Our Infrastructure Strategy

We manage drinking water, wastewater, stormwater, roading and footpath assets for the benefit of everyone who lives, works and travels in our district. Thinking ahead and planning for the long term is vital to make sure that current and future generations enjoy well-maintained services, and this Infrastructure Strategy is a key part.

Our Infrastructure Strategy looks across the next 30 years and beyond, and lays out the most likely scenarios for how our critical infrastructure will be managed, and the most important decisions we're going to face as a community in the future.

This strategy does not stand alone. It is written in conjunction with the Financial Strategy, which sets out the funding challenges that the community faces over the next 10 years. These two strategies underpin our 10 Year Plan, which contains more detailed plans and programmes.

Both documents are informed by our overarching strategic vision: to be the district of choice for lifestyle and opportunity, and the guiding principle of planning for and providing fit for purpose services.

In this Strategy, figures used are inflated unless stated otherwise.

Our present

Our district

Our district is in the central South Island, south of the city of Christchurch. It has a land area of around 6,175 square kilometres and is crossed by State Highway 1. We have a population estimated to be 35,800, of which around 21,000 people live in our largest town – Ashburton[1]. Other urban centres in our district include Methven (around 1900 people) and Rakaia (around 1200 people). There are also a number of smaller villages around the district.

[1] .iD population forecasts for 2021 (based on the 2013 Census data).

Our district's economy is centred on agriculture and its supporting industries, and has shown strong economic growth in recent years due to the expansion of reliable irrigation and the pivot towards dairying, dairy support and high value crops. The township of Methven is close to the Mt Hutt ski field and attracts a large number of tourists.

We have seen consistent growth of approximately 2% per year between 2006 and 2018 in our district. While we continue to grow, the rate is projected to slow to approximately 1.0% per year over the next 30 years, adding approximately 11,000 people between 2013 and 2048. This growth is projected to occur evenly both in the rural and urban area, although to a lesser amount in Rakaia. The population in 2051 is expected to be around 44,400.

Our assets

This Strategy covers the core asset groups of drinking water, wastewater, stormwater, roads and footpaths. According to the July 2019 asset valuation, we have approximately $800 million of replacement value ($500 million after depreciation) in these asset groups, more than half of which is in roads and footpaths.

Asset group	Description and highlights	Depreciated replacement value
Drinking Water	12 drinking water schemes with 15 water treatment plants 497km of water mains	$76.2 million

Asset group	Description and highlights	Depreciated replacement value
Wastewater	4 wastewater treatment and disposal facilities serving 3 schemes 15 wastewater pump stations 185km of wastewater mains - most is gravity, but there are some isolated areas of pressure sewer reticulation	$102 million
Stormwater	44km of stormwater mains 7.5ha of stormwater detention and infiltration basins	$41.6 million
Roads and Footpaths	1512km of sealed and 1102 km of unsealed road 245km of footpath 186 bridges 10,570 signs	$296 million

We spend around $12.7 million each year operating and maintaining these assets, and in 2019/20 we budgeted $22 million for renewals and upgrades.

How well do we know our assets?

We know our assets pretty well, but there is also a lot we don't know. Some of our assets were built a hundred years ago, and it's not always easy to understand the condition they're in or to predict exactly when they'll fail.

In the last five to ten years a lot of work has gone into improving our knowledge and understanding of our assets. In particular, we have implemented a new asset database for the three waters and have thoroughly checked and corrected the information we hold on all of our assets, both water and transportation.

We carry out regular condition assessments on our assets. We undertake a closed-circuit television (CCTV) survey of a selection of our wastewater pipes each year to assess their condition and refine our renewals programme. Roads, bridges, footpaths and other transportation assets are also inspected regularly for defects and condition to inform the upcoming renewal programme.

Both asset groups are generally assessed as having accuracies of ±5-15% depending on the type of asset. Some assets are inspected more easily and more regularly than others, such as bridges or fire hydrants. Others are more difficult to inspect, such as underground pipes, or are less well-documented, such as retaining walls. Replaced or new assets come with high-quality data, which improves our overall knowledge.

The tables below list the data confidence grades given to each of our asset classes. We have given a grade to various pieces of information:

- the amount or number of assets in each class (e.g. the length of pipe);
- the location of those assets;
- the cost to replace those assets;
- the life remaining in them; and
- the depreciated replacement cost, which is a measure of the remaining value of the assets, after accounting for their age.

On the whole, this gives us reasonable confidence that the information we're using in our planning is correct and that our plans represent good use of funds.

Table 1 - Utilities assets data confidence

Asset group	Asset	Location	Quantity	Replacement cost	Life expectancy
Water assets	Pipes and reticulation	B	B	B	C
	Facilities	A	A	B	C
Wastewater assets	Pipes and reticulation	B	B	B	B
	Facilities	A	A	B	C
Stormwater assets	Pipes	B	B	B	B
	Treatment, retention and outfall structures	B	B	B	B

Table 2 - Transportation assets data confidence

Asset group	Asset	Location	Quantity	Replacement cost	Life expectancy
Transportation assets	Berms	B	C	B	C
	Bridges	A	A	B	B
	Drainage	B	C	B	C
	Footpaths	A	A	B	B
	Islands	B	B	C	C
	Minor	B	A	B	B
	Railings	B	B	C	C
	Retaining wall	C	C	C	C
	Signs	B	C	B	C
	Street lights	A	A	C	C
	Surface water	A	B	B	C
	Traffic facility	B	B	B	C
	Traffic signals	A	A	C	C
	Formation	A	A	B	B
	Pavement	A	B	C	C
	Top surface	A	B	A	C

Key:

A: the data is accurate (±5%) and based on reliable documentation

B: data is based on some supporting documentation but is less certain (±15%)

C: there is a fair amount of assumption and local knowledge used to reach the conclusion (±30%)

D: a reasonable informed guess, where there is no formal documentation to base an assessment on (±40%).

Our direction

Our vision

Our vision for our district, is to be the district of choice for lifestyle and opportunity.

Fit-for-purpose infrastructure, maintained and operated well, plays a vital role in achieving our community outcomes of providing great spaces and places, a balanced and sustainable environment, and a prosperous economy based on innovation and opportunity.

Our key drivers

We are guided by a range of factors that influence our decisions. For this Strategy we have identified four key drivers, made assumptions about the most likely future, and assessed the impact that they might have on our infrastructure.

Driver	Most likely scenarios for our district	Impact on infrastructure and our response
Compliance	Short- to medium-term uncertainty over the future regulatory model for drinking water, wastewater and stormwater ("three waters"). An expectation of higher regulatory standards in the drinking water and public health area. Long-term pressure to reduce or maintain volumes in water take resource consents. General tightening of environmental discharge rules to improve freshwater quality, affecting the renewal of consents. Increased requirements for evidence-based proposals and results reporting for New Zealand Transport Authority (NZTA) subsidy funding. Temporary Traffic Management (TTM) changes driven by NZTA, with additional minimum training and increased on-site requirements.	The exact detail of future three waters regulations is not clear, and we must be able to adapt to the future. This means considering all reasonable options, working with authorities and preparing to respond as new information arises. There will need to be increased investment in water treatment and monitoring equipment in the short term and in wastewater and stormwater treatment in the longer term. Increasing water-use efficiency requires ongoing investment in monitoring, but also in education and communication with customers. Current staff resources and expertise will be stretched, thus requiring either additional roles or an increase in consultancy fees. TTM changes will increase the costs of in-house staff certifications and contractor project costs. An alternative TTM system could be utilised with lesser, but still appropriate, requirements.

Driver	Most likely scenarios for our district	Impact on infrastructure and our response
Growth	The district is forecast to grow at an average rate of 1.0% per year, adding approximately 12,000 people from 2013 (a total of 44,400 in 2051). Growth is forecast to occur evenly across both the rural and urban area. There is likely to be strong growth in the number and proportion of older people (65+) and of young people particularly the 0-14 and 25-39 age groups. Heavy Commercial Vehicles cause the majority of damage to roads, and while their volumes are forecast to slightly decrease, their mass is predicted to increase, albeit at reduced rates in comparison to the last ten years.	Growth and development and the extra capacity required is accounted for when planning renewals and upgrades. The makeup of households has an impact on the location and type of development that will occur. For example, an increase in young families with children might lead to more suburban residential development which means networks on the fringes of towns need to be able to accept new connections. Where planning for water and transportation networks takes place we make provision where practicable. Growth and demographic shifts are currently occurring slowly enough that they are not affecting modelling processes or budgets, beyond a steady increase in renewal and maintenance budgets commensurate with the expansion. Urban walking and cycling would be affected by increases in older and younger residents, but not to the extent of changing existing levels of service or forecast works. Road deterioration is likely to continue, but at lesser rates than seen during the core dairy expansion period. Maintenance and renewals will need to be increased to ensure promised levels of service are attained.

Driver	Most likely scenarios for our district	Impact on infrastructure and our response
Resilience	Resilience is the ability of the network to remain as fully functional as possible when there is disruption to parts of it, and to recover quickly from this disruption. There is a reasonable probability of a significant earthquake in the life of our infrastructure assets. Climate change is expected to lead to more frequent and more extreme weather events, including heavy rain and flooding, and drought conditions.	New and renewed infrastructure needs to be designed to remain as serviceable as possible, or be quickly repaired, after a natural disaster. This will affect construction priorities and methodologies. As part of the regular renewal programmes we prioritise the replacement of critical or vulnerable assets. We consider the resilience of the replacement solutions at the design phase. Extremes of weather are likely to impose additional demand. Additional capacity will continue to be added to the network to meet future requirements. Climate change and other extremes are considered whenever assets are renewed, replaced or new assets planned, and proposed work programmes already account for this. Water sources of all types may be threatened in the longer-term, and alternatives or more secure sources may be needed. Some less secure water sources have alternatives already proposed in this LTP, including formalising a backup bore. As trends indicate the need for further work we will provide for that. The large grid-like road network means the district is relatively well-placed to withstand long-term disruption, with rivers the main weak points. Where flooding is a recurring issue on particular parts of the road network these are addressed either with an engineering solution (which may remove or minimize the effect of the flooding) or a standard procedure (traffic management).

Driver	Most likely scenarios for our district	Impact on infrastructure and our response
Affordability	Financial forecasts show that future infrastructure spending will remain within affordability benchmarks. We will face increased pressure to keep rates affordable. This means future rates rises and borrowing limits have caps to work within. Interest rates are forecast to be stable in the medium-term; borrowing remains affordable. There is likely to be increased pressure on engineering resources (people and plant) due to the government's enhanced infrastructure programmes, and the reduced availability of overseas assistance, which will likely result in rising costs. Oil price volatility will affect construction costs and bitumen prices in particular.	Ongoing infrastructure maintenance and renewal programmes will be able to continue as they currently do. Cost-efficiencies will be sought wherever possible, including improved procurement approaches such as larger packages or longer-term delivery contracts. Major project work, such as water treatment upgrades, can have a significant effect on rates. Where practical, the timing of major projects will be coordinated across council's activities to manage their impact on rates affordability. However, where there is an immediate need, or a regulatory deadline, this may not be possible. The strain on resources, coupled with reduced NZTA subsidies (forecast for at least the 2021-24 period) will require judicious decision-making when programming forward work. In the transportation activity, forecast works are initially based on need rather than available budget, so any funding constraints will be managed by undertaking a final programme that is affordable. Flexibility in programming is always required as works may change in priority for a number of reasons.

Our assumptions

All long-term planning is based on assumptions about the future, which affect future operations and future capital spending. Infrastructure planning has to be set in a wider context of what else is happening in the district, the country and the world.
As well as the scenarios outlined above, there are some general forecasting assumptions from our 10 Year Plan which tell us about the overall direction we see the district going in. When discussing future decisions later in this strategy we have also identified some more specific assumptions.
The following are some key assumptions not previously covered that affect infrastructure planning.

Three waters reform

While we are anticipating that there may be a change to the ownership and delivery of three waters in the next ten years, we are not able to say with certainty what those changes will be, and we probably won't know until mid- or late-2021. For this Strategy we have assumed that it will be business as usual for the delivery of three waters.
Taking this assumption means that we are planning for what we believe is necessary and reasonable. It is expected that if water services come to be provided by larger independent entities this will make it easier to fund and afford necessary capital works.
We are also assuming there will be changes to standards and compliance rules, but these have already been covered in the previous section.

Climate change

Our Climate Change Policy was adopted in 2019, which contains district-specific assumptions.

The main threats to our infrastructure from climate change come from extreme weather events: heat, cold, rain and wind. We don't have any assets in areas likely to be affected by sea-level rise.
Flooding and storm damage threatens bridges and culverts, some of which also carry water assets. Wetter weather places greater demands on wastewater and stormwater systems and increases the risks of overflows and flooding. Warmer summers increase peak water demand, while less alpine snow can reduce groundwater recharge and affect bore levels.

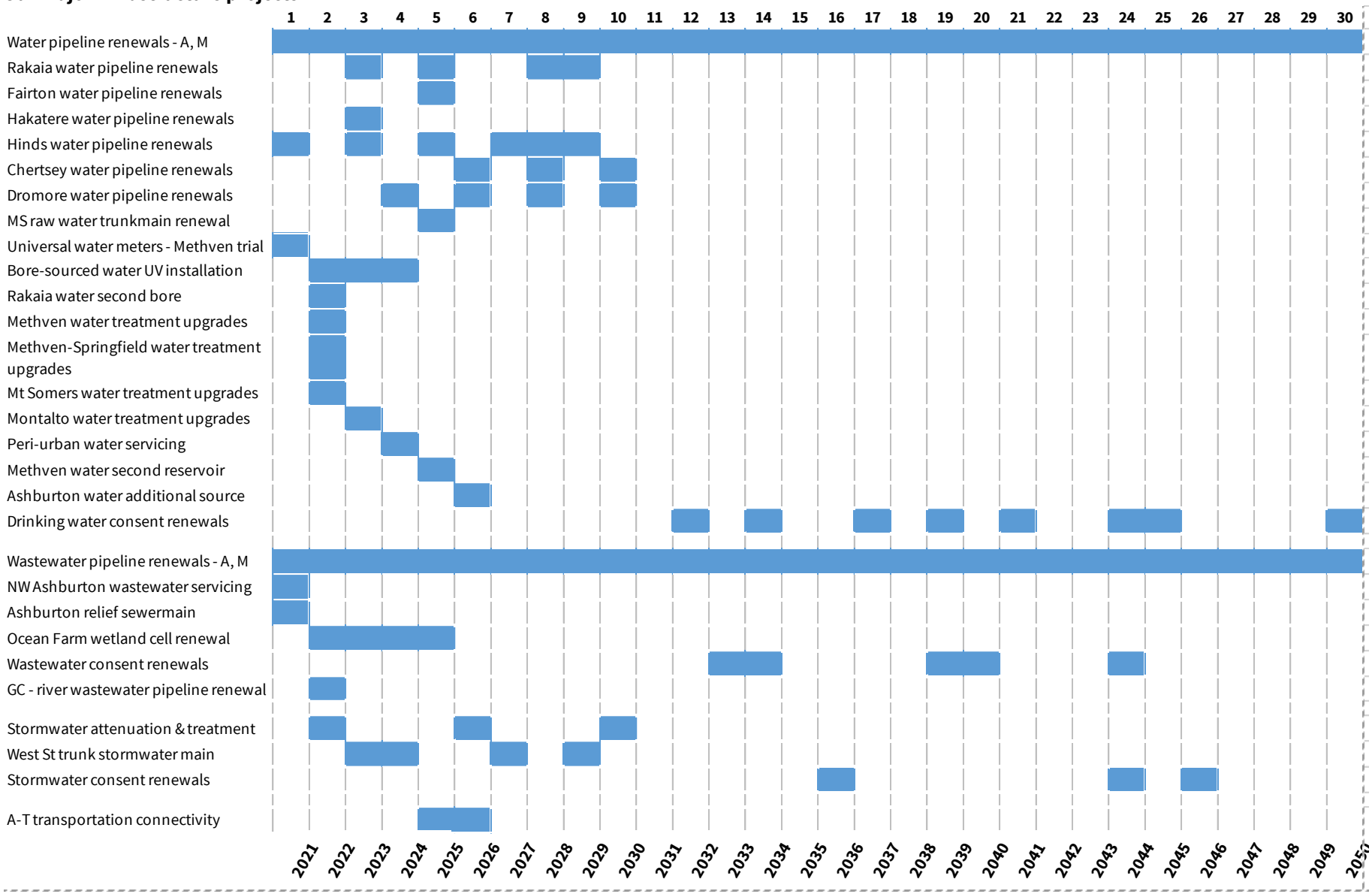
Covid-19

Covid-19's impact on our district has been relatively limited, partly due to a focus on agriculture in our economy. We have assumed that New Zealand will continue to pursue elimination of Covid-19 from the country, with efforts focused on the border and on vaccination.
This is likely to have a small impact on our rating base, which will be factored into affordability calculations and rate rises. Where Covid-19 could have a larger impact is on the availability of specialist staff and consultants, which often come from overseas. This could be especially acutely-felt if there is a ramp-up of activity to meet new targets for drinking water and a shortage of skilled people in the country.
The effect is assumed to be mostly limited to the coming 3-5 years.

Our major projects

We have a number of major decisions to make around how we deal with a number of major projects over the coming 30 years. These decisions are shown across the timeline below, when they need to occur and roughly how long it will take to complete the project. Further detail explaining the projects and decisions that need to be made are in the following sections of this strategy.

Our major infrastructure projects



* A: Ashburton, M: Methven, MS: Mt Somers, NW: North West, GC: Grit chamber, A-T: Ashburton-Tinwald

There is a large number of projects in the first three to four years. The relatively small number of projects later on is partly due to these projects simply not jet being identified. One of the main drivers of our work programme is new regulations and standards – these do not yet exist for the later years.
The relatively high number of projects early on for drinking water reflects a need for work to meet current and imminent drinking water standards. There will be challenges in completing this programme, both internally in project management and externally in finding capable consultants and contractors. This may be compounded by other water suppliers doing the same thing.
We need to set such an ambitious timetable to meet our obligations, but be prepared to be flexible and adapt to changing circumstances. We might, for example, combine work into larger packages, perhaps even working with neighbouring water suppliers, to help facilitate this work.

Our future – Drinking Water

Our drinking water services provide our communities with access to safe, reliable and potable water at an affordable cost.
The future for the Drinking Water activity will see significant tension between demands to improve drinking water quality and security of supply, and the costs involved in achieving this aim. This will be of greatest concern for our relatively small rural schemes.
Our priorities for the next 30 years are to:

- Attain and maintain compliance with all applicable regulations, especially the Drinking Water Standards for New Zealand (DWSNZ) and our various resource consents.
- Monitor and manage demand to ensure levels of service can be maintained.
- Continue to replace aging assets to minimise the chance of failures.
- Seek out cost efficiencies, including adopting new technologies.

Compliance

Compliance, particularly in the area of water safety, is the highest priority in the Drinking Water area.
Several water supplies do not currently meet the DWSNZ, particularly Methven, Mt Somers, Methven Springfield and Montalto. Compliance for these schemes must be achieved and this will be the focus for the next two to three years.
Drinking water standards are expected to tighten further in the coming few years, following the creation of a new national drinking water regulator, Taumata Arowai, which will provide national direction and oversight of drinking water provision, and will produce revised DWSNZ. This is anticipated to lead to upgrades across the board. Where schemes are currently compliant, upgrades will be introduced to provide multiple layers of protection to meet higher safety standards. In particular, there will be an expansion of protection and monitoring for the reticulation; for example, this means rolling out backflow prevention devices, and establishing continuous monitoring of pressure and chlorine around the networks.
There has already been change. The requirement to comply with the DWSNZ has been reinforced and qualifying language such as “all practicable steps” removed. Water Safety Plans (WSPs) are now required to be much more detailed and comprehensive, and the Health Act has been amended to give more weight to the implementation of WSPs and delivering the identified improvements. Additional staff resourcing will be needed to manage the preparation, maintenance and implementation of these plans and programmes.
More change is in the pipeline. There are proposals for a change to service delivery arrangements on the table, which include the transfer of service delivery from local councils to new regional or multi-regional organisation that. These arrangements have not been decided upon, so this Strategy assumes the status quo.

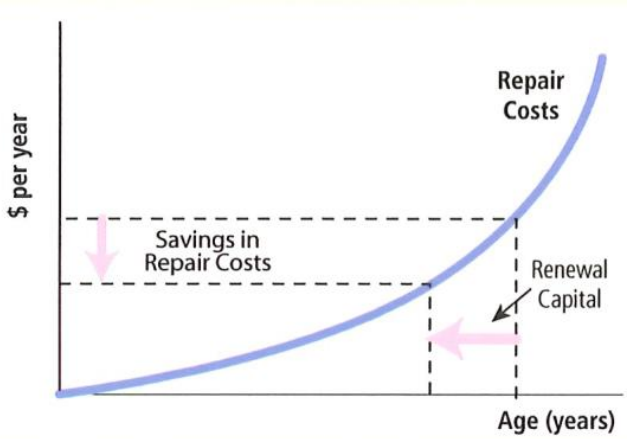
Demand management

Our district’s water supplies have notably high levels of reported water loss. Early investigations from smart water meters retrofitted to existing residential properties suggest that there is also a relatively high level of real water loss. This means that we are not meeting the water loss or the consumption per person level of service targets.
As well as the level of service targets, water loss bears real, tangible costs. There is a financial cost to pump and treat water that is wasted. Reducing water loss also delays the need to amend or expand water take resource consents, which is a costly process that brings other risks. In some cases there is a possibility of breaching consent limits in the short term.
Water loss from old pipes will be addressed over time through our ongoing renewal programme, and new leaks can be located and fixed. Design and construction standards are being improved to reduce the probability of leaks from new and renewed infrastructure.
Industry rules of thumb estimate that around half of water loss is from private (on-property) pipes and fittings. Our main tool to address private water loss and inefficient consumption is universal water metering. We have chosen to take a measured approach, by undertaking a community trial and installing meters in

Methven across 2021/22. If this trial identifies a significant amount of water is being lost from the system – as per our estimates, then universal drinking water meters may be rolled out to all properties connected to our drinking water supplies in the future.
Universal water metering will give future councils better information on which to base decisions on drinking water funding, including the introduction of wider or universal volumetric charging. Changing the drinking water funding model is a significant decision to be taken in the coming years.

Asset renewal

We have been renewing our water pipes and associated assets steadily for decades, and this programme will continue into the future. Timely renewal of assets is important to reduce the probability of major unplanned failures, and to reduce the maintenance cost imposed by frequent, repeated minor repairs, such as stuck valves or leaking pipes or fittings. This is important to control costs; many repairs simply have to be carried out and paid for.
Renewals to date have been focused mainly on Ashburton and Methven, the oldest schemes. At the present rate, the renewal of all original pipe networks in the Ashburton and Methven towns is likely to take another 20-30 years. The other schemes were constructed later, in the 1970s and 1980s, and so large-scale renewals have not been needed yet, although some isolated renewals have taken place. In the life of this Strategy there will be an increase in routine renewals in other schemes, beginning with Rakaia and then others as indicated by criticality, faults and condition assessments.
Renewals expenditure is matched approximately to the rate of depreciation. We are not seeing a large number of full-scale asset failures, so the assets do not appear to be on the verge of imminent failure, although that risk increases over time. We choose to spread out renewals over time to avoid having a large spike of expenditure over a short time period. Where a significant rise in maintenance visits is seen for specific assets or classes of asset, they are prioritised for urgent renewal.



Renewal priority is based around age, material and criticality, with modifications made based on analysis of maintenance records and customer complaints.
As more assets age toward the end of their nominal life, we expect an increased rate of failures, unreliability or other problems. In that case, a faster rate of renewal will be required to prevent the maintenance cost burden, and reduced levels of service to customers caused by widespread network failures. Renewal lowers the average age of the network, which lowers the maintenance cost. The optimum theoretical renewal approach for an individual asset is to renew it when the cost of renewal approximates the maintenance cost saving (see figure inset). However, it may become beneficial to increase the rate of renewal early to spread out expenditure peaks, rather than reach a point where a large volume of assets reaches its optimal renewal point at the same time.

Cost efficiency

Affordability is one of the key drivers for any public service, and councils constantly face the need to balance the costs of providing higher levels of service against the desire to keep cost increases to a minimum.
Some cost efficiency will come from minimising maintenance costs and optimising renewals. More will come from minimising water loss and inefficient water use.
Another route to reducing costs is likely to be the adoption of new technologies to enable automation, optimisation and remote monitoring of networks. For

example, smart water meters can be read wirelessly from a passing vehicle and do not need a meter reader to open every toby box and record the reading. If these meters were able to automatically send back readings continuously, there would be only minimal need for readings.
Automation is used around Ashburton in the central control system, which adjusts the numbers and speeds of the various pumps to optimise the running of the network and avoid inefficient pumping practices. With more detailed pressure and demand information this system could be further refined. There is also the option to time reservoir filling cycles to take advantage of cheaper power at low demand times (e.g. overnight). These options have not been worked through in detail and have not been assumed when forecasting future costs.
As a final example, cameras and solar-powered data loggers can reduce the number of visits required at remote locations, such as the Montalto water intake, saving significant time and cost.

Significant decisions

This section outlines the main significant decisions to be made in the coming years. These range from very specific questions about projects to questions of strategic direction.
Only one infrastructure issue was specifically addressed during our consultation: universal water meter installation. Following feedback, we have chosen to take a measured approach and committed to a trial in this 10 year plan.
In this section, figures used are uninflated to facilitate comparisons between options.

Universal water meter installation

Driver: Compliance, demand and growth

Decision required: 2021

While our population is growing, we operate within fixed water take limits. The district's water supplies have relatively high levels of water loss. Not being able to demonstrate sound management of water demand is likely to hinder consent renewals or applications for larger allocations.

We need to improve our water use efficiency to remain compliant with consents and to ensure levels of service can be maintained for our customers.

Assumptions: Population growth will continue as forecast, and will lead to a proportional increase in demand.

Water take resource consent limits will remain unchanged, at least until they begin to expire in the 2030s. For planning purposes, we assume consents are renewed with the same annual allocation as the current consents. Given general growth, this represents a reduction in per-property allocation.

We will continue a programme of public leak detection work.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Undertake a community trial and install meters in 2021/22 in Methven	Results of the trial will be used to confirm the validity of previous water loss assumptions. In particular, it will confirm the presence and scale of private property leaks and allow for the balance between public and private leakage to be quantified. Methven was selected for the trial as it is a community that includes a full cross-section of properties from new subdivisions to those 100 years old. Methven also has very high minimum night-time flow. It will therefore be valuable to understand the balance between public leaks, private leaks and private consumption to focus future efforts. Acoustic leak detection on the whole scheme in July 2020 found 51 leaks, 29 private and 22 public. Opting for a trial instead of progressing a full rollout will delay our ability to meet the levels of service agreed with the community for water loss and consumption on all schemes.	$1m 2021/22		✓	
Other options	Install water meters on every water connection	Meters are likely to slow water demand through knowledge of consumption. Assists with understanding and finding private property leaks or high users, and facilitates a better estimate of real water loss. Metering would show good stewardship of the water allocated under our consents. Supports broader objectives under the Climate Change Policy. However, there would be an ongoing cost associated with reading meters. Additional infrastructure to enable automatic continuous reading may provide operational cost savings.	$5m 2021-2024		✓	
	Do nothing.	May leave us liable to prosecution if we knowingly breach resource consent limits. We would also continue to not meet the levels of service agreed with the community for water loss and consumption.	$0			

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
		Significant reputation loss would arise from a perceived double-standard between ADC water supplies and other water users (e.g. farmers) who are working hard to improve efficiency. May reinforce perceptions at Government level that local authorities are not a fit steward of water resources.				

Water charging

Driver: Compliance, demand and growth

Decision required: 2023/24

While our population is growing, we operate within fixed water take limits. The district's water supplies have relatively high levels of water loss. Not being able to demonstrate sound management of water demand is likely to hinder consent renewals or applications for larger allocations.

We need to improve our water use efficiency to remain compliant with consents and to ensure levels of service can be maintained for our customers.

Assumptions:

Population growth will continue as forecast, and will lead to a proportional increase in demand.

Water take resource consent limits will remain unchanged, at least until they begin to expire in the 2030s. For planning purposes, we assume consents are renewed with the same annual allocation as the current consents. Given general growth, this represents a reduction in per-property allocation.

We will continue a programme of public leak detection work.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Charge volumetrically for commercial and large properties only (status quo)	As this option represents the status quo, no significant effect is expected to be seen. We would probably also continue to not meet the levels of service agreed with the community for water loss and consumption.	$0 (no change)		✓	

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Other options	Universally charge for water on a volumetric basis	The exact charging model is yet to be determined, and options include: • Charge per m^3 with an allowance • Charge per m^3 with no allowance • Charge per m^3, reducing the cost per m^3as consumption increases • Charge per m^3, increasing the cost per m^3as consumption increases Each option has different impacts on customers and will have different effectiveness. Adding a direct cost signal is likely to improve the effect of meters through reducing demand to save money and improving the rate and speed with which leaks are fixed. However, there would be an ongoing cost associated with generating and handling billing	Cost-neutral However, there will be some small operational cost associated with billing		✓	
	Remove all volumetric charging	It is expected that this option would lead to an increase in demand from some customers. This might be immediate as people are no longer incentivised to economise, or longer-term as there is no financial feedback if demand grows. People may feel that, as they pay their rates, they are entitled to as much water as they wish. This option may be popular with larger consumers, particularly, for example, large residential or small lifestyle property owners, whose relatively high demand would be subsidised by other ratepayers. We would probably also continue to not meet the levels of service agreed with the community for water loss and consumption.	$0 Potentially a small saving in administration cost, although this is unlikely to be realised as this is a small part of larger roles for the staff involved.		✓	

DWSNZ compliance upgrades – Montalto, Methven-Springfield, Mt Somers

Driver: Compliance

Decision required: 2021

We are not currently complying with the DWSNZ for these four schemes, and compliance with the Health Act 1956 is only possible through having, and actively implementing, a water safety plan (WSP). A WSP for these schemes would require steps to be taken to comply with the DWSNZ.

Mt Somers Water Treatment Plant was upgraded in 2013 to meet the DWSNZ requirements for protozoa treatment. This treatment has proven not to be adequate in severe weather events, and boil water notices have been issued for this scheme.

Montalto and Methven-Springfield have not received upgrades for protozoa treatment requirements due to uncertainty around the compliance models for rural agricultural schemes.

Doing nothing is not an option, the provision of safe drinking water to our customers is required under the Health Act 1956 (and the proposed Water Services Bill).

Assumptions:

DWSNZ rules will be substantially the same in the short term.

Alternative delivery mechanisms for rural agricultural schemes remain available to us.

Rural agricultural schemes remain separate from the 'household' schemes rating group. This could be changed.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Upgrade existing treatment facilities (based on Methven experience)	Providing high quality membrane or conventional treatment systems would ensure protozoal compliance, but at high capital and operational cost. This could affect affordability, particularly for the rural schemes which are not part of the group rating system at present. This could be changed by Council if desired.	$9.5m 2021-2023		✓	
Other options	Seek alternative water sources first	Bore drilling to find water of a better and more consistent quality has a low to moderate chance of success in these areas. If successful, the existing treatment could be retained at Mt Somers but upgrades would likely still be required at Methven Springfield and Montalto. Operational costs would be reduced due to more consistent water quality, simpler operation and fewer quality incidents to manage. Should this option be unsuccessful this expenditure would not affect the cost of any other option pursued.	$650,000 (bores) $1m (wellheads and pipework) The additional cost to develop the wells and pipework is highly uncertain, and is dependent on the depth and location. 2021-2023		✓	

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
	Build pipelines to connect the rural schemes to a central treatment site	If Methven has upgraded compliant treatment equipment, it may be possible to pipe water to the smaller water supplies and retire the individual treatment plants. Due to the distances involved and the need for additional pumping stations the cost will be high (capital and operational).	**UNKNOWN** Estimate for pipe is extremely uncertain and would need to be the subject of further investigation. 2022		✓	
	Decentralised treatment (point of entry, point of use) for the rural agricultural schemes	Instead of installing a large central treatment system for schemes where over 75% of the water is for agricultural purposes, we apply a simple, coarse pre-treatment to the water at source and supply and maintain smaller, high-performance treatment equipment at each connected dwelling. This option has the potential to offer lower capital costs but may have higher operational costs to maintain the individual treatment systems. Some pre-treatment and monitoring will still be required to ensure the individual treatment systems can adequately treat the water, or that we communicate with property owners if they can't. There is some uncertainty about whether this will be an acceptable solution in the longer term.	**UNKNOWN** 2021		✓	
	Withdraw from providing water services to some or all communities.	Following a referendum of customers, and ensuring that there was access to alternative water sources, we could move to close the schemes, or convert them to non-potable, agricultural schemes only. Grants or other assistance could be provided to effect a safe transition. This option may only be applicable to Montalto due to population limits (maximum 200 people) and has a requirement to consult with the Medical Officer of Health and with the community. This option also does not improve the quality of the service provided to the community.	$100,000 2021			

Water treatment upgrades in response to DWSNZ revisions

Driver: Compliance

Decision required: 2021 and again in later years

We are not currently complying with the DWSNZ on several schemes, specifically due to not meeting the protozoal compliance criteria relating to secure groundwater. Compliance with the Health Act 1956 is only possible through having, and actively implementing, a water safety plan (WSP). A WSP for these schemes would require steps to be taken to comply with the DWSNZ. Due to factors external to the bores themselves, such as nearby potential sources of contamination, it seems likely that protozoa treatment will be required to ensure water safety.

If not required currently, it is expected that a new revision of the DWSNZ will be issued in the next few years, once the new regulator Taumata Arowai is fully established. These new standards may require changes to existing infrastructure or additional infrastructure to be installed, to provide more safeguards, barriers, monitoring or control.

Based on previous experience, and the need to allow water suppliers reasonable time to respond, there is likely to be some flexibility in the timing of these changes. This decision seeks to set Council's preference for how quickly and urgently to respond to required changes.

Some examples might include additional UV disinfection for groundwater sources, additional treated water storage, more continuous monitoring of pressure and chlorine.

Doing nothing is not an option, the provision of safe drinking water to our customer, and the duty to comply with the DWSNZ is required under the Health Act 1956.

Assumptions:

DWSNZ will require increases in treatment quality.

An implementation period of several years will be allowed, especially for smaller schemes.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Proactively plan for and implement improvements once they are in the DWSNZ	Shortly after new requirements are clear, a programme would be developed and put to Annual Plans and budgets for approval. Upgrades may still be staged over years according to risk and urgency, but this option would allow for us to achieve the requirements ahead of statutory deadlines. This is preferred, to demonstrate good management of water safety, ensuring that identified risks and inadequacies are addressed as soon as reasonably possible. Note that this option still allows for the consideration of financial, practical and operational factors, so the effect on rates affordability would be part of this planning process.	**UNKNOWN** (new standards being released December 2020 / January 2021 which will effect improvements)		✓	

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Other options	Wait until upgrades are due and install them as late as possible	This option is similar to the preferred option, but delays implementation until the statutory deadline, to limit the risk of further changes to the DWSNZ making new upgrades obsolete. This risk is low but not zero. The possibility exists that additional funding might be made available as deadlines near and that by installing upgrades too soon we might miss out on this funding. However, this option also presents the risk that delays or difficulties might mean that planned upgrades are not completed in time. It is also fair to note that this option may leave important water safety risks unaddressed for years, and this may not be acceptable to our community. Finally, there is a risk that prices from suppliers and contractors may rise as the deadlines approach and demand rises.	**UNKNOWN** Potentially in the order of millions of dollars. Possibly 2022		✓	

Reticulation extensions

Driver: Demand and growth

Decision required: 2021

Around the district, particularly on the edges of towns, there are areas of development or residential areas that are currently unserviced. There are regular requests for large-scale extended reticulation.

For example, the North-East Ashburton area contains mainly large residential and lifestyle properties, obtaining their water from private bores. In recent years there have been concerns around the quality and safety of the water being supplied to these properties, with E.coli and nitrate being the main areas of concern.

Assumptions:

Demand for reticulation in the area will be present and will increase.

We are not compelled to provide reticulation by an external factor.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Proactively prepare plans and designs for peri-urban residential areas and areas identified for future development but wait for demand and service small areas – an incremental approach.	Overall servicing plans are developed to ensure that the systems will work and provide appropriate levels of service. Installing the reticulation ourselves ensures control over the alignment and quality of the infrastructure, and allows fair cost recovery to be achieved. Spreading out the construction helps keep increases in capital cost and depreciation cost small. Where a pipeline is constructed in a street there may be a capital contribution required, and even non-connected properties may be liable for a (half) rating charge. Responding to demand limits the impact of this on opposed ratepayers.	Higher overall capital cost, but spread over time.	✓	✓	
Other options	Consult with larger areas and proceed with design and construction only if an area-wide rollout is favoured.	This is the approach as presented in the 2018-28 LTP for the north-east Ashburton area. This option, as a larger single package of work, offers cost-efficiency. However, the cost is all incurred at once, which may affect debt and rates limits. This option also may lead to the installation of infrastructure which is largely unused for years or decades, and slow uptake may delay cost recovery through capital contributions. This option may be seen as not recognising the needs of specific roads or areas.	Lower capital costs overall but incurred in larger amounts each time.	✓	✓	
	Do not plan for or install reticulation. Allow developers or private landowners to install reticulation to be vested in Council.	This option is the cheapest for Council, as the costs of development are borne by the landowners directly. This may act to discourage connections to the reticulated network and encourage more deep private bores. This option cedes some control over the location and timing of development.	Minimal cost to Council	✓	✓	

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
	Regulate to restrict development	This option uses non-engineering responses to control development by reducing the available areas of residentially zoned land, to steer development into areas that are currently serviced or which will be the most cost-effective to service. This option takes more control over the location of development, but is vulnerable to legal challenge through the District Plan process and the environment court. This option could alternatively be combined with other options, rather than being seen as an option in itself.	Potentially high cost if legal challenges arise	✓	✓	

Renewal programme intensity

Driver: Resilience, affordability

Decision required: 2023, and prior to every LTP thereafter

Ongoing renewal of aging pipes is carried out to minimise the costs of failures or leaks. The amount of money dedicated to renewals can be varied to trade expenditure for risk.

Assumption: The rate of failures increases relatively slowly, rather than a sudden jump.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Renew in line with depreciation	There is no additional effect on rates as depreciation must be rated for regardless. This is the preferred option because we are not seeing a widespread increase in infrastructure failures and so the additional cost may be unnecessary.	No additional cost			✓
Other Options	Raise renewal funding above depreciation	This option would help to flatten a potential 'bow wave' of failing pipes in the future, protecting potential future ratepayers but at a cost to present ratepayers. When borrowing costs are low, this might present a favourable option compared to waiting for assets to fail and borrowing at the prevailing rates at the time.	Variable. Possibly $500,000 pa additional		✓	✓
	Lower renewal funding below depreciation	There is no effect on budgeted rates as depreciation must still be funded, but over time an increase in maintenance costs may be seen as more pipes fail. This ensures that asset lives are maximised and a reserve may be built up with this option, to be spent on demand as assets begin to fail. However, failures can be unacceptable to the public, causing inconvenience and potentially danger. Renewal of failing assets is more time-critical and less flexible than planned routine renewal. Work under this option is inherently more variable, and may not be compatible with efficient procurement of large or multi-year work packages.	Potential for higher costs of repairing at point of failure		✓	✓

Financial forecasts

Renewal profile

The renewal profile below shows the forecast renewals for each year over the next 100 years (orange bars), based solely on standard asset lives and valuations, modified for condition rating. This shows the theoretical renewal programme before any smoothing is applied. The chart also shows the 10-year moving average and 100-year average.
What this illustrates is that there is a need for continued renewals for the next 20-30 years, averaging $1.5m initially and then reducing after year 20. In our actual programme we are targeting an average of $1.7m in the first 10 years, as we bring forward some renewals on the small schemes where issues other than life, such as level of service or leakage, are having an effect.
There is also a lull in renewals between years 30 and 50, which reflects that most of the rural water supplies were built in a relatively narrow period in the 1960s, 70s and 80s and will not reach the end of their theoretical life until around the 2050s. In practice, we would aim to bring forward renewal work where appropriate to smooth the peak in year 67 and from year 85 onwards.

Looking at the next 10 years, and considering reticulation and facility assets, the graph below shows our actual planned renewal expenditure (blue bars), with the 10-year average expenditure (black line) and the annual depreciation in 2021 dollars (blue line) on top. This shows how we plan to spend approximately in line with our depreciation, effectively replacing assets as fast as they age.

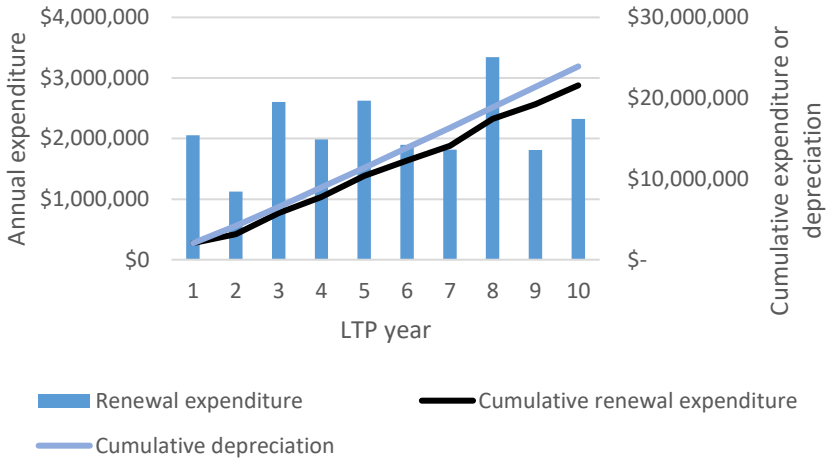


Figure 1 - Drinking Water 10-year renewal expenditure vs depreciation forecast

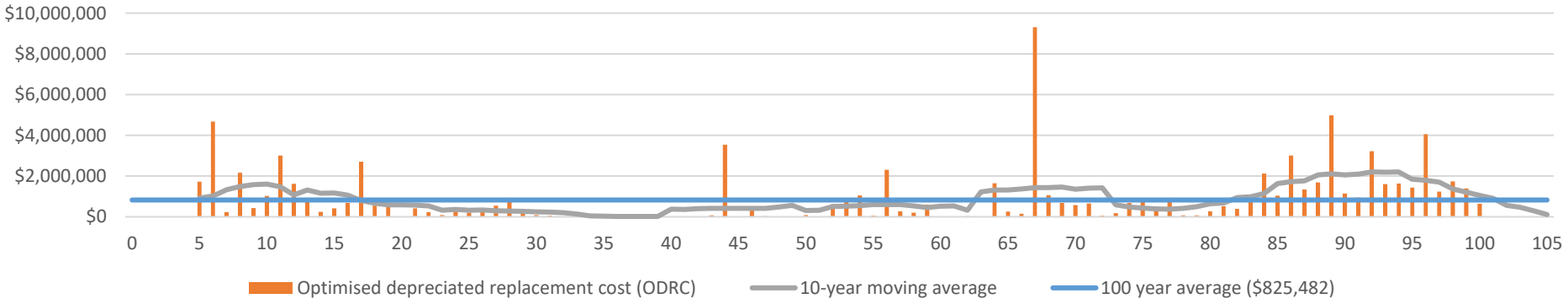


Figure 2 - Drinking Water renewal profile – all schemes

Capital expenditure

All new capital expenditure on Drinking Water is shown in the chart below. Note that the last four bars represent 5-year totals. The chart shows a large amount of new infrastructure in the first 5 years of the plan, reflecting a push to achieve compliance with the current and proposed Drinking Water Standards within 5 years.
The lack of projects in the later years reflects high uncertainty about where standards may go in the future. We will add projects to this long-term programme when the direction of travel becomes clear. For example, we may be required to provide for nitrate removal, or a policy of removing chlorination may be adopted, but any attempt to predict the scale and timing of any such improvements will only provide misleading guesses.
Unlike some other councils, we do not proactively install water pipes in advance of development, preferring to let developers install this as development occurs and vest the assets in Council.

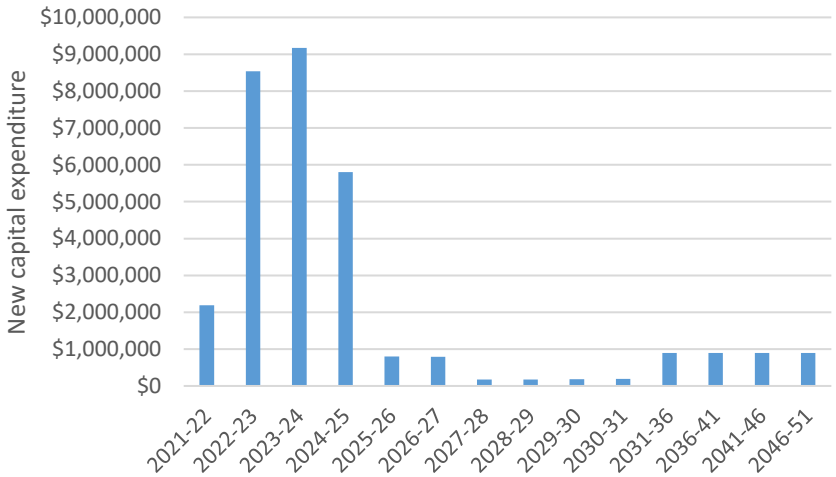


Figure 3 - Drinking Water new capital expenditure

Operating costs

Forecast operational expenditure for Drinking Water is shown in the chart below. Note that the last four bars represent annual average figures, for easier comparison. This chart shows a general increase over the next 30 years, as costs overall rise in line with inflation and growth in the network. New facilities add to the cost of operating the network, while new pipes should not lead to an immediate increase in costs as they should be reliable for a long time.

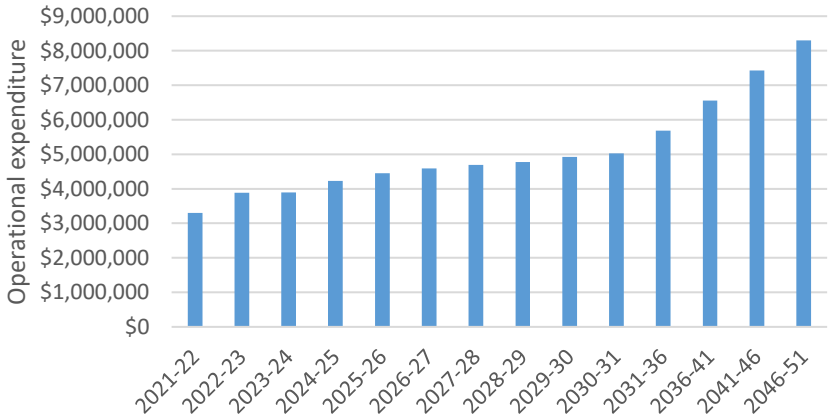


Figure 4 - Drinking Water forecast operational expenditure

Our future - Wastewater

Our wastewater services provide communities with safe, reliable and sanitary disposal of wastewater at an affordable cost.
The future for the Wastewater activity will see tighter requirements for nutrient loadings take effect as resource consents come up for renewal in the 2030s.
The ongoing central government Three Waters Review and the new regulator Taumata Arowai will have impact on the governance, management and regulation of wastewater services. The detail is still to be determined, but it is likely to mean higher standards and expectations, and may also include regional or supra-regional entities responsible for managing wastewater services.
Infiltration and inflow (I&I) will continue to consume capacity, pumping and treatment resources. Ongoing renewals will help to reduce infiltration from the public mains networks, but other interventions may be needed if capacity becomes too constrained and causes maintenance problems or impedes development and expansion.
Low pressure and vacuum sewer systems are gaining acceptance and can provide advantages in certain circumstances over gravity networks. We adopted a Pressure sewer System Policy in 2020. Throughout the life of this strategy an expansion of these types of sewer systems is likely and they need to be understood to ensure they can be managed in a way that minimises faults and maintenance costs and that optimises the use of the networks.
Finally, there exists a possibility that pressure may come to expand municipal wastewater services to areas not currently serviced. Initially this is likely to be areas on the periphery of existing urban schemes, and there are proposals in place already to extend the reticulation to the north-west of Ashburton, for example. Other villages such as Hinds may need to be serviced in the longer term, although there is no direct imperative for that at present.
Our priorities for the next 30 years are to:

- attain and maintain compliance with applicable resource consents;
- monitor condition and performance of assets to ensure that levels of service are being maintained;
- continue to replace aging assets to minimise the chance of failures and to increase resilience;
- seek out cost efficiencies, including adopting new technologies.

Compliance

Compliance with resource consents and particularly with effluent quality and contaminant loadings is the highest priority in the Wastewater area.
Our three wastewater schemes generally comply with our resource consents, although there have been departures in recent years. The most important of these are at Ocean Farm, where the effluent has had E. coli concentrations above the permitted levels, and Rakaia, where the sludge nitrogen loading has been higher than permitted. These are being addressed through consenting processes and proposed capital work.
These resource consents are due for renewal in the 2030s. In anticipation of higher standards, capital expenditure is likely to be needed at these treatment facilities, either to achieve higher treatment levels or to increase disposal area. Ocean Farm and Rakaia have already had extra land purchased nearby to provide options for extending irrigation areas. What is yet unknown is whether the focus will remain primarily on nutrient loadings, or whether treatment processes will need to be made more sophisticated to deal with emerging contaminants, such as viruses.

Inflow and infiltration management

Inflow of water directly into sewers or infiltration of groundwater into pipes and manholes consumes conveyance and treatment capacity in wastewater networks and facilities, which adds to running costs and leads to the need to renew earlier or enlarge pipes to avoid wet weather overflows.
Our ongoing renewal programme helps to reduce infiltration in the public network by replacing older, leaky pipes with new, sealed ones. Inflow is

addressed through ongoing inspection of gully traps and stormwater systems and by tracing sources of water during wet weather events.

Asset renewal

We have been renewing our wastewater pipes and associated assets steadily for decades, and this programme will continue into the future. Timely renewal of assets is important to reduce the probability of major unplanned failures, and to reduce the maintenance cost imposed by frequent, repeated minor repairs, such as blockages caused by dips or faulty joints. This is important to control costs; many repairs simply have to be carried out and paid for.
Relining is favoured for the on-property sewers that are prevalent in Methven and the Hampstead area of Ashburton. Relining is only practical when the sewer main is not collapsed or badly deformed, otherwise excavation is needed. It is therefore important to ensure that relining is carried out before these pipes begin to fail, or accelerated if there appears to be an increase in failures.
We carry out CCTV inspections of a sample of approximately 1-2% of pipelines every year and have used this information to extrapolate the condition of similar pipes in the network. As more information is forthcoming the priorities and pace of the programme can be revisited.
Renewals expenditure is matched approximately to the rate of depreciation. As with the drinking water assets we are not seeing a large number of full-scale asset failures, so the assets do not appear to be on the verge of imminent failure, although that risk increases over time. We choose to spread out renewals over time to avoid having a large spike of expenditure over a short time period.
Renewal priority is based around age, material and criticality, with modifications made based on analysis of maintenance records and customer complaints.
Since the Rakaia scheme was constructed in 1999 we do not anticipate widespread renewals in the near future, but we anticipate adding this scheme to the inspection programme from the 2040s onwards. We expect to begin the first renewals towards the 2070s or 2080s in order to provide reasonable smoothing of expenditure, although this is very much subject to change depending on the deterioration of the pipes.

Cost efficiency

A large component of cost in our wastewater treatment systems is electricity – used for powering mechanical aerators and pumping wastewater around treatment plants and out for irrigation at Rakaia and Ocean Farm. The best way to save costs is to stop groundwater or stormwater from entering the network, and thereby not spending resources pumping or treating it. Methods for reducing this infiltration and inflow have already been discussed.
There are also options to improve the efficiency of the treatment, such as more energy-efficient aeration methods, smarter monitoring and control of aeration, and managing pumping schedules to spread demand.
In the reticulated networks we carefully consider the best approach to renewals. This means carefully selecting the methods used, and also means considering which assets to replace and to what extent.
As with drinking water, remote monitoring equipment and greater use of automation can reduce the number of visits required at sites, saving significant time and cost.

Significant decisions

This section outlines the main significant decisions to be made in the coming years. These range from very specific questions about projects to questions of strategic direction.
None of these are being specifically addressed in the Consultation Document. This is because the options are not developed and understood, or the decisions fall several LTPs hence, or the proposed option is status quo.
In this section, figures used are uninflated to facilitate comparisons between options.

Renewal programme intensity

Driver: Resilience, affordability

Decision required: 2023, and prior to every LTP thereafter

Ongoing renewal of aging pipes is carried out to minimise the costs of failures and blockages, and the additional treatment costs from infiltration and inflow.

The amount of money dedicated to renewals can be varied to trade capital expenditure for risk.

Assumption: The rate of failures increases slowly, rather than in a sudden jump.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Renew in line with depreciation	There is no additional effect on rates as depreciation must be rated for regardless. This is the preferred option because we are not seeing widespread infrastructure failures and so the additional cost may be unnecessary.	No additional cost 2023		✓	✓
Other options	Raise renewal funding above depreciation	This option would help to flatten a potential 'bow wave' of failing pipes in the future, protecting potential future ratepayers but at a cost to present ratepayers. When borrowing costs are low, this might present a favourable option compared to waiting for assets to fail and borrowing at the prevailing rates at the time.	Variable. Perhaps $500,000 pa additional		✓	✓
	Lower renewal funding below depreciation	There is no effect on budgeted rates as depreciation must still be funded, but over time an increase in maintenance costs may be seen as more pipes fail. A reserve may be built up with this option, to be spent on demand as assets begin to fail. This has the advantage of maximising the life of assets, by not renewing them until they fail, or begin to cause large increases in maintenance costs. However, this option also requires more reactivity and agility as renewal of failing assets is more time-critical and less flexible than planned routine renewal. Work under this option is inherently more variable, and may not be compatible with efficient procurement of large or multi-year work packages.	Potential for higher costs of repairing at point of failure			✓

Ocean Farm wastewater disposal system

Driver: Compliance, affordability

Decision required: 2023 – Allows time for investigation before programming for the next LTP

Treated wastewater is disposed of to land at Ocean Farm via a network of pop-up sprinklers and grass is harvested and sold through a cut-and-carry operation. The sprinklers suffer from pressure problems that limit irrigation coverage and the direct application of effluent to the grass limits the markets it can be sold to. Alternative systems for disposal of wastewater could solve both problems, which would increase yields and thus income.

At present ADC is generally meeting its levels of service, although this could change if operational performance deteriorates.

We have a long-standing unmet requirement to measure effluent volumes discharged to each irrigation zone. Ideally this would be addressed along with any overhaul of irrigation.

Assumptions:

Cut and carry remains part of the operation of Oceam Farm.

Any required variations or approvals from ECan to vary the irrigation methodology are forthcoming

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Replace current irrigation system with subsurface irrigation	Under this option the existing irrigation will be removed from the whole farm and replaced with subsurface drip irrigation. Main pipework may be reused or may be replaced, to be determined by detailed design. This option carries a high capital cost but should be cheaper for operations as the number of sprinklers needing replacement and cleaning will be dramatically reduced. This option also enables higher grass yields due to more complete coverage (up to doubling the area reached by irrigation) and may unlock higher prices for the grass due to more buyers for the product.	$400,000 2021		✓	✓
Other options	Replace existing popup sprinklers with another type, such as impact sprinklers	Small-scale trials have indicated that changing to impact sprinklers improves irrigation coverage. High-maintenance pop-up sprinklers would be replaced with simpler alternatives, reducing operational costs. There is a significant capital cost for this option as well, although the cost could be spread. Failed pop-up sprinklers could be replaced with impact sprinklers individually or on a zone-by-zone basis, so the up-front cost is offset by not spending maintenance funds on new pop-ups.	More expensive than the preferred option			✓
	Replace existing irrigation system with other irrigation system, such	This option has not been explored in detail to date, and would require investigation to determine both feasibility and cost.	Likely to be the most expensive			✓

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
	as a combination of pivots and laterals	It is likely to be the most expensive and most complicated option, particularly given the nature of the farm (long, narrow and split across two levels with inlets).	and complicated option			
	Do minimum	This is a viable option, because the irrigation methodology is not a consent liability per se. We would still need to either improve flow monitoring to meet our consent condition or vary the consent (or seek non-enforcement).	Cheapest option			

Resource consent renewal approach

Driver: Compliance, demand and growth

Decision required: From 2035

Resource consents for the wastewater activity are due for renewal in the 2030s: Rakaia in 2033, Methven in 2034 and Ashburton in 2039. In anticipation of higher standards, capital expenditure is likely to be needed at these treatment facilities, either to achieve higher treatment levels or to increase disposal area.

Assumption: We have not proposed any major projects in the short term, but with the uncertainty about the future regulatory environment it is possible that a clearer strategic direction may emerge in the next few years, which will be reflected in subsequent AMPs and LTPs.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Follow a similar treatment approach, but expand the disposal area to meet contaminant loading limits	Likely to be the lowest cost and gets the most from our available resources	Moderate Relatively quick to implement		✓	
Other options	Upgrade the treatment processes	Expensive	High Due to the need for investigations and design we would need to begin planning perhaps 3 years prior to renewal		✓	
	Attempt to ensure compliance though the consenting process	Unlikely	Low Approximately 1 year prior to expiry			

Sludge management – Ashburton and Methven

Driver: Compliance, demand and growth

Decision required: From 2030

Sludge, a by-product of biological wastewater treatment processes, naturally builds up in wastewater treatment ponds over decades. Eventually it will build up to a level that impairs correct functioning of the treatment and will need removal. Sludge surveys are carried out periodically to check levels.

A range of options exist to manage and remove sludge, with different efficacies and timescales.

Assumption: Sludge builds up at a similar rate to historical records

.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Explore non-conventional sludge management options This might include microbial or chemical digestion	This investigation may not identify any viable alternatives to conventional desludging. Microbial digestion has been proven ineffective in one trial, but other systems are available.	Low, but risky if techniques do not work. As these methods may be slower, this work would need to begin much sooner than more conventional methods.			✓
Other options	Dredging to geotextile bags or on-site holding pond for dewatering before disposal off-site (landfill)	This option is safe but the most expensive. It may also be seen as inefficient to cart all of the solids to landfill.	High Relatively quick to remove sludge, although drying time could be extensive.			✓
	Dredging to geotextile bags or on-site holding pond for dewatering before disposal to farmland or composting	This option may not be practical, depending on the nutrient levels in the sludge. High nutrient levels or limited land availability may limit the rate of disposal to land.	Moderate-High Could be cheaper than landfill if land is available and consenting is not too difficult.			✓
	Dredging to geotextile bags or on-site holding pond for dewatering before retaining permanently in situ	This option would require careful planning to manage the risks around retaining this material on site. There is a risk that we may not be able to obtain a consent for this.	High Compliance costs could be very high			✓

Financial forecasts

Renewal profile

The renewal profiles below show the forecast renewals for each year over the next 100 years (blue bars), based solely on standard asset lives and valuations, modified for condition rating. This shows the theoretical renewal programme before any smoothing is applied. The chart also shows the 5-year moving average and 10-year average, as well as the running totals of depreciation and replacement cost

What these illustrate is that there is a need for a routine pipeline renewals programme for the next few decades, and then a relative lull before renewals expenditure ramps up again into the 22nd century as PVC pipes installed in the last two decades come up for renewal. This is likely to be brought forward, based on condition assessment, both in order to spread the cost and to renew pipes as they need it, since some are likely to not make their theoretical life.

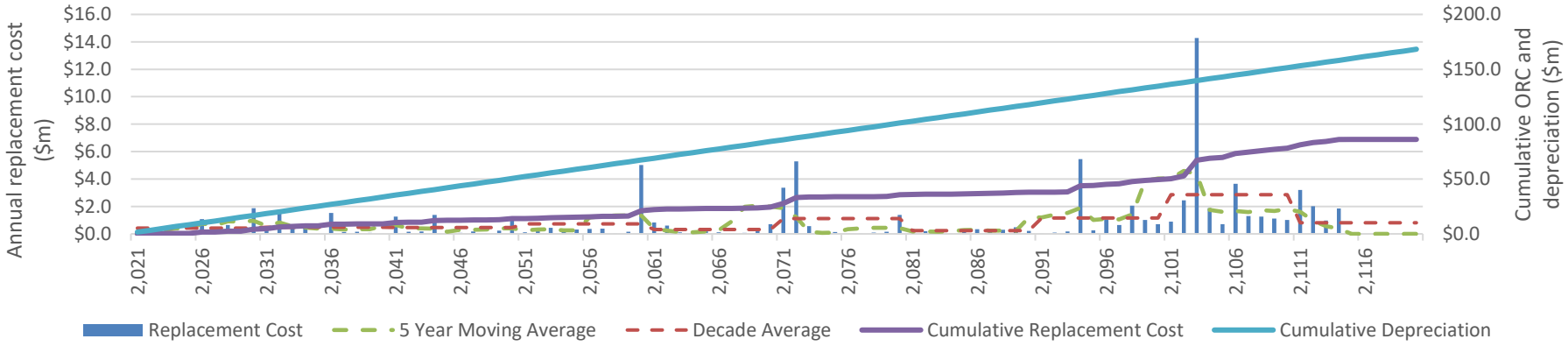


Figure 5 - Wastewater reticulation renewal profile

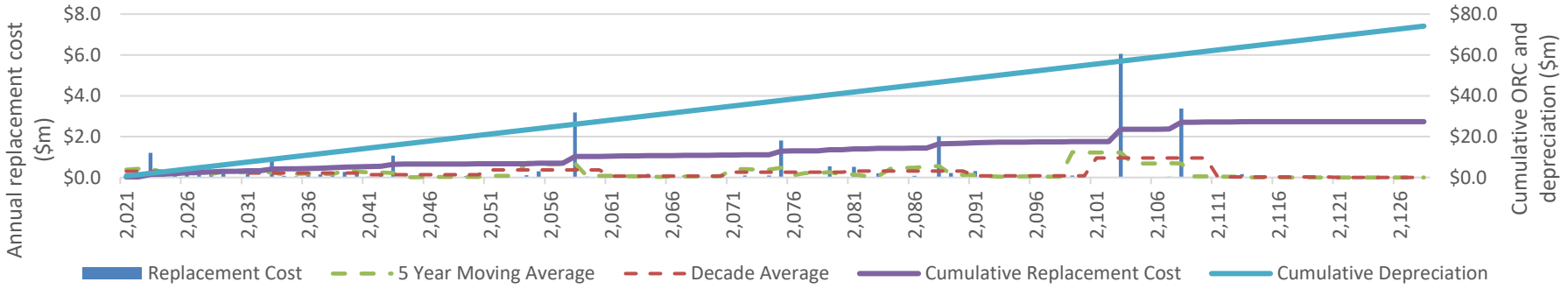


Figure 6 - Wastewater facilities renewal profile

Capital expenditure

All new capital expenditure on Wastewater is shown in the chart below. Note that the last four bars represent 5-year totals. The chart shows significant expenditure in three large tranches:

- At the beginning, there is a large spend on the Ashburton Relief Sewer, and on reticulating the north-west area of Ashburton;
- In 2027-28 there is another area of town being reticulated in the north-east area;
- In 2031-36 and 2036-41 there are projects included to extend irrigation in Rakaia and at Ocean Farm, and to install a UV treatment system at Ocean Farm. These are in preparation for future resource consent renewals.

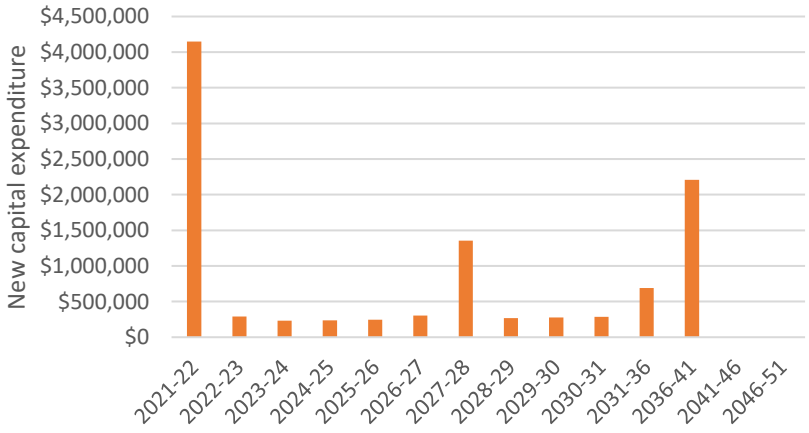


Figure 7 - Wastewater new capital expenditure

Operating costs

Forecast operational expenditure for Wastewater is shown in the chart below. Note that the last four bars represent annual average figures, for easier comparison. This chart shows a general increase over the next 30 years, as costs overall rise in line with inflation and growth in the network. New facilities add to the cost of operating the network, while new pipes should not lead to an immediate increase in costs as they should be reliable for a long time.

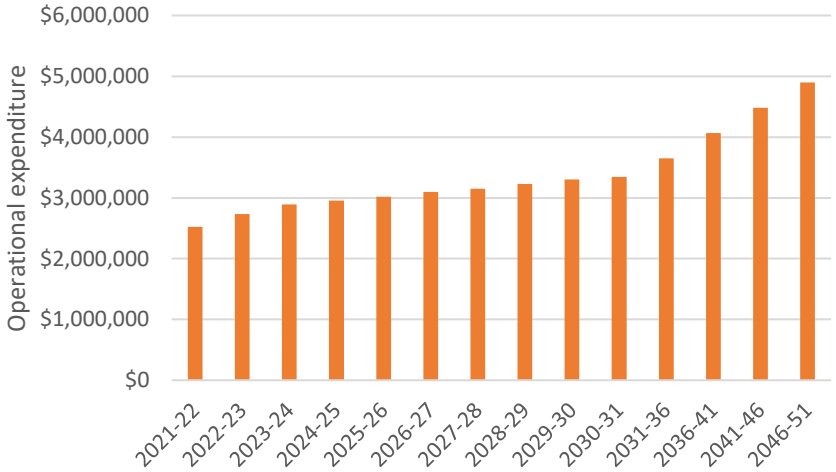


Figure 8 - Wastewater forecast operational expenditure

Our future - Stormwater

Our stormwater services provide communities with managed collection, conveyance, treatment and disposal of stormwater at an affordable cost.
The next 30 years will see a stronger focus from government and regulators on improving freshwater quality, and stormwater management is a key part of that. Historically stormwater networks have focused on collection and disposal rather than treatment and the quality of wastewater discharges to waterways; this balance is changing.
Councils need to formalise resource consents for stormwater disposal from their urban networks, and begin to implement monitoring and improvement programmes outlined in these consents. We have recently obtained a global stormwater consent covering the Ashburton, Tinwald and Fairton urban areas which is beginning to be implemented. Methven and Rakaia will follow; consents for these are currently required by 30 June 2022.
The ongoing central government three waters review and the new regulator Taumata Arowai will have limited impact on stormwater in the short term – their initial focus is on the regulation of drinking water, but the purpose of Taumata Arowai includes an aim to:

> "provide national-level oversight, leadership, communication, and co-ordination in relation to—
>
> […]
>
> (ii) the environmental performance, management, and regulation of wastewater and stormwater networks;"

At present it is not certain whether stormwater is likely to be included with wastewater and stormwater in any putative new water entity, or whether it will remain with local government.

There has been an increasing interest in rural stormwater management in recent years, particularly as land use patterns change and irrigation and stockwater races are closed or moved. This may lead to an expansion of the scope of the stormwater services to include more than the traditional concentrated networks.
Our priorities for the next 30 years are to:

- obtain, implement and maintain compliance with applicable resource consents;
- roll out the programme of upgrades proposed for Ashburton to ensure that discharges to the river and streams are captured and treated to an appropriate quality;
- monitor the condition and performance of existing assets to ensure that levels of service are being maintained;
- seek out cost efficiencies, including adopting new technologies.

Significant decisions

The future direction for the urban stormwater networks is largely set by the existing and future resource consents. As a result, there are no significant decisions relating to those networks. The identified significant decision relates to the future of the responsibility and management of rural drainage.
In this section, figures used are uninflated to facilitate comparisons between options.

Rural stormwater

Driver: Resilience, demand and growth

Decision required: 2024

Ashburton District has had a network of stockwater races since the late 1800s. As these races have been closed and filled in the drainage function they also served has been lost, causing flooding and nuisance issues. Environment Canterbury only takes responsibility for the drainage schemes operated by the former drainage boards. This decision is around how we manage rural stormwater on behalf of our ratepayers.

Assumption: Stockwater race closures continue at similar rates to present.

Principal options		Implications of the options	Cost estimate and timing	Driver		
				Growth	Level of service	Renewal
Preferred option	Assess and designate important former races as drainage assets for the purposes of the Land Drainage Act Accept responsibility for these drains	By accepting responsibility for these drains there will be a need for funding and resources to inspect and manage them. A modest budget provision has been agreed already for current issues, but this would increase continually as more assets come under the Rural Stormwater umbrella. We might require landowners to maintain the drains, or undertake maintenance ourselves. There may be some efficiencies available in the short term if the management can be shared with the existing Stockwater activity, but this may not continue indefinitely.	Final cost is undetermined at the moment, as these drains are yet to be comprehensively identified. This project should be completed during this LTP. However, the cost is likely to be high, on the order of hundreds of thousands of dollars per year.		✓	
Other options	Leave as the responsibility of landowners	May be seen as not providing a necessary community service.	Minimal cost		✓	

Financial forecasts

Renewal profile

The renewal profiles below show the forecast renewals for each year over the next 100 years (blue bars), based solely on standard asset lives and valuations, modified for condition rating. This shows the theoretical renewal programme before any smoothing is applied. The chart also shows the 5-year moving average and 10-year average, as well as the running totals of depreciation and replacement cost

What these illustrate is that there are few assets in need of renewal in the next 30 years, and so depreciation accumulates until it is needed in later decades. By the time all current assets have been renewed, renewal expenditure has (correctly) caught up to depreciation.

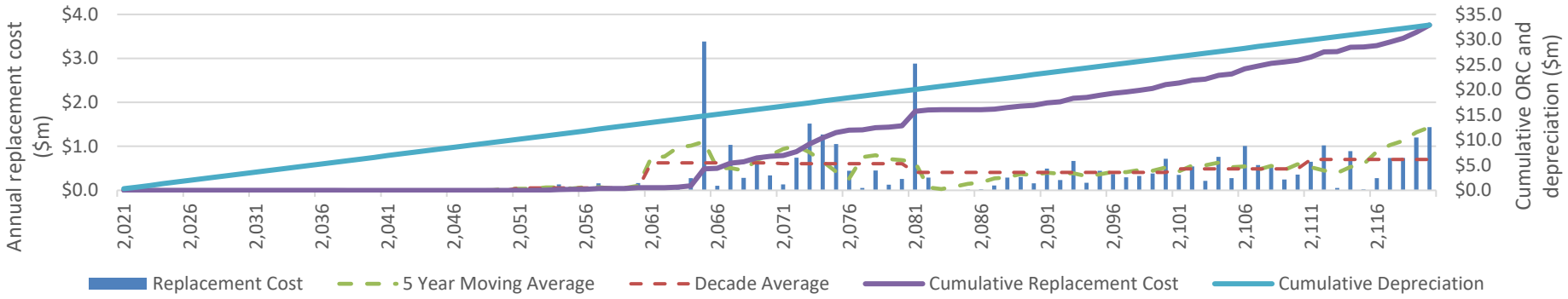


Figure 9 - Stormwater reticulation renewal profile

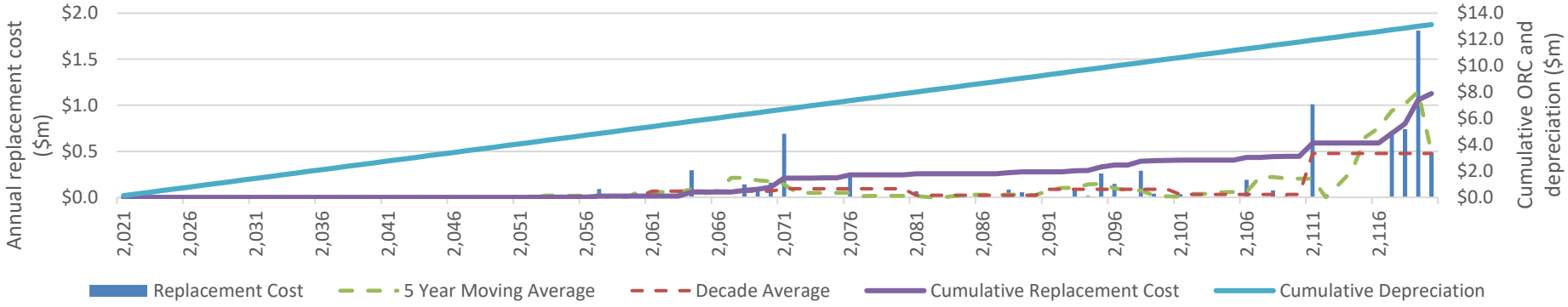


Figure 10 - Stormwater structures renewal profile

Capital expenditure

All new capital expenditure on Stormwater is shown in the chart below. Note that the last four bars represent 5-year totals. The chart shows a long-term programme of pipelines and treatment facilities spread across the 30 years.

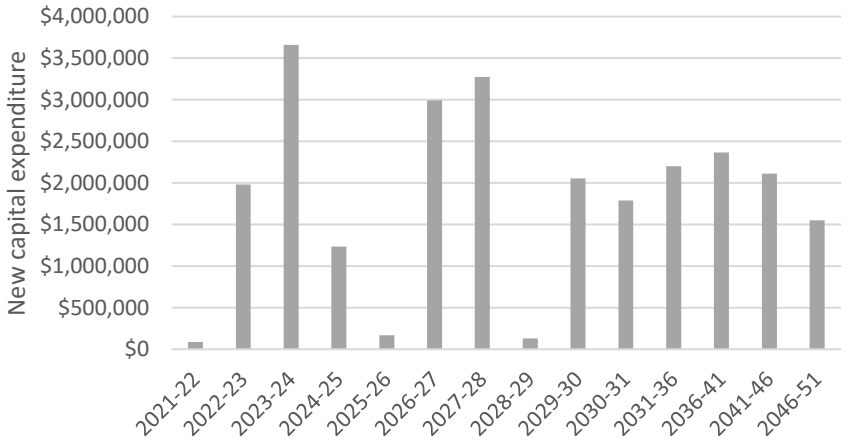


Figure 11 - Stormwater new capital expenditure

Operating costs

Forecast operational expenditure for Stormwater is shown in the chart below. Note that the last four bars represent annual average figures, for easier comparison. This chart shows a general increase over the next 30 years, as costs overall rise in line with inflation and growth in the network. New facilities add to the cost of operating the network, while new pipes should not lead to an immediate increase in costs as they should be reliable for a long time.

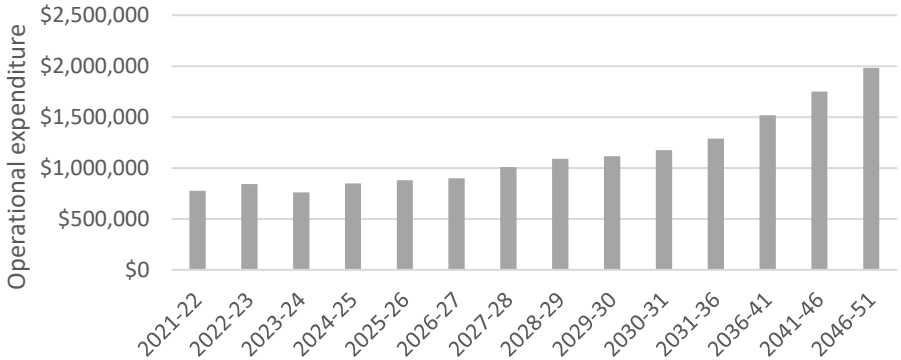


Figure 12 - Stormwater forecast operational expenditure

Our future - Roads

Our responsibility is to provide users with a network that enables safe, effective and fit-for-purpose journeys. This network includes roads, footpaths, walkways and cycleways.

Our users are diverse and include (but are certainly not limited to) residents, tourists, pedestrians, truck drivers, cyclists, commuters, goods and service suppliers, schoolchildren, motorcyclists, farmers, the disabled and physically challenged, and shoppers. This means we have to balance social, personal, economic and community requirements. The composition and needs of users over the next 30 years is unlikely to change markedly, but there is likely to be moderate expansion of the existing urban areas.

While forecasting so far ahead cannot be an exact science, it is certain that the following will be key objectives over that period;

- ensuring network users' safety
- providing multi-modal transportation options
- achieving value for money
- providing economic and social benefits
- minimising environmental impacts
- identifying and managing risks
- enabling and improving resilience.

Specific challenges that, if not addressed and managed, could impede the achievement of these objectives include;

- resource availability and affordability
  - *with the forecast increase in national infrastructure projects over the next decade there may be a shortage of workers and equipment, and possible associated cost increases.*
- maintaining levels of service while ensuring cost effectiveness
  - *over-subscribed funding sources will necessitate innovative and practical decision-making to ensure users' expectations are met.*
- meeting NZTA reporting and proposal requirements
  - *there is ever-increasing scrutiny of the evidence and processes that inform work programmes to ensure public monies are well spent.*
- future-proofing Ashburton-Tinwald connectivity
  - *as the district's urban centre and a critical regional and national transport hub, long term resilience projects could include bypasses and additional river crossings.*
- ensuring bridge replacements are anticipated and budgeted.
  - *these are the most critical and at-risk nodes on our network, and replacement works are relatively high-cost projects, so appropriate planning is crucial.*

Significant decisions

In this section, figures used are uninflated to facilitate comparisons between options.

Ashburton-Tinwald connectivity

Driver: Resilience, demand and growth

Decision required: 2021

State Highway 1 (SH1) is a key strategic transport route for the South Island, is the main route through Ashburton and Tinwald, and also functions as a core local traffic distributor. A number of factors combine to sometimes cause standstill congestion through this urban area.

A Strategic Business Case (SBC) has been completed to demonstrate the need for wider investment across the Ashburton and Tinwald transport network. This SBC outlines the benefits of investing in improving connectivity, examining available evidence for the problems, and identifies key performance indicators (KPIs) to measure the success of investment over time.

The need for investing in improving connectivity between Ashburton and Tinwald is being driven by:

- the need to support population growth
- the need to ensure people can move safely and easily across the river, including emergency services
- the need to ensure that inter-regional freight is moved efficiently
- the need to provide locals with alternative travel modes to motor vehicles.

This SBC has come about from a long-standing proposal to build a second bridge across the Ashburton River. This bridge would be on a local road thus be a council asset. Council has previously resolved to only fund 20% of the costs involved. The remaining 80% may be sourced from NZTA subsidy, and/or other central government funding options (e.g. Provincial Growth Fund).

An SBC is required to step back from the proposed solution (the second bridge) and ensure that, at a strategic level, the previously identified issues and evidence are valid and robust. At the time of writing, the SBC is with NZTA for review, and dependent on NZTA's response, the next step could be to write a Detailed Business Case (DBC). A DBC delves deeper into the problems and looks at specific solutions and their appropriateness. Based on Council's previous decisions, and NZTA's current policies, one of the following four scenarios will arise;

A. NZTA agree to fund the project to the current standard Funding Assistance Rate (FAR) of 51%. (Council′s cost: $18.13M)
B. NZTA agree to fund the project at the 80% subsidy proposed by Council (Council′s cost: $7.5M)
C. NZTA agree to fund the project at an alternative FAR (Council's cost: unknown)
D. NZTA do not agree the project merits subsidy and there is no NZTA funding (Council′s cost: $37M)

We′ve budgeted to start the detailed design in 2024/25. Construction would begin the following year. The full cost of this project is estimated to be $37m - we′ve included $7.5m of debt and funding in our financial forecasts (20% of the project cost). We have planned on the balance of the funding to come from Waka Kotahi ($18.8m - 51% of the project) and central government - $10.7m (remaining 29% of project).

The option of either building or not building a bridge will in large part be dependent on which situation ensues. If there is NZTA funding offered then we will have to decide if the proposed subsidy rate is acceptable. If it is then the project can proceed. If not then scenario D arises which would either stop the project or require investigation of alternative funding sources.
Note that the current estimated cost of $37 million will need to be reviewed/revised with updated and detailed design data and criteria.

Assumption: Having only a single two-lane bridge across the Ashburton River in the urban area is causing undue traffic congestion.

Principal options		Implications of the options	Cost estimate and timing	Drivers		
				Growth	Level of service	Renewal
Preferred option	Construct a second bridge within the urban area.	Substantial financial commitment for both construction and subsequent ongoing maintenance and renewals. Requires connecting roads/paths (and related assets) to be constructed or renewed. Requires bylaws regarding HCV routes to be updated to ensure residential areas are not unduly affected by changes in traffic composition or volumes.	$37 million (ADC contribution $7.5m (20%), Waka Kotahi $18.8m (51%), Central Government $10.7m (29%)) 2021/22 to 2025-26 (investigations, design, construction)	✓	✓	
Other options	Do not construct a second bridge – investigate other options on existing roads that could manage the traffic flows through Ashburton and Tinwald.	These options could include increasing lane numbers, increasing lane widths and controlling traffic movements on the existing State Highway and connecting local roads through Ashburton and Tinwald. It is unlikely that these actions would adequately address the current congestion issues, and even less likely with subsequent traffic growth, even if that growth is low.	Unknown		✓	

Financial forecasts

Renewals

The forecast renewal expenditure for the next 30 years is shown in the graph below. Note that the last four bars are annual averages, for ease of comparison. This illustrates a fairly consistent rate of renewal, reflecting a stable programme with no large variations for major asset renewals. The increase is due mainly to a general trend of cost inflation, with no significant increase in the asset base anticipated.

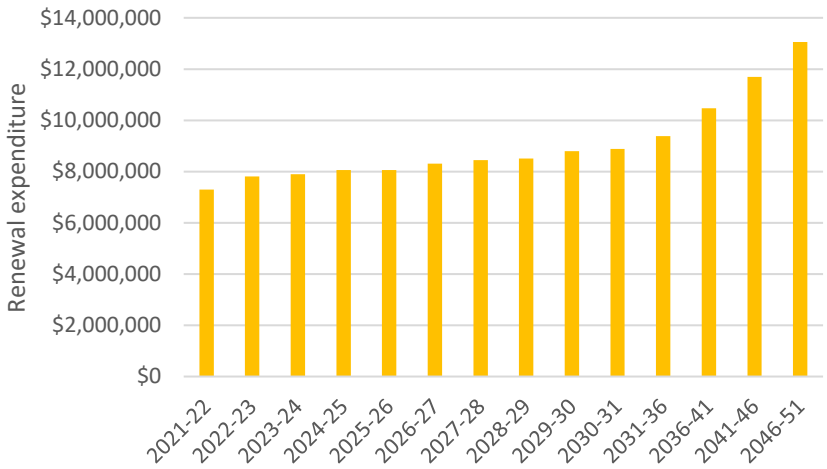


Figure 13 - Roading renewal expenditure

Capital expenditure

All new capital expenditure on Transportation is shown in the chart below. Note that in this chart the last four bars represent 5-year totals.
The chart shows large expenditure in 2025-26 and 2026-27 for the Ashburton-Tinwald connectivity project, followed by three light years before annual expenditure reverts to a more typical $4-5m.

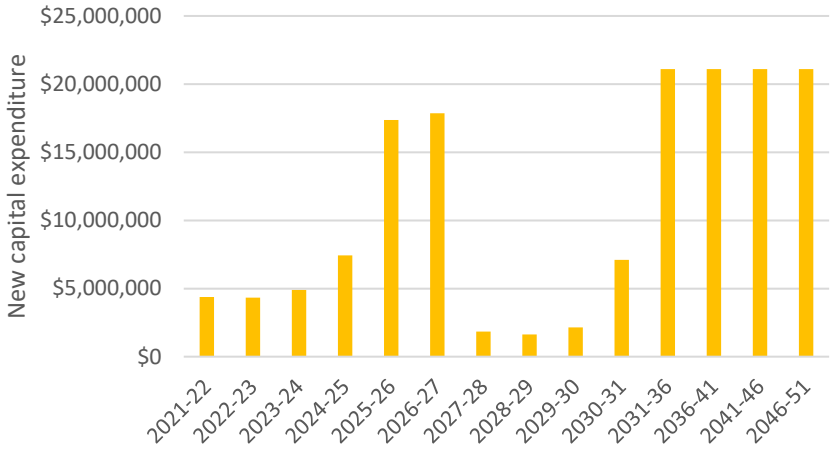


Figure 14 - Roading new capital expenditure

Operating costs

Forecast operational expenditure for Transportation is shown in the chart below. Note that the last four bars represent annual average figures, for easier comparison. This chart shows a general increase over the next 30 years, as costs overall rise in line with inflation.

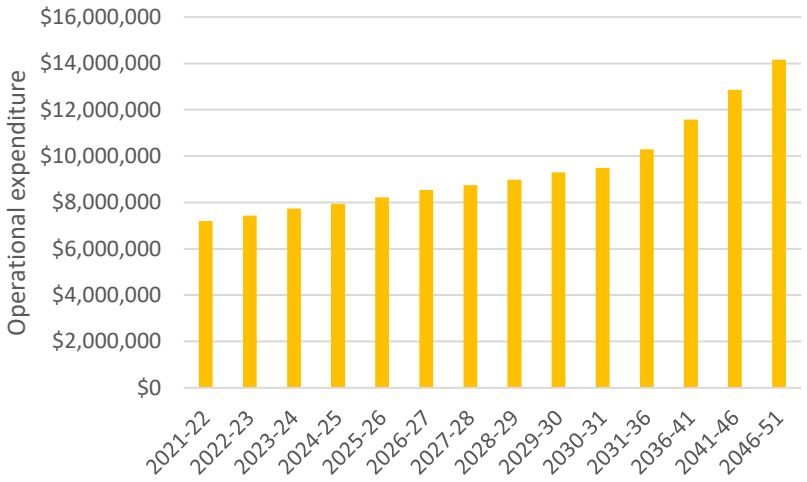


Figure 15 - Roading forecast operational expenditure