land within the new development has been assigned for stormwater detention. This will detain part of the run-off and help reduce the peak flow. Dished, grass swales will provide a flow path for stormwater whilst at the same time increasing infiltration into groundwater. This natural process will provide primary treatment by removing some of the suspended solids and other contaminants from the run-off. A regulated portion of the flow will be directed into the existing Murphy's Creek and the remainder directed to the Taylor River through a new stormwater pipe. Development of the Stormwater Management Area Plan for Springlands in 2020 also assisted in a collaborative approach across Council and local residents to managing stormwater in this area, monitoring it and setting a benchmark to achieve.

Climate Change

Strategies to manage the effects of more intense storms are considered in all future infrastructure assessments. Building bigger infrastructure and ensuring renewed pipes are sized to meet the new standards will be important. Advanced mathematical models are used to project future stormwater flow patterns and ensure infrastructure is designed with sufficient contingency to accommodate the current uncertainties. A good understanding of historic rainfall patterns and the powerful hydraulic models allow different combinations of factors to be simulated. Non-infrastructure alternatives can be modelled and the engineering solutions adjusted.

The use of overland flow paths along roads can avoid the expense of installing additional stormwater infrastructure, but roads and adjacent properties need to be designed appropriately to provide this function. Stormwater detention areas can make an important contribution to stormwater management by removing the peak flows and allowing stormwater to drain away once the peak flood waters have receded. Maximising the potential for soakage into the ground is useful, as are roof

water collection tanks. The code of practice for subdivision could be amended to encourage greater stormwater management for new developments.

5.2. Stormwater quality

Rainfall landing on urban areas will mobilise a wide range of contaminants — oils and greases from roads and parking areas, litter and urban waste, tiny but significant amounts of metals from roofs and spouting, and an assortment of chemicals and organic matter that wash off hard, impervious surfaces. If the stormwater cannot soak into the ground within a property, it is piped and channelled to the nearest waterway. This could lead to significant deterioration in the quality of the natural waterway. Stormwater from industrial areas can be a particular hazard, but accidental and sometimes deliberate spillages from residential areas can also cause acute pollution problems.

Stormwater and wastewater pipes are often laid underground in close proximity to each other. The potential for both systems to leak, and for stormwater to become contaminated with sewage, is high. This is particularly the case following an earthquake, as both systems can be damaged by ground movement. Regular monitoring of stormwater outfalls provides useful information on the integrity of both systems.

In 2017 a government supported project was initiated by Council's Environmental Science and Monitoring Department to monitor the water quality of the Taylor River as it passes through Blenheim. The Assets and Services Department opted to undertake a complementary sampling programme of the stormwater outfalls to the river. The outcome of the project helps to guide future decisions on pipe rehabilitation and stormwater treatment.

Many of the existing stormwater outfalls are managed under a range of different resource consents. The Blenheim Stormwater Strategy includes a proposal to consolidate the legacy of consents into a new consent structure that meets both the current and foreseeable standards and reflects the land use plans for the town. This process has taken place for Springlands SMAP and will continue for the remaining 10 stormwater areas in Blenheim and then for the rest of Marlborough.

The most recent sub-divisions on the periphery of Blenheim have included specially designed swales (shallow dished drainage channels), porous water courses and a wetland to provide treatment of urban run-off through filtration and entrapment of particulate matter. The cost of installation resides with the developer as a condition of resource consent, however maintenance, renewal and monitoring will become an on-going operational cost to Council and will be included in future budgets. As we gather information and technology in stormwater treatment and retention improves, we are flexible in taking a case-by-case approach in areas of development to ensure our stormwater runoff is not having a negative impact on the mauri of the water.

There are numerous patented treatment systems that can be installed on the reticulation system to intercept contaminants in the urban stormwater. Due to their compact nature they can be an effective treatment for particulate matter to retrofit to existing outfalls.

5.3. Ageing infrastructure

The age profile of the stormwater pipes shows a relatively modest rate of replacement is required over the next 30 years. However, around 48kms of predominantly concrete mains were laid in the 1960s and 70s and these will be reaching the end of their useful life around 2050/60, just on the edge of this planning horizon. This spike has been smoothed within the 30 year planning period. In reality, many of these pipes are not critical and will be able to sustain their useful lives being extended and still meeting level of service requirements.

These predictions are based mainly on the current knowledge of pipe condition and the expected rate of deterioration. As discussed previously, many factors influence the life expectancy of pipes. It will be important to gain more knowledge of the pipe condition over the life of this strategy, so the projections can be refined and plans developed for the replacement in a manageable renewals programme. A programme to CCTV survey wastewater and stormwater pipes was instigated following the 2016 earthquake. The survey has been targeted towards pipes considered to be most affected (mainly earthenware and vitreous clay) in the areas where most damage is expected (Blenheim) and the pipes that will have the most severe consequence of failure (generally wastewater).

6. Options to Respond to Each of These Identified Challenges, and Implications of These Options

6.1. STORMWATER QUANTITY - increased stormwater volumes from subdivision development and climate change

Option	Implications
Upsize infrastructure to accept maximum anticipated flows at the developers' cost.	***Benefits:*** Certainty of outcome. Follows the principle of "user pays". ***Costs:*** Disruption during the installation and escalating costs of development. Downstream consequences as the receiving waters reach capacity and also require infrastructure upgrades.
Upsize infrastructure to accept maximum anticipated flows and devise funding formula to spread costs.	***Benefits:*** Certainty of outcome. Development costs are shared to assist with affordable housing. ***Costs:*** Disruption during the installation. Inequity as ratepayers fund private developments. Downstream consequences as the receiving waters reach capacity and also require infrastructure upgrades.
PREFERRED OPTION Implement a combination of engineering interventions as part of an integrated Stormwater Management Area Plan.	***Benefits:*** Total and peak discharge volumes are optimised. Minimises infrastructure upgrades and impacts on downstream drainage. Good coordination between urban stormwater and the receiving waters. Forms part of a coordinated river catchment strategy. ***Costs:*** Potentially requires set-aside land for stormwater detention. Significant planning, modelling and engineering design require in advance of development.

6.2. STORMWATER QUALITY – ensuring discharge quality of all stormwater is not detrimental to existing water bodies

Option	Implications
REQUIRED Meet the requirements of the National Policy Statement for Freshwater Management.	Council will continue to identify best practice from around NZ and implement these practices to ensure new developments are 'future-proofed' to meet current and anticipated standards. This work will include monitoring current discharge quality and catchment risks and preparing plans for preventative and remedial works.
Status quo. Pro-actively manage potential pollution sources within catchments and respond to pollution incidents as they occur.	***Benefits:*** No additional costs. ***Costs:*** Derogation of responsibilities under the NPSFW. Fails to address long term low-level contamination from urban run-off. Unable to adequately monitor stormwater impact on the receiving waters.
PREFERED OPTION Continue to implement a comprehensive Stormwater Management Area Plan including comprehensive stormwater monitoring regime. Install water quality treatment on new developments and retro-fit treatment to existing stormwater reticulation.	***Benefits:*** Provides good information on the catchment and infrastructure integrity and allows planned remedial works. Proactively protects the receiving water from chronic contamination. Fits with the aims of the Blenheim Stormwater Strategy. ***Costs:*** Additional costs to new developments. Capital investment in retro-fit treatment. Additional operational and maintenance costs of treatment apparatus. Costs of sampling, laboratory analysis and data interpretation of stormwater outfalls.

6.3. AGEING INFRASTRUCTURE – strategy to renew stormwater networks.

Option	Implications
Renew non-critical mains when failure rates become intolerable.	***Benefits:*** Ensures that only pipes that have reached the end of their useful life are replaced. ***Costs:*** Pipe failure will become apparent during storm events and during likely increases of property flooding. Operation and maintenance costs will increase. Unpredictable renewals make budget and resource planning difficult. Unplanned work is more disruptive and expensive than a planned programme of renewals.
PREFERRED OPTION Implement a proactive, planned pipe renewals programme and invest more in both condition assessment technology, field data collection and data management.	***Benefits:*** Targeted investment in planned renewals works. Smooths the renewals investment profile. Avoids unacceptable deterioration of the level of service. ***Costs:*** Additional costs of pipe surveying, analysis and data collection to improve pipe and asset condition assessments, to ensure well targeted renewals and efficient investment. Smoothing the renewals profile may accelerate the investment programme if works cannot be deferred.

7. Most Likely Scenario

The most likely scenario is that the Blenheim Stormwater Strategy will continue to be implemented through the progressive implementation of Stormwater Management Area Plans for the remaining ten management areas. The solutions implemented will be multi-dimensional to the benefit of the urban drainage and receiving waters. The strategic approach will be extended to the other urban settlements (Picton, Havelock, Renwick, Seddon, Spring Creek and other smaller settlements). The aims and objectives of the strategy, and the holistic approach to catchment management, remains a strong framework for future stormwater management.

7.1. and 7.2 Stormwater quantity and quality

It is likely there will be an increasing focus on urban stormwater quality and the impact on the natural receiving waters. As a result, there will be a regular stormwater monitoring programme and a programme of remedial works as Stormwater Management Area Plans are developed. It is likely that the remedial works will include:

- increased management of potential contamination sources such as factories, businesses and commercial sites;
- retrofitting treatment devices into stormwater pipelines;
- stormwater treatment to be built into all new development; and
- increased efforts to raise public awareness and education.

7.3. Ageing infrastructure

The useful service lives of infrastructure assets are considered annually during the valuation process. Condition data collected through CCTV, planned and reactive maintenance across the network validates this data.

Additional resources will be allocated for pipe condition surveys through CCTV in targeted areas and pipe sampling where maintenance takes place. Data is continually gathered to enhance the targeted renewals programme. It is likely that a small but growing pipe renewals programme will be instigated over the next three years, with accelerated growth in the following years, as more information is gained on pipe condition and life expectancy. Plans will be developed to manage the predicted peak in renewals from 2050.

8. Table of Major Projects for this Activity

A brief summary of upcoming projects for this asset is shown below and includes an indication of the main reasons for the projects. Many of these have multiple drivers that span the challenges identified in the earlier sections of this chapter.

The key ‘drivers’ of investment are:

- Growth — investment to provide additional capacity to cope with increased demand for the service due to population growth or increased usage.

- Levels of service — investment to improve the service customers receive.
- Renewals — investment to replace worn out or inefficient assets.
- Discharge Quality –NPS for Freshwater Management and also the Marlborough Environment Plan have requirements for improved discharge quality.

Asset Type	Project	LoS %	Growth %	Renewel %	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Combined														
Connections	New connections across Region		100%		$0.6M									
Blenheim														
Pipelines	Murphys Creek Pipeline Upgrades	35%	65%		$5.2M									
Pipelines	Redwood St - Muller to Stephenson Renewal			100%	$1M									
Pipelines	Stephenson to Stuart St Upgrades	100%			$1M									
Pipelines	Graham St - Stephenson - Boys college - Francis St			100%			$2.5M							
Pipelines	Renewals Pipelines			100%	$1.6M									$0.5M
Renewals Pipelines	Chinamans Drain			100%					$1M					
Renewals Pipelines	Behind Whitney St school			100%							$0.75M			
Pump Stations	Town Branch drain upgrade	80%	20%					$10.1M						
Picton														
Pipelines	Pipelines Renewals and Upgrades			100%	$1.32M									
Seddon & Spring Creek & Renwick														
Pipelines	Renewals Pipelines			100%	$0.65M									

Rivers and Flood Protection

For Marlborough to achieve its vision for the future, the infrastructure must be sufficient and functioning, achievable and sustainable with the resources available.

Flood Protection Goals

- To manage flood hazard and drainage occurring in more developed areas of Marlborough.
- Requirements in different areas have developed according to the history of flood risks, development of drainage improvements and more recently from development due to land use changes.

Introduction

This chapter covers three activities:

- Controlling flood waters from major rivers.
- Management of drains and small streams which receive the stormwater flowing from the urban stormwater network in Blenheim, Picton and other settlements.
- Land drainage, which is the steady, longer term removal of water from low-lying rural land.

Since 2010 significant flood events have occurred in most of the region's rivers and streams including the Rai/Pelorus/Wakamarina catchments, outer Sounds catchments, in the wider Picton/Waikawa/Koromiko area, Wither Hills and Southern Valleys and the main Wairau River and lower Wairau flood plain. The existing flood systems have generally coped well with these events.

The Wairau flood plain's major rivers and stop-banked floodways cover 20,000 hectares of fertile land around Blenheim and is Council's major river control and drainage activity. A review of the Wairau River Floodways Management Scheme is programmed to commence in mid-2024 and expected to take 3.5 years to complete. The work will include updated hydrological and hydraulic assessments, a comprehensive review of existing and historic assets, multi-dimensional risk assessment, scheme development, and financial modelling. The outcome sought is a comprehensive review of the current flood scheme, its future needs in the face of climate change, and development of a strategic plan for its implementation, shaping Council's Infrastructure Strategy.

Expectations of higher standards for flood protection and environmental values

There is a trend for ratepayers to expect that Council will provide a high standard of flood control and drainage throughout Marlborough. The Building Act 2004 and the Resource Management Act 1991 (RMA) also oblige councils to take a more active role in managing flood risks than was required under earlier legislation.

New river control assets may be required for several reasons:

- Areas that would like to benefit from flood protection and are prepared to meet the costs can request this service from Council.
- Land development increases the flood run-off from the land.
- Increased awareness of flood risks as a result of climate change and/or better hydrological flood records.

The long history of flood control and drainage on the lower Wairau flood plain initially had an emphasis on risk management and affordability. However, over recent years the issues involved in river control and drainage have become more complex. Much more regard must now be given to maintaining and enhancing ecological values to meet the requirements of the Resource Management Act (RMA), the National Policy Statement on Freshwater Management (NPSFM) and the New Zealand Coastal Policy Statement (NZCPS).

Council is committed to maintaining high environmental standards for its flood protection activities, particularly as there are many valuable and sensitive ecological sites in the region. Maintaining and enhancing riparian ecological habitats, including whitebait spawning areas and bird nesting habitat, is also necessary.

9. Specific challenges

9.3. Levels of service and increasing demand for flood protection

Blenheim Stormwater Outfall Upgrades

Ongoing development of Blenheim including infill housing and expansion into the recently rezoned areas to the north and west requires upgrade of the stormwater system, including the outfall channels and pump stations.

Work continues on the design and construction of upgrades for the Redwood Street catchment (Town Branch drain, Redwood Street and Snowdens Pond and additional pumping), Murphys Creek and Fultons Creek upgrades (Boyce Street stormwater diversion main, Parker Street stopbanking), Blenheim West (Camerons Creek capacity and environmental issues).

Maintaining the Wairau River Alignment

The stopbanked reach of the Wairau River downstream from the Waihōpai confluence has very powerful and erosive river flows. Bank protection in the form of rock rip-rap armouring and tree planting is required to protect the stopbanks from erosion, especially as a result of floods.

Regular asset inspections have confirmed the need for continued investment in new works and regular maintenance of existing works to ensure a robust flood protection system is in place. Ongoing maintenance and upgrade work is required downstream to both the Diversion and Wairau river mouths.

A key project for this plan is completion of the Upper Conders programme of works, including stopbank realignment, groyne retreats, intermediate groynes and stopbank raising. The aim of this work is to maintain the river alignment and so ensure the security of the adjacent stopbank and irrigation intake infrastructure.

Stopbank Upgrades

The primary stopbanks along Peninsula Road, Spring Creek, require repair and upgrade to ensure their ongoing security and that of the Spring Creek township that they protect. Design work is underway on this critical project with construction work to commence in July 2025, and completion in FY2026-27, subject to funding.

Ongoing stopbank upgrades are planned for the Taylor River through Blenheim, lower -Ōpaoa River and lower Wairau River. The stopbank upgrades are to bring older sections of stopbank to current structural standards, to provide agreed flood capacity and through Blenheim where possible shift sections of stopbank from private property into the Taylor River reserve. Likely climate change impacts will be included in upgrade designs where appropriate.

Stormwater Flows in Blenheim and Picton and the effects of new Urban Development

The Building Act 2004 requires the floors of new buildings to be protected in a 1-in-50 year return period flood event. The main challenge related to urban areas is to ensure that the system of drains, natural watercourses, pumping stations, and floodgates can adequately cope with the stormwater runoff that occurs in a 1-in-50 year return period flood.

This level of protection from stormwater flows is being achieved for many, but not all of the dozen watercourses in Blenheim and Picton.

Residential, industrial and commercial development is resulting in more impermeable (hard) surfaces, which reduces absorption of rain by land and increases the amount of rainfall runoff into the small rivers, streams and drains via stormwater pipes. This is occurring in all urban areas, especially Blenheim, Picton and Renwick. The Riverland's industrial area is also expanding rapidly and includes the conversion of rural land (zoned industrial) to industrial land.

Wairau Land Drainage Areas and Land Use Changes

The Wairau drainage area covers 8,000 hectares of low lying floodplain, which is drained by 200km of minor watercourses and 18 pumping stations. This land is to the east of Blenheim and O'Dwyers Road. Council is committed to avoiding more than 2-3 days of ponding occurring in paddocks in these drainage areas.

The drainage system consists of a mix of deliberately excavated drains and natural watercourses with flood gated culverts into the major rivers and a series of pumping stations.

The current drainage network was last formally reviewed in 2015 and will be reassessed as part of the Wairau River Floodways Management Scheme

review. This 2015 review recognised there has been significant intensification of land use and subdivision, a trend towards viticulture and an expectation of a generally high level of service since the Wairau Scheme was established in 1960.

An extra 15.3km was included in the managed network of drains following the 2015 review. This provides a drainage outfall to all rural land parcels greater than one hectare within the Lower Wairau Drainage Scheme area.

Sixty percent of the land within the Lower Wairau designated floodway is owned by Council while 40% remains in private ownership. Private land owners are required to use the land in ways that are compatible with floodway management. As viticulture land becomes more scarce, there are likely to be further requests to plant private land within key Wairau floodways (especially the Ōpaoa, Wairau and Taylor River floodways), and requests for inclusion of these areas within the 1-in-100 year standard of the Wairau flood plain. Where 'compatibility' cannot be agreed there is a land purchase budget each year for acquisition of private land. The budget has not increased.

Viticulture is progressing westwards up the Wairau Valley. Land above the Waihopai confluence has a lower standard of flood protection. A rate review within the term of the Infrastructure Strategy may see further requests for an increased level of service in the upper Wairau Valley. The strategy assumes that the current level of service remains materially unchanged and the rate review will align the funding and service levels.

Most adjacent vineyard owners above the Waihopai confluence have now recognised that it is in their interest to leave an adequate fairway to provide for flood capacity and to undertake edge protection works, which are typically some combination of rock and willow planting to provide a good buffer between the active channel and productive vineyards. Council continues to assist some property owners with the design and construction of new works, where the works are to be owned by the landowner.

Vineyard developments also appear to be causing increased runoff on the gently sloping, moderately impermeable land of the southern valleys to the south of New Renwick Road and State Highway 63 to the west of Renwick. This will need to be managed with larger culvert sizes and increased maintenance of the drainage channels.

9.4. Environmental expectations

Weed Control

The blocking of drainage and stormwater channels by thick aquatic and terrestrial weeds is a major maintenance issue. Weed growth can reduce the hydraulic performance of the channels by a factor of 10, reducing the drainage efficiency and increasing the flood risk to nearby properties. Regular annual removal using herbicide or by excavation is essential.

The spread and extent of weed is increasing and new weeds regularly arrive in Marlborough. Conversely, there is an increasing expectation from the public of more weed removal and there is generally increasing environmental (resource consent) constraints on the manner in which aquatic weed removal is carried out.

The use of herbicides is a key tool for maintaining both the drainage network and a number of key streams infested with aquatic weed. . In addition, Council's weed-cutter boat is being replaced in September 2024 following its successful commissioning.

Impacts of Flood Gates on fish Migration

A total of 249 gravity outlets have been installed under river stopbanks. Simple floodgates (or flap valves) are constructed on the outlet of these culverts to prevent water flowing back from the river. These floodgates, while essential for preventing the backflow of floodwater, adversely affect movement of whitebait and other fish into the drainage network.

Pukaka Quarry Extension

The Council owned Pukaka Quarry is a key source of rock rip-rap for river protection works on the Wairau River and tributaries, and clay for stopbank upgrades and repairs. The quarry also supplies a variety of aggregates to the contracting market as a by-product of the rock production.

With the quarry extension now complete, planning work will begin in the FY2025-26 for future development needs of this strategic asset.

9.5. Climate change

Managing the Impact of Coastal Storm Waves and Sea Level Rise on Drainage

The lower Wairau flood plain includes several thousand hectares which are less than 2 metres above sea level.

Sea level rise will impact on coastal erosion and drainage of this low-lying farm land. The effects and consequences of sea level rise will be factored into the Wairau River Floodways Management Scheme review to ensure the system is resilient in the face of future uncertainty.

The marine storm wave forces are a very important factor. In the past they have formed a sand bar, typically extending a kilometre to the north. The bar is formed by a combination of marine forces, tidal flows into the Vernon Lagoons and river flows from the lower Wairau, and to a lesser extent the lower Ōpaoa. A training groyne at the mouth of the Wairau River has helped to maintain an open channel to the sea and scour any sand accumulation. There is some evidence of increased accretion at the mouth of the Lower Ōpaoa. The situation continues to be monitored and may require additional dredging. If required, dredging will be a significant maintenance cost.

Potential Impacts of Climate Change on Flood Flows

Climate change will also alter the frequency and severity of flood events. Current advice to Council is that by 2050 a given 100 year or 1% AEP flood will increase in size by 10 – 15%. That means the current 5500 cubic metres per second (cumecs) Wairau flood could increase to over 6000 cumecs. However, flood flows are likely to be variable — in some catchments they may actually decrease, while increasing in other areas.

The various scenarios will be factored into the Wairau River Floodways Management Scheme review to ensure the system is resilient in the face of future uncertainty.

9.6. Legislation

Dam Upgrades

The recently enacted Building (Dam Safety) Regulations 2022 comes into effect in August 2024, raising compliance standards for dam owners and operators. For Council's Taylor Dam, this requires a higher standard of dam safety assurance followed by a series of asset upgrades that will be put forward for funding in the 2027 LTP budget.

10. Options and Implication

10.3. Levels of service and increasing demand for flood protection

Level of flood protection for the Wairau floodplains

Option to address it	Implications of the options (financial and non-financial)
PREFERRED OPTION Maintain and upgrade the floodways passing across the main Wairau flood plain to provide a capacity for flood sizes of up to a 1-in-100 year return period for the Wairau River and other major flood plain rivers of the Lower Wairau, Wairau Diversion, Ōpaoa, Taylor, Omaka, Riverlands Co-op and others.	***Benefits:*** Recognises agreements reached through the Wairau Rivers Floodway Management Plan in 1994. Certainty that building and land use planning can proceed to an agreed standard. ***Costs:*** Financial costs of ongoing upgrades outline budget to 2034 of $20.8M. Environmental impacts of river control works.
Maintain the existing level of protection, but do not increase the level of protection to meet a 1-in-100 year return period if the magnitude of floods increases as a result of climate change.	***Benefits:*** Avoids the need for flood protection upgrade works. ***Costs:*** Community consultation and consent required. Uncertainty as to level of flood protection and risks. Damage to property and crops. Possible reputational damage.

Wairau land drainage areas and land use changes

Options to address it	Implications of the options (financial and non-financial)
Further extend the land drainage areas on an adhoc basis when requested to do so by landowners.	***Benefits:*** Responds to land use changes in a timely way. ***Costs:*** Does not provide for integrated solutions within a catchment. Difficult to implement a fair cost recovery plan.
PREFERRED OPTION Scheduled land drainage reviews, to consider extensions of the land drainage area integrated with rate review.	***Benefits:*** Managed and cost-effective approach for Council. Increased land productivity and subsequent indirect benefits to the region from greater flood protection. ***Costs:*** All costs to be borne by benefitting properties through the classified rate.

10.4. Environmental expectations

Weed Control

Options to address it	Implications of the options (financial and non-financial)
Use of herbicide	***Benefits:*** Cost-effective. Manual clearance is between 6 and 10 times more expensive than herbicide. Costs are likely to increase as landowners demand improved disposal of cleared weeds. Gradual die-back of targeted weeds has less impact on native flora and fauna. ***Costs:*** Additional cost of environmental impact monitoring of herbicides on aquatic life. Ensure safe working practices are employed. Possible but unknown environmental effects of chemical residues.
Manual clearance	***Benefits:*** A conventional mechanical removal system with known environmental impacts. ***Costs:*** Disturbance of river and stream beds and impacts from sedimentation. More expensive. Damage to stream profile leading to increased 'canalisation'.

10.5. Climate change

Potential Impacts of Climate Change on Flood Flows

Options to address it	Implications of the options (financial and non-financial)
PREFERRED OPTION Undertake a comprehensive review of the Lower Wairau Flood Protection Scheme including climate change scenarios and to consult with the community on both the desired levels of flood protection and their willingness to pay.	***Benefits:*** Community involvement in decision-making. Retains ability to adapt to changes over time. Include the most recent climate change projections and high quality hydraulic modelling. Decision-making using high quality information. ***Costs:*** Consultancy costs to perform analysis and modelling. Potential delay in decision-making. Financial and practical resources will be required for monitoring and for adaptation to changing flood flows and frequencies of flood events.
Accept lower levels of flood protection over time in areas where climate change increases the magnitude and frequency of flood events.	***Benefits:*** Recognises ongoing and increasing nature of climate change. ***Costs:*** Flood damage to private property and public infrastructure. Loss of some existing land uses over time. Costs of managed retreat. Possible reputational damage from flood damage.

11. Most Likely Scenario

Council will review the core Wairau River Floodway Management Plan and take climate change into account as well as the 25 plus years of additional flow data records collected since the plan was originally prepared. Once the flood risk data has been updated Council will undertake a major public consultation exercise with the key stakeholders on an updated plan for the key Wairau works through to 2050. The objective is to gain more understanding of the desired level of service and willingness to pay for future flood protection works.

Current thinking is that relatively minor upgrades will be required to preserve existing levels of service to about 2050 but after that time other options, including accepting increased flood risk or retreat from some very low lying areas, may need to be considered.

This plan is likely to be implemented through a range of activities including building and maintaining stopbanks, river diversions, detention dams, stopbank erosion protection (rock and trees), river channel clearing, channel excavation, channel training, and use of flow control gates.

A climate change allowance is already built into all current Blenheim stormwater design and planning.

Over the longer term, further investigation of upgrading costs and also of possible funding sources for these upgrades is required as a part of the planned review of the Wairau River Floodway Management Plan followed by discussion with the affected community.

12. Major Projects For This Activity

A brief summary of upcoming projects for this asset is shown below, and includes an indication of the main reasons for the projects. Many of these have multiple drivers that span the challenges identified in earlier sections of this chapter.

Asset type	Project	LoS %	Growth %	Renewel %	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Wairau														
Rock & Gabion Protection	Edge works			100	$0.1M		$0.1M		$0.1M		$0.1M		$0.1M	
Rock & Gabion Protection	Diversion edge works			100		$0.4M			$0.2M					
Rock & Gabion Protection	Edge works	100					$2.05M				$1.8M		$1.2M	
Stopbanks	Lower Wairau stopbanks			100				$0.2M		$0.5M				
Stopbanks	Delays			100				$0.9M						
Stopbanks	Peninsula Road repair & upgrade			100		$8.7M								
Ruakanakana Creek														
Drainage Channels	Lower terrace upgrade		100				$1.1M							
Culverts, Gates, Concrete Walls	Waihopai control gate upgrade			100		$0.4M								
Omaka														
Rock & Gabion Protection	Edge works			100	$0.4M				$0.1M					
Stopbanks	Stopbank upgrades			100					$0.8M					
Opaoa														
Boat	Weedcutter boat replacement			100	$0.23M									
Stopbanks	Waipuna St			100				$0.5M	$0.15M		$0.15M			
Stopbanks	Stopbanks	100				$0.32M			$0.32M	$0.32M				
Drainage Channels	Dungeys Gully upgrades	56		44		$0.1M								
Taylor														
Dams	Taylor Dam			100			$0.5M							
Rock & Gabion Protection	Edge works/bank protection			100	$0.74M									
Land purchases														
Land	Land purchases		100		$2.0M									
Wither Hills														
Drainage Channels	Wither soil conservation works			100	$0.4M									
Picton/Waikawa														
Rock & Gabion Protection	Rock and Gabion protection	100			$0.27M									
Blenheim														
Pump Stations	New Pump stations		100		$0.61M			$0.15M		$0.15M		$0.15M		$0.15M
Drainage Channels	Town Branch drain upgrades downstream	100			$3.5M									
Drainage Channels	Fultons Creek	100					$0.3M							
Drainage Channels	Town Branch drain upgrade		100					$0.3M						
Rural														
Pump Stations	Pump stations	100			$1.04M									

Community Facilities

For Marlborough to achieve its vision for the future its infrastructure must be sufficient and functioning at the same time as being achievable and sustainable with the resources available.

Community Facility Goals

- Enhance the quality of the environment through the establishment and maintenance of reserves, parks, open spaces, libraries, museums, cemeteries, public conveniences, halls, trees etc.
- Promote quality lifestyles and the desirability of Marlborough as a place to live and visit.
- Provide a wide range of opportunities and facilities for recreation from passive through to active.
- Invest in, and planning for, infrastructure to meet social and economic wellbeing and health of our communities.

Introduction

Council has included Community Facilities within the Infrastructure Strategy. There is no statutory requirement to do so in the Local Government Amendment Act of 2014. However the infrastructure that contributes to Community Facilities has been included as it has a reasonably significant value both in terms of their financial value and their contribution to community wellbeing. There are also many smaller assets that individually are less valuable but when grouped together are significant. The asset groups included are sports stadia, community halls, libraries, cemeteries and memorials, playgrounds and public conveniences.

The assets included in Community Facilities are quite diverse in the nature of the service they provide and spatial location around the region. Whilst they are subject to many of the key themes of the strategy some services provided are of a more discretionary nature.

Marlborough has an increasingly ageing population while at the same time becoming more ethnically diverse. As a population ages, sporting participation preferences are likely to change. Generally speaking, older residents do not participate in higher levels of moderate to vigorous physical activity. Another significant change is many older adults have the ability to recreate during week days, which is often a period of time where sporting facilities are under-utilised. The increasingly ethnic diverse profile of Marlborough also brings opportunities for residents to participate in a more diverse range of activities. This diversity may place additional pressure on Council to provide facilities for a wider range of activities as they emerge.

The **affordability of renewals** may also be a challenge for some groups of assets, particularly if there is a demand for an improved **level of service** from the replacement. Although there are some newer facilities in the district, the network of sporting facilities is generally ageing. Council has looked at increased investment in the network recently, including the development of the Endeavour Sports Hub and the hard courts and sports hub at Lansdowne Park. The Picton Library and the recently completed Blenheim Library include a degree of upgrade to meet an increased level of service demanded by customers.

Demand for public services can also decline over time. Technological changes, changing trends and personal choices about activities people take part in, and how they take part in can result in facilities being under-utilised. Similarly it has been assumed that the various community halls will not be replaced when they reach the end of their useful life. Money has not been collected to fund their depreciation and renewal affordability could be a challenge. It is, therefore, important that facilities can adapt to meet changing needs and are sustainable, including financially.

Climate change and **resilience** to natural hazards may also impact on some of the groups of Community Facilities. For example coastal tracks and coastal reserves may be subject to increased storms, rising sea-level and the effects of tsunami. There will need to be some modifications to sports facilities to maintain them through more severe weather events – drought resistant turf, irrigation and improved drainage. These are likely to be resolved through incremental changes that can be incorporated into operational management plans with lower financial impact.

Recreational Facilities

The underlying story for sports and recreational facilities, parks and reserves is that the major influences of change over the next thirty years are not likely to have a shock impact that will require major capital investment. Change is likely to be gradual and at least partially compensated by other contemporary changes. The other prevailing trend is that while levels of

service may alter with changing community demands and operating environment, the overall standards are unlikely to decline. If this projection is correct, the operational and maintenance costs will be at least comparable with current expenditure.

The major sports stadia in Marlborough - Stadium 2000 and Regional Aquatic Centre, the BDO Spicers Renwick Sports and Events Centre, Picton Endeavour Park Pavilion and the Lansdowne Park Sports Hub in Blenheim have a combined insurance value of $95 million. For the other Pavilions the total value is $12.9 million. The major stadia are relatively new and have a long-life expectancy. The Sports Facilities Strategic Plan 2021 has been developed to understand the current and future facility needs and aspirations of sporting codes in Marlborough. The plan identifies what changes, updates or additions could be made to the Council's sports facilities network over the next ten years. To date sharing of common facilities and synergies between codes helps to promote sports, save costs and future-proof the facilities to meet changes in community demand.

Stadium 2000 has undergone strengthening works to improve its resilience to earthquake as have other of Council's community facilities. It is important to note that the main aim of building strengthening is to prevent catastrophic failure and to allow people to escape. It does not mean the facility will be serviceable after a large earthquake. Council has insurance to help manage the risk but the insurance excess can still be considerable.

Community Halls

There are around 16 community halls, managed by Council, located in many of the small settlements from D'Urville Island to Ward. Many of them are old but are still a significant focus for the community with a high number in rural locations predicted to have declining populations in the future.

The halls have an important role to play with many being the only public facility available in isolated communities. They may have limited use but they have strong cultural and nostalgic linkages to the community. Some are more valued for their heritage and future potential as much as their current practical utility. Six have been identified as Civil Defence Community Response Centres.

Council policy is not to fund depreciation of the community halls and an assortment of management practices have evolved by individual communities. Not all structures have been assessed for earthquake resilience. Strengthening works would need to be incorporated into a cohesive management plan.

Parks and Reserves

Council has three premier parks (Pollard Park, Seymour Square and Picton Foreshore) and 220 parks and reserves with 81 neighbourhood parks. The premier parks not only provide a service for the local community but, increasingly, an attraction for visitors. Neighbourhood parks provide playground areas which are likely to become more frequented as property section sizes decrease. For these reasons the level of service for these assets is likely to be maintained into the foreseeable future.

Other Facilities

Walkways and Cycleways - Similarly, walkways and cycleways are increasingly used by visitors to the area. Tourism is an important and growing part of the economy. There will be continuing demand to expand and upgrade the facilities provided and maintain a high level of service for the benefit of local community and visitors. A recent example is the Whale Trail network.

Public Conveniences - Council maintains 71 public toilet facilities across the district with sixteen of those facilities receiving significant refurbishments since 2018. The upgraded facilities have been in areas with highest demand based on user numbers and the proximity to state highways. Smart technology has also been installed as part of these upgrades to support more efficiency with maintenance and wastewater systems and providing accurate user data and trends.

The infrastructure across many of the smaller more rurally located sites while basic, is meeting current levels of services. These sites have also received upgrades and modernisations to ensure they continue to meet user demand.

The community expects public conveniences to be maintained to a high level and any change in this level of service may not be acceptable.

Libraries

The new libraries in Picton and Blenheim are modern buildings designed to the latest standards with updated fittings and facilities. The main

infrastructure is designed and built to last beyond the 30 year strategy but advances in technology may make some of the facilities obsolete or require significant re-investment. It is difficult to predict the implications of new technology but the strategy ensures the new structures are as flexible as possible to adapt to changing service requirements in a way that will allow the long term durability of the assets.

Museums and Cultural Facilities

The main Marlborough museum is located at Brayshaw Park and several smaller museums and art galleries at Havelock, Renwick, Picton, etc. A new art gallery will also form part of the new Blenheim Library complex. There is unlikely to be a major shift in the strategic management of these facilities. However, a change in level of service may be anticipated to embrace modern technology. Museum visitors now expect inter-active displays and high quality presentation materials. Conversion of archive material to digital formats and other operational costs can be expected. The smaller facilities may face premature technical obsolescence or expensive upgrade.

The cultural significance of the Wairau Bar settlement in New Zealand history is becoming more apparent as more archaeological evidence is discovered. There may be increasing pressure for investment in a permanent facility to recognise and display the artefacts for the site.

Cemeteries and Memorials

The Council administers eight cemeteries with a combined area of around 26 hectares. Population projections show the proportion of the population over 65 is likely to increase from its current level of around 20% to 35%.

Increased demand for burial space may require additional land purchases and development investment and operational costs. However, there is evidence of a trend towards greater cremation. The introduction of the Cemeteries Bylaw in 2017 has provided the option to pre-purchase up to two cemetery plots per application. Management plans have been developed for all of the cemeteries to assist future planning. Changes are expected to be accommodated without significant investment aside from a need to consider the purchase of additional land.

The community expect cemeteries and memorials to be maintained to a high standard. Deterioration to this level of service is unlikely to be acceptable.

Options and Implications

An options and implications table has not been included for Community Facilities.

Relatively small changes will be gradually deployed to implement further upgrades and meet changes in demand. The new infrastructure that has recently been completed or is under construction, libraries and sports hubs, has been deliberately designed to be as flexible as possible. Changing demand patterns, demographics of the community and new technologies can be accommodated in the structures that are planned or have been completed.

Project title	**Approximate date required**	**Estimated cost $m**	**Reason for project**	**(% weighting)**	
			Growth	**Level of Service**	**Renewal**
Blenheim A&P Park Pavilion	2025/2028	$5.9M	0	50%	50%

General Assumptions and Risks

Made in preparing financial information (generally up to years 11 to 30):

1. Capitalised overheads have been added to capital spending in years 11 to 30 at the average rate they are applied in the budget ten years, by Activity.

2. The capital inflation rate applied to years 11 to 30 is BERL's forecast LGCI for the year ending June 2034, i.e. 2.0%

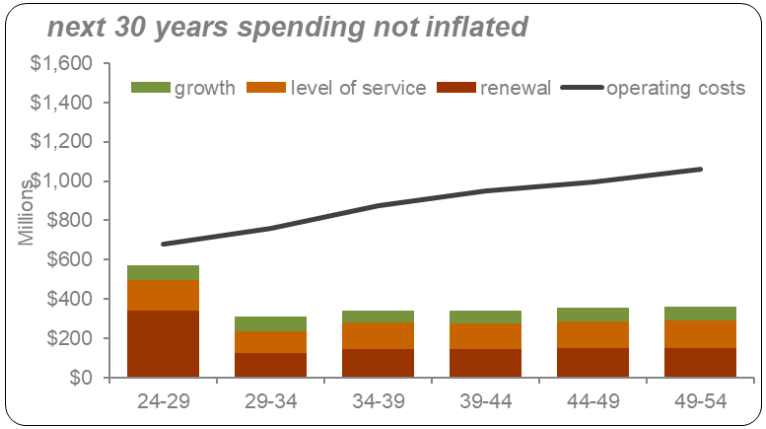
3. Additional operating costs, including insurance and depreciation, have been estimated in relation to growth and level of service related capital projects in years 11 to 30.

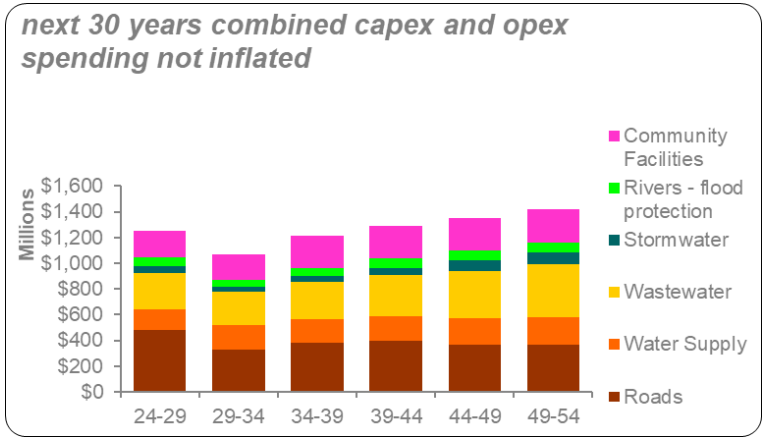
4. For renewals capital expenditure in years 11 to 30 it has been assumed that any additional costs will be more than offset by a reduction in related maintenance and no operating costs adjustment has been made; this may lead to an immaterial overstatement of operating costs towards the end of the planning horizon.

5. Expected renewals have been based on the estimated useful life of current and planned assets have been forecast to utilise availability of operational and financial resources; renewal have generally not been forecast earlier than the engineering trigger point.

Part Three — Financial Summary

The capital work presented in section two represents total infrastructural capital spending of $2.28 billion over the next 30 years; with associated operating expenditure totalling $5.32 billion – to operate and maintain existing and new infrastructural assets. The operating expenditure is spread fairly evenly across the years whereas the capital expenditure is more concentrated in the early years.





The preceding chart shows the total infrastructural spending (capital and operating combined) by Activity Group.

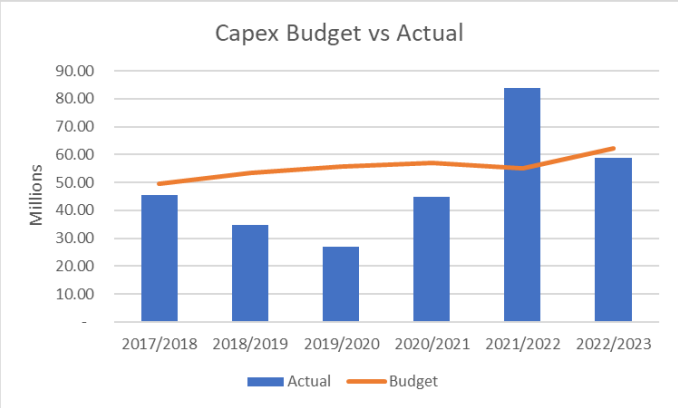
Given the constant challenge to provide the required services in an affordable manner, and the demand on internal and external project management and construction resources, the renewals expenditure based on expected useful life has been budgeted to "fill the gaps" between the major projects.

In preparing its LTP, Council has to inflate the project cost estimates, also added into the budget are approximately $1.8 million of planning and development costs which will be capitalised. The same methodology has been applied throughout the thirty years of this financial summary.

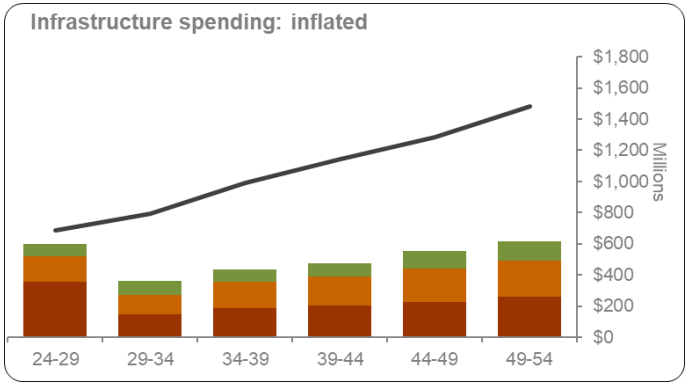
Preparing the LTP and this financial summary also involved consideration of factors which may delay the proposed timing of projects and have a significant impact on the overall capital programme.

Over the past five years actual capital expenditure has ranged from $34.71 million in 2018/19 to $83.8 million in 2021/22 with an average of $49.10 million; the projection for 2023/2024 is over $74 million. In all but 2021/22, the actual spending was below budget, often significantly. Capital project timing has been delayed due to:

- finalising community consultation;
- obtaining land access;
- obtaining resource consents;
- the availability of external professional expertise;
- receiving acceptable contract price and contractor availability.



As described throughout the strategy there are many projects and some demand for improved services from all of the core activities. However, it is unlikely that projects will rapidly overcome the obstacles described and accelerate much beyond an annual expenditure of $85 million. It has therefore been decided to limit capital financing to $85 million plus Sounds roading per annum for the first three years of the LTP.



The resulting "inflated" budget is for total capital expenditure of $3.034 billion and operating expenditure totalling $6.4 billion. The inflated capital spending is:

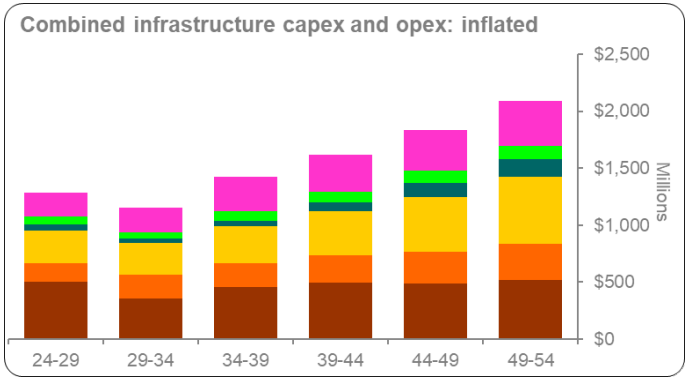
- 18.5% to service forecast growth;
- 36.2% to improve levels of service (strongly influenced by wastewater and also by water supply);
- 45.3% to renew assets as they reach the end of their lives.

Council's Financial Strategy sets out the strategic financial direction; the external and internal factors expected to have a significant impact (in particular over the next ten years), and the approaches used to fund this scenario in a prudent manner.

The strategy identifies that in general:

- growth driven capital expenditure is funded by development contributions;
- capital expenditure to increase levels of service, e.g. improve quality of drinking water supply, is funded by borrowing;
- renewals capital expenditure is funded from revenue - rates and charges - set to recover depreciation expense and accumulated until spent. This funding source emphasises the importance to Council of continually fully funding depreciation on infrastructural assets.

In practice any funds available are used before new loans are drawn down, to avoid paying interest unnecessarily; excepting development contributions which are only ever used to fund growth projects.



Activity Graphs

The following graphs show, for each Activity:

Budgeted expenditure over the next ten years, i.e. as included in the LTP, year by year:

- inflated
- not inflated

with the same scale for both graphs.

Forecast expenditure over the next thirty years, taking the first ten years from the LTP and showing spending in five year blocks:

- inflated
- not inflated

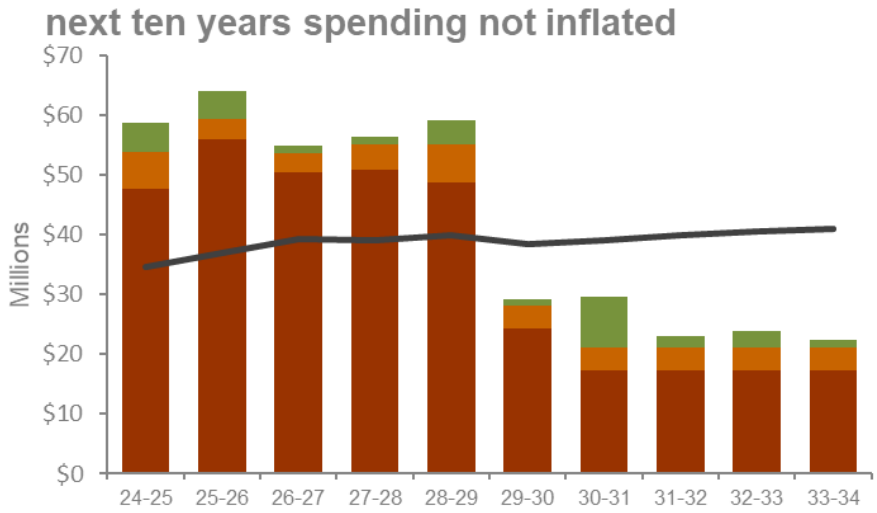
with the same scale for both graphs

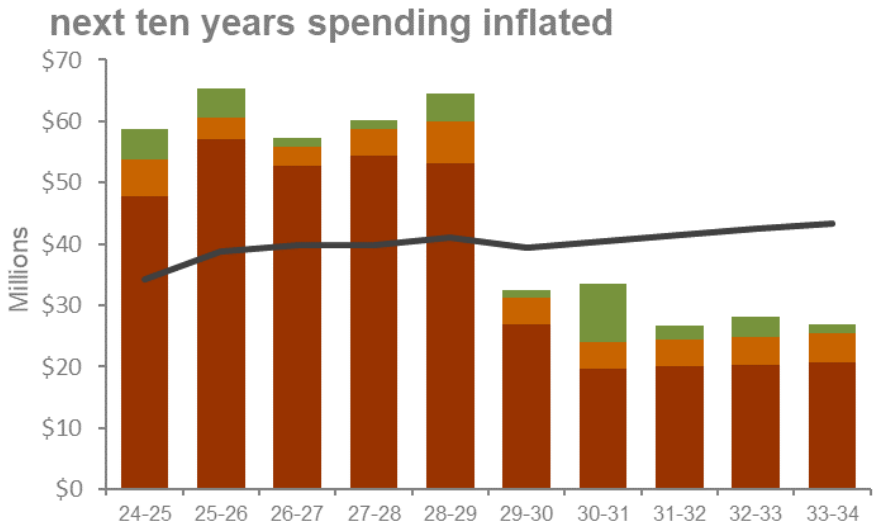
All graphs show:

- total operating expenditure
- capital expenditure separately identifying renewals, growth driven and level of service driven expenditure

Key:	
Capex to:	
cater for growth	
increase level of service	
renew existing assets	
Total operating expenditure	

Roading


next ten years spending not inflated
Millions
$70
$60
$50
$40
$30
$20
$10
$0
24-25
25-26
26-27
27-28
28-29
29-30
30-31
31-32
32-33
33-34


next ten years spending inflated
Millions
$70
$60
$50
$40
$30
$20
$10
$0
24-25
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28-29
29-30
30-31
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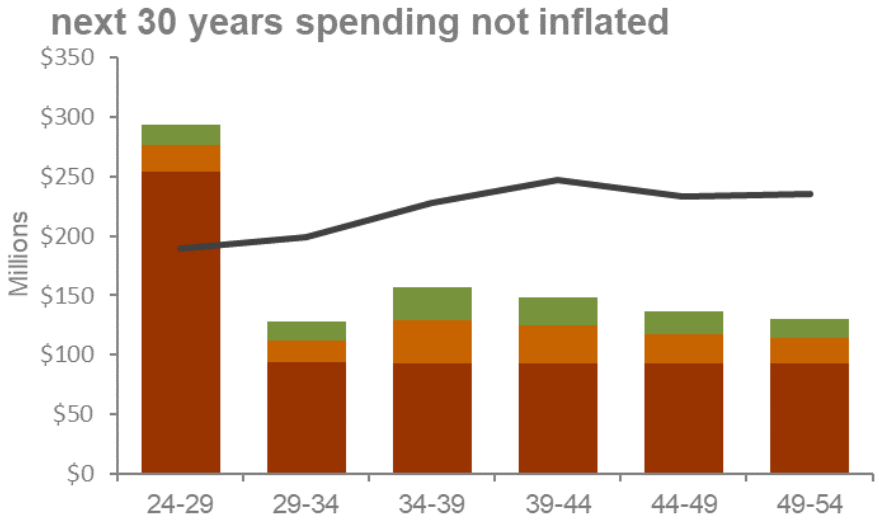
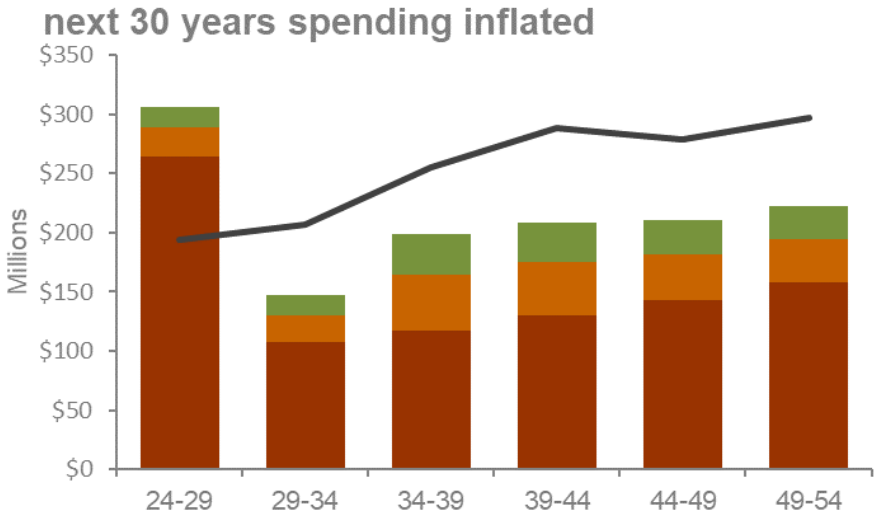
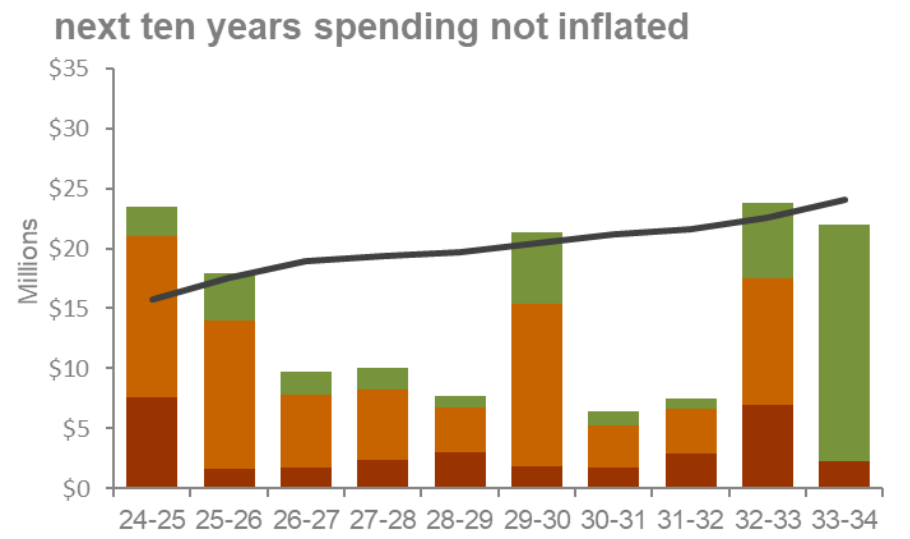
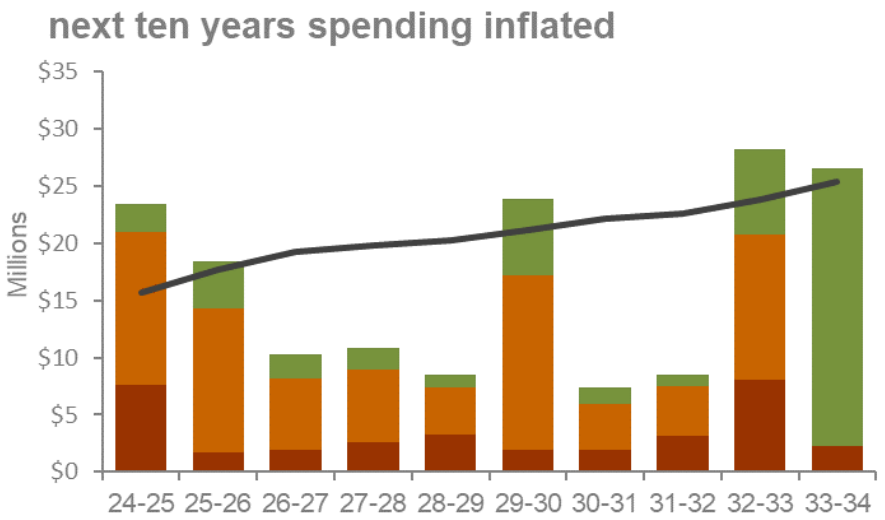
32-33
33-34

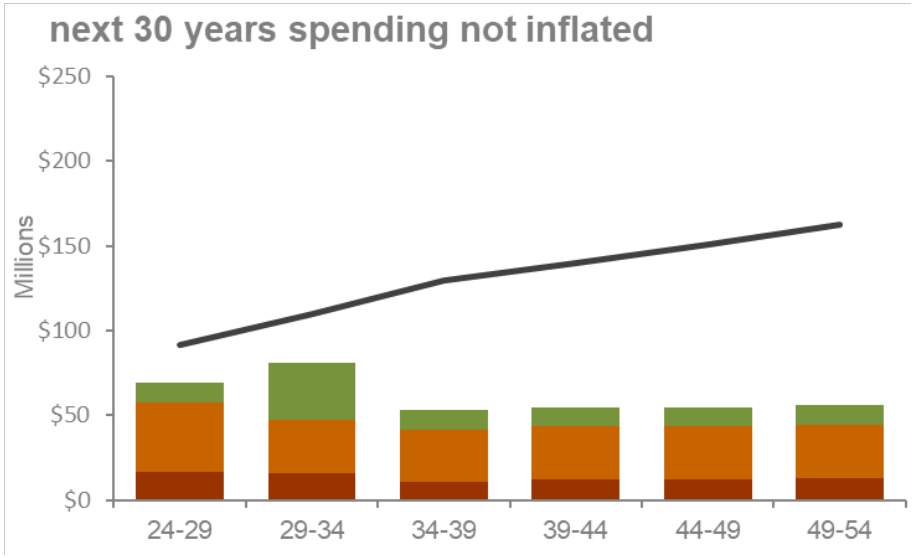

next 30 years spending not inflated
Millions
$350
$300
$250
$200
$150
$100
$50
$0
24-29
29-34
34-39
39-44
44-49
49-54

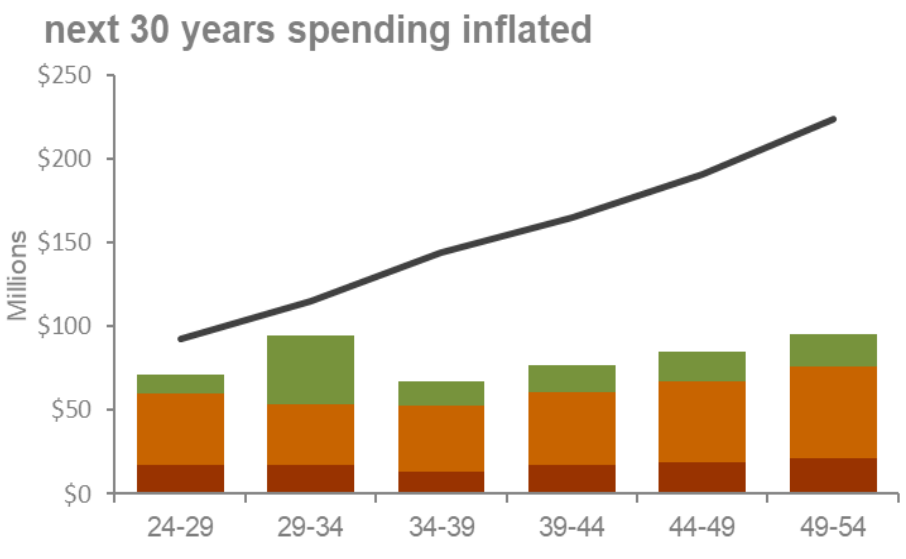

next 30 years spending inflated
Millions
$350
$300
$250
$200
$150
$100
$50
$0
24-29
29-34
34-39
39-44
44-49
49-54

Water Supply

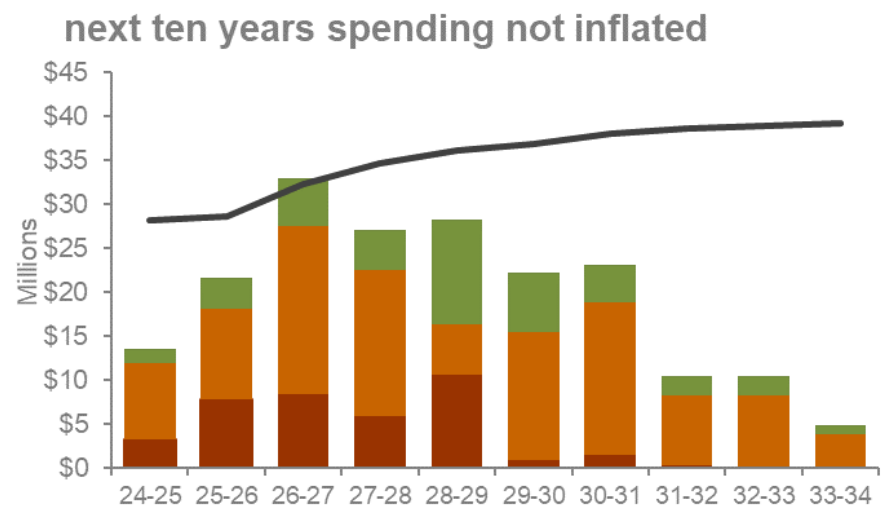








Wastewater


next ten years spending not inflated
Millions
$45
$40
$35
$30
$25
$20
$15
$10
$5
$0
24-25
25-26
26-27
27-28
28-29
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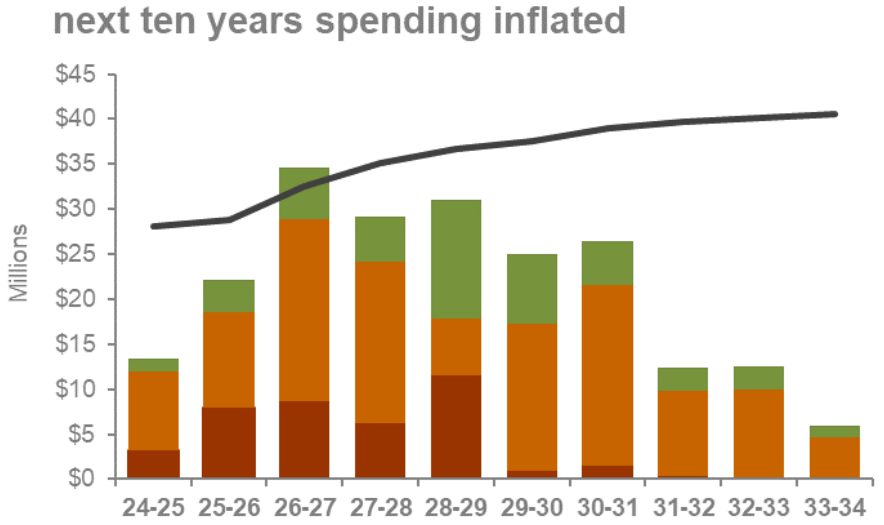
next ten years spending inflated
Millions
$45
$40
$35
$30
$25
$20
$15
$10
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$0
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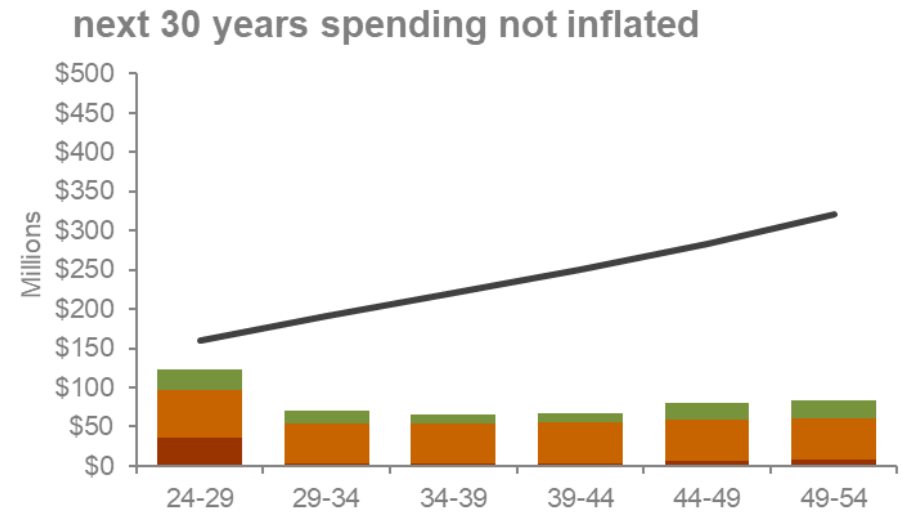
next 30 years spending not inflated
Millions
$500
$450
$400
$350
$300
$250
$200
$150
$100
$50
$0
24-29
29-34
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39-44
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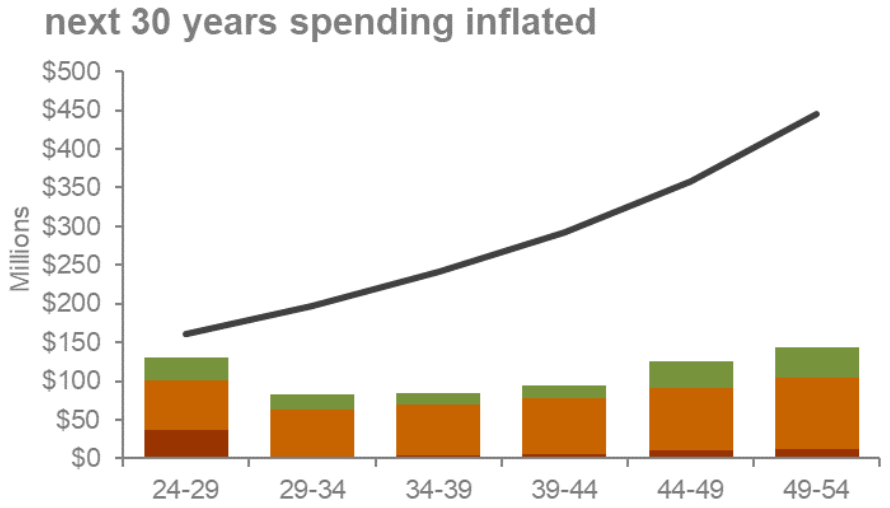
next 30 years spending inflated
Millions
$500
$450
$400
$350
$300
$250
$200
$150
$100
$50
$0
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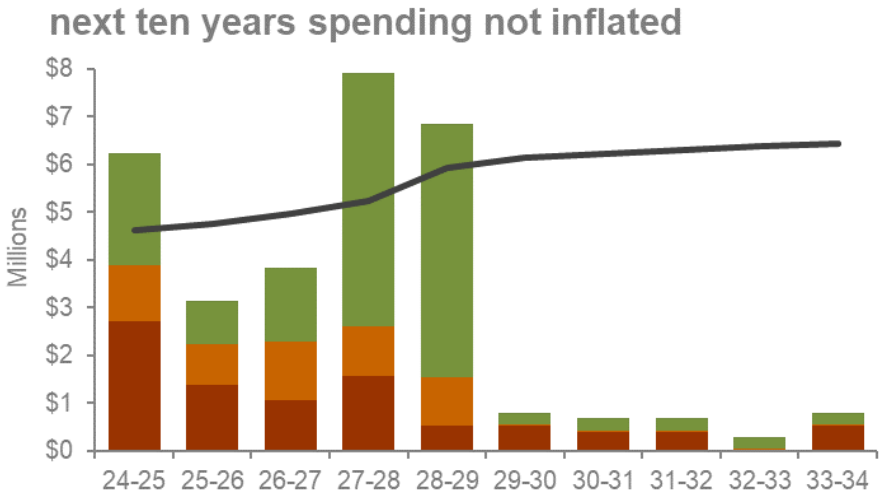
34-39
39-44
44-49
49-54

Stormwater


next ten years spending not inflated
Millions
$8
$7
$6
$5
$4
$3
$2
$1
$0
24-25
25-26
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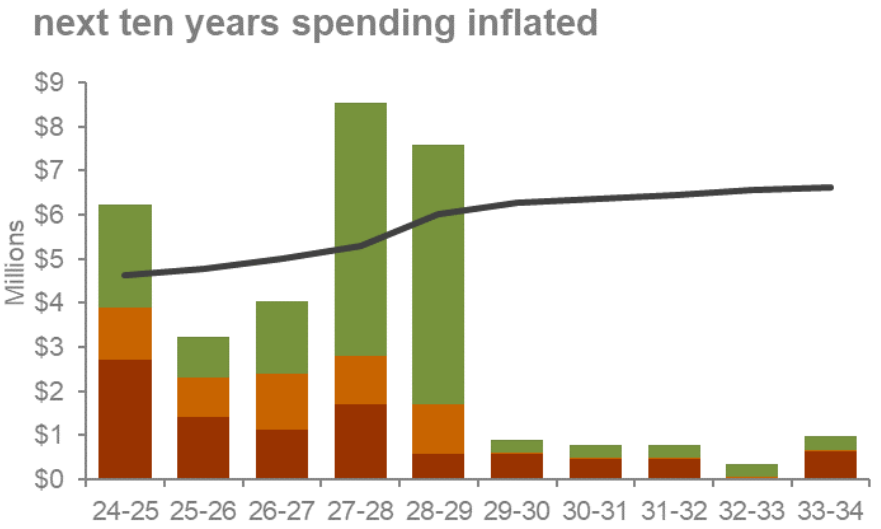
next ten years spending inflated
Millions
$9
$8
$7
$6
$5
$4
$3
$2
$1
$0
24-25
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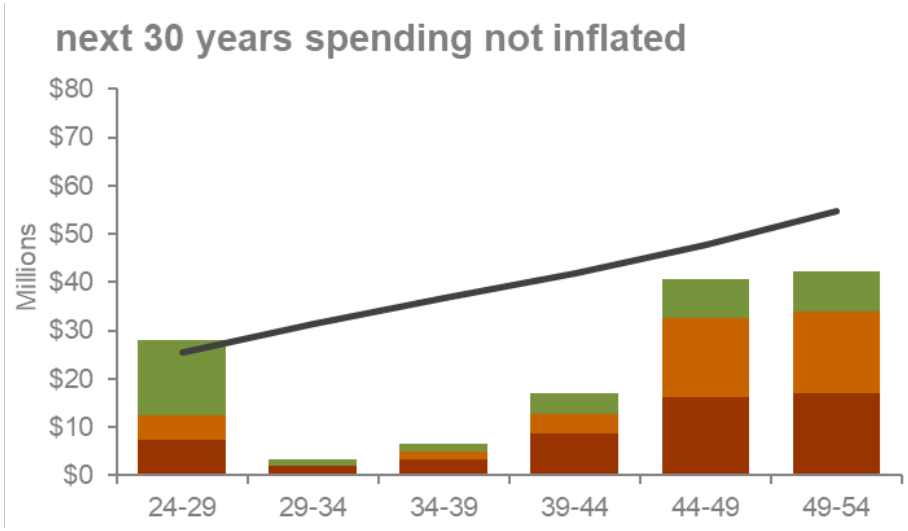
next 30 years spending not inflated
Millions
$80
$70
$60
$50
$40
$30
$20
$10
$0
24-29
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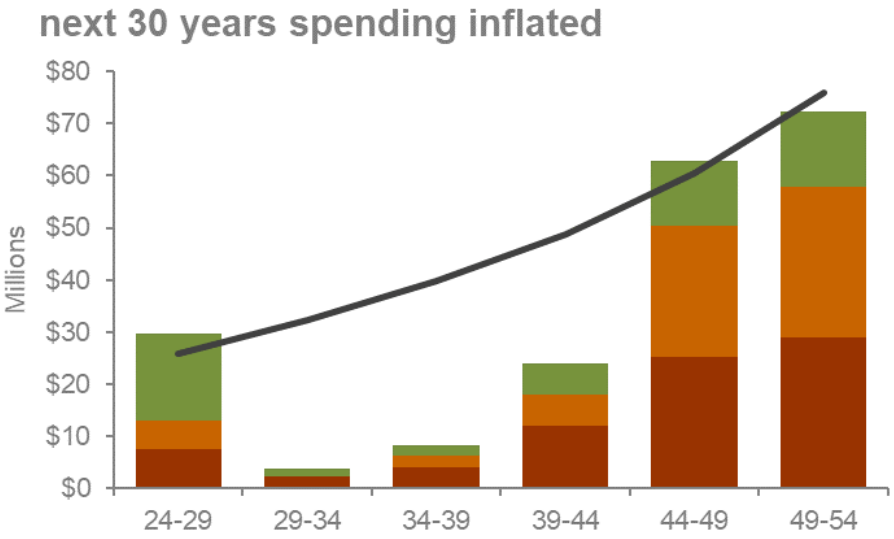
34-39
39-44
44-49
49-54


next 30 years spending inflated
Millions
$80
$70
$60
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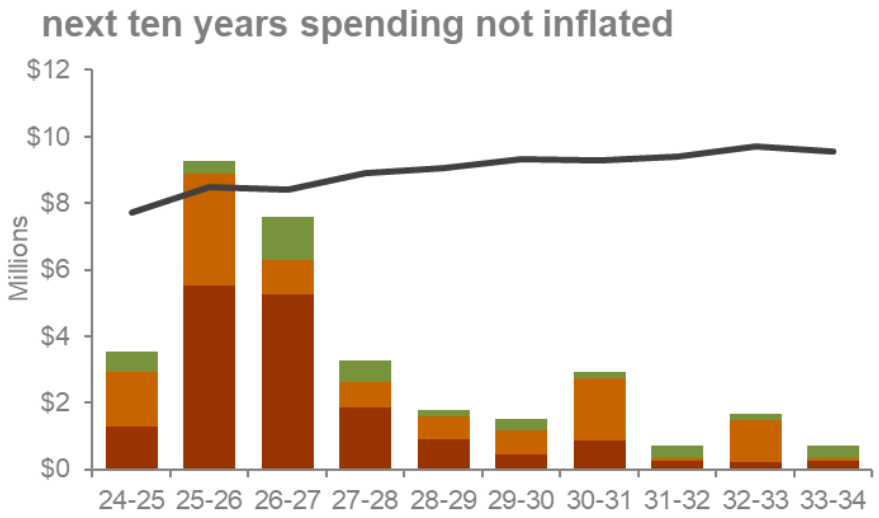
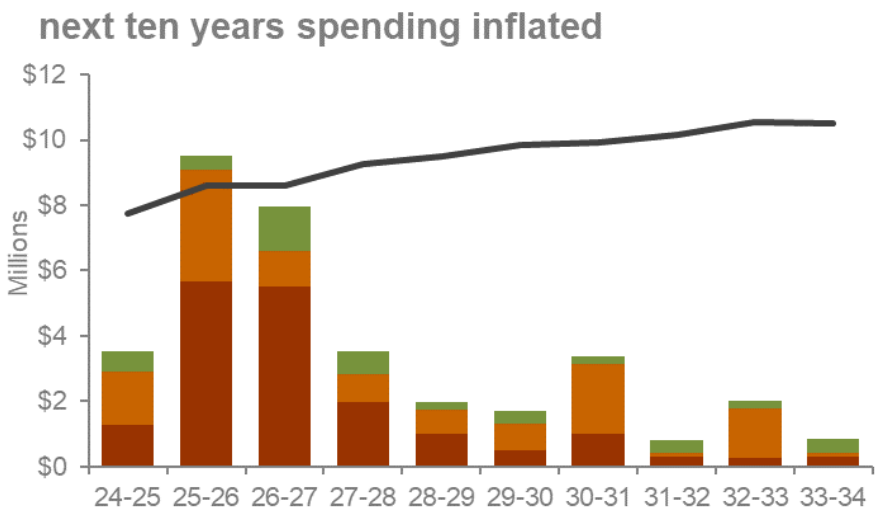
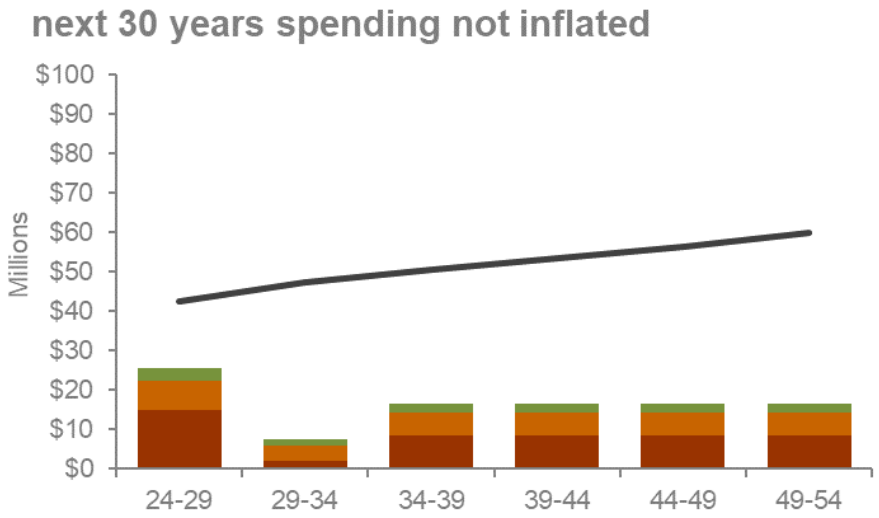
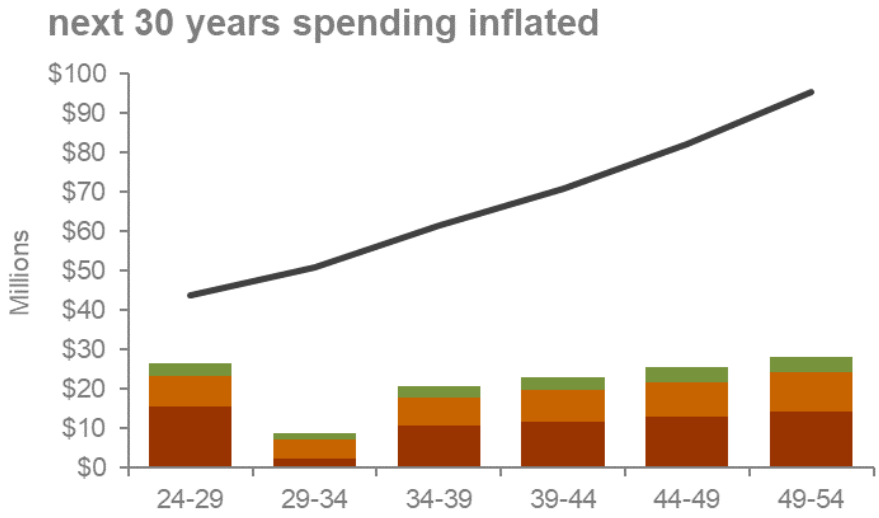
Flood Protection









Community Facilities