Wastewater Activity Management Plan 2018

Quality Assurance Statement		
	Version:	1 July 2018
Tasman District Council	Status:	Final
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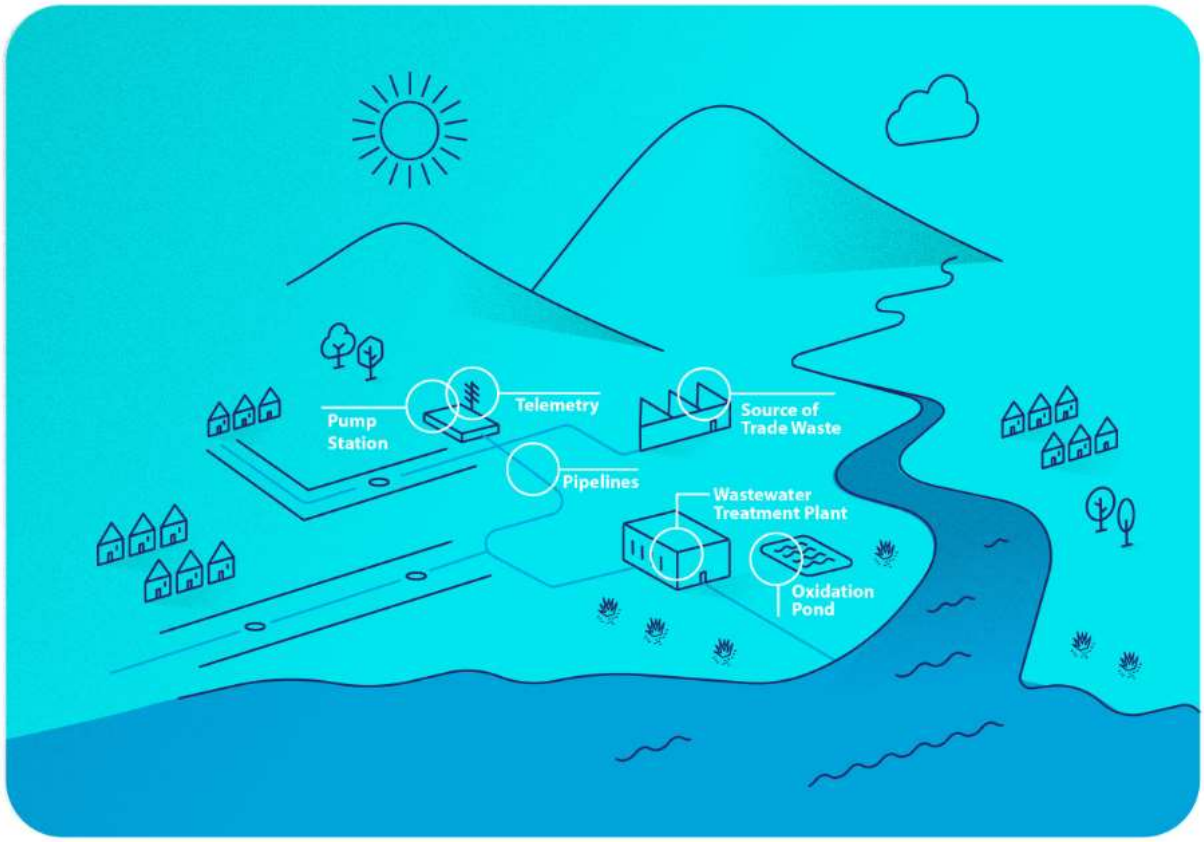
1 Executive Summary

1.1 What We Do

Council provides and manages wastewater collection, treatment and disposal facilities for residents connected to Council's nine wastewater networks. These networks convey wastewater to nine treatment plants, eight of which are owned and managed by Council. The largest treatment plant (Bell Island) is owned by both Nelson and Tasman Councils on a 50:50 share basis and is managed by the Nelson Regional Sewerage Business Unit.

Below is an overview of the key components of the wastewater activity.



1.2 Why We Do It

We aim to provide cost effective and sustainable wastewater systems in a manner that meets environmental standards and agreed levels of service.

The provision of wastewater services is a core public health function of Local Government and is something that Council has always provided. By undertaking the planning, implementation and maintenance of wastewater services Council promotes and protects public health within the District.

For Council a key duty required by the Health Act 1956 is to improve, promote, and protect public health within the District. Providing wastewater services helps achieve this.

1.3 Levels of Service

Council aims to provide the following levels of service for the Wastewater activity:

"Our wastewater systems do not adversely affect the receiving environment."	"Our wastewater systems reliably take out wastewater with a minimum of odours, overflows or disturbance to the public."	"Our wastewater systems are built, operated and maintained so that failures can be managed and responded to quickly."
"Our wastewater activities are managed at a level that satisfies the community."	"Our wastewater systems are designed, operated and managed to be resilient."	

Council is planning investment in order to improve its performance in preventing overflows so that they do not adversely affect the environment. Council is planning pump station and rising main upgrades in Mapua and Pohara to help mitigate overflows in these areas. Council plans to mitigate overflows in Richmond through addressing inflow and infiltration issues. Council is planning investment into storage capacity and generators to make the network more resilient.

1.4 Key Issues

The most important issues relating to this activity and how Council is planning to respond are summarised below.

KEY ISSUE	COUNCIL RESPONSE
 Inflow and infiltration uses pipe capacity, increases conveyance and treatment costs, and contributes to overflows	Council has planned an ongoing inflow and infiltration programme in addition to the existing CCTV investigations. This will enable Council to collect more condition data and enable better decisions on balancing maintenance and renewal spending. Over time the renewals programme will address inflow and infiltration as aging and broken pipes will be replaced. Council will identify illegal private and failed connections and take actions to have these rectified. The cost of identifying the work will be funded by Councils budget and the private party involved will fund the repairs. Council is considering the use of low pressure pump systems for new subdivision in flats areas where the groundwater table is high. This will likely reduce the impact of inflow and infiltration in the network. Council is planning to improve coordination with the Building Compliance Team to ensure new connections to the network do not contribute to the existing issues.
 Meeting residential and commercial growth demand is a challenge in some key areas	Growth is a Council priority and many projects are driven by the need to cater for future growth. Council has planned new pump station and rising main projects in Brightwater North, Mapua and Motueka West. Council has planned upgrades to existing infrastructure in Motueka, Richmond West, Brightwater and Wakefield.

KEY ISSUE	COUNCIL RESPONSE
 The wastewater network lacks back up power options and emergency storage capacity making it less resilient	Council has planned to increase storage capacity at pump stations at high-risk sites and as part of the pump station renewals programme. Council has planned to invest in site dedicated and mobile generators. This will enable key pump stations to operate during power outages make the network more resilient. Council is considering the use of low pressure pump systems for new subdivision in flats areas where the groundwater table is high. This will allow increased capacity during wet weather.
 Managing overflows is becoming increasingly challenging in some areas	Overflows adversely affect the environment and pose a risk to public health. Council is planning to mitigate overflows by addressing inflow and infiltration in Richmond and Motueka. Council is planning pump station and rising main upgrades in Pohara and Mapua. The investment will provide assets of adequate capacity for the current and future population. The risk of overflows should reduce, and the community should experience a higher level of service. Council has planned to have telemetry installed across all wastewater networks by the end of 2018. This will enable Council to manage short-term capacity issues by utilising existing emergency storage as buffering capacity during peak flow and significant rainfall events.
 Asset information needs improving to allow better asset management and facilitate sound decision making	Improving asset information is long-term strategic process. Council has planned to conduct regular condition assessments; improve data requirement specifications in the proposed Land Development Manual; develop asset data standards, and work towards adopting proposed metadata standards. Council's planned inflow and infiltration programme and CCTV and data capture programme will assist in improving asset data.

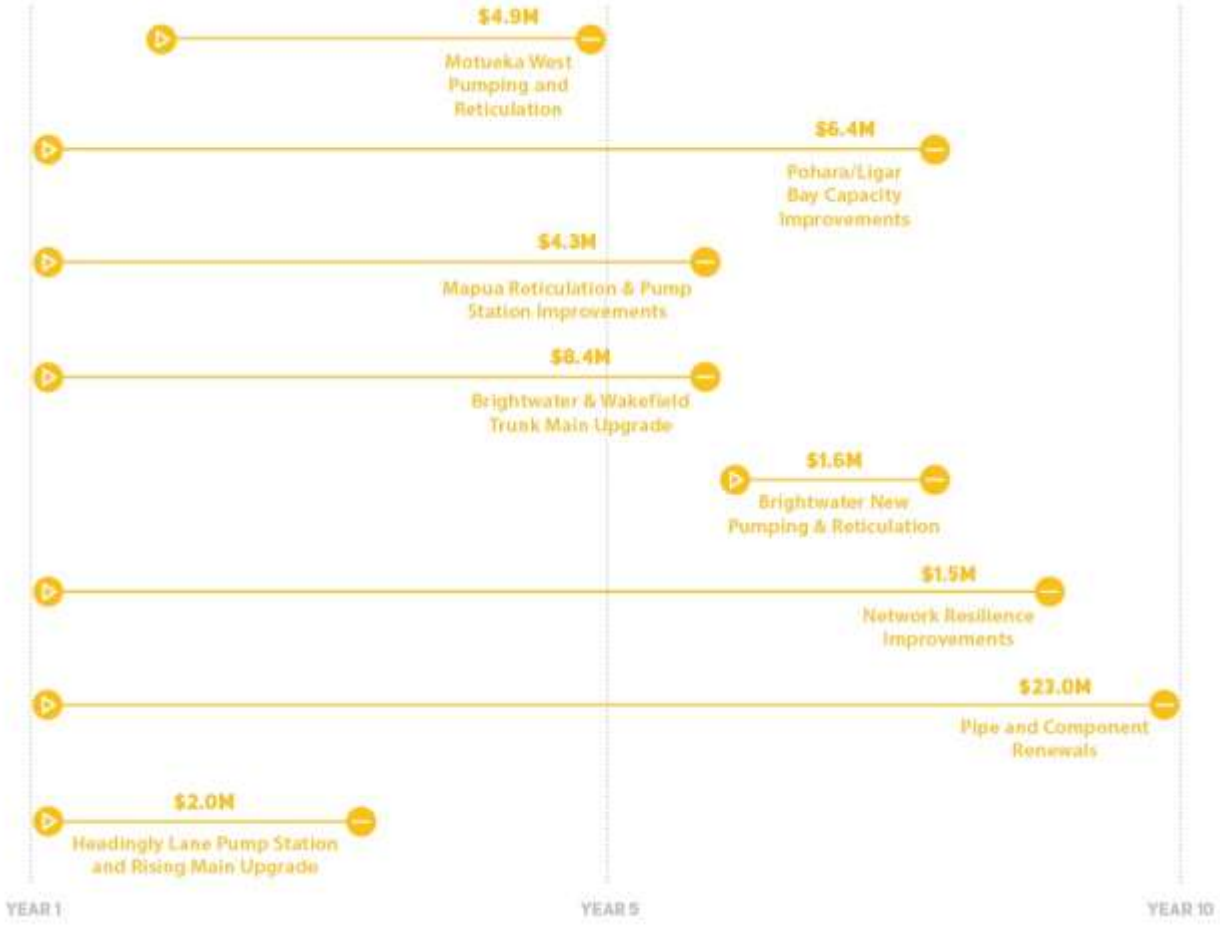
1.5 Operational Programme

The wastewater operations and maintenance programme covers all day to day activities that are required to manage the wastewater activity. Operational costs for the wastewater activity are forecast to increase by around 3% per year for the first 10 years, and 4% per year over 30 years. The major activities included in this programme and the forecast spend over 30 years is summarized below.

Routine & Reactive Maintenance	Operations	General Operating Costs	Professional Fees	NRSBU costs
Reticulation, Treatment, Pump Stations	SCADA/Telemetry, Inflow & Infiltration, CCTV Programme	Electricity, Rates, Insurance	Consultants, Legal Fees, Studies	Variable Loading, Fixed Costs
$45M	$11M	$20M	$4M	$120M

1.6 Capital Programme

Council plans to spend around $64 million on capital improvements over the next 10 years. Of this 31% is attributed to growth, 31% for level of service improvements, and 38% for asset renewal. Council anticipates that the majority of investment being made to enable growth will be required within the first 10 years. After this, negligible costs will be attributable to growth. Beyond 10 years, Council has planned to make a major investment in a new inland wastewater treatment plant in Motueka, this occurs between Year 15 and Year 20 and accounts for the notable increase in forecast capital expenditure.



1.7 Key Changes

The following tables summarises the key changes to the operational and capital programmes:

Table 1: Summary of key changes to the operational programme

Operational Programme Key change	Reason for Change
Increased wastewater modelling budget	Growth has occurred much faster than Council anticipated. Council has determined that more up to date modelling is required to help define and plan growth in key areas. Council has budgeted $100k pa in year 1 and 2, $40k pa in year 3 and 4 and $20k pa thereafter. Modelling will complement the planned long-term strategic studies.
New long-term strategic studies for Waimea and Motueka	Council has planned new budget to undertake a long term strategic study for the Waimea wastewater networks, and the Motueka wastewater network. The outcomes of the study will help Council plan appropriate infrastructure upgrades that meet the needs of the current and future communities, bearing in mind

Operational Programme Key change	Reason for Change
	the impacts of climate change.
Increased budget to address inflow & infiltration issues	Inflow and infiltration is more widespread than Council had anticipated and a continuing challenge to manage. In the previous AMP, Council budgeted to undertake inflow and infiltration reduction works in the first three years, and an ongoing investigation & repair budget thereafter. In this AMP Council has planned an ongoing budget of $165k pa to maintain a consistent proactive approach to this work.

Table 2: Summary of key changes to the capital programme

Capital Programme Key change	Reason for Change
New projects to enable residential and business growth	Growth is happening faster than expected in some settlements and wastewater infrastructure needs to be in place before development can occur. Key projects include: • New pump station and rising main is required in Brightwater • New rising main from Motueka West to the Wastewater Treatment Plants (WWTP) to accommodate growth • Upgrade of the Headingly Lane pump and rising main to accommodate growth in the Richmond West area
Council has given priority to reticulation and storage upgrades in Mapua and Pohara	The Mapua/Ruby Bay network suffers from wet weather infiltration. The existing infrastructure needs to be upgraded to provide storage capacity to allow for growth and address overflows from the network. The Pohara network also suffers from wet weather infiltration. The existing infrastructure needs to be upgraded to provide adequate storage capacity and the pipelines needs to be replaced.
Transferred sludge removal from operational to capital programme	Council considers that sludge removal increases the capacity of wastewater treatment plants and enables a longer asset life therefore, Council has classified the work as renewal and a capital cost.

1.8 Key Risks and Assumptions

There are factors outside of Council's control that can change having an impact on Council's ability to do what it planned. Sometimes the impact can be significant. There is always uncertainty in any planning process but the key to good quality planning is to make clear assumptions to help address this uncertainty. This section sets out the key risks and assumptions that relate to this activity.

- Currently, there are high levels of inflow and infiltration within the Motueka wastewater network taking up capacity that could otherwise be used by new connections. Council has assumed that this inflow and infiltration will be addressed by on-going pipe renewals and targeted inflow and infiltration repairs. Council expects that this work will reduce demand enough to be able to provide capacity to support the level of growth predicted for Motueka (excluding Motueka West). It is possible for the works to achieve insufficient capacity, or for the rate of growth to exceed the rate of inflow and infiltration reductions. If this is the case, Council will need to programme additional pipe upgrades to enable growth, or potentially limit the rate and location of new connections.
- Council has prepared the wastewater programme of works based on the information that was available at the time. Over the next few years, Council has planned to undertake long term strategic studies for Motueka and the Waimea networks. This will provide new and up-to-date information that is likely to identify alternative options for the way the schemes could operate, and the associated operating and capital requirements.

- Council is uncertain about NRSBU costs because operational costs are based on the use of individual subscribers and this can be variable. Council has planned budgets based on historic usage. If usage is different to what was assumed, costs may increase or decrease.
- Council is planning to increase trade waste charges commencing July 2018 and is uncertain about the associated income in the future. Council assumes trade waste volumes and income will be in line with historic usage and budgets.
- Council is responsible for maintaining new low-pressure household pumping units (where a complete catchment is set up with pressure pumps) and cannot be certain about the number of assets that will be vested. It largely depends on where and how fast growth occurs. Council has assumed maintenance budgets based on growth occurring as per the growth model. If the rate and location of growth changes, Council may need to amend maintenance budgets.

2 Introduction

The purpose of this activity management plan is to outline and to summarise in one place, the Council's strategic management and long-term approach for the provision and maintenance of its Wastewater activity.

2.1 Rationale for Council Involvement

The provision of wastewater management services is considered to be a core service of local government and is something that Council has always done. The service provides many public benefits and it is considered necessary to the community, so Council undertakes the planning, implementation, and maintenance of wastewater services in the District. Territorial Authorities have numerous responsibilities relating to wastewater. One such responsibility is the duty under the Health Act 1956 to improve, promote and protect health within the District. This implies that, in the case of the provision of wastewater services, councils have the obligation to identify where such a service is required, and to either provide it directly themselves, or to maintain overview of the supply if it is by others.

2.2 Description of Assets & Services

Table 3 below provides an overview of the wastewater networks assets and valuation data (as of April 2017).

Table 3: Summary of the wastewater assets

Wastewater Assets		Replacement Value	Depreciated Value
	WWTP (8)	$57.1M	$40.4M
	50 % of NRSBU (Bell Island)	$44.6M	$31.5M
	TDC (7)	$12.5M	$8.9M
	78 pump stations	$18.4M	$10.8M
	3689 manholes	$17.3M	$13M

Wastewater Assets		Replacement Value	Depreciated Value
	360 km piped reticulation	$91.9M	$62.3M
	14,041 Wastewater Connections	$19.9M	$14.0M
	Other assets	$5.6M	$4.4M
TDC's 50% CONTRIBUTION TO NRSBU		$44.6M	$31.5M
TDC ASSETS		$165.6M	$113.4 M
TOTAL VALUE OF WASTEWATER ASSETS		$210.2M	$144.9 M

2.3 Wastewater Network System Descriptions

Table 4 below identifies the management status of the nine wastewater networks. The following sections provides a brief description of each networks. Further details including network schematics and maps are available in Appendix C.

Table 4: Wastewater Networks

Wastewater Network	WWTP	Management
Collingwood	Collingwood WWTP	Tasman District Council
Mapua/Ruby Bay	Bell Island WWTP	50:50 with NCC
Motueka (Riwaka & Kaiteriteri)	Motueka WWTP	Tasman District Council
Murchison	Murchison WWTP	Tasman District Council
St Arnaud	St Arnaud WWTP	Tasman District Council
Takaka (Pohara, Ligar Bay & Tata Beach)	Takaka WWTP	Tasman District Council

Wastewater Network	WWTP	Management
Tapawera	Tapawera	Tasman District Council
Upper Takaka	Upper Takaka	Tasman District Council
Waimea (Richmond, Hope, Brightwater, Wakefield)	Bell Island WWTP	50:50 with NCC

2.3.1 Collingwood

The Collingwood scheme was constructed in 1989 and services the Collingwood township and along Collingwood-Bainham Main Road. Wastewater from the lower end of Beach Road drains into the Beach Road pump station, which discharges into a manhole further up Beach Road towards Elizabeth Street. This plus the remainder of the township drains into the Motel pump station (upgraded in 2010), which pumps on to the Wally's Rest pump station (upgraded in 2009).

All pump stations have one duty and one standby pump with ultrasonic or hydrostatic level control. All pump station have digital telemetry. Wally's Rest and Motel pump station have emergency storage and flow meters.

All wastewater from Collingwood is pumped from the Wally's Rest pump station to the WWTP. The treatment plant is located approximately 1.5km west of the town on the Collingwood-Bainham Main Road and comprises an inlet screen, aerated oxidation pond followed by constructed wetlands with UV disinfection and telemetry, and final discharge to the Burton Ale Creek. The WWTP is located on a terrace 11 metres above sea level. There is an iron pan approximately one metre below ground level which means much of the site is boggy in winter making grounds maintenance difficult, and stormwater drains need to be regularly maintained.

The wetlands underwent a major rehabilitation in 2015 to improve the flow through the wetlands, reinstate eroded embankments and provide flow buffering through all five wetland cells. Previously flow was restricted to 8l/s and the final cell was prone to overflow in sustained heavy rainfall events. Flows can now achieve 12.5l/s which is the limit of UV disinfection system.

Collingwood is very close to an estuary and the sea. The risk of a sewage overflow or malfunction of the treatment ponds and pump stations have potentially significant effects that must be mitigated against and managed. This scheme operates well although there are issues with periodic high storm flows that cause the treatment plant to fill and re-suspended solids deposited in the wetlands. This causes high turbidity and reduces the effectiveness of the UV disinfection system. Since the upgrade of the Motel and Wally's Rest pump stations, there have been no overflows of the pump stations.

2.3.2 Mapua/Ruby Bay

Mapua and Ruby Bay were reticulated for wastewater circa 1988. The reticulation network generally drains south and east via gravity, interspersed with pumping stations, delivering all wastewater to the Mapua Wharf pump station. From the wharf, a rising main crosses the Mapua Channel to Rabbit Island and then to Bell Island WWTP. Council's responsibility for this rising main ends at the connection to the NRSBU inlet works on Bell Island.

There are 12 pump stations in the Mapua/Ruby Bay network, all with duty and standby pumps, with corresponding controls and telemetry. The Mapua Wharf pump station was upgraded in 2012 and includes a backup generator, emergency storage tanks and an odour treatment system.

Operation of the pump station is monitored in real time by Council's telemetry system, which can be viewed and interrogated by Council staff and the maintenance contractor. This contractor is responsible for monitoring and responding to alarms and ensuring the pump stations operate. Eight of the 12 pump stations are on the digital network and the remaining ones will be converted as part of future upgrades associated with the new trunk main.

The rising main under the Mapua Channel is a 250mm diameter PE pipeline. An additional unused polyethylene (PE) pipeline also crosses the channel, allowing for future growth in Mapua/Ruby Bay. The balance of the rising main to Bell Island WWTP is 355mm diameter PE and was installed in 2010.

Much of the reticulation network is at or nearing capacity, especially during rain events. New housing developments in the area have put additional pressure on the network through poor quality plumbing which allows surface and ground water to enter the wastewater network. This has led to Council paying closer attention to plumbing work during building compliance inspections and educating local plumbers and drain layers on acceptable plumbing solutions.

2.3.3 Motueka, Riwaka and Kaiteriteri

There are three wastewater systems that discharge into the Motueka Wastewater Treatment Plant (WWTP), Motueka, Riwaka and Kaiteriteri.

2.3.3.1 Motueka

The Motueka wastewater network was constructed in the 1940s with untreated wastewater discharged to the coast until the WWTP, located just south of the Motueka River mouth, was constructed in 1980. The treatment plant has undergone several upgrades, the most recent in 2015/16. The treatment plant comprises a mechanical inlet screen with odour treatment, an aerated lagoon (constructed in 1990), followed by an oxidation pond which is divided into three by two rock bunds. The rock bunds have a recirculation spray system installed on them, so the bunds act as trickling filters, converting ammonia-nitrogen into nitrate and nitrite. After this final pond, wastewater is pumped through a membrane treatment system and out to the coast via two subsurface duckbill diffusers.

The area serviced by this system is flat and low lying, so consists of local gravity reticulation and a series of 20 pump stations. The present system involves some pump stations injecting into the rising main to the treatment plant while other pump stations pass the wastewater along from one to another until it is eventually pumped into the rising main by one of the main pump stations. The pump stations are fitted with duty and standby pumps. Digital telemetry and alarm systems are included on all pumping stations and the treatment plant.

The wastewater flow from the Motueka township is measured by a magflow meter as it enters the treatment plant and flows can be monitored in real time via Council's telemetry system.

2.3.3.2 Kaiteriteri

The Kaiteriteri wastewater system consists of reticulation and pumping stations only. Wastewater is conveyed to the Motueka WWTP for treatment. The Kaiteriteri system is made up of a number of sub-catchments and these relate to the various bays plus the large campground.

The reticulation in Kaiteriteri gravitates to the main pumping station at Martin Farm Road (wastewater is also pumped from Honeymoon and Breaker Bay into this system). Wastewater is pumped up to a vessel on the hill above Tapu and Stephens Bays and then gravitates across Tapu Bay to Riwaka via a 215mm dia PE pipe. This pipeline is being replaced by a 280mm dia PE land based pipeline in 2017/18. A control valve on the Kaiteriteri pipeline automatically opens/closes when the level in the vessel rises/falls to set points so that the wastewater gravitates to the Motueka WWTP in a series of "pulses".

There are three other small catchments that pump directly to the vessel; Stephens Bay, Tapu Bay (via Stephens Bay) and Little Kaiteriteri. There is emergency storage at Stephens Bay, Little Kaiteriteri and Tapu Bay pump stations as well as a large 100m³ storage tank on Inlet Road near the campground. A recent level survey found that only about half of this storage tank can be used, due to the low level of the manholes around the inlet near Bethany Camp.

All six pump stations and the vessel can be monitored remotely via the digital telemetry network.

Due to low flow into the Honeymoon Bay and Breaker Bay pump stations, regular flushing with clean water is required to prevent septicity, especially in summer. The pipeline from the vessel to the Motueka Treatment Plant is approximately 9 kilometers long and over summer wastewater becomes septic and can cause odour issues at the WWTP. A chemical dosing system operates at the vessel, between 1 December and 26 February each year. This works very well.

2.3.3.3 Riwaka

The Riwaka serviced area is flat and low lying. It consists of local gravity reticulation and a series of five pump stations. Pump stations pass the wastewater along from one to another until it reaches the Riwaka main pump station which injects into the Kaiteriteri – Motueka WWTP rising main. The pump stations are fitted with duty and standby pumps and all can be monitored remotely via the digital telemetry network.

There is little or no emergency storage within the wastewater network and during heavy rain events the reticulation immediately upstream of the School Road pump station can overflow. This has led to Council installing a non-return valve on the connection at 29 School Rd, to prevent flooding of the house from the wastewater network.

2.3.4 Murchison

The Murchison wastewater scheme was built around 1989 and services the Murchison township. The gravity reticulation discharges to two pump stations, and a WWTP on the western side of the Matakitaki River.

The Hotham Street pump station collects flows from the river end of Hotham Street and discharges into the gravity system at the corner of Hotham and Fairfax Streets. The remaining system gravitates to the main pump station in Waller Street.

The Waller Street pump station pumps all of Murchison's wastewater to the treatment plant. Both pump stations operates duty and standby pumps and are monitored remotely via the digital telemetry network. Both pump stations were upgraded in 2011 along with the rising main under the SH6 bridge across Matakitaki River. The Waller St pump station upgrade included 10 hours emergency storage and the disconnection of an overflow soakage pit which discharged into the gravels and groundwater adjacent to the pump station. The Waller Street pumps operate on alternating duty and cannot be operated together. This is to prevent damaging the remaining original parts of the rising main to the WWTP as well as preventing overloading of the inlet screen at the WWTP.

Wastewater from the Council's Riverview campground is pumped into the gravity network and leachate from the closed Murchison landfill and the pit sump at the Resource Recovery Centre are pumped direct to the WWTP.

The treatment plant was upgraded in 2006 when an aeration lagoon with mechanical inlet screen was added prior to the existing oxidation pond. The oxidation pond was desludged and two HDPE baffles installed across the pond to aid circulation. A fine bubble aerator has been installed on the oxidation pond to aid mixing and movement of sludge away from the inlet.

The original gravel filter was upgraded, and a second filter added with a pump station alternately dosing the gravel filters. The treated wastewater is then discharged from the gravel filters to ground via subsurface disposal beds constructed in 2011.

Due to the isolated location of Murchison, a mobile generator was purchased for operating both the water and wastewater supplies in the event of a power failure.

2.3.5 St Arnaud

The St Arnaud wastewater system including the WWTP was built in 1999 and serves the St Arnaud township and the Department of Conservation (DoC) campgrounds at Kerr Bay and West Bay. Reticulation drains by gravity to three pump stations. The Kerr Bay pump station (No.1) pumps up the hill to Rotoiti Street where it discharges into the gravity network draining to the Alpine Lodge pump station (No.2). The Beechnest pump station, constructed as part of a subdivision in 2009, pumps into the reticulation which drains to the Alpine Lodge pump station. From there the entire catchment is pumped to the treatment plant at Teetotal Flats. The West Bay campground, operated by the Department of Conservation (DoC) is only open between December and April and waste is pumped direct to the WWTP, injecting into the rising main from Alpine Lodge just prior to the WWTP.

Council pump stations have duty and standby pumps which are connected to the Council's digital telemetry system. The original two pump stations have six hours storage at peak occupancy while Beechnest has 10 hours storage at dry weather flows.

A mobile generator is stored in St Arnaud in case of power failure, so the pump stations can be operated to prevent overflows into Lake Rotoiti or any of its tributaries. The generator can also be used to power the WWTP, although this can operate without electricity for many weeks.

The wastewater treatment plant is located on 17.9 hectares owned by DoC. This land is held as a local purpose reserve specifically for wastewater treatment and Council is appointed to control and manage the reserve. The treatment plant consists of an aerated oxidation pond, two wetland cells with treated wastewater dosed into the ground via a subsurface pressure system. The disposal pump station doses each of the four soakage trenches, in order, utilising an automated sequencing valve. Should there be a fault with the pump station, or a power failure, there is a gravity emergency bypass of the sequencing valve and pump station to all soakage trenches. The oxidation pond aerator is controlled by a dissolved oxygen probe.

A gravel trap exists prior to the Kerr Bay and Alpine Lodge pump stations. These require regular checking and cleaning out.

The potential of a sewage overflow into Lake Rotoiti is rated as an extreme risk that needs careful management. The pump station closest to the lake was located above known high lake levels. The gravity pipeline from the DoC toilet block by the lake edge at Kerr Bay has a manual valve on it that must be closed if lake rises sufficiently to flood the toilet block.

2.3.6 Takaka (Central Takaka - Tata Beach)

The original Takaka township wastewater scheme was constructed in the mid 1980s. Wastewater from the township area gravitates and pumps to either the Waitapu Road pump station at the northern end of town or Hiawatha Lane pump station in the centre of town. Wastewater is pumped from Waitapu Road along SH60 and Haldane Road to the Takaka WWTP from the north. Wastewater is pumped from Hiawatha Lane via Roses Road to the WWTP from the south.

During 1994 and 1995, Pohara Valley, Pohara campground and Richmond Road were connected to the Takaka wastewater scheme via a pumping/gravity main along Abel Tasman Drive. In 1995 and 1996, further outlying areas were connected to the Takaka scheme including Clifton, Pohara township, Tarakohe, Ligar Bay and Tata Beach. In 2006, a further reticulation extension was completed to both the north and south of Takaka township, including Park Avenue, Dodson Road, Central Takaka, Motupipi and Three Oaks. This was completed with subsidy from the Ministry of Health and included four new pump stations.

Flows from the settlement of Rototai to the northeast of Takaka are intercepted and pumped into the Waitapu pump station in Takaka. The coastal community is served by nine major pumping stations, which transfer wastewater along a distance of approximately 11km from Tata Beach to Sunbelt Crescent pump station, which pumps directly to the WWTP. Wastewater from Central Takaka is pumped to Motupipi Street pump station which pumps directly to the WWTP.

In total there are 20 pump stations within the Takaka wastewater network. All have telemetry although seven remain on the analogue network. Pumps stations are fitted with duty and standby pumps.

The WWTP is located in the Takaka River flood plain. The pond embankments have been designed to withstand a Q50 flood event. A major upgrade of the WWTP was completed in June 2015 and the WWTP now consists of a mechanical inlet screen, two aerated oxidation ponds (one with a baffle to aid circulation), a floating wetland, a dosing pump station and eight rapid infiltration basins (RIB). A septage facility for accepting some specific trade waste was also included as part of the upgrade. The WWTP is split over two adjacent sites, with the inlet works and ponds on the original site and the new RIB on a two hectare site elevated on a slightly higher river terrace.

The floating wetland removes algae before the treated wastewater is discharged into one of eight RIBs. Treated wastewater then filters though the underlying gravels into the groundwater. The groundwater flows towards the Takaka River. Monitoring bores both upstream and downstream of the RIBs are sampled each month to confirm there is no bacterial contamination of the groundwater due to the discharge.

A weather station and telemetry were installed at the WWTP in 2014. The wastewater from all sources is measured by a magflow meter as it enters the treatment plant and flows can be monitored in real time via Council's digital telemetry system.

When the Takaka River floods, access to the WWTP is cut off as there are two fords to cross. Flooding can occur several times each year.

Council have identified that the trunk main between Pohara to Tata Beach and the associated pump station require upgrading in the near future to accommodate growth and reduce overflows.

2.3.7 Tapawera

The Tapawera wastewater scheme was originally installed by the New Zealand Forest Service in 1973. It services the residential area between Matai Crescent and Main Road Tapawera, including properties along Main Road Tapawera to the treatment plant. The service area includes the Tapawera Area School which has two swimming pools totaling 80m³ of water.

The Tapawera scheme comprises a gravity reticulation system that discharges to the treatment plant to the west of the town. There are no wastewater pump stations within Tapawera. The treatment plant was upgraded in 2008. The final treatment process consists of a mechanical inlet screen, an HDPE lined aerated oxidation pond with two baffles followed by a pumped discharge to four rapid infiltration basins. Telemetry was installed as part of the upgrade along with a flow meter on the discharge pipe.

The Tapawera treatment plant is located on the upper terraces of the Motueka River but within its flood plain. Any failure of the system may have a negative effect on the surrounding groundwater and potentially the river. Therefore, the plant is managed to mitigate this risk.

2.3.8 Upper Takaka

The original wastewater scheme serving the Upper Takaka village (which housed staff operating the Cobb Power Station) was operated under the ownership and control of Electricorp (previously NZ Electricity Department) since the early 1950s. In 1991, Electricorp upgraded the wastewater scheme and handed ownership over to Tasman District Council.

Wastewater gravitates to the only pump station on the north east corner of the village, which pumps to a treatment plant 600m to the north of the village. This plant comprises treatment in an oxidation pond followed by a wetland before discharging via overland seepage into the ground. There is no power at the WWTP site.

The wetland was replanted in 2008/09 and the soakage area was extended and renovated in 2008. The oxidation pond was desludged in 2008.

The pump station operates with a duty and a standby pump with remote monitoring via Council's analogue telemetry system.

The pump station, and treatment plant are on Council-owned land although surrounded by private farmland. Access to the treatment plant is via a right-of-way that passes through a ford. If the ford is flooded, there is an alternative route to the treatment plant through the farm, but the landowner must be consulted prior to use. The rising main passes through the farm and has been accidentally dug up on occasion.

2.3.9 Waimea (Brightwater, Wakefield, Hope and Richmond)

These four settlement are grouped together because they are all connected via a trunk main that discharges into the Beach Road pump station that is owned and operated by the Nelson Regional Sewerage Business Unit (NRSBU). From the pump station wastewater is pumped to Bell Island Wastewater Treatment Plant.

2.3.9.1 Wakefield to Brightwater

The entire Wakefield reticulation network operates under gravity, gravitating to the Brightwater Main pump station via a 200mm diameter trunk main laid in the former railway reserve. There is a flume flow meter on this trunk main at Bird Road so flows from the Wakefield catchment can be monitored. The Brightwater reticulation network consists of a gravity pipe network combined with four pump stations. The gravity system discharges into one of the three pump stations with all wastewater passing through the Brightwater Main pump station. Leachate from the Eves Valley Landfill discharges into the Waimea West pump station.

All Brightwater and Wakefield wastewater arrives at the Brightwater Main pump station within the Brightwater Engineering Ltd property. From here it is pumped up and over Burkes Bank to discharge into the manhole at the start of the gravity trunk main to Richmond.

The Brightwater Main pump station is equipped with a standby diesel generator that automatically cuts in if the power supply fails. This pump station has duty and standby pumps. All four pump stations can be monitored via Council's digital telemetry network.

Council have identified that a new pump station and rising main connecting to existing pump station is required to accommodate growth in Brightwater. The trunk main from Wakefield to Three Brothers Corner also needs greater capacity to cater for growth.

2.3.9.2 Hope to Richmond

Properties within the Hope area discharge into the trunk gravity main in the disused railway reserve (from Burkes Bank to the Beach Road NRSBU pump station). This trunk main also carries all of the Wakefield and Brightwater wastewater.

The Richmond wastewater network is a gravity reticulation system originally installed in the 1950s. There is a small pump station on Hill Street South as well as a pump station near Headingly Lane, which serves the commercial/industrial area of Lower Queen Street and new residential developments in Richmond West. Both pump stations pump into the gravity network. The Richmond West area is anticipated to mainly include low pressure pumped systems, with individual house pump stations owned by Council with power supplied by the property owner.

With the forecast growth in Richmond West, Council anticipates the Headingly Lane pump station and downstream rising main will need to be upgraded. There are several alternative options that Council will assess with the NRSBU that could address the capacity issues in the short and long term.

Council has spent two years investigating sources of inflow and infiltration in Richmond and found that it is the newer developments that are contributing the most stormwater and groundwater into the network. This corroborates the findings in the Mapua Rise subdivision. The volumes of water entering the wastewater network in rain events has resulted in frequent multiple-point overflows in the Beach Road/McPherson Street areas of Richmond.

While the trunk main between Three Brothers Corner and the Beach Road pump station has sufficient capacity, the Beach Road pump station and downstream rising mains don't. The flow rate into the Beach Road pump station is limited to 387 l/s, controlled by an electronic flow meter and automatic penstock valve, which are monitored remotely via the analogue telemetry network. During heavy or prolonged rainfall, the wastewater network in low lying parts of Richmond surcharges and can overflow for twelve hours or more.

There are two gravel traps between the trunk main flow meter and the Beach Rd pump station that require regular clearing, particularly prior to and post significant rainfall events.

3 Strategic Direction

Strategic direction provides overall guidance to Council and involves specifying the organisation's objectives, developing policies and plans designed to achieve these objectives, and then allocating resources to implement the plans.

3.1 Our Goal

We aim to provide cost effective and sustainable wastewater systems in a manner that meets environmental standards and agreed levels of service.

3.2 Contribution to Community Outcomes

Table 5 summarises how this activity contributes to the Councils Community Outcomes

Table 5: Summarises how the wastewater activity contributes to the achievement of the Councils Community Outcomes

Community Outcomes	Does Our Activity Contribute to the Community Outcome	Discussion
Our unique natural environment is healthy, protected and sustainably managed.	Yes	All wastewater in Council-owned schemes is treated and discharged into the environment. We sustainably manage this, so the impact of the discharges does not adversely affect the health and cleanliness of the receiving environment.
Our urban and rural environments are people-friendly, well-planned, accessible and sustainably managed.	Yes	We ensure wastewater is collected and treated without causing a hazard to public health, unpleasant odours and unattractive visual impacts.
Our infrastructure is efficient, cost effective and meets current and future needs.	Yes	We consider the wastewater activity to be an essential service that should be provided to properties within the urban areas in sufficient size and capacity.
Our communities are healthy, safe, inclusive and resilient.	Yes	We aim to provide a service that is safe for the community by providing quality treatment, minimising overflows, and ensuring our infrastructure is resilient.
Our communities have opportunities to celebrate and explore their heritage, identity and creativity.	No	By providing wastewater services we don't primarily contribute to this outcome. However, where possible we incorporate community and school groups into the design and provision of infrastructure.
Our communities have access to a range of social, cultural, educational and recreational facilities and activities.	Yes	Wastewater is an essential service that underpins other facilities and activities.

Community Outcomes	Does Our Activity Contribute to the Community Outcome	Discussion
Our Council provides leadership and fosters partnerships, a regional perspective, and community engagement	Yes	We have a regional partnership with Nelson City Council for the management of the Nelson Regional Sewerage Business Unit. We collaborate with iwi and site neighbors to identify issues and concerns; and when the opportunity arises, we engage with community for facility open days and plantings days.
Our region is supported by an innovative and sustainable economy.	Yes	Wastewater underpins the regional economy by providing and managing wastewater collection, treatment and disposal. Sustainability is a key driver of our future planning.

3.3 Infrastructure Strategy

Council's Infrastructure Strategy covers the assets needed to support Council's water supplies, stormwater, wastewater, rivers and flood control, and transportation activities.

The purpose of the Strategy is to identify the significant infrastructure issues for Tasman over the next 30 years, and to identify the principal options for managing those issues and the implications of those options.

When setting out how Council intends to manage the District's infrastructure assets and services, it must consider how:

- to respond to growth or decline in demand;
- to manage the renewal or replacement of existing assets over their lifetime;
- planned increases or decreases in levels of service will be allowed for;
- public health and environmental outcomes will be maintained or improved; and
- natural hazard risks will be addressed in terms of infrastructure resilience and financial planning.

There are three parts to the Strategy; the Executive Summary, the Strategic Direction, and the Activity Summaries. The Strategic Direction section sets the direction for infrastructure management and outlines the key priorities that Council will focus on when planning and managing its infrastructure. The Activity Summaries section provides an overview of each activity and is largely a summary of the relevant activity management plan.

The four key infrastructure priorities included in the Strategy are:

- Providing infrastructure services that meet the needs of our changing population
- Planning, developing and maintaining resilient communities
- Providing safe and secure infrastructure and services
- Prudent management of our existing assets and environment

These priorities have been used to determine and prioritise what is required to be included in the programmes of work for each activity management plan.

3.4 Financial Strategy

The Financial Strategy outlines Council's financial vision for the next 10–20 years and the impacts on rates, debt, levels of service and investments. It will guide Council's future funding decisions and, along with the infrastructure strategy, informs the capital and operational spending for the Long Term Plan 2018-2028.

Three key financial limits are established in the Financial Strategy that set Council's overall financial boundaries for its activities. These include:

- Rates Income - limited to $65 million per annum and targeted rates to $60 million per annum.
- Rates Increases - limited to a maximum of 3% per annum, plus an allowance for annual growth in rateable properties.
- Debt - net external debt limited to a maximum of $200 million

Infrastructure expenditure forms a large proportion of Council's spending being 39% of operational expenditure and 80% of capital expenditure over the next 10 years. Because of this, the Infrastructure Strategy and Financial Strategy are closely linked to ensure the right balance is struck between providing the agreed levels of service within the agreed financial limits. Often these financial limits will influence how Council manages and develops existing and new assets. This is especially so for the next 10 years.

Over the next 10 years, forecast rate income increases and debt levels are projected to be near Council's limits. Council has had to work hard to prioritise and plan a work programme which addresses key issues while staying within these limits. Given Council's debt is projected to peak at $199.6m in Year 2020/21 there is very little scope to add further work programmes in the next five years.

3.5 Key Issues

Council has identified key issues specific to the wastewater activity, which are summarised in Table 6 below. Each of these issues relate to Council's infrastructure priorities. For the wastewater activity, key issues are interrelated and often, investing in solutions will likely to help address other issues to varying degrees.

For the wastewater key issues there is a close relationship between each of the issues. Often, implementing the preferred options is likely to help address the other issues to varying degrees. To help simplify the discussion, options have been allocated to the primary reason they have been considered.

Table 6: Key Issues for the Wastewater Activity

Key Issue	Discussion
Meeting residential and commercial growth demand is a challenge in some key areas	Council expects that over the next 10 years Tasman's population will grow by approximately 4,400 residents. To accommodate this growth, new houses will need to be built, most of which will need to be supplied with wastewater. Council can supply some of this new demand through existing infrastructure where capacity is available. Where capacity is not available, or if the infrastructure does not exist, Council will need to provide upgraded or new infrastructure to enable growth. Growth is occurring faster than Council anticipated in settlements such as Richmond, Mapau and Motueka; and to a slightly lesser extent in Brightwater and Wakefield. Some networks have reached capacity, restricting future residential and commercial development. An example of this is in Mapua where Council cannot meet current demand and no further wastewater connections can be made until the existing network is upgraded. Capacity constraints put pressure on existing infrastructure and storage. There are several projects that are driven by growth demands that have been brought forward in the capital works programme. An example if this is in the Headingly Lane pump station. The current wastewater system is operating close to capacity and the pump station needs an upgrade to cater for growth in the Richmond West area. Council has planned a $7.4M programme of upgrades and reconfiguration of the network to accommodate growth. Council applies development contributions to growth projects so that developers meet the cost of the growth component of some projects, rather than ratepayers.

Key Issue	Discussion
Inflow and infiltration (I/I) uses pipe capacity, increases conveyance/ treatment costs and contributes to overflows	Infiltration is the unintentional entry of ground water into the wastewater network and inflow occurs when rainwater enters the network. Common points of entry include broken pipe and defective joints, as well as cracked manholes. Inflow and infiltration (I/I) is a significant issue in some settlements because it consumes useable network capacity causing the overloading of pipe networks and wastewater treatment plants during very heavy rainfall events. In turn, this restricts residential and commercial growth because it uses up available network capacity. I/I in the network creates the need to pump, convey and treat the extra water and means additional and unnecessary costs. Excessive levels may also dilute wastewater and cause treatment plant performance to deteriorate. I/I has direct links to wastewater overflows. Discharges from the wastewater system pose a risk to public and environment health and safety and can cause flooding and property damage. Over the last few years, there has been an increasing trend in temporary overflow signs erected at waterways and in 2016/17 the related level of service performance measure was not achieved. Six reported overflow signs were erected and 5 of the 6 overflows occurred in Pohara, where I/I was a contributing factor. Overflows/discharges can result in increased number of customer complaints. I/I can also cause breaches of resource consent conditions, which in turn may result in potential fines and prosecution. In the 2015 AMP, there was 3-year budget of $495k for an I/I Reduction Programme; however, Council have determined that an ongoing budget of $165k pa for a strategy and programme is required. There is also an ongoing CCTV & Data Capture budget that will help identify sources of I/I. These operational budgets will help inform the asset renewal programme. Renewal programmes should be based on actual I/I performance, as well as age and condition data as it considers all failure modes. Council will use Section 459 of the Local Government Act to target failing private laterals and illegal connections in order to make the repairs where these is a known I/I problem. Council plans improve coordination between the Utilities and Building Compliance Team teams to ensure new connections to the network do not contribute to the I/I issue.
Emergency storage & backup generation is required to improve network management and provide resilience	Some wastewater networks experience high wet weather flows and their respective pump stations have no emergency storage capacity. Often electrical outages occur with intense rainfall events and the problem can be compounded when there is no backup generation. Currently Council do not meet the level of service that measures the performance of pump station storage and standby electrical generation. Council plans to invest in pump station storage capacity and backup generators. This will enable improved network resilience. Council plans to invest $1.2million over the first five years for the installation of storage tanks at key sites across the District. Storage tanks will enable extra capacity and allow time for septic tankers to get to site and alleviate the storage pressures. Council has also planned to invest $315,000 over 15 years for the purchase of new mobile generators that can be used across the District.

Key Issue	Discussion
Managing overflows is becoming increasingly challenging	Overflows occur when untreated wastewater escapes from the network into the environment, presenting a risk to public and environmental health. Overflows can be caused by wet weather due to stormwater inflows which overload the system, or they can occur due to blockages, breaks, power outages, or lack of network capacity. There is an increasing trend where temporary overflow signs are being erected at waterways. This issue is primarily caused by wet weather and compounded by a lack of adequate stormwater systems in some areas. Climate change will exacerbate this existing problem. Climate change will likely result in increased intense rainfall that will put further strain on already limited capacity in some of Councils wastewater networks. Some networks are at or near capacity and a lack of emergency storage increases the likelihood of overflows. Council can try to prevent or manage overflows by linking local telemetry to the wider network of systems to optimise overall network management. Council has planned to upgrade pump stations and rising mains in Pohara/Ligar Bay. The upgrade will provide more capacity and reduce the risk of overflows.
Asset information including knowledge, data, metadata, processes and systems needs improving so that sounds decision making can be made.	Council relies on good asset information to make good asset management decisions. Council's asset data is incomplete and inaccurate. Council relies on staff and operators to fill gaps in knowledge about where assets are located, understand how they operate and identify maintenance requirements. With staff turnover, some of this knowledge has been lost. Poor data limits Councils ability to make sound decisions about the timing of the renewals programme. Accurate age, condition and performance data should underpin the renewals programme and provide certainty and confidence for budgets and planning purposes. Long term financial planning also depends on accurate asset valuation that uses reliable asset data. It can also result in increased operations costs and higher incidence of reactive rather than planned maintenance. A recent review of our asset management systems and data capture process has highlighted a number of opportunities. Improvements includes the development of an As-built Data Standard to better define data requirements and improvement in the accuracy and completeness of data provided from external parties (for newly constructed and replaced assets). This document will be complementary to but sit separate to the proposed Land Development Manual. Council is considering a staged alignment to the NZ Asset Metadata Standards (v1.0). Staff are making internal business improvements to enhance the process of obtaining data (including condition data from contractor's repairs. obtaining data from contractor's repairs. Staff are developing ActiveManuals™, a repository of operations and maintenance manuals, manufacturer manuals, technical documents, drawings, photographs and videos. This enables shared access for council and its partners responsible for operating and maintain assets. Increased operational budgets for CCTV and data capture will provide better condition and performance information that will enable better decision making around the renewals programme.

3.6 Prioritisation

Council cannot afford to undertake all work at once due to financial and resource constraints. This means that Council needs to prioritise what work it undertakes first, and what work can wait until later.

There are multiple factors that affect the priority of individual works. These include:

- The need to protect public health & safety
- Statutory compliance
- Meeting the needs of tomorrow's population

- Readiness to implement works
- Co-funding opportunities
- Enabling pleasant community environments
- Benefits and risks
- District distribution
- Strategic fit

Council has taken all of the above into consideration when planning its programme of work. Generally, mandatory requirements such as statutory compliance take priority, and discretionary activities have been programmed second to this.

3.7 Strategic Approach for each Wastewater Network

Table 7: Strategic Approach for Wastewater Network

Network	Strategic Approach
Wakefield, Brightwater, Richmond/Hope, Mapua Ruby Bay	The issues facing these schemes include: • the rising costs of treatment through the NRSBU; • growth in all settlements is likely to lead to more frequent capacity issues in trunk mains and critical rising mains. The strategic approach to these schemes is to: • continue to construct and upgrade the trunk main systems to provide capacity to accommodate growth in new areas; • continue to investigate reticulation systems to identify and repair defects and sources of wet weather inflow into the sewers; • review hydraulic models to confirm which of the levels of service can be achieved; • there is a strategic study budget planned for 2018-2020 for a Waimea Long Term Wastewater Strategy; this will determine the long term requirements of the scheme.
Motueka, Riwaka, and Kaiteriteri	The issues facing these schemes are: • the Motueka reticulation system is old and is known to have high winter flows due to groundwater infiltration; • lack of stormwater capacity leading to stormwater entering the wastewater network; • the Motueka WWTP is located in an area of significant risk which will increase as sea level rises; • there are two section of rising main from Kaiteriteri to the Motueka WWTP that need upgrading; The strategic approach to these schemes is to: • continue field investigations and modelling of the reticulation to identify and repair system defects; • there is a strategic study budget planned for 2018-2020 for a Motueka Long Term Wastewater Strategy; this will determine the long term requirements of the scheme; • Long term, Motueka WWTP will be relocated away from the coast as the impacts from sea level rise mean it becomes uneconomic to continue operating at the site. Phase 1 is a strategic study budget planned for 2020-2021 to determine a suitable site; Phase 2 is a land purchase budget planned for 2029/30-2030/31 and Phase 3 is a WWTP construction budget planned for 2033-2037. • the final two section of rising main upgrades between Kaiteriteri and the Motueka WWTP will be complete in 2021; • continue to involve iwi and other stakeholders by providing input to the decision-making process;

Network	Strategic Approach
Takaka, Pohara and Ligar Bay/Tata Beach	The issues facing these schemes are as follows: • the Takaka gravity reticulation is in a poor condition which is giving rise to high flows during wet weather and leads to blockages; • odour issues along the Pohara scheme; • the Pohara scheme pumping mains were constructed using inappropriate pipe material, resulting in high number of bursts; • the growth along the Pohara/Tata Beach coast is overloading the system during wet weather; • uncontrolled fats, oils and grease discharges in the commercial area leads to frequent blockages. The strategic approach to these schemes is to: • major upgrades are planned for the whole Pohara scheme starting with Four Winds pump station, this should enable growth and address odour, reliability and rising main breaks; • CCTV pipelines within Takaka and make improvements where necessary; • implementation of the Trade Waste Bylaw. • Flushing programme to blockage prone mains.
Collingwood	The main issues facing Collingwood sewerage scheme are: • the treatment plant is approaching its design capacity; but growth demand is not expected to exceed available capacity; • the reticulation network suffers from high wet weather flows during heavy rainfall. This is compounded when heavy rainfall events coincide with high tides; • the shellfish industry, and the high social, environmental and cultural value of the environment makes it very sensitive to overflows from wastewater networks; • an overflow can enter the coastal marine environment and the response to any failure of the system can take some time due its remote location. The strategic approach for this system is to: • identify then repair sources of inflow/infiltration as necessary.
Upper Takaka	The main issue facing Upper Takaka is: • high inflow and infiltration from private sewer laterals. The strategic approach to this system is to: • work with the community to resolve this issue. The Upper Takaka scheme is small. The treatment plant is operating adequately, and the strategic approach is to maintain this performance. The public reticulation system has been investigated and the many defects have been addressed.
Tapawera	The treatment plant was upgraded on the basis that there would be little population growth in population in Tapawera. The upgrade was aimed at improving environmental outcomes rather than increasing treatment capacity of the plant. The strategic approach going forward is to maintain performance.
St. Arnaud	The St Arnaud scheme is a relatively new scheme and was designed to cater for the peak population within the network as at 1999. Generally, the treatment system performs well, but there is evidence inflow during rain events, likely to associated with new developments.
Murchison	No formal assessment of the reticulation condition has been undertaken, but there are no known concerns regarding the condition of these assets. Most of the infrastructure is of an age (approximately 25 years old) where condition problems are not expected. Council intends to continue operating the asset to minimise its impact on the community and the environment. The strategic approach going forward is to maintain performance.

4 Key Linkages

There are multiple factors that influence how Council manages this activity. They can be internal or external and include legislation, policies, regulations, strategies and standards. This section summarises these key linkages.

4.1 Overview

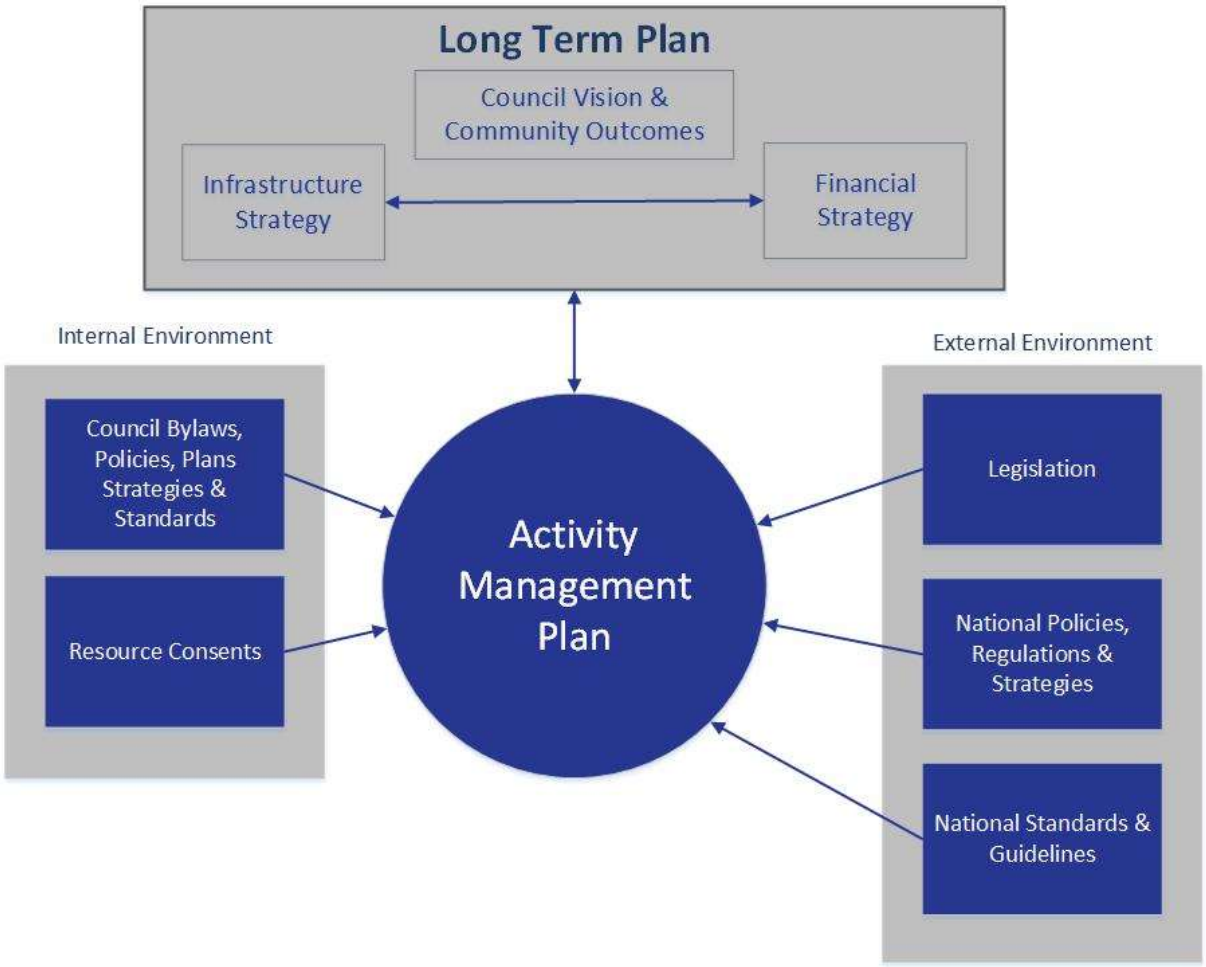


Figure 1: How the Wastewater Activity relates to Other Documents

4.2 Legislation

The Acts below are listed by their original title for simplicity, however all Amendment Acts shall be considered in conjunction with the original Act, these have not been detailed in this document. For the latest Act information refer to http://www.legislation.govt.nz/.

Table 8: Legislative acts that influence the wastewater activity

Key Legislation	How it relates to Wastewater Activity
The Health Act 1956	Council have the responsibilities under the Health Act 1956 to improve, promote, and protect public health within the District. Some Councils uses provisions in the Health Act as legal bases to issue I/I defect notices to property owners. I/I problems lead to sewer overflows which in turn poses a risk to public health.

Key Legislation	How it relates to Wastewater Activity
Local Government Act 2002	The Local Government Act requires local authorities to prepare a ten-year Long Term Plan and 30-year Infrastructure Strategy, which are to be reviewed every three years. The Act requires local authorities to be rigorous in their decision-making by identifying all practicable options and assessing those options by considering the benefits and costs in terms of the present and future well-being of the community. This activity management plan provides information to support the decisions considered in the Long Term Plan.
Resource Management Act 1991	Sets out obligations to protect New Zealand's natural resources such as land, air, water, plants, ecology, and stream health. Resource consents draw their legal authority from the Resource Management Act 1991.
Civil Defence Emergency Management Act 2002	Sets an expectation that the Councils services will function at the fullest possible extent during and after an emergency, even though this may be at a reduced level of service.
Health and Safety in Employment Act 1992 & 2015	Health and Safety legislation requires that staff and contractors are kept safe at work. New legislative changes to the act will mean improved health and safety measures will be required.
Utilities Access Act 2010	The processes and rules for coordinating work done in transport corridors by utility operators, or that affects utility operators' assets
Te Tiriti o Waitangi – Treaty of Waitangi	The Treaty of Waitangi is an agreement between Māori and the Crown. Under Section 4 of the Local Government Act 2002 local authorities are required to 'recognise and respect the Crown's responsibility to take appropriate account of the principles of the Treaty of Waitangi and to maintain and improve opportunities for Māori to contribute to local government decision-making processes'. Further sections of the Act, particularly 77 and 81, detail the scale of requirement for local authorities to seek contributions and involvement from Māori in consultation and decision-making processes.

4.3 Key Planning, Policies and Strategies

4.3.1 Key National Policies & Strategies

Table 9: Key National Policies and Strategies that relate to this activity

Documentation	Affect on the Wastewater Activity
National Policy Statement on Urban Development Capacity 2016 (NPS-UDC)	Sets out the objectives and policies for providing development capacity under the Resource Management Act 1991 and came into effect on 1 December 2016.
New Zealand Coastal Policy Statement (NZCPS)	Guides local authorities in their day-to-day management of the coastal environment. Highlights declining coastal water quality because of contamination through stormwater and wastewater discharges.
National Environmental Standard Sources of Human Drinking Water	Guidelines intended to reduce the risk of contaminating drinking water sources by requiring regional councils to consider the effects of activities on drinking water sources in their decision making. Regulations 6, 7 and 8 apply to applications for discharge permits issued by regional councils.
The Local Government (Financial Reporting) Regulations 2011	Sets out the content of local authorities' annual reports and financial reporting framework and standards.

Documentation	Affect on the Wastewater Activity
Sustainable Development for New Zealand - Programme of Action (Ministry of Social Development)	Sets out the Government's approach to achieving sustainable development and specifies an improved provision of infrastructure and services (including water supply, wastewater treatment transport, energy and housing).

4.3.2 Key National Standards & Guidelines

For all New Zealand standards refer to http://www.standards.co.nz

Table 10: National Standards and Guidelines

Standard	Affect on the Wastewater Activity
NZS 4404:2010	Land Development and Subdivision Infrastructure
AS/NZS ISO 9001:2016	Quality Management Systems
AS/NZS 3917:2013	Fixed Term Contract Management
ISO 24516-3:2017	Wastewater collection networks
NZS 9201.22:1999	Model general bylaws - Wastewater drainage
NZS 9201.23:2004	Model general bylaws - Trade waste
Water New Zealand's Infiltration & Inflow Control Manual	Provides information on inflow and infiltration and the corresponding issues, complexities, and good practice strategies to reduce and manage.
New Zealand Pipe Inspection Manual 3rd edition (2006)	An overview of tasks that can be completed using CCTV and how these activities can be used to manage wastewater and stormwater assets.
Ministry for the Environment: Coastal Hazards and Climate Change - Guidance for local government	A major review of the 2008 edition, updating scientific understanding and the legal framework. Introduces new material on hazard, risk and vulnerability assessments and collaborative approaches to engaging with communities. Also explains adaptive approaches to planning for climate change in coastal communities.
Office of the Auditor General publications: 1. Local government: Examples of better practice in setting local authorities performance measures. 2. Getting the right information to effectively manage public assets: Lessons from local authorities	Paper that promotes discussion about improvement of performance measures for various activities. Discussion paper examining how local authorities approach identifying and gathering the asset information.
Department of Internal Affairs publications: Supporting guidance for sewerage and the treatment and disposal of sewage (2014)	Guidance to help local authorities when setting levels of service and targets related to mandatory performance measures.

Standard	Affect on the Wastewater Activity
Sustainable Development for New Zealand - Programme of Action (Ministry of Social Development)	Sets out the Government's approach to achieving sustainable development and specifies an improved provision of infrastructure and services (including wastewater, wastewater treatment transport, energy and housing).

4.3.3 Key Local Bylaws, Polices, Plans, Strategies & Standards

Table 11: Local Documentation Bylaws, Polices, Plans, Strategies

Council Documents	How it relates to Wastewater Activity
Tasman District Council District Plan – Tasman Resource Management Plan (TRMP)	The Tasman Resource Management Plan (TRMP) provides a guideline and sets the rules about how Council manages the districts natural and physical resources. Chapter 35 addresses the adverse effects of discharges to the coastal marine area and Chapter 36 defines rules in relation to discharges.
Tasman Regional Policy Statement (TRPS)	The Tasman Regional Policy Statement (TRPS) is the strategic resource management plan to promote sustainable resource management in the Tasman District. Part 9: Coastal Environment- addresses issues relating to the discharge into the environment and Part 10: Contamination & Waste – address issues relating to the adverse effects of discharges of contaminants.
Tasman District Council's Engineering Standards and Policies 2013	Sets out the requirements that ensure that Councils infrastructure assets achieve acceptable levels of service and that they are modern, cost-effective and durable (will be superseded by Land Development Manual).
(Proposed) Land Development Manual	Provides standards and guidance for the design and construction of network assets and infrastructure that are or will be owned by Council. Joint Council NCCTDC, will replace Engineering Standards.
Wastewater Bylaw (2015)	The Wastewater bylaw applies to all users of the wastewater system and includes trade waste and protection of the wastewater infrastructure. The bylaw sets out the requirements around connection and discharges to the wastewater system, the extent of public/private responsibilities, the prevention of inflow and infiltration, and working and building around wastewater reticulation.
Water Assessment Services Assessment (WSSA)	The Water and Sanitary Services Assessment is a Council/community review of how Council provides water, wastewater, stormwater, solid waste (refuse), public toilets and cemetery services and explores options for managing them more sustainably.
Tasman District Council's Financial Strategy	Sets out the how Council funds its activities, projected population growth rates, funding expenditure, projected debt levels and management of investments.
Tasman District Council's Infrastructure Strategy	Provides a look forward for 30 years at current and upcoming key infrastructure issues for the core engineering activities and significant projects and expenditure required to address them.

Council Documents	How it relates to Wastewater Activity
Long Term Plan	The Local Government Act 2002 requires Council to produce a Long Term Plan (LTP) every three years. The LTP outlines activities and priorities for ten years, providing a long-term focus for decision-making.

4.4 Strategic Studies

Table 12: Strategic Studies related to Wastewater Activity

Network/Area	Strategic Studies	Date
Wakefield, Brightwater, Richmond/Hope and Mapua/Ruby bay	Hydraulic models for Richmond, Hope, Brightwater, Wakefield and Mapua/Ruby Bay	Ongoing
	Mapua Wastewater Upgrade Strategy, MWH New Zealand Ltd	2009
	Programme Business Case – Mapua Water and Wastewater, Stantec New Zealand Ltd	2017
	Inflow and Infiltration: Assessment of Impacts and Drivers – Richmond Wastewater Catchment, MWH New Zealand Ltd	2010
Motueka, Riwaka and Kaiteriteri	Inflow and Infiltration: Assessment of Impacts and Drivers – Motueka Wastewater Catchment, MWH New Zealand Ltd	2010
	Motueka Hydraulic Mode	
	Motueka WWTP Upgrade Design Report, Beca Ltd	2014
Takaka, Pohara and Ligar Bay/Tata Beach	Pohara/Tata Beach Sewerage Upgrade, MWH New Zealand Ltd	2006
District Wide	Trade Waste Implementation –Council staff have compiled a list of likely trade waste dischargers and informed users of the need to apply for permits. Water and Sanitary Services Assessment (WSSA): is a Council/community review of how Council provides water, wastewater, stormwater, solid waste (refuse), public toilets and cemetery services and explores options for managing them more sustainably. CCTV reports	Ongoing 2005 Ongoing

4.5 Planned Strategic Studies

Table 13: Summary of planned wastewater studies

Study Name	Brief Description	Planned
Sludge Management Strategy	Developing a strategy to manage sludge disposal or use from all WWTPs. Will be reviewed every 10 years.	2023/24

Study Name	Brief Description	Planned
Waimea Long Term Wastewater Strategy	Strategic studies to consider the long term impact of climate change	2018/19-2019/20
Motueka Long Term Wastewater Strategy	Strategic studies to consider the long term impact of climate change	2018/19-2019/20
District Modelling	Hydraulic models assist with assessing the capacity and deficiencies within the reticulation networks, this includes pipes and pump stations. Hydraulic models exist for Hope, Brightwater, Wakefield, Motueka, Mapua and Richmond.	Ongoing
Inflow and Infiltration Strategy and Programme	Council has planned an annual strategy and programme to maintain a consistent proactive approach to this work.	Ongoing
Regional CCTV Inspections and Data Capture	Council has planned annual programme to undertake CCTV around the District. Data and information gathered till inform renewals and modeling programmes.	Ongoing
Health and Safety Assessments and Review	Council is currently focusing on health and safety risks at existing facilities. Each site will be assessed, and it is anticipated that modifications may be needed to mitigate or remove those risks. Changes to the way assets are maintained may also be needed. Hazard registers for each facility will be developed and reviewed every 5 years	5 yearly commencing 2021/22

5 Levels of Service

A key objective of this plan is to match the levels of service provided by the Wastewater activity with the agreed expectations of our customers and their willingness to pay for that level of service. These levels of service provide the basis for the life cycle management strategies and works programmes identified in this plan.

Levels of service can be strategic, tactical or operational. They should reflect the current industry standards and be based on:

- Customer Research and Expectations: information gained from stakeholders on expected types and quality of service provided.
- Statutory Requirements: Legislation, regulations, environmental standards and Council bylaws that impact on the way assets are managed (e.g., resource consents, building regulations, health and safety legislation). These requirements set the minimum level of service to be provided.
- Strategic and Corporate Goals: Provide guidelines for the scope of current and future services offered and manner of service delivery, and define specific levels of service, which the organisation wishes to achieve.
- Best Practices and Standards: Specify the design and construction requirements to meet the levels of service and needs of stakeholders.

5.1 Our Levels of Service

Table 14 summarises the levels of service and performance measures for the this activity. The light blue shaded rows show those that are included in the Long Term Plan and reported in the Annual Plan.

Table 14: Levels of Service

Levels of Service	Performance Measure	Current Performance	Future Performance Targets			
			Year 1	Year 2	Year 3	Year 10
			2018/19	2019/20	2020/21	2028/29
Our wastewater systems do not adversely affect the receiving environment. Our wastewater systems do not adversely affect the receiving environment.	Compliance with resource consents for discharges from wastewater systems is achieved. As measured by the number of: • abatement notices • infringement notices • enforcement orders • convictions Received in relation to those resource consents. Mandatory measure 2	Achieved We have achieved compliance with all our resource consent conditions and there have been no notices or orders issued during the past 12 months. (Target: 0)	0	0	0	0
	The number of times temporary wastewater overflow signs are erected at waterways is minimised. Measured by the number of contract job request.	Not Achieved (2017: 6) (Target: <5)	<5	<5	<5	<5

Levels of Service	Performance Measure	Current Performance	Future Performance Targets			
			Year 1	Year 2	Year 3	Year 10
			2018/19	2019/20	2020/21	2028/29
Our wastewater systems reliably take out wastewater with a minimum of odours, overflows or disturbance to the public.	The total number of complaints received about: • odour • system faults • system blockages • Council's response to issues within its systems is less than the target. (Expressed per 1000 connections.) Measured by the number of contract job request. Mandatory measure 4	Achieved (2017: 2) (Target: <35)	<35	<35	<35	<35
Our wastewater systems are built, operated and maintained so that failures can be managed and responded to quickly.	The number of dry weather overflows from Council wastewater system (expressed per 1000 connections to wastewater system) is less than the target. Dry weather is defined as a continuous 96 hours with less than 1mm of rain within each 24-hour period. Measured by the number of contract job request. Mandatory measure 1	Achieved (2017: 2) (Target: <5)	<5	<5	<5	<5
Our wastewater activities are managed at a level that satisfies the community.	Percentage of customers (who receive a service) are satisfied with the wastewater service. Measured through the annual residents' survey.	Achieved (2017: 94%) (Target: >80%)	>80%	>80%	>80%	>80%

Levels of Service	Performance Measure	Current Performance	Future Performance Targets			
			Year 1	Year 2	Year 3	Year 10
			2018/19	2019/20	2020/21	2028/29
Our wastewater systems are built, operated and maintained so that failures can be managed and responded to quickly.	Overflows resulting from a blockage or other fault in the wastewater system are attended and resolved within the target timeframes. Attendance time - from the time Council receives notification to the time that service personnel reach the site. Resolution time - from the time Council receive notification to the time that the service personnel confirm resolution of the blockage or other fault. Measured by attendance and resolution times recorded in Confirm. Mandatory measure 3	Not Achieved The system required to record attendance and resolution times was implemented in 2016/17 and we will be able to report on a full set of data for 2017/18. We expect data for attendance and resolution times for calls received within office hours to be reliable. We expect data for attendance and resolution times for calls received outside of office hours to be less reliable and we plan to refine the data collection process to improve data reliability.	Median ≤60 mins Resolution Median ≤9 hrs	Median ≤60 mins Resolution: Median ≤9hrs	Median ≤60 mins Resolution: Median ≤9 hrs	Median ≤60 mins Resolution: Median ≤9 hrs
Our wastewater systems are designed and operated to be	All pump stations have standby pumps in case of mechanical failures. Detailed in the asset register and ActiveManuals™.	Achieved	100%	100%	100%	100%

Levels of Service	Performance Measure	Current Performance	Future Performance Targets			
			Year 1	Year 2	Year 3	Year 10
			2018/19	2019/20	2020/21	2028/29
resilient. Our wastewater systems are designed and operated to be resilient.	Our pump stations have storage or standby electrical generation in case of power failure.	Not Achieved (2017: 45%)	50%	60%	80%	100%

5.2 Level of Service Changes

Council reviews its levels of service every three years, as part of the Long Term Plan development. Table 15 below summaries the key changes Council has made during development of the Long Term Plan 2018 – 2028.

Table 15: Summary of areas where we are changes to our levels of service

LOS Theme	Performance Measure	Summary of change
Resilience	Pump stations storage or standby generation.	The previous performance target was 50%. Council has planned to increase future performance target to 60% in year 2, 80% in year 3 and 100% in year 10. Council is planning to invest $2.7 million in a network resilience improvements programme. Improvements include: • Increased storage capacity at pump stations at high-risk sites and as part of the pump station renewals programme. • Site dedicated and mobile generators. • Considering the use of low pressure pump systems for new subdivision in flats areas where the groundwater table is high.

This review has incorporated some recommendations from the following agencies.

Table 16: External agency recommendations

External Agency	Guidance Support
Department of Internal Affairs	Define the non-financial performance measures rules and provide supporting guidance and examples.
Water New Zealand	Water New Zealand publish the National Performance Review (NPR), an annual benchmarking exercise of New Zealand's 3 Waters service delivery. This is an optional exercise, but Tasman District Council have submitted annual performance data since 2015.
Controller and Auditor General	• Local government: Examples of better practice in setting local authorities' performance measures • Matters arising from 2015-25 local authority long-term plans • Water and roads: Funding and management challenges

5.3 Levels of Service Performance & Analysis

Compliance with resource consents for discharges from wastewater systems is achieved.

This performance measure indicates how well Council is managing the environmental impacts of its wastewater systems. Compliance with resource consents is 100% with no notices requiring additional consents, abatement notices, or enforcement orders received during the last 3 years. The Department of Internal Affairs introduced this mandatory measure in 2015 and since then Council has complied with it. The target will remain at 0. Minor breaches or technical non-compliances are not reported against this measure.

The number of times temporary wastewater signs are erected at waterways is minimised.

Waterways are highly valued by the wider community for recreational activities and cultural purposes. Overflows pollute waterways and temporarily affect the ability of the community to use them. This performance measure gives an indication about the impact that overflows have.

Over the past year, there have been six wastewater overflows from our network into waterways where warning signs were erected. Of these incidents, five affected the Pohara area. Two were the result of storm events overloading the wastewater network and three resulted from rising main breaks. The sixth overflow was in Kerr Bay adjacent to Lake Rotoiti. The manhole blockage may have been caused by rags wipes being dumped at the Department of Conservation caravan dump point as another blockage occurred a few months later, but did not result in an overflow to a waterway.

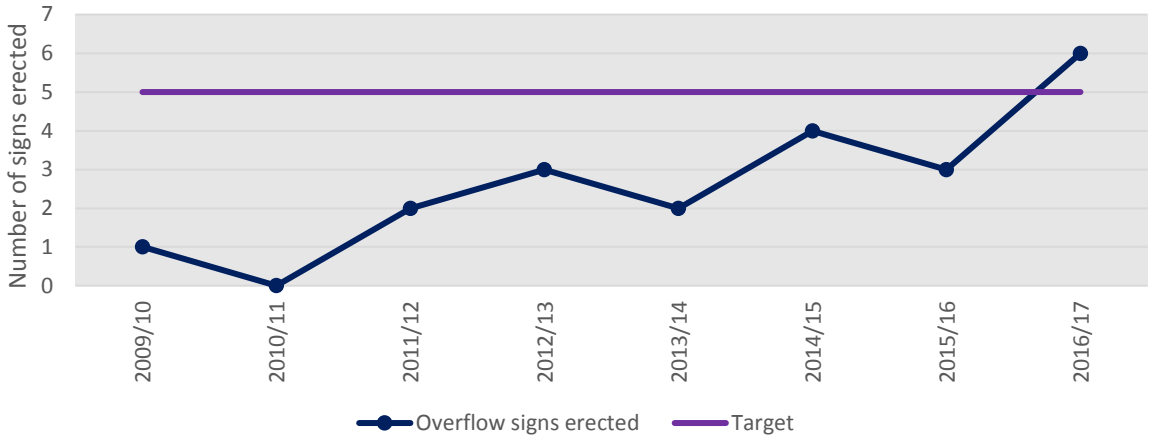


Figure 2: Number of temporary wastewater overflow signs erected at waterways.

Council plans to spend $8.6 million over the next 13 years to address capacity improvement in Pohara. Council expects the number of overflows to reduce over time.

For the short to medium term, Council intend to hold the performance measure target at <5. Council's longer-term strategic goal (within a 15-20 year timeframe) is to reduce the target to <2. Achievement of the target will be dependent on completion of planned pipeline and pump station upgrades.

The total number of complaints received about: odour, system faults, blockages, Councils response to issues within its system.

This performance measure gauges the level of customer satisfaction and is a key indicator about the quality of our wastewater service. This helps inform Council about the adequacy and reliability of the wastewater service. This measure also illustrates how satisfied customers are with the way in which Council responds to requests to fix problems. The information may highlight areas where upgraded or new infrastructure may be required.

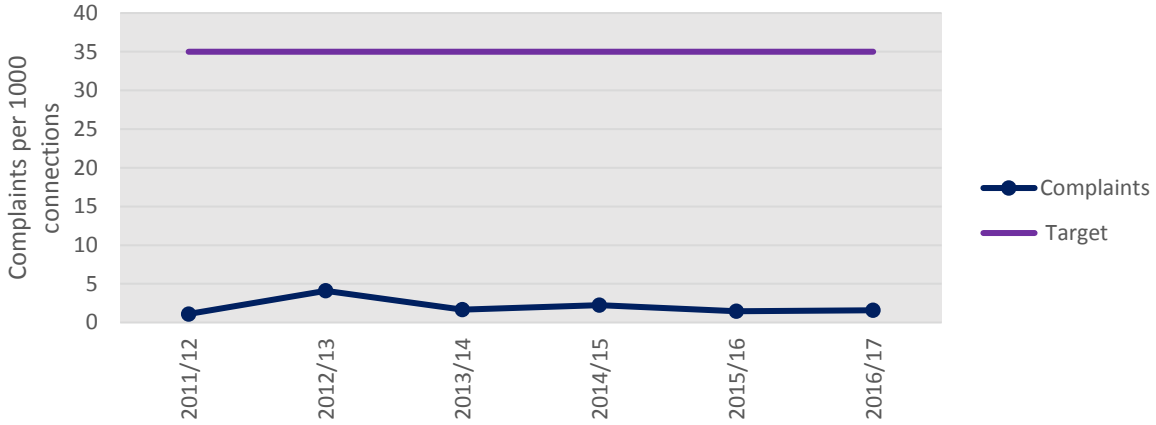


Figure 3: Total number of complaints per 1000 property connections

Figure 3 shows that Council have a very low number of complaints in relation to the target.

Complaints are collected as part of the request for service processes by Customer Services or Call Care. There will be occasions where there is more than one complaint for a singular event. In such situations, each complaint is counted separately not each event or occurrence.

In total 21 complaints were received in 2017. Seven for odour, three for noise, eight for the Hickmott dump point in Motueka and three regarding overflows. This equates to 1.6 complaints per 1000 connections.

The calculation takes the total number of complaints divided by the number of rated properties and rounds to the nearest whole number for reporting purposes.

Although Council performs very well against this performance measure, the target will remain at 35 in line with the Department of Internal Affairs guidance.

The number of dry weather overflows from Council wastewater system (expressed per 1000 connections to wastewater system) is less than the target.

Dry weather overflows represent a fundamental failure in a wastewater system under typical operating circumstances. This performance measure indicates the effectiveness of the network; whether it has been adequately designed and is being operated in a way that minimises harm to the community and receiving environment. An dry weather overflow fault can be caused by root intrusion or the presence of fat in the network.

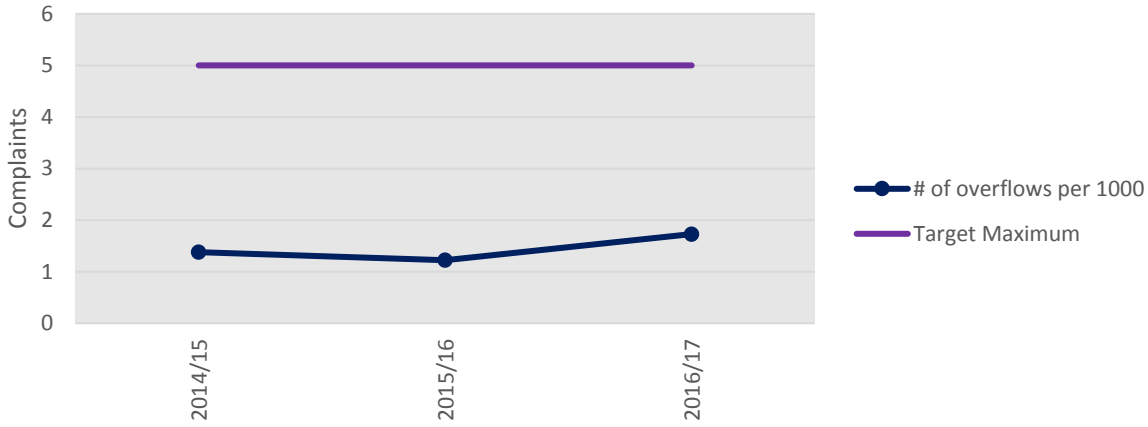


Figure 4: Number of dry weather overflows expressed per 1000 connections

Figure 4 illustrates that performance over the last 3 years (since the measure was introduced in 2015) is under the set target rate and staff intend to maintain the target at 5 overflows.

5.3.1 Percentage of customers satisfied with the wastewater service meets our targets.

Figure 5 shows customer satisfaction trends over the last six years. The graph illustrates that Council have consistently maintained very good results as measured by the annual resident's survey.

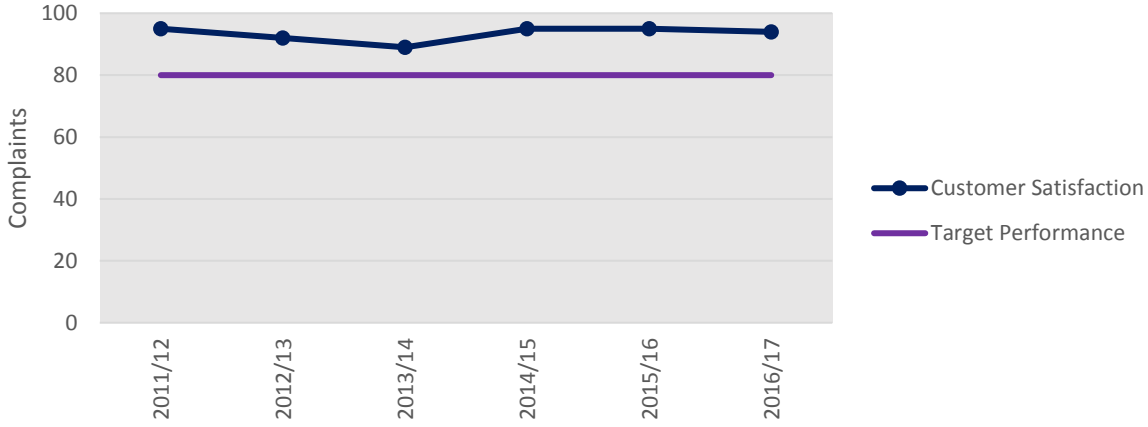


Figure 5: Trends in customer satisfaction over time

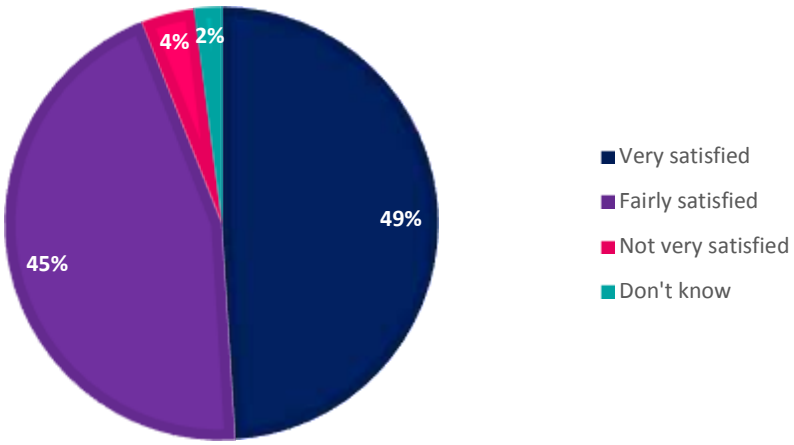


Figure 6: Customer satisfaction where a service is provided

Figure 6 shows that 94% of customer who receive a wastewater service are either very or fairly satisfied. Council consistently achieve very good results according to this performance measure, Council will maintain the target of 80% satisfaction.

5.3.2 Attendance time frames for overflows resulting from a blockage or other fault in the wastewater system

Attendance and resolution timeframes are a Department of Internal Affairs mandatory measure. Historically, capturing these timeframes has been problematic to report because a system to accurately capture relevant and data did not exist.

A system to record attendance and resolution times was implemented in 2016/17 and we will be able to report on a full set of data for 2017/18. We expect data for response times for calls received within office hours to be reliable. We expect data for response times for calls received outside of office hours to be less reliable and we plan to refine the data collection process to improve data reliability.

To assist data improvements, Council staff are providing a monthly feedback reports to the maintenance contractor to highlight any missing or incomplete information, so they can address data entry issues. Furthermore, staff are also developing a new interface for Call Care (out of hours customer service) so that call centre staff can enter enquiries directly into the asset management system (Confirm) and assign the correct start time.

5.3.3 All pump stations have standby pumps in case of mechanical failures.

For the past three years, since this measure was introduced, all pump stations have had standby pumps on hand in case of mechanical failure. Council will continue to maintain the target at 100%. Details of the individual pumps are provided in the asset register and further information of specific pumps are available in ActiveManuals™.

5.3.4 Our pump stations have storage or standby electrical generation in case of power failure.

This performance measure provides an indication of network resilience in the event of a power failure and is directly related to a key issue mentioned in section 3.5. In the past, Council have not achieved the performance target of 50% emergency storage or standby electrical generation, as shown in Figure 7. Council intend to increase the level of service by lifting the future performance target and investing $2.7 million in a network resilience improvements programme, this includes:

- $1 million pump station and storage upgrades over the next six years in Mapua
- $1.3 million of storage tanks installed at key sites across district over the five years
- $370,000 for site dedicated and new mobile generators over the next 13 years

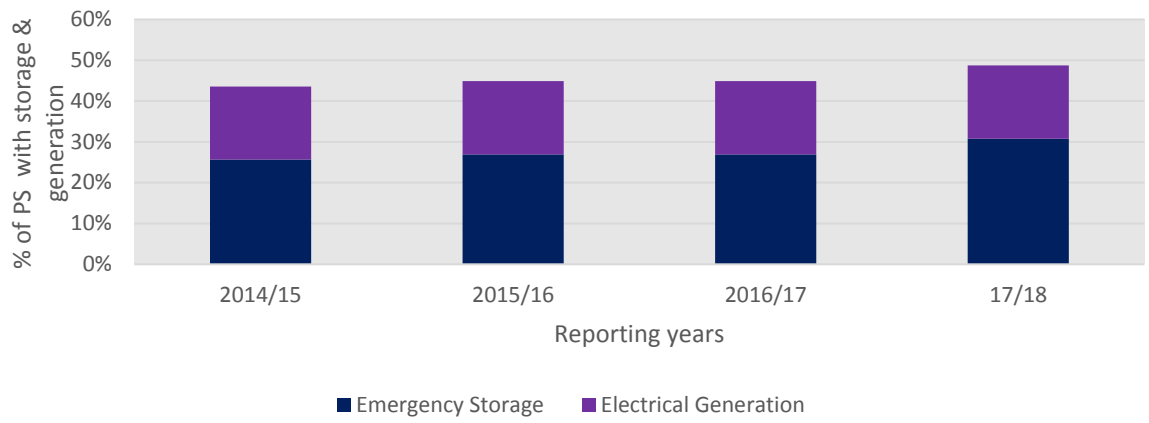


Figure 7: Pump station resilience (as measured by storage & generation)

6 Our Customers and Stakeholders

Council consults with the public to gain an understanding of customer expectations and preferences. This enables Council to provide a level of service that better meets the community's needs.

6.1 Stakeholders

There are many individuals and organisations that have an interest in the management and/or operation of Council's assets. Council has a Significance and Engagement Policy which is designed to guide the expectations with the relationship between Council and the Tasman community. Council has made a promise to seek out opportunities to ensure the communities and people it represents and provides services to have the opportunity to:

- be fully informed;
- provide reasonable time for those participating to come to a view;
- listen to what they have to say with an open mind;
- acknowledge what we have been told;
- inform contributors how their input influenced the decision Council made or is contemplating.

Engagement or consultation:

- is about providing more than information or meeting a legal requirement;
- aids decision-making;
- is about reaching a common understanding of issues;
- is about the quality of contact not the amount;
- is an opportunity for a fully informed community to contribute to decision-making.

The key stakeholders Council consults with about the wastewater activity are:

- elected members (Community Board members);
- Iwi/Maori (including Tiakina te Taiao and Manawhenua ki Mohua, iwi monitors);
- Regulatory (Consent compliance, Public Health);
- Fisheries organizations;
- Public Health Service (NMDHB);
- Heritage New Zealand;
- Civil Contractors New Zealand (Nelson - Marlborough);
- service providers / suppliers (Network Tasman, power companies);
- affected or interested parties (when applying for resource consents);
- neighbours.

6.2 Consultation

6.2.1 Purpose of Consultation and Types of Consultation

Council consults with the public to gain an understanding of customer expectations and preferences. This enables Council to provide a level of service that better meets the community's needs.

Council's knowledge of customer expectations and preferences is based on:

- feedback from residents surveys;
- other customer/user surveys, such as Yardstick visitor measures;
- levels of service consultation on specific issues;
- feedback from staff customer contact;
- ongoing staff liaison with community organisations, user groups and individuals;
- public meetings;
- feedback from elected members, advisory groups and working parties;
- analysis of customer service requests and complaints;
- consultation via the Annual Plan and Long Term Plan processes;

Council commissions residents surveys on a regular basis (the National Research Bureau Ltd has provided this service since 2008). These NRB Communitrak™ surveys assess the levels of satisfaction with key services, including provision of community facilities, and the willingness across the community to pay to improve services. Other informal consultation is undertaken with community and stakeholder groups on an issue by issue basis, as required.

6.2.2 Consultation Outcomes

The most recent NRB Communitrak™ survey was undertaken in May 2017. This asked whether residents were satisfied with the wastewater system and included residents that were connected to Council service and some that were not. The results from this survey are summarised in below:

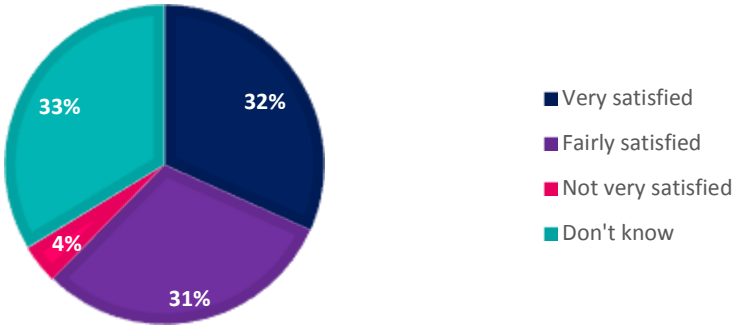


Figure 8: Overall Customer Satisfaction

Figure 8 shows 63% of residents are satisfied with the District's wastewater service (compared to 71% in 2016), including 32% who are very satisfied (38% in 2016). Four % are not very satisfied, while 34% are unable to comment (24% in 2016). The percent not very satisfied (4%) is similar to the Peer Group and National Averages and the 2016 reading. A large percent (33%) were unable to comment on their satisfaction with Council's wastewater system and that is likely due to not being connected to Council's wastewater system.

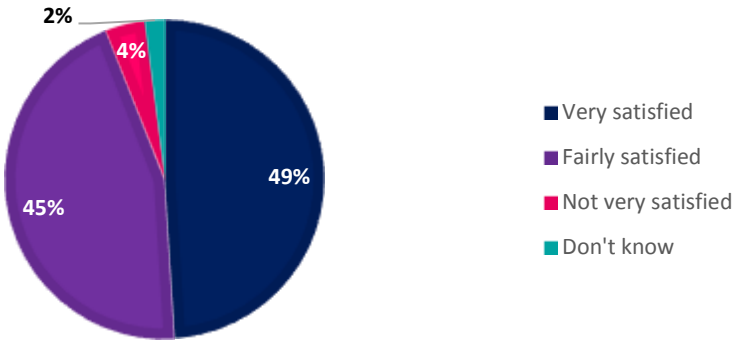


Figure 9: Satisfaction where a service is provided

Figure 9 shows that of the residents who are provided with a wastewater service, 94% are satisfied with it. This result is much higher in comparison with our rural peer group (62%) and the national average (81%).

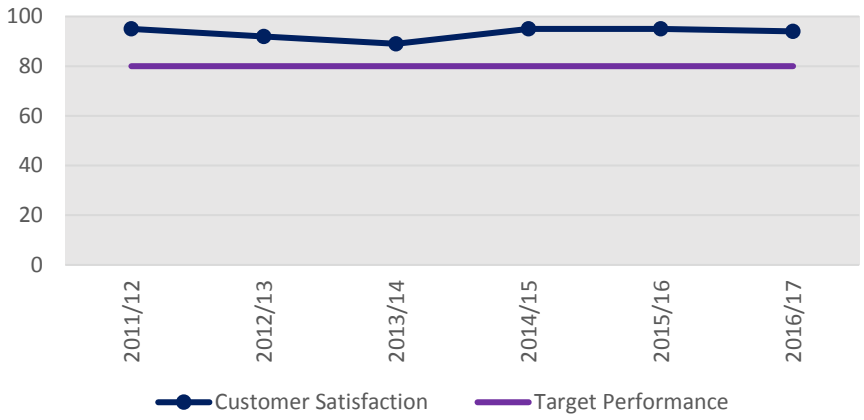


Figure 10: Customer satisfaction trends over time.

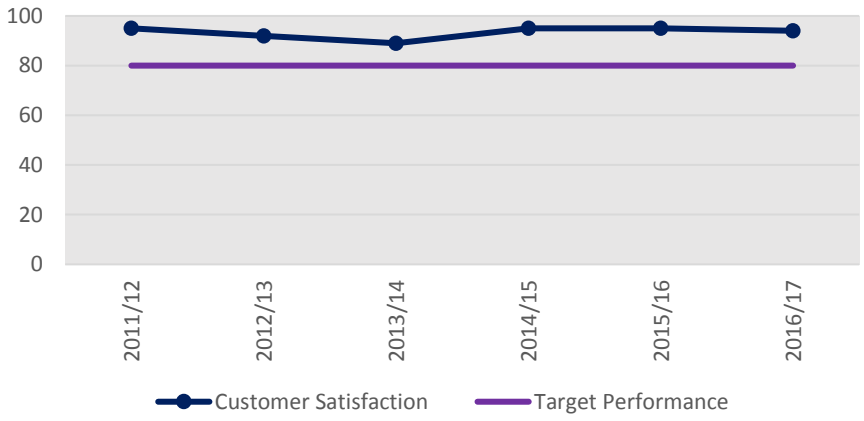


Figure 10: Customer satisfaction trends over time.

illustrates customer satisfaction trends over the last six years, and shows that Council have consistently maintained very good results from the annual resident's survey.

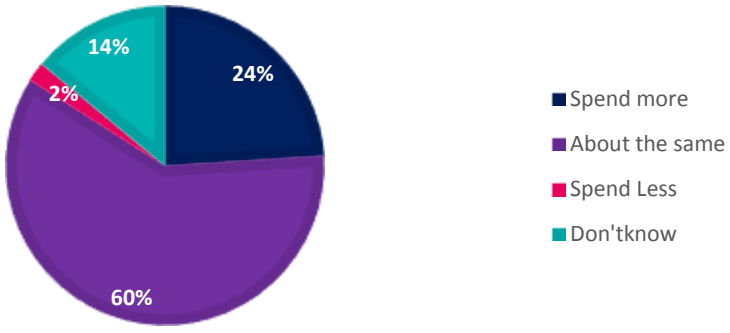


Figure 11: Spending emphasis for wastewater services

Figure 11 shows the breakdown of spending emphasis for wastewater service. Residents were asked if they would like to spend more (24%), about the same (60%), or less (2%) on wastewater given that Council cannot spend more without increasing rates or user charges; 14% of residents said they did not know.

6.2.2.1 Implications of Changes in Community Expectations

Community expectations vary geographically and over time. Key trends in community expectations that Council recognises include those listed in. Table 17

Table 17: Trends in community expectation

Trends in Community Expectations	Implications for Wastewater Systems	How Council Plans to Address the Issues
Environmental awareness is leading to a demand for higher treatment standards.	Council needs to be seen as a leader in sustainable practices and wastewater treatment so there is a need to improve treatment.	It is not anticipated that public expectation will exceed legislative requirements in the near future. Continue to identify opportunities for preventing breaches of resource consents.
Increased demand for public wastewater services.	Although growth is the main driver for services, public systems may be demanded as an alternative to on-site treatment and disposal systems especially in areas with difficult soil conditions.	Council will consider options and alternatives as communities identify a need for public wastewater services.
Customers are becoming more aware of the need for improved water conservation.	Improved water conservation by the public will lead to a reduction in wastewater flows per connection. This will extend the capacity of existing conveyance and treatment systems.	Council will promote water conservation. May also create odour issues due to reduced velocities.
Customers and communities are becoming less tolerant of sewage overflows, odours or mechanical noise at pump stations and treatment plants.	Upgrades are needed to reduce overflows and odours. Also need to take steps to improve reliability of assets to minimise the number of shutdowns and service faults.	Increase storage and conveyance capacities. Improve visibility and control of assets. Improve odour management systems.
Residents have expressed interest in alternative systems such as composting toilets or small community systems.	Reduce flows in existing systems. Reduce need for rural extensions and offers an alternative to conventional on-site systems.	Council will address alternatives on a case by case basis as there is the potential to create issues in the long term. Requires good monitoring and maintenance.

7 Current and Future Demand

The ability to predict future demand for services enables Council to plan ahead and identify the best way of meeting that demand. That may be through a combination of demand management and investing in improvements. This section provides and overview of key drivers of demand and what demand management measures Council has planned to implement.

7.1 Demand Drivers

Key factors driving demand for wastewater include:

- Residential use;
- Industrial and commercial trade waste use;
- Demographic changes;
- Inflow and infiltration and climate change;
- Customer expectations;
- Political factors.

7.1.1 Residential Use

There is an increasing demand for wastewater services in some urban settlements and this is primarily driven by population growth. High population growth and residential development in Richmond, Brightwater, Wakefield, Motueka and Mapua has taken up significant capacity in the wastewater network. Recently, Council have approved several special housing areas. This will mean there will be some high-density housing areas on small lots (e.g. Richmond West). Council is also proposing to change planning rules to encourage medium density housing in Richmond, close to the town center. New connections to some networks are not being permitted if they are not within a residential zone.

7.1.2 Commercial and Industrial Use

There is demand for new commercial wastewater connections associated with growing urban settlements.

There has been a reduction in projected commercial demand in Richmond West due to a plan change to incorporate a Special Housing Area. The Special Housing Area has gone in an area that was originally zoned for mixed business.

7.1.3 Industrial/Commercial Trade Waste Use

Generally, the industry type will determine the composition and amount of the trade waste that enters the network. Some of the major industries in the District are serviced by their own on-site treatment facilities (e.g., Fonterra at Takaka and Brightwater) or discharge direct to the NRSBU network (e.g. Nelson Pine Industries at Richmond). All industries connected to the Council's networks are subject to the Wastewater Bylaw, which came into effect on 1 July 2015. There is not expected to be any significant change in industrial demand on the wastewater system, although trade waste is now actively managed. Trade waste charges are due to significantly increase commencing July 2018 and again the following year (2019). All conditional trade waste dischargers have been advised.

7.1.4 Demographic Changes

Demographic changes will impact the demand for wastewater services. More people will create more wastewater. Also the predicted increase in the older portion of the populations will likely create the need for more single household units, which will have a higher per capita water consumption losing economies of scale and increasing wastewater discharge volumes. The key demographic assumptions affecting future growth are:

- Ongoing population growth over the next 30 years with the rate of growth slowing over time. The overall population of Tasman is expected to increase by 4,420 residents between 2018 and 2028, to reach 55,690.
- Higher growth in Richmond, Motueka, Mapua, Brightwater, and Wakefield for 2018-2028. For 2018-20208, Council has used Statistics New Zealand's high growth projections for Richmond, Brightwater, Wakefield, Motueka, and Mapua/Ruby Bay, and medium growth projections for the rest of the District. Medium growth projections have been used for the whole District for 2028-2048.

- An ageing population, with population increases in residents aged 65 years and over. The median age of the Tasman District population is projected to increase from 44 years in 2013 to 54 years by 2043. The proportion of the population aged 65 years and over is expected to increase from 18% in 2013 to 37% by 2043.
- A decline in average household size, mainly due to the ageing population with an increasing number of people at older ages who are more likely to live in one or two person households.

7.1.5 Inflow and infiltration

Inflow and infiltration increases the demand for wastewater services and consumes network capacity causing network overloading during very heavy rainfall events. There have been instances of poor compliance with the building code requirements which has contributed to increases in inflow and infiltration from relatively new (less than 10 year old) subdivisions. The Utilities Team is targeting new subdivisions as part of its inflow and infiltration investigations and is working with drain layers and Council's Building Services to improve compliance with the building code.

7.1.6 Climate change

Climate change is likely to exacerbate the impact of inflow and infiltration as a consequence of predicted increase in frequency and intensity of rainfall events. Sea level rise and the associated groundwater level rise is also likely to impact on inflow and infiltration. As a result some reticulated areas may be abandoned or manholes and pump station chambers raised above inundation levels. Several pump stations, pipelines and associated infrastructure are located in areas already subject to coastal erosion. These assets may need to be protected or relocated as necessary.

7.1.7 Tourism

Tasman District is a popular tourist destination and tourist numbers are increasing over time. As a result, there is increased seasonal demand for wastewater services in many coastal settlements due to an influx of visitors staying in baches, motels and campgrounds; in particular Pohara to Tata Beach, Kaiteriteri, Collingwood and St Arnaud. Murchison also experiences an increased demand for wastewater services in summer because of the increased visitors passing through on route to other South Island destinations.

7.1.8 Customer Expectation

Customers' expectations are changing over time. There is increasing awareness and support for environmental protection. As a result, customers and the wider public are less tolerant of wastewater overflows and expect higher treatment standards. Customers are also less tolerant of wastewater infrastructure (such as pump stations) being in close proximity to their private properties and want them moved or disguised.

7.1.9 Political Factors

Local and Central Government initiatives such as the Emissions Trading Scheme, Carbon Neutral Public Service programme and New Zealand's commitment to the Kyoto Protocol are driving the requirement to report on, manage and reduce emissions in relation to wastewater treatment plants. Council acknowledges that WWTPs are energy intensive and contribute to the production of greenhouse gasses. Council is open to exploring opportunities to improve energy efficiencies and make processes and facilities more resilient and this is a key consideration in the design of all new wastewater infrastructure.

7.2 Assessing Demand

7.2.1 Current Demand

There are various methods for assessing current demand, the primary methods used to asses and analyse demand are:

- Theoretical assessment based on the number of connections with peak flows assumed to be six times the average dry weather flow (ADWF).
- Connection numbers are compared to the network flow meter readings and flow meters on large trade waste dischargers.

7.2.2 Future Demand

To identify the future wastewater demands, it is important that the current demands are accurately identified so that they can be used as a baseline for the future projections. Council uses the following to determine future demand:

- Council's Growth Supply Demand Model
- Population growth (Statistic New Zealand)
- Household dwelling growth derived from building consents numbers
- Research into growth expectation in industrial and commercial sectors
- Research into growth expectations in the rural
- Modelling that enables Council to examine the potential effect of strategies on future demand.

As a result of this projected growth, Council has included following projects within the capital works programme:

Table 18: Capital Works Programme

AMP ID	Project Description
96028	Wakefield to 3 Brothers Corner Pipeline Upgrade
96029	Motueka Bridge to Motueka WWTP Rising Main Upgrade
96012	Aranui Road Pump Station Upgrade
96008	Higgs Road Pump Station Upgrade
96011	Ruby Bay Pump Station Upgrade and Storage
96007	New Stafford Dr Pump Station and Rising Main
96009	Toru Street Pump Station Upgrade and Storage
96013	New Rising Main Across Mapua Channel
96010	Aranui-Higgs Rd Pump Station Upgrade and Storage
96061	Upgrade of Mapua Rise Pump Station & Rising Main
96063	New Seaton Valley Road Pump Station & Rising Main
96064	New Rising Main Motueka West to WWTP
96015	New Brightwater North Pump Station & Rising Main
96058	Headingly Lane Pump Station & Rising Main Upgrade
96005	Ligar Bay Pump Station and Rising Main Upgrade
96006	Tata Beach Pump Station and Rising Main Upgrade
96022	Four Winds Pump Station and Rising Main Upgrade

7.2.2.1 New or Expanded Schemes

Projection for future growth in demand for wastewater schemes must take into account not only new developments but also existing residents from un-serviced areas connecting to Council's services, especially where on-site systems are failing. Council does not anticipate undertaking any new developments, instead Council will work with developers to allow for future developments. Council have not planned or budged for new reticulation and treatment infrastructure for areas like Marahau and Tasman, where there are known issues with onsite wastewater systems. These issues are dealt with the by the regulatory arm of Council.

7.3 Demand Management

The objective of demand management (sometimes called non-asset solutions) is to actively seek to modify customer demands for services in order to:

- Optimise utilisation/performance of existing assets;
- reduce or defer the need for new assets;
- meet Council's strategic objectives;
- deliver a more sustainable service; and
- respond to customer needs.

Prudent management includes managing water demand by best using the water that is already available. Water demand management involves the adoption of policies to control consumer demand or investment to achieve efficient water use by all members of the community.

7.3.1 Council's Approach to Demand Management

7.3.1.1 Optimise telemetry to improve network management

By the end of 2017/18, Council will have full telemetry installed across all wastewater networks. This enables Council to manage short-term capacity issues utilising existing emergency storage as buffering capacity during peak flow and significant rainfall events.

Council use SCADA technology to send text message and email communication to notify large trade waste users that an impending storm event is expected. This signals the trade waste user to discharge waste into the network (at pre-agreed increased rate) allowing storage capacity to be freed up until the storm passes.

Council is considering this approach as a short-term strategy to manage capacity issues at the Headingly Lane pump station until the pump station and rising main upgrade is completed. This is a not a sustainable management solution and is only used as short-term management measure.

7.3.1.2 Low pressure household storage

Where appropriate, Council is requiring new houses in subdivisions on low lying areas (and/or high groundwater) to install low pressure pumping units with 24-hour storage. The purpose of these systems is to prevent inflow and infiltration and allow discharge when gradients do not allow. An added advantage is storage capacity during rain events if required.

7.3.1.3 Trade waste load reduction & management

Although trade waste accounts for a small proportion of overall network load, it generates wastewater that has a high pollutant strength. There are two feasible mechanisms to manage demand, these include:

- Charging: setting the trade waste charges at an appropriate level to encourage waste minimisation and promote efficiencies. This also acts as an incentive for permit users to consider pre-treatment options.
- Conditions on trade waste permits: These conditions can include discharge limits and the requirement for flow buffering and wet weather storage. Council liaise with permit holders and allow some flexibility in discharge rates before a significant weather event to maximize storage availability.

7.3.1.4 Inflow and infiltration control

Council have planned an ongoing budget for an I/I Strategy and Programme and a complementary CCTV Inspections and Data Capture budget. These budgets will help identify problem areas, inform the location of repairs and develop the renewals programme. This should reduce current and future levels of I/I. Council will also use section 459 of the LGA to target failing private laterals and illegal connections where I/I is an issue and free up capacity for customer demands.

7.3.2 Technological Changes

Technological change has the ability to impact the demand for a service. These changes can reduce or increase the demand for wastewater infrastructure. Council assumes that the predicted technological changes will not have a significant effect on the assets in the medium-term. However, relevant considerations are:

- new or different treatment processes that provide a higher quality and more reliable discharge quality;
- better technology to measure flow and analyse system performance;
- better technology to rehabilitate pipelines (trenchless technology etc.);
- improved telemetry technology for monitoring asset operation and performance;

- low flush/alternative toilet systems;
- new water efficient industrial processes;
- demand for irrigation quality wastewater in water short areas

8 Lifecycle Management

Lifecycle cost is the total cost to Council of an asset throughout its life including, creation, operations and maintenance, renewal, and disposal. Council aims to manage its assets in a way that optimises the balance of these costs. This section summarises how Council plans to manage each part of the lifecycle for this activity.

8.1 Asset Condition and Performance

Council needs to understand the condition of its assets as this helps inform renewal and upgrading decisions which feed into the Long Term Plan. Condition monitoring programmes consider how critical an asset is, how quickly it is likely to deteriorate, and the cost of data collection.

Above ground assets include items and equipment within pump stations and wastewater treatment plants that can be accessed or inspected without the need for digging. Below ground assets include pipelines, manholes and underground valves.

Currently, Council has poor information on the condition of below ground assets and no formal process for gathering this data. Current practice is to assign wastewater assets a default grade of three unless the asset is less than five years old. Assets less than 5 years old have been assigned a grade of one. As new condition information is made available the gradings are amended.

Under the proposed Three-Waters Operation and Maintenance Contract commencing 1 July 2018, improving knowledge of asset condition is a key objective. The contractor will:

- undertake condition assessments of all above ground assets to confirm or otherwise determine their appropriate condition grading every two years.
- Undertake condition assessments of all manholes within three years (33% per annum).
- manage and maintain all new assets (less than six months old) and all assets with a condition grading of one or two to at least condition grade two or better.
- manage all other existing assets to at least condition grade three or better.

In the event of an asset failure, the contractor will assess the mode of failure and condition of the remaining asset (unaffected by the failure) and condition grading will be amended accordingly.

Council will also undertake random audits of the condition data provided by the Contractor.

Once critical assets are defined, these will be assessed for condition, especially those assets which are approaching the end of their theoretical useful life. We are also looking at ways to make better use of current information that is gathered but not stored in the asset register.

Condition rating of gravity sewer pipes is conducted using CCTV surveys. Council plans to incorporate this data into Confirm. Pipes have been rated both on structural (condition) and service (performance) defects basis. Sewer rising mains (pressure pipes) condition and performance have not been rated but will have a break record and some will have performance information recorded.

Where condition rating is done, a one-five scale is used, as per the NZQQA Infrastructure Asset Grading Guidelines, as shown in. Table 19

Table 19: Asset Condition Rating Table

Condition Grade and Meaning	General Meaning
1 Very Good	Life: 10+ years. Physical: Fit for purpose. Robust and modern design. Access: Easy; easy lift manhole lids, clear access roads. Security: Sound structure with modern locks. Exposure: Fully protected from elements or providing full protection.

Condition Grade and Meaning	General Meaning
2 Good	Life: Review in 5 – 10 years. Physical: Fit for purpose. Early signs of corrosion/wear. Robust, but not latest design. Access: Awkward; heavy/corroded lids, overgrown with vegetation. Security: Sound structure with locks. Exposure: Adequate protection from elements or providing adequate protection.
3 Moderate	Life: Review in 5 years. Physical: Potentially impaired by corrosion/wear, old design or poor implementation. Access: Difficult: requires special tools or more than one person. Secure: Locked but structure not secure, or secure structure with no locks. Exposure: Showing signs of wear that could lead to exposure.
4 Poor	Life: Almost at failure, needs immediate expert review. Physical: Heavy corrosion impairing use. Obvious signs of potential failure. Access: Restricted, potentially dangerous. Secure: Locks and/or structure easily breeched. Exposure: Exposure to elements evident e.g. leaks, over heating.
5 Very Poor	Life: 0 years – broken. Physical: Obvious impairments to use. Heavy wear/corrosion. Outdated/flawed design/build. Access: Severely limited or dangerous. Security: No locks or easily breeched. Exposure: Exposed to elements when not specifically designed to be.

The following sections provide summary overview of each of the wastewater networks general condition.

8.1.1 Collingwood

Although no formal assessment of the reticulation condition has been undertaken, the Collingwood wastewater network performs adequately and is considered fit for purpose as there are limited blockages and failures. Both Wally's Rest and Motel Pump Stations are in good condition given relatively recent upgrades. Inflow and infiltration can be an issue during heavy rainfall events and the WWTP reaches its hydraulic capacity at least once a year and the consequence is short lived. The wetland distribution pipe work has failed in the past and water levels within individual cells cannot be controlled. The replacement of this pipe work and reinforcing of eroded embankments was carried out in 2015/16.

8.1.2 Mapua/Ruby Bay

The original reticulation in Mapua/Ruby Bay was not designed to cope with current and future flows. The network suffers from high wet weather flows due to inflow and infiltration problems. All pump stations (with the exception of the Wharf pump station) are a very basic design with no storage capacity. Non-return valves in the pump stations restrict flow and cause blockages. Blockages frequently occur at the Aranui-Higgs Road pump station due to rags being disposed in the upstream network. Growth generated by development upstream of the school has caused significant overflows forcing the school to close on numerous occasions. Wastewater from McKee Domain is also a cause of overflows during summer peaks and during wet weather. This is part of the network is going to be addressed by Council's Parks and Reserves Team.

8.1.3 Motueka, Riwaka, Kaiteriteri Network

8.1.3.1 Motueka

Motueka suffers from high inflow and infiltration during high rainfall or high groundwater due to inadequate stormwater systems, old wastewater pipes and poor construction.

Reticulation

Overloading of the reticulation due to stormwater and groundwater infiltration has been a regular occurrence resulting in some pump stations running 24 hours a day for several days and high flows for weeks or months. The AC trunkmain between Goodman Park pump station and the WWTP is very shallow but is assumed to be in a reasonable condition as it has no history of breakage. Flow through the pipe is controlled by variable speed drives so flow and pressures spikes are minimised.

Much of the gravity system is laid at very flat grades and is prone to blockages. There are also many areas where gully traps and manholes on private property are lower than pump station overflow heights, so if blockages or power failures occur, overflows can occur on private property. A large proportion of the reticulation has undergone CCTV inspection which has resulted in numerous repairs and renewal of damaged or substandard pipe work. Much of the reticulation is very old (50 years +) and generally the older concrete pipes are in the worst condition through degradation of the pipe material. The earthenware pipes also suffer from significant groundwater infiltration, but this appears to be due more to the degradation of the rubber joints than the pipe material itself. Subsequent property connections to these earthenware and concrete pipes were poorly constructed.

There are various issues with pump stations. The main issue is lack of storage to manage, inflow and infiltration, and planned and unplanned power outages and blockages (due to inappropriate material). There are also some issues with corrosion of pipe work, and infrastructure associated with pump stations located on private property (13 Trewavas Street and 217 Thorp Street).

Treatment & Disposal

The wastewater treatment plant has recently been upgraded and complies with most resource consent conditions (currently non-compliant for Total Nitrogen discharge concentration). Peak loadings at the WWTP occur in summer due to the large increase in holiday population, particularly in Kaiteriteri. While in the past this has led to overloading and nuisance odour affecting neighbouring residents, usually between Christmas and mid-January, the upgrades have significantly reduced these problems. The current dosing system for managing odour, at Kaiteriteri Vessel, needs upgrading to deal with odour issues at the treatment plant.

Trade waste is discharged into the wastewater network. There is one known large and many smaller dischargers as well as possibly some more unidentified dischargers. Trade waste discharges have the potential to add to the seasonal high loadings and careful management is required to prevent overloading of the treatment system, recovery from which adds significant additional costs.

8.1.3.2 Riwaka

Generally, Riwaka reticulation performs moderately well with a limited blockages and failures. Although the system capacity of Riwaka is sufficient to prevent overflows, the pumping hours are considered high for the population served. This indicates that infiltration is occurring. The School Road pump station often requires a wash down due to a build-up of solids within the wet well.

8.1.3.3 Kaiteriteri

Although no formal assessment of the reticulation condition has been undertaken the Kaiteriteri part of the network performs adequately with limited blockages and failures. Although the infrastructure in Kaiteriteri is approximately 20 years old and condition problems are not expected, inflow during storm events is apparent.

The reticulation network within the settlement was designed in 1987 to cope with a fully developed network as per the current zoning so has no capacity issues. The trunkmain between the Kaiteriteri Vessel and Goodall Road has recently been upgraded to allow growth within the current zoning. This leaves two sections of older pipe to be upgraded. Both sections are on private property, one in Riwaka and the other between the Motueka River (SH60) bridge and the WWTP.

The Little Kaiteriteri pump station is susceptible to inundation during heavy rainfall events coinciding with high tides.

The Kaiteriteri system is reliant on telemetry to operate. The vessel has an operational volume of around 2m² with minimal storage.

Because of the long distance from Kaiteriteri to the Motueka WWTP, the wastewater in the pipeline goes septic. This causes odours at the WWTP as hydrogen sulphide gas is released at the inlet in the WWTP. This is exacerbated in summer with the increase in population and flows increasing from 100 to 600+ m^3 /day. Dosing of magnesium oxide (MagOx) at the vessel from December to the end of February each year assists with minimising odours released at the WWTP.

8.1.4 Murchison

Generally, the reticulation in Murchison performs adequately with limited blockages and failures. Asset condition information is relatively accurate. The reticulation network was constructed with cleaning eyes on bends in pipe work rather than manholes. Sometimes, this causes maintenance difficulties trying to investigate and clear blockages. Cleaning eyes are replaced with manholes as necessary. The rising main from the Waller Street pump station to the oxidation pond requires pigging at least once a year to reduce the likelihood of pipe blockages. Since the rising main and pump station upgrades, the system has operated trouble free apart from during flood events. On a few occasions surface flooding caused flooding of the wastewater network. Improvements to the stormwater drains have since helped mitigate this issue and Council has planned works to the Ned's Creek area in 2018/19/. The WWTP was replaced in 2006 and work well, and complies with all resource consents.

8.1.5 St Arnaud

The original wastewater network is nearly 20 years old (1999) and is in a good condition and performs adequately well with limited blockages and failures. As the scheme is so young, the accuracy of asset information is very good. The WWTP meets all consent conditions. The deep water table means that there is unlikely to be any impact on the groundwater from the treated wastewater discharge.

8.1.6 Takaka, Pohara, Ligar Bay/Tata Beach Network

For the most part, the wastewater network performs moderately with the exception of parts of the Pohara. The rising main (from Four Winds pump station to the receiving gravity reticulation) is considered to be in poor condition. The system has inherent operational difficulties given the large distances to transfer wastewater and the relatively small population. Difficulties are mostly in terms of odour and septicity and large increases in average daily flows from the seasonal impact of tourism in this area. There are no flow meters in the Pohara/Tata Beach pump stations. The first flow meter is at the Delaney pump station in Motopipi. This means it is difficult know how much flow can be attributed to each settlement and makes summer dosing to manage hydrogen sulfide and odour difficult.

Pohara

Reticulation in the settlements of Pohara, Ligar Bay and Tata Beach was installed in the early 1990s. The Pohara pump stations have a history of unreliability with frequent call-outs to pump overloads and burst pipelines and have insufficient storage. Attempted improvements to deal with heat and moisture have not completely fixed the problem. Most of the problematic sections of the rising mains have been replaced except for the Four Winds pump station to Clifton, this section suffers from frequent breaks, mainly during the peak summer season. Telemetry has been installed at many of the Pohara pump stations. as the visual flashing light alarms were vulnerable to vandalism. The Pohara Camp suffers from high volumes of fat material and sand during peak season. The Pohara Valley has been identified as having infiltration issues. The December 2011 storm event caused a slip below Paradise Way, which damaged a section of gravity pipe. The slip continued to be unstable, so a temporary above ground pipe has been laid as a replacement. This section needs to be checked after heavy rainfall events to ensure no further damage has occurred.

Takaka

Original sections of the Takaka wastewater network constructed in the early 1980s and some sections of the gravity reticulation were poorly laid with areas where grades are flat resulting in blockage problems. Access into the reticulation is poor due to a high number of cleaning eyes rather than manholes. This is an issue when trying to CCTV the pipeline.

Stormwater infiltration in the older sections of Takaka Township is a problem that has resulted in numerous overflows in the past. Pump station and rising main upgrades have resulted in a significant reduction in overflows. This has led to increased flows at the treatment plant, which lead to capacity issues. The upgrade of the WWTP was completed in 2015 and will have sufficient capacity for the foreseeable future.

8.1.7 Tapawera

Original parts of the Tapawera reticulation network were constructed in the 1970s. Although no formal assessment of the reticulation, condition has been undertaken, it is appearing in good condition and performs adequately well. There are no known specific concerns regarding the condition of these assets and there are very few blockages or other issues reported by residents.

Because of the flat grades along Main Road Tapawera, the gravity main requires regular flushing to reduce the risk of blockages. The Tapawera Area School swimming pools are connected to the sewerage scheme and have historically been emptied without warning, generally in the spring. The volume of water discharged can be significant at over three times the average daily flow. This impacts the treatment performance. Council has requested that the school contact Council prior to each empty but to date this has not occurred.

The accuracy of the asset location data is very good as Tapawera was a pilot area for the implementation of the Confirm asset information management system.

Monitoring of the groundwater downstream of the WWTP has shown little or no impact on the groundwater to date. The Tapawera WWTP was upgraded in 2009 and monitoring of the treatment process has shown good performance.

8.1.8 Upper Takaka

The wastewater network is about 40 years old and Council has replaced most of the earthenware pipes with uPVC because of significant infiltration through pipe joints. There are still significant amounts of infiltration from groundwater when the water table rises after prolonged rainfall.

Most of the ongoing infiltration is suspected to come from private house connections which are still the original earthenware pipes. Inflow and infiltration investigations have identified a number of dwellings and sewer faults which are currently being dealt with. Council completed further infiltration investigations in 2008 and is currently working to eliminate the major sources of the infiltration.

At the WWTP the wetland area needs to be kept free of weeds at all times and the soakage area mown by hand mower or weed eater. No vehicles are permitted to drive across the soakage area as this compacts the soil, reducing its permeability. During the oxidation pond desludging operation, it was noted that there were large volumes of pine needles in the pond. As a result, the pine trees adjacent to the WWTP were removed in late 2008 and the embankment replanted with natives.

During the extension of the soakage slope in 2008 an iron pan was discovered in the embankment above the WWTP which creates a perched water table that is intercepted by the extended soakage slope. Therefore, when the pine trees were removed a cut-off drain was constructed across the embankment to prevent groundwater ponding on the soakage slope.

8.1.9 Waimea: Wakefield, Brightwater, Richmond/Hope

Wakefield/Brightwater

Wakefield and Brightwater were originally reticulated in the late 1970s however, most development occurred the late 1980s. Although no formal assessment of the reticulation condition has been undertaken there are no concerns regarding the condition of these assets. Inspections by Council staff, maintenance contractors and consultants have not identified any notable defects.

Most of the reticulation network is uPVC pipe and infiltration through pipe joints is not a significant problem. Some of the oldest pipes around the Lord Auckland Road, Martin Ave and Harcourt Place area are AC material, installed in the late 1970s. The Wakefield and Brightwater gravity systems run relatively trouble free.

There have been recent capacity issues due to storm events. This causes large volumes of leachate at Eves Valley Landfill to be greater than the pump station can cope with. This discharges into to the Brightwater reticulation. Leachate is also tankered from the landfill to the Brightwater main pump station, which has caused some minor overflows immediately upstream of the pump station.

Currently there is no way to hold back the significant gravity flows from Wakefield from discharging into the Brightwater main pump station. There is insufficient storage capacity at the Brightwater pump stations and there is no safe way to undertake maintenance work within the wet well. Telemetry has been installed the Malthouse Crescent pump station, so it can be monitored remotely.

Richmond/Hope

The original reticulation installed during the 1950s is in poor condition. Generally, the concrete pipes from the original network are in the worst condition through pipe material degradation. The original earthenware pipes also suffer significant infiltration, but this appears to be due more to the degradation of the rubber joints rather than the pipe material itself. Much of the remaining reticulation in Richmond and Hope is less than 30 years old due to the significant development of Richmond between the late 1980s to present day. This reticulation is in much better condition and performs adequately. However, recent inflow and infiltration investigations have found significant sources from homes constructed in the last 10 years attributed to poor installation of private pipe work.

High flows during storm events has led to increased frequency of overflows in the commercial/industrial area in the lower catchment around Beach Road McPherson Street. Improvement to the stormwater system and secondary flow paths will help reduce the size and frequency of these overflows. Council's ongoing inflow and infiltration programme will continue to address this issue.

There is a concern that significant growth in the Richmond area will exceed the NRSBU pumping capacity.

8.2 Operations and Maintenance

8.2.1 Key Maintenance and Operational Themes

Pump Blockages

Typical maintenance activities involves responding to pump blockages, These are generally caused by inappropriate material (including excess debris and rags) being disposed of into the wastewater network.

Rising Main Breaks

Routine maintenance issues associated with rising main breaks are typically caused from poor construction techniques such as:

- Inappropriate choice of material surrounding pipe;
- Inappropriate or low grade/class of construction pipe material;
- Lack of construction monitoring (e.g. pipes laid in Pohara and Murchison in the early – mid-nineties)

General Blockages

General blockages in the gravity section of the wastewater reticulation are usually caused from inappropriate material being disposed of into wastewater network (e.g. rags and fat).

Electrical Failure

Electrical components (e.g. ultra-sonic, level transducer) typically have a short life span and as such these assets need to be replaced more frequently than other assets. Power surges caused by lightning strikes and power outages associated with storm events can cause failure to electrical assets.

8.2.2 Operations and Maintenance Contract

The operation and maintenance of the wastewater networks has been incorporated into a performance-based contract. The current maintenance contract was awarded to Downer New Zealand Ltd in 2007 and extended in 2013. Council extended it again through to mid 2018 to allow for the procurement of a new contract.

The key outcomes of the new contract include:

- A high degree of reliability of all services, systems, network and supply.
- Best value to the ratepayer.
- Consistently meeting regulatory requirements – no breaches of resource consents.
- High levels of customer satisfaction.
- Assets sustainably maintained to meet asset condition ratings.
- Innovations introduced that add value.
- Accurate and timely reporting to meet statutory requirements and contract targets.
- Up-to-date and accurate asset information.

8.2.3 Maintenance Strategies

There are different types of maintenance strategies and approaches for the wastewater activity. The two major maintenance categories include routine and reactive work. Typically, reactive work includes responding to day-to-day asset failures. Examples of this type of work includes rising main breaks, pump blockages and electrical failure etc. Generally, routine work is more proactive in nature and include activities outlined in Table 20 below.

Table 20: Summary of routine maintenance activities

Maintenance Activity	Description
Annual maintenance	Council plan an annual maintenance programme scheduled for October-November for assets including: • inlet screens; • aerators; • fans; • variable speed devices; • sensing equipment; • odour equipment (carbon and bark filters are replaced); • timers are maintained or calibrated.
Annual maintenance	Council conduct proactive maintenance such as pigging (cleaning) exercises on some rising mains (e.g. Murchison) and regular flushing of some gravity mains (e.g. Tapawera) as a preventative measure to reduce the risk of blockages.
Peak season maintenance	During the peak summer season (mid- December – mid February) daily maintenance checks are conducted on sections of known problem areas along Pohara Drive; visual inspections are done to spot leaks early in order to minimise overflows. Council also conduct gravity mains flushing in known areas that tend to block or cause odour over summer months (e.g. Commercial Street in Takaka, High Street in Motueka and in Tapawera).
Pre-weather event maintenance	When a storm event is expected, precautionary maintenance activities are undertaken to reduce the effect of inflow and infiltration (e.g. the gravel trap at Beach Road Pump Station is cleaned out).

8.2.4 Forecast Operations & Maintenance Expenditure

30-year forecasts for operations and maintenance costs are shown in Figure 12 below. This includes the operation and maintenance cost of all wastewater networks. For detailed breakdown forecast operations and maintenance expenditure, see Appendix A.

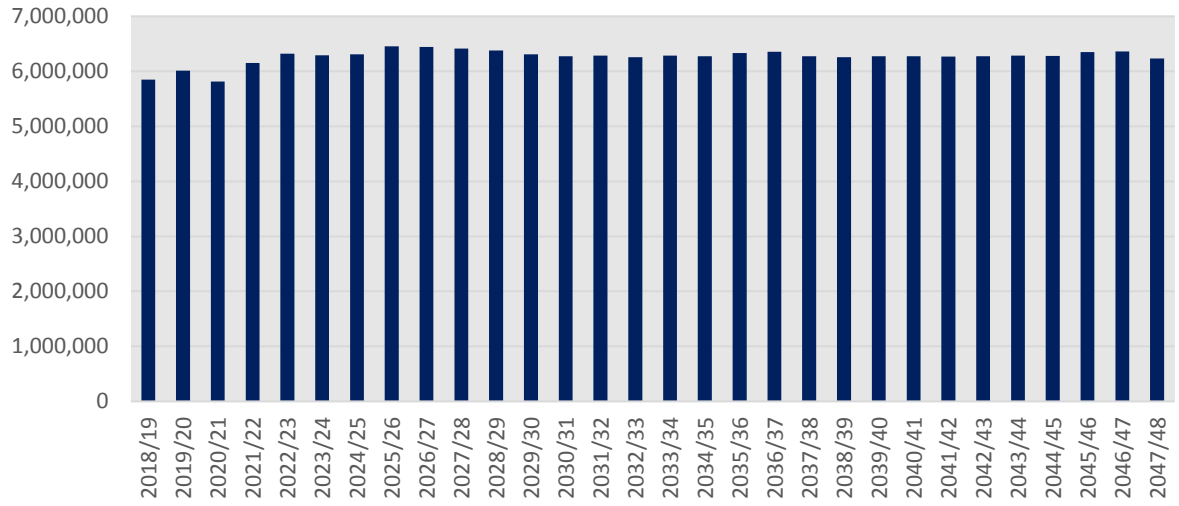


Figure 12: 2018– 2048 Direct Operation and Maintenance Expenditure Excluding Inflation

8.3 Asset Renewal/Replacement

Renewal expenditure is major work that does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original capacity. Work over and above restoring an asset to original capacity is new works expenditure.

8.3.1 Key Renewal Themes

Asset age, Condition and Performance

Asset age is the primary consideration for determining asset end of life cycles and driving the renewals programme. Other factors such as asset condition and performance is also considered when attempting to strike the optimal balance between maximising asset life (increased maintenance costs over time) and investment in replacing asset.

Historically, asset condition data has been poor, particularly for below ground assets. Council is planning to improve the process of collating and populating condition data into the asset management system (Confirm). When routine pipe maintenance is done, the contractor has the opportunity to inspect the asset and provide condition data. This information combined with staff and operator knowledge can provide better information about assets. Condition data can also be gathered through CCTV inspection and will help inform the renewals and I/I programme. Sometimes growth drivers added an element of pressure to the renewals programme.

Inflow and Infiltration

Over time the renewals programme will address inflow and infiltration issues as aging and broken pipes will be replaced. This will be help address known issues in Motueka and Richmond.

8.3.2 Renewal Strategies

Assets are considered for renewal when:

- they near the end of their effective useful life;
- the cost of maintenance becomes uneconomical and the whole-of-life costs are less to renew the asset than keep up maintenance;
- the risk of failure of critical assets is unacceptable.

The renewal programme has generally been developed by the following:

- Taking asset age and remaining life predictions, calculating when the remaining life expires and converting that into a programme of replacements based on valuation replacement costs.
- Reviewing and justifying the renewals forecasts using the accumulated knowledge and experience of asset operations and asset management staff. This incorporates the knowledge gained from tracking asset failures and performance through the asset management system.
- The renewal programme is reviewed in detail every three years, by planning advisors, asset engineers and engineering management; and crossed referenced with other activities to determine if other projects are occurring in the same location. Timings may be tweaked to optimise overall programme to minimise disruptions to the public and realise potential costs saving in the reinstatement and preliminary and general works where possible.
- Every year the annual renewal programme is reviewed and planned with the input of the maintenance contractor.

8.3.2.1 Management and Mitigation of Renewals

To improve the information base for the renewals strategy and replacement programme, Council needs to focus on the following improvements:

- updating the wastewater asset valuation
- using the more up-to-date and complete data in Confirm
- critically assessing remaining life of pipelines with known condition problems – especially in the light of the increasing database of CCTV imagery;
- capturing asset data to reduce the amount of pipelines that have "Unknown" construction material;
- using a risk-based approach to identify pipeline replacement programmes;
- improving condition knowledge of some of the "high risk" pipelines, especially to identify:
- asset condition may be worse than expected;

- situations where remaining life is under-estimated.

Some of the particular areas where Council needs to improve their knowledge include:

- inspecting the AC and earthenware pipelines in Richmond to assess remaining life and whether the pipelines will reliably provide 60 years of service life;
- inspecting the pre-1960 concrete pipelines in Richmond to assess remaining life and whether the pipelines will reliably provide another 30 or so years of service life;
- reflecting on the outcomes of CCTV inspections in Motueka and associated replacement and rehabilitation work that has been done, and determine the preferred ongoing strategy for replacing or renewing pipelines;
- inspecting the AC in Tapawera to assess remaining life and whether the pipelines will reliably provide 60 years of service life;
- inspecting the PVC gravity pipelines in Takaka to assess remaining life and whether the pipelines will reliably provide 80 years of service life;
- review of the remaining life assessments where it is known replacements are planned – eg, Kaiteriteri to Motueka pressure main, Pohara rising mains.

8.3.3 Delivery of Renewals

Minor renewal projects are typically carried out by the operations and maintenance contractor. Contracts for larger value renewal projects are tendered in accordance with the Procurement Strategy. Prior to the asset being renewed, the operations and maintenance contractor will inspect these assets to confirm whether renewal is actually necessary. In the event it does not need to be renewed, a recommended date of renewal is then entered back into the Confirm database. This new date will then be included in the next AMP update.

A rolling programme of CCTV investigation is currently in place progressing through each network. The programme targets sections of main for investigation based on the age and known problems. Many of the advanced pipeline renewals planned for Motueka and Richmond have been deferred for three years pending the outcome of a structured renewal programme. Historically the pipeline renewals programme focused on renewing rising mains with a history of high breakage or gravity mains where overflows were common. Most of these issues have been resolved and now the focus needs to be on investigating the unseen problems in gravity systems where inflow and infiltration is prevalent. The new renewal programme will prioritise renewals based on the greatest benefit/value for money and will more accurately plan future funding needs.

8.3.4 Deferred Renewals

Deferred renewal is the shortfall in renewals required to maintain the service potential of the assets. This can include:

- renewal work that is scheduled but not performed when it should have been, and which has been put off for a later date (this can often be due to cost and affordability reasons);
- an overall lack of investment in renewals that allows the asset to be consumed or run-down, causing increasing maintenance and replacement expenditure for future communities.

Figure 13 shows there is a significant difference between planned renewals and forecast depreciation over 30 years. This divergence is due primarily to the long useful life and age profile of Council's current assets. Most of Council's wastewater assets are not due for replacement within the next 30 years. The significant investment programme in new assets Council has planned also contributes to the divergence between renewals and depreciation. The new assets contribute to higher depreciation but, like the bulk of Council's current wastewater assets, most do not need replacing within the next 30 years. While not shown here, Council has compared the likely renewal requirements for 100 years with depreciation over the same time. This assessment shows that the gap closes in the long-run.

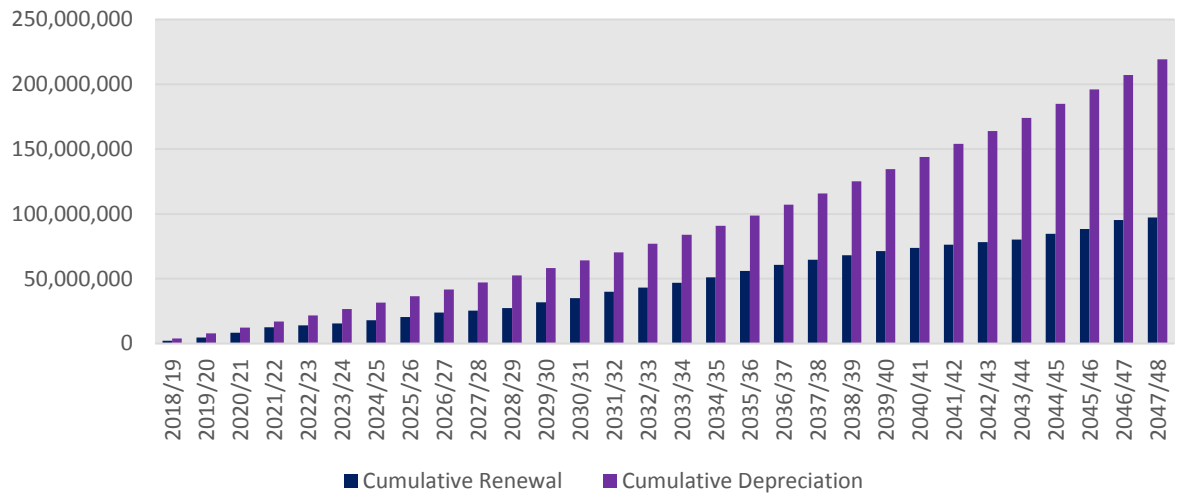


Figure 13: Cumulative Depreciation vs Renewal Comparison Including Inflation

8.3.5 Forecast Renewal Expenditure

Figure 14 shows a summary of the expenditure forecast for renewals over the next 30 years.

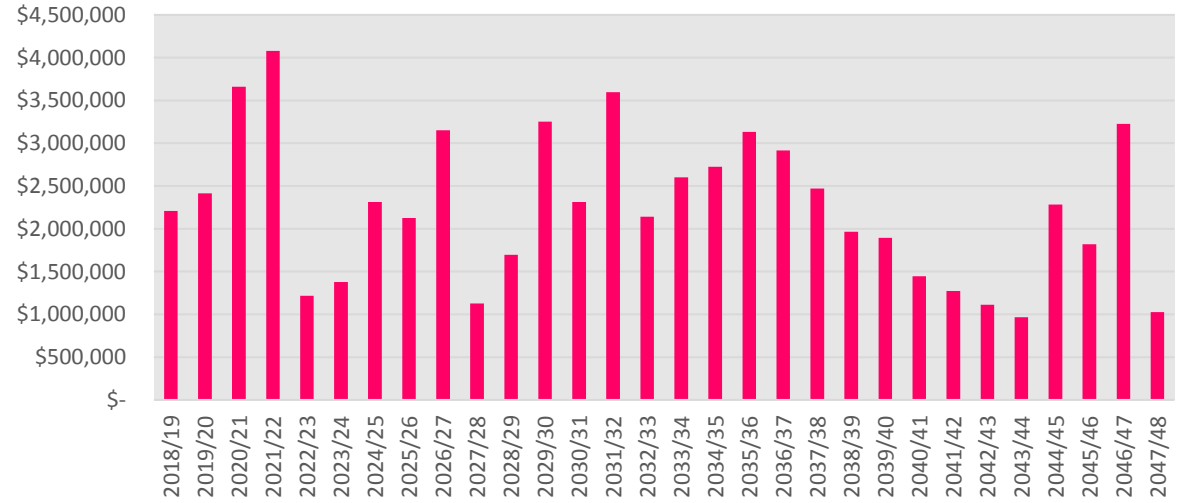


Figure 14: 2018 – 2048 Annual Renewal Expenditure Excluding Inflation

8.4 Asset Development

New capital expenditure is used to create new assets, expand or upgrade existing assets, or increase the capacity of existing assets beyond their original design capacity or service potential. This section summarises future new capital work requirements for this activity.

8.4.1 Key Asset Development Themes

Growth

Enabling growth is a Council priority. Council plans to provide new infrastructure in Wakefield, Brightwater and Motueka.

Emergency Storage & Generators

Council have planned the installation of new storage tanks at key sites across the District and a series of pump station upgrades that includes new storage tanks. Council have also planned to invest in site-specific generators for WWTP and new mobile generators that can be used across the District.

Low-Pressure Pump Systems

Council have recently trialed low-pressure pump systems with 24-hour storage as an alternative solution in subdivisions in low-lying areas (or areas with high groundwater). Developers install the assets and later vest them Council. It is expected that more of these new assets will be vested to Council as areas like Richmond West develop over time.

Coastal Retreat

Council is considering the long-term impact of climate change and plans to relocate the Motueka WWTP to a new inland location within 20 years. Council need to consider other wastewater assets that are currently located close to the coast.

8.4.2 Projects to Support Increasing Levels of Service

- Oxford and Cambridge Streets Gravity Upgrades
- Aranui Road Pump Station Upgrade
- Ruby Bay Pump Station Upgrade and Storage
- New Stafford Dr Pump Station and Rising Main
- New Mobile Generators
- New Motueka WWTP

8.4.3 Projects to Support Growth

- Wakefield to 3 Brothers Corner Pipeline Upgrade
- Headingly Lane Pump Station & Rising Main Upgrade
- New Rising Main Motueka West to WWTP
- New Brightwater North Pump Station & Rising Main

8.4.4 Forecast New Capital Expenditure

The capital programme that has been forecast for this activity where the primary driver is classed as new works (i.e. growth or levels of service) and is shown in Figure 15 below. The notable peak in 2035/36 and 2036/37 represents the construction of the new inland Motueka WWTP. Figures in the graph are uninflated.

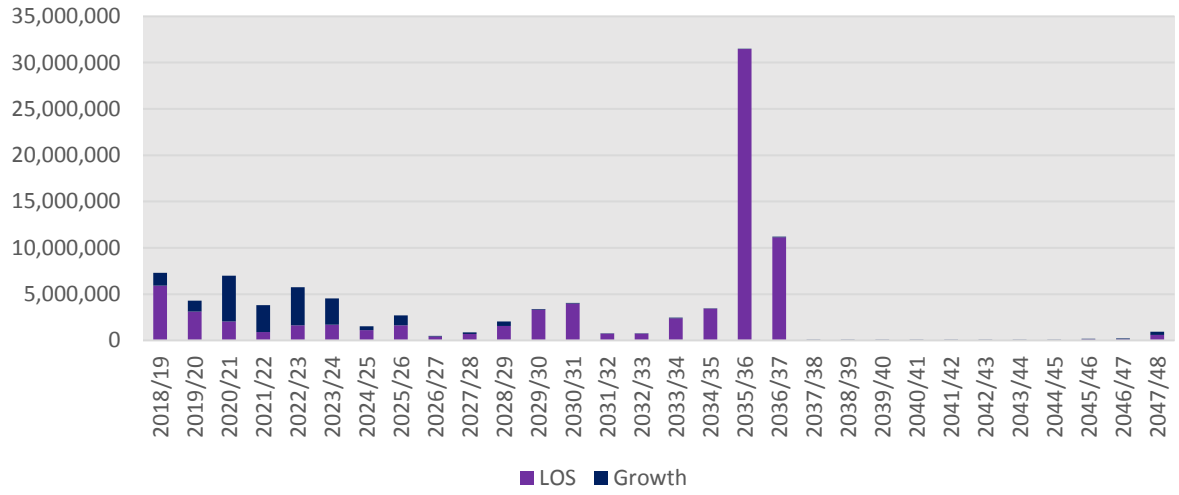


Figure 15: 2018 – 2048 New Capital Expenditure Excluding Inflation

8.5 Asset Disposal

Council does not have a formal strategy on asset disposal and as such it will treat each asset individually on a case-by-case basis when it reaches a state that disposal needs to be considered.

Asset disposal is generally a by-product of renewal or upgrade decisions that involve the replacement of assets.

Assets may also become redundant for any of the followings reasons:

- Under-utilisation;
- Obsolescence;
- provision of the asset exceeds the required level of service;
- uneconomic to upgrade or operate;
- policy change;
- the service is provided by other means (e.g. private sector involvement);
- potential risk of ownership (financial, environmental, legal, social, vandalism).

Depending on the nature, location, condition and value of an asset it is either:

- made safe and left in place;
- removed and disposed of;
- removed and sold;
- ownership transferred to other stakeholders by agreement.

In most situations assets are replaced at the end of their useful lives and are generally in poor physical condition. Consequently, the asset with be disposed of to waste upon its removal. In some situations, an asset may require removal or replacement prior to the end of its useful life. In this circumstance, Council may hold the asset in stock for reuse elsewhere on the network. Otherwise, if this is not appropriate it could be sold off, transferred or disposed of.

When asset sales take place, Council aims to obtain the best available return from the sale and any net income will be credited to that activity. Council follows practices that comply with the relevant legislative requirements for local government when selling off assets.

9 Financials

Council has planned a prudent financial approach to managing its assets and services. This section provides a summary of the total value of the activity and the investment that Council has planned to make over the next 30 years.

9.1 Funding Sources

The Wastewater activity is funded through a mixture of the following sources. The sources and their proportion of contribution is shown in Figure 16 below.

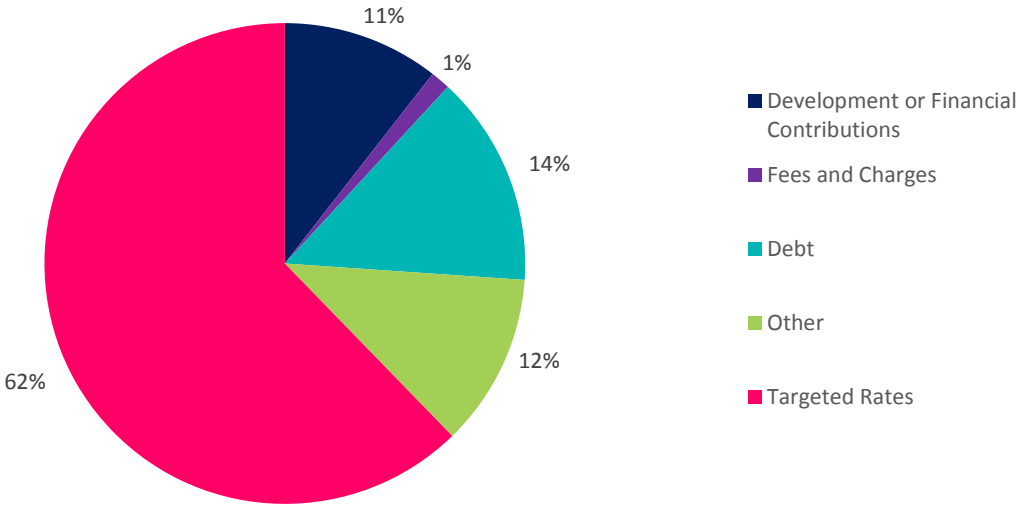


Figure 16: Sources of wastewater funding

9.1.1 Development Contributions

Council's Development and Financial Contributions Policy can be found on our website at www.tasman.govt.nz/policy/policies/development-contributions-policy.

The Policy will be adopted in conjunction with Council's Long Term Plan and will come into effect on 1 July 2018.

The Policy sets out the development contributions payable by developers, how and when they are to be calculated and paid, and a summary of the methodology and rationale used in calculating the level of contributions.

The key purpose of the Policy is to ensure that growth, and the cost of infrastructure to meet that growth, is funded by those who cause the need for and the benefit from the new or additional infrastructure, or infrastructure of increased capacity.

There are three wastewater development contributions in place. Which charge is applicable depends on what catchment the development is located in.

Table 21: Wastewater Development Contributions Charges as of July 2018.

Catchment	Development Contribution per HUD $ (incl GST) *
Waimea	$ 10,442
Motueka	$ 8,964
Golden Bay	$ 13,257
Rest of District	Nil

HUD = Household Unit of Demand

* The value of the Development Contribution shall be adjusted on 1 July each calendar year using the annual change in the Construction Cost Index.

9.1.2 Targeted Rates

Council sets a targeted rate for the purpose of meeting the costs of the general wastewater account. Refer to Council's Funding Impact Statement and Revenue and Financing Policy for further details.

Schedule of Fees and Charges

There may be a charge for the actual costs associated with a wastewater connection. Refer to Councils Schedule of Fees and Charges for further details.

Trade Waste Charges

Trade waste charges are additional to the wastewater targeted rate because trade waste has characteristics that make it more difficult to treat and/or convey than typical domestic wastewater.

The Wastewater Bylaw (2015) sets out three types of trade waste users: permitted, conditional and prohibited. Permitted trade waste is generally of small volume and will have a minor impact on the wastewater systems if it complies with the permitted waste conditions. Conditional trade waste will have a greater impact on the wastewater systems and needs to be more actively managed. Therefore, two different charging systems have been established to reflect the difference.

Council is planning to increase the trade waste charges commencing from July 2018, there will likely be a stepped increase over a two-year period. Council have informed affected conditional users of the increase via letters and staff are planning to visit these trade waste users in early 2018 to discuss the change.

There is an annual charge only for permitted trade waste while conditional trade waste dischargers are charged an annual fee as well as a conveyance and treatment charge, which is proportional to the volume and strength of the discharge.

Council sets the conditional trade waste charges to recover the cost of conveyance and treatment of the waste. All trade waste charges are detailed in the Long Term Plan. The charges are reviewed each year and included in the Annual Plan.

9.2 Asset Valuation & Depreciation

The Local Government Act 1974 and subsequent amendments contain a general requirement for local authorities to comply with Generally Accepted Accounting Practice ("GAAP").

Council requires its infrastructure asset register and valuation to be updated in accordance with Financial Reporting Standards and the AMP improvement plan.

The valuations summarised below have been completed in accordance with the following standards and are suitable for inclusion in the financial statements for the year ending June 2017.

- NAMS Group Infrastructure Asset Valuation Guidelines – Edition 2.0
- New Zealand International Public Sector Accounting Standard 17; Property, Plant and Equipment (PBE IPSAS 17) and PBE IPSAS 21 (Impairment of Non Cash Generating Assets).

9.2.1 Latest Valuation

The wastewater assets are valued every three years and were last re-valued in April 2017. The valuation is reported under separate cover1. Key assumptions in assessing the asset valuations are described in detail in the valuation report.

The majority of information for valuing the assets was obtained from the Council's Confirm database. The data confidence is detailed in Table 22 below.

Table 22: Data Confidence

Asset Description	Confidence	Comments
Wastewater Assets	B - Good	The asset registers provide all the physical assets that make up each scheme. However, attribute information could be more detailed such as pipe and manhole depths, surface types etc.

Based on NZ Infrastructure Asset Valuation and Depreciation Guidelines – Edition 2, Table 4.3.1: Data confidence grading system.

The Base Useful Lives for each asset type as published in the NZIAVDG Manual were used as a guideline for the lives of the assets in the valuation. Generally, lives are taken as from the mid-range of the typical lives indicated in the Valuation Manual where no better information is available. Lives used in the valuation are presented in Table 23 below.

Table 23: Asset Lives

Item	Life (years)	Minimum Remaining Life (years)
Pipelines		
AC, EW pipe	60	5
Concrete, CI, DI, PVC, Steel, unknown pipe	80	5
PE pipe	120	5
Miscellaneous pipework's and fitting associated with treatment plants and pump stations	15	2
Valves	50	5
Cleaning Eyes, Inspection Points	80	5
Manholes	100	5
Flow meters	15	2
Non Pipeline Assets		
Pump chambers	80	5
Concrete structures	50	5
Buildings (all materials)	50	5
Oxidation pond earthworks	Not depreciated	

[1] Tasman District Council Valuation of Wastewater Infrastructure Assets as at 1 April 2017

Item	Life (years)	Minimum Remaining Life (years)
Small plant – pumps, aerators, odour control, generators	20	2
Electrical, telemetry, control cabinets	15	2

The optimised replacement value, optimised depreciated replacement value and annual depreciation of the wastewater assets are summarised in Table 24 and Table 25 below.

Table 24: Wastewater Asset Valuation Summary 1 April 2017

Asset Type	Optimised Replacement Value ($000)	Optimised Depreciated Replacement Value ($000)	Annual Depreciation ($000/yr)
Wastewater Pipes	94,733	64,257	1,160
Wastewater Non Pipe Assets	70,868	49,097	1,507
Nelson Regional Sewerage (half share)	44,640	31,474	Funded from users
Total	210,241	144,828	2,667

Table 25: 2015 / 2017 Wastewater Valuation Comparison excluding Nelson Regional Sewerage

Year	Optimised Replacement Value ($000)	Optimised Depreciated Replacement Value ($000)	Annual Depreciation ($000/yr)
2015	154,694	107,755	2,306
2017	165,601	113,354	2,667
% Increase	7.1%	5.2%	15.7%

Overall the optimised replacement value has increased by 7.1% since the 2015 valuation. The increase in the replacement values is due to the following reasons:

- increase in the unit rates of assets over the period
- the addition of new assets to the utilities since 2015;

The percentage increase in depreciation from 2015 to 2017 is higher at 15.7%. This is due to the addition of shorter life assets at the Motueka Treatment Plant.

9.2.2 Depreciation

Depreciation of assets must be charged over their useful life. Council calculates depreciation on a straight line basis on most infrastructural assets at rates which will write off the cost (or valuation) of the assets to their estimated residual values, over their useful lives.

9.3 Financial Summary

9.3.1 Funding Impact Statement

Council's Funding Impact Statement (FIS) for this activity is included in the table below. It summarises in one place how this activity will be funded and how those funds will be applied over the next 10 years.

Table 26: Funding Income Statement for the Next 10 years

	2017/18 AP $000	2018/19 Budget $000	2019/20 Budget $000	2020/21 Budget $000	2021/22 Budget $000	2022/23 Budget $000	2023/24 Budget $000	2024/25 Budget $000	2025/26 Budget $000	2026/27 Budget $000	2027/28 Budget $000
SOURCES OF OPERATING FUNDING											
General rates, uniform annual general charges, rates penalties	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	10,380	10,231	10,720	10,913	11,009	11,040	11,930	12,313	12,599	12,953	12,957
Subsidies and grants for operating purposes	0	0	0	0	0	0	0	0	0	0	0
Fees and charges	99	174	230	236	242	248	255	262	269	277	285
Internal charges and overheads recovered	0	0	0	0	0	0	0	0	0	0	0
Local authorities fuel tax, fines, infringement fees, and other receipts	4,866	3,327	3,522	3,738	4,265	4,744	4,802	4,857	4,976	5,077	5,253
TOTAL OPERATING FUNDING	**15,345**	**13,732**	**14,472**	**14,887**	**15,516**	**16,032**	**16,987**	**17,432**	**17,844**	**18,307**	**18,495**
APPLICATIONS OF OPERATING FUNDING											
Payments to staff and suppliers	9,206	6,731	7,002	6,876	7,487	7,868	8,069	8,339	8,806	9,065	9,297
Finance costs	1,338	1,501	1,580	1,789	1,966	2,064	1,927	1,803	1,689	1,564	1,434
Internal charges and overheads applied	1,312	1,362	1,398	1,357	1,524	1,661	1,878	2,040	2,029	2,079	2,066
Other operating funding applications	0	0	0	0	0	0	0	0	0	0	0
TOTAL APPLICATIONS OF OPERATING FUNDING	**11,856**	**9,594**	**9,980**	**10,022**	**10,977**	**11,593**	**11,874**	**12,182**	**12,524**	**12,708**	**12,797**
SURPLUS (DEFICIT) OF OPERATING FUNDING	**3,489**	**4,138**	**4,492**	**4,865**	**4,539**	**4,439**	**5,113**	**5,250**	**5,320**	**5,599**	**5,698**

SOURCES OF CAPITAL FUNDING											
Subsidies and grants for capital expenditure	0	0	0	0	0	0	0	0	0	0	0
Development and financial contributions	1,506	2,322	2,322	2,322	1,835	1,835	1,835	1,930	1,930	1,930	1,496
Increase (decrease) in debt	2,237	3,515	845	634	(181)	(2,847)	(2,624)	(2,155)	(1,741)	(2,278)	(4,044)
Gross proceeds from sale of assets	0	0	0	0	0	0	0	0	0	0	0
Lump sum contributions	0	0	0	0	0	0	0	0	0	0	0
Other dedicated capital funding	0	0	0	0	0	0	0	0	0	0	0
TOTAL SOURCES OF CAPITAL FUNDING	**3,743**	**5,837**	**3,167**	**2,956**	**1,654**	**(1,012)**	**(789)**	**(225)**	**189**	**(348)**	**(2,548)**
APPLICATIONS OF CAPITAL FUNDING											
Capital expenditure											
- to meet additional demand	106	294	792	4,370	1,851	4,761	3,416	359	1,346	0	0
- to improve the level of service	708	7,903	4,306	5,278	4,842	1,656	1,726	1,961	2,324	2,286	1,287
- to replace existing assets	5,683	1,105	1,568	1,077	1,342	911	1,253	1,846	1,733	1,679	1,072
Increase (decrease) in reserves	735	673	993	(2,904)	(1,842)	(3,901)	(2,071)	859	106	1,286	791
Increase (decrease) in investments	0	0	0	0	0	0	0	0	0	0	0
TOTAL APPLICATIONS OF CAPITAL FUNDING	**7,232**	**9,975**	**7,659**	**7,821**	**6,193**	**3,427**	**4,324**	**5,025**	**5,509**	**5,251**	**3,150**
SURPLUS (DEFICIT) OF CAPITAL FUNDING	**(3,489)**	**(4,138)**	**(4,492)**	**(4,865)**	**(4,539)**	**(4,439)**	**(5,113)**	**(5,250)**	**(5,320)**	**(5,599)**	**(5,698)**
FUNDING BALANCE	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

9.3.2 Project Drivers

All expenditure must be allocated against at least one of the following project drivers.

- Operation and Maintenance: operational activities that do not involve the renewal or upgrade of assets, or work that is necessary in order to provide on-going services at the agreed levels.
- Renewals: significant work that restores or replaces an existing asset towards its original size, condition or capacity.
- Increase Level of Service: works to create a new asset, or to upgrade or improve an existing asset, beyond its original capacity or performance.
- Growth: works to create a new asset, or to upgrade or improve an existing asset, beyond its original capacity or performance to provide for the anticipated demands of future growth.

This is necessary for two reasons as follows.

- Schedule 13(1) (a) and section 106 of the Local Government Act require Council to identify the total costs it expects to have to meet relating to increased demand resulting from growth when intending to introduce a Development Contributions Policy.
- Schedule 10(2)(1)(d)(l)-(iv) of the Local Government Act requires Council to identify the estimated costs of the provision of additional capacity and the division of these costs between changes to demand for, or consumption of, the service, and changes to service provision levels and standards.

All new works have been assessed against these project drivers. Some projects may be driven by a combination of these factors and an assessment has been made of the proportion attributed to each driver.

9.3.3 Scope Risk and Funded Capital Programme

When developing this work programme, Council needs to estimate how much to budget for each project. Often, Council cannot be certain what the actual costs or scope of the project will be because the design is yet to be completed. Typically, Council has more confidence in the cost and scope of projects that are planned within the first three years. After this, estimates are usually based on simple concept designs.

To address this uncertainty, Council has incorporated funding of scope risk into capital project budgets. The amount of scope risk included varies from 5% to 25% of the project estimate, depending on the expected complexity of the individual project. Based on history, it is unlikely that all individual projects will need the full amount of allocated scope risk funding, in reality there will be some under and over spending.

For the water, wastewater, and stormwater activities, Council has made an overall downward adjustment to the total capital programme of 5% per year. This adjustment acknowledges that Council is unlikely to use the full amount of scope risk in the programme for every project and enables Council to avoid over-funding the activities. We refer to this as the total funded capital programme.

9.3.4 Total Expenditure

The estimated expenditure needs for the Wastewater activity have been prepared for the next 30 years. Figure 17 and Figure 18 show the total expenditure for the wastewater activity for the first 10 and 30 years respectively. Figures include inflation.

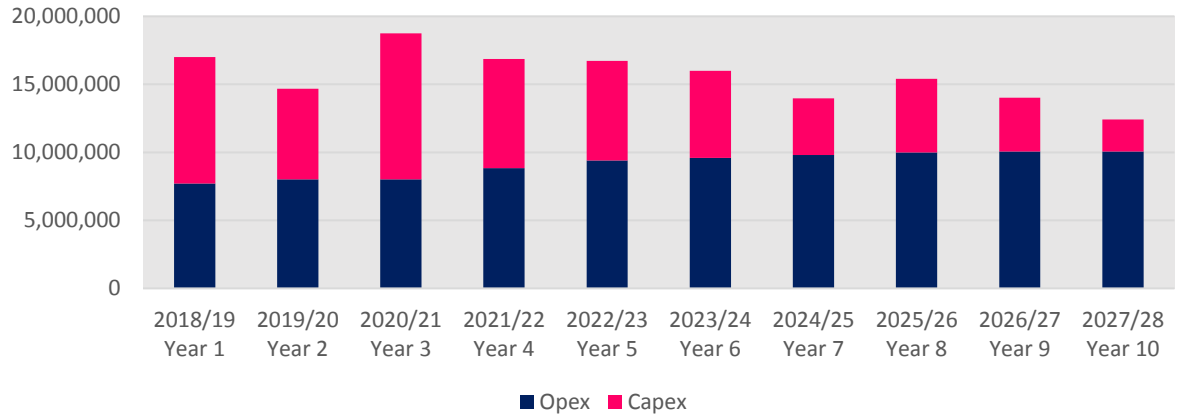


Figure 17: Total Annual Expenditure Year 1-10 Including Inflation

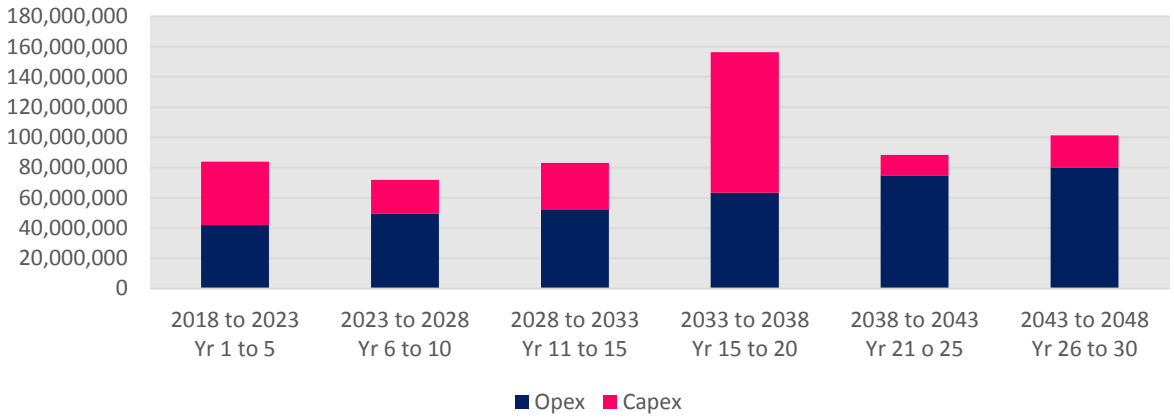


Figure 18: Five Yearly Total Expenditure Years 1 to 30 Including Inflation

9.3.5 Total Income

Figure 19 and Figure 20 show the total income for the wastewater activity for the first 10 and 30 years respectively.

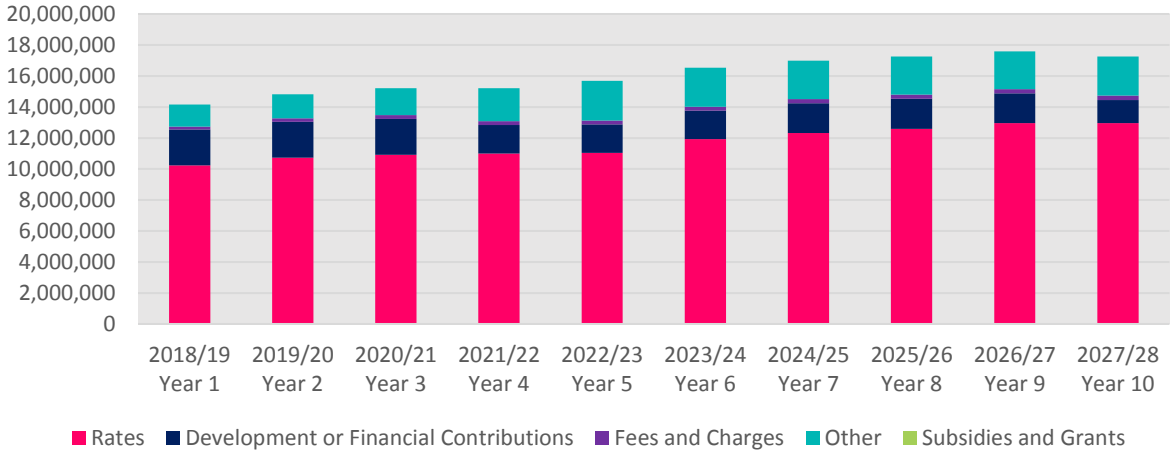


Figure 19: Total Annual Income Years 1 to 10

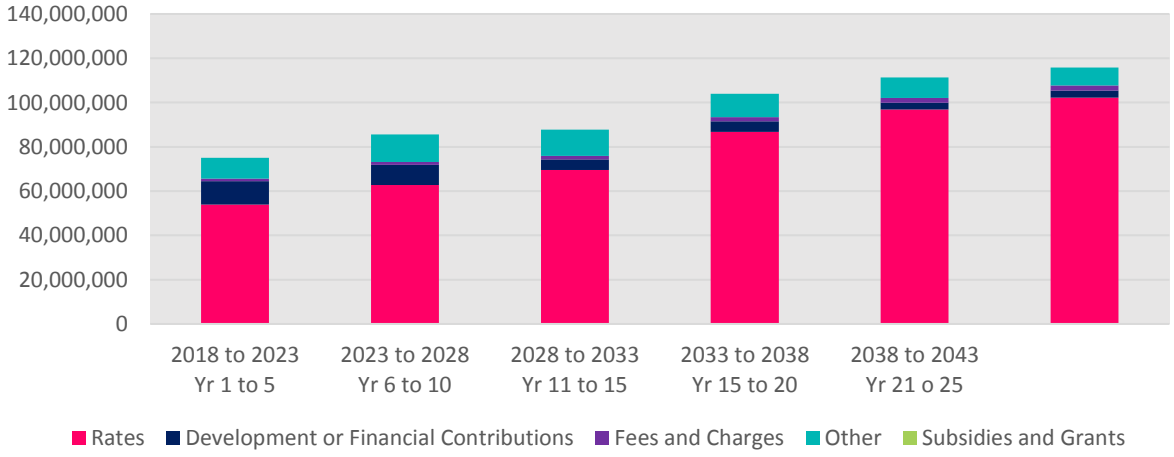


Figure 20: Five Yearly Total Income Years 1 to 30

9.3.6 Operational Costs

Figure 21 and Figure 22 show the total operating expenditure for the wastewater activity for the first 10 and 30 years respectively.

Operational costs for the wastewater activity are forecast to increase by around 3.1% per year for the first 10 years, and 3.8% per year over 30 years. Within the first 10 years, the most notable increase in direct costs occurs between Year 3 and Year 4. This is due to an increase in the Council's share of operational costs from the Nelson Regional Sewerage Business Unit. Indirect costs increase primarily due to increasing loan interest costs associated with the capital programme for this activity. On top of this, both direct and indirect expenditure gradually increase due to inflation.

The majority of the operating costs are indirect costs and mainly made up of costs for staff wages, interest and depreciation.

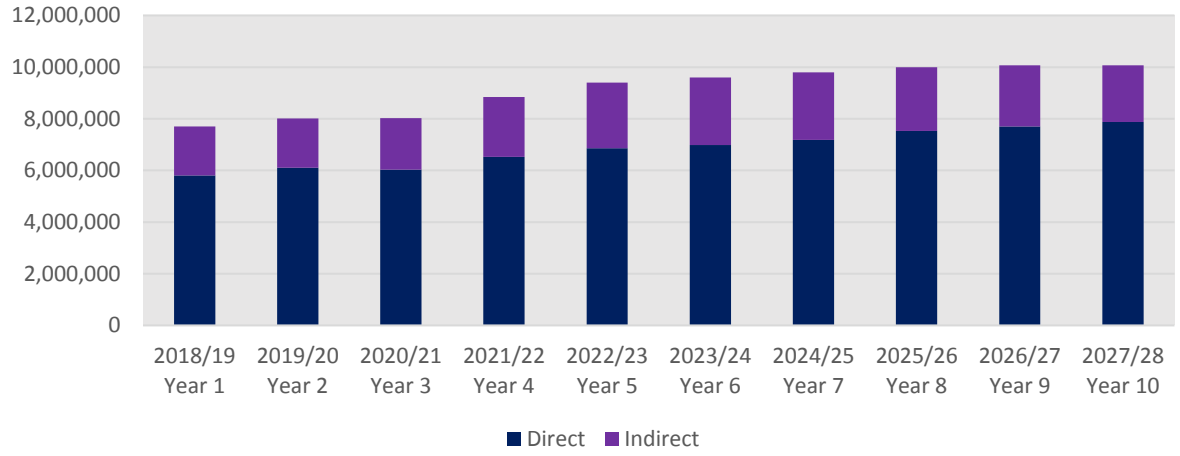


Figure 21: Total Annual Operating Costs Years 1-10 Including Inflation

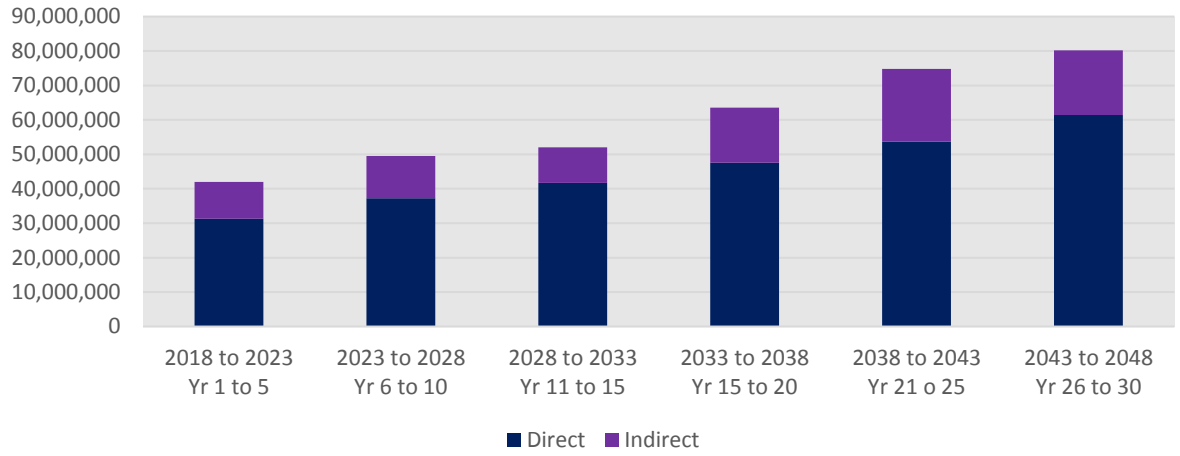


Figure 22: Five Yearly Operating Cost Years 1 to 30 Including Inflation

9.3.7 Capital Expenditure

Council plans to spend around $64 million on capital improvements over the next 10 years. Of this 31% is attributed to growth, 31% for level of service improvements, and 38% for asset renewal. Council anticipates that the majority of investment being made to enable growth will be required within the first 10 years. After this, negligible costs will be attributable to growth. Beyond 10 years, Council has planned to make a major investment in a new inland wastewater treatment plant in Motueka, this occurs between Year 15 and Year 20 and accounts for the notable increase in forecast capital expenditure.

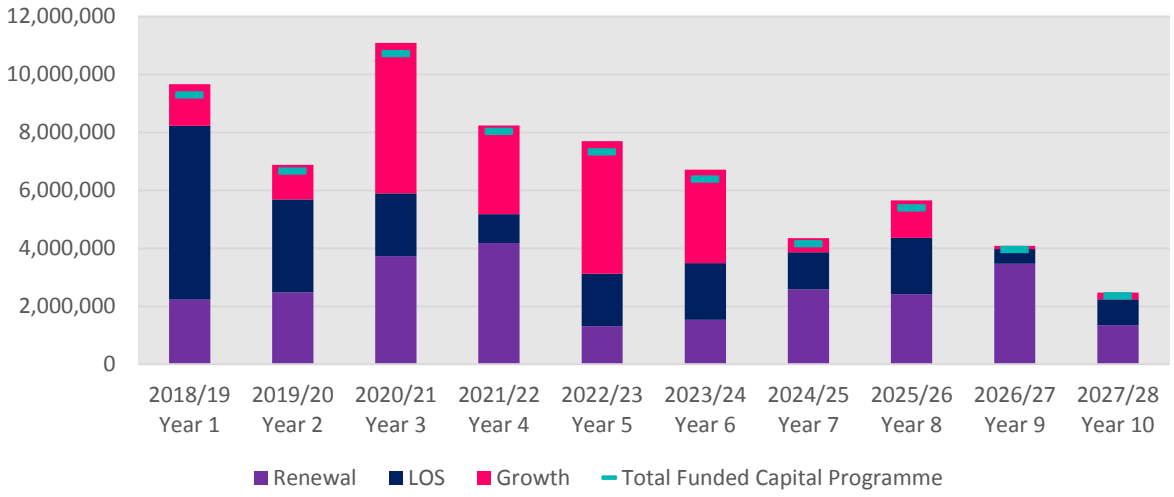


Figure 23: Annual Capital Expenditure Years 1 to 10 Including Inflation

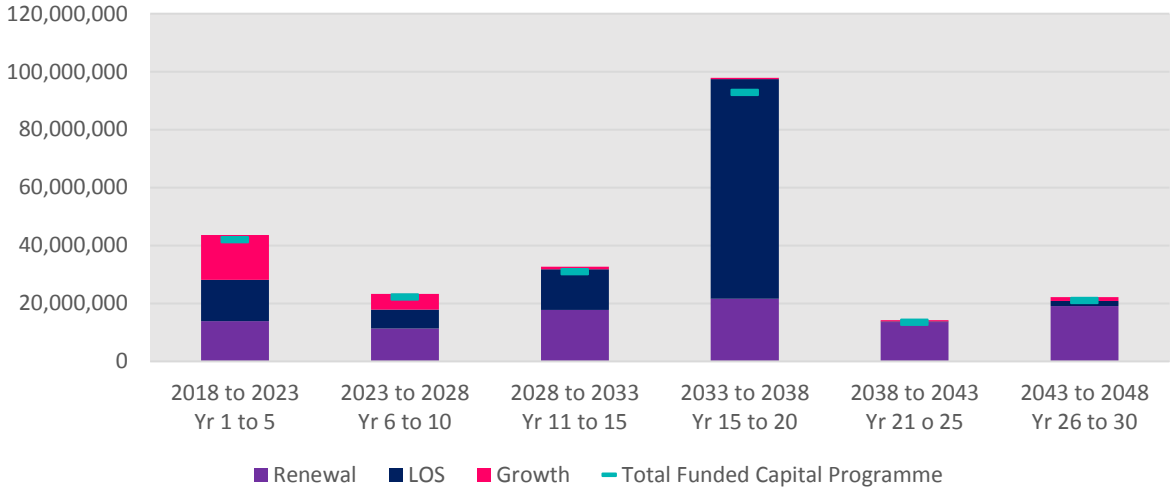


Figure 24: Five Yearly Capital Expenditure Years 1 to 30 Including Inflation

Error! Reference source not found. shows a peak in the year 15-20 period, this is due to the planned c onstruction of a new inland WWTP in Motueka between 2033 and 2037.

10 Sustainability

Sustainability means that we effectively balance the needs of present and future communities. From an asset management perspective, sustainability is critical, as many assets have a long lifespan and must be 'future-proofed'. Council has a responsibility to manage this activity in way that supports the environmental, social, cultural and economic well-being of current and future generations. This section focuses on social, cultural and environmental sustainability.

The Local Government Act 2002 requires local authorities to take a sustainable development approach while conducting their business, taking into account the current and future needs of communities for good-quality local infrastructure, and the efficient and effective delivery of services.

Sustainable development is a fundamental philosophy that is embraced in the Council's Vision, Mission and Objectives, and is reflected in the Council's community outcomes. The levels of service and the performance measures that flow from these inherently incorporate the achievement of sustainable outcomes.

We measure sustainability against the triple bottom line framework that aims to create a balance between the three dimensions of performance, often referred to as people, planet and profit (3P's).

People – The effects of the activity on the social and cultural wellbeing of our community

Council is guided by the Community Outcomes to assist in determining how our decisions affect the social wellbeing of our community. We undertake this activity to meet the level of service that is required to enhance community well-being

Planet – The effects of the activity on the environment

Our receiving environments are affected by discharges from our WWTPs. Urbanisation and increased trade waste volumes have led to increased amount of wastewater requiring treatment. This impacts on the ability to manage overflows and utilise our natural resources for amenity and food gathering purposes. We control our discharges through discharge consents that are required under the Tasman Resource Management Plan. We will encourage and practice implementation of our land development manual to protect and enhance our receiving environment.

Profit – The financial and overall long-term economic viability of the activity

Council operates, maintains and improves the wastewater infrastructure assets on behalf of its ratepayers. Council uses its Financial Strategy to guide the development of an affordable work programme. Council's finances are managed within the set debt limits and rates income rises to ensure economic viability for current and future generations.

This section reviews both the positive and negative effects of the wastewater activity and ensure that the negative effects have adequate mitigation measures in place.

10.1 Potential Negative Effects

Potential significant negative effects and the proposed mitigation measures for the wastewater activity are listed below in Table 27.

Table 27: Negative Effects

Effect	Description	Mitigation Measures
Noise	Social Noise can originate from many sources but is usually temporary. If there are power outage generators may be used to operate plant. Construction machinery used during repairs or installation of new wastewater assets can be a nuisance to the local community.	Noise suppression is an important consideration for all generator purchases made by the Council. Maintenance work is undertaken during the day except in emergency situations.

Effect	Description	Mitigation Measures
Disruption to service	Economic Disruption to the wastewater service for a prolonged period may result in businesses having to close. Wastewater bylaw outlines that Council does not guarantee continuity of service.	The operation and maintenance Contract has clear repair timeframes that must be adhered to. Quick temporary repairs may be made with permanent repairs made in consultation with affected people.
Wastewater blockages and overflows	Overflows are usually the result of a blockage, pump fault or power outage. Social Overflows can cause distress and a public health risk, especially when they occur on private property. Overflows on private property usually occur from gully traps as they should be the lowest point in the private reticulation system. Blockages, power outages, or pump faults may mean ablution facilities cannot be used without causing overflows, often affecting other downstream users. Economic Businesses, schools and hospitals may need to close if they are unable to provide sanitary facilities or use the wastewater system because of blockages, faults or overflows. Environmental Wastewater overflowing to the surrounding environment could result health risks, contamination of waterways and/or beach closures and could threaten natural habitats.	A CCTV programme is used to identify blockage risks such as root intrusion in pipes and structural defects. This means that root cutting, defect repair, and renewal programmes can be targeted. Inflow and infiltration issues are identified by monitoring flows to highlight problem catchments for further investigation and remedial action to eliminate inflow and infiltration. Emergency storage is provided at key pump stations and most have the ability to be powered by one of Council's mobile generators. Several key pump stations have on-site generators.
Wastewater odour	Social Odour can cause distress to local residents, as it can impact on how they live their lives, having to keep windows closed, and restricting outdoor activities. Economic Odour can cause distress to local businesses as localised odour may put off customers.	Developing a system specific Odour Management Plan detailing how odour will be managed and installing odour control systems at problematic air valves, pump stations and treatment plants. This can include chemical dosing to reduce the hydrogen sulphide produced in pipelines and carbon filters to reduce odours by neutralizing odourous gases.

Effect	Description	Mitigation Measures
Non-compliant WWTP discharge	Social May result in the degradation of water quality, preventing the use of groundwater, nearby rivers and beaches for 'all year round bathing', preventing the collection of shellfish. Economic May result in the degradation of water quality, preventing the use of groundwater or surface water for irrigation and preventing the harvest of shellfish from marine farms. Environmental May result in the degrading of water quality, preventing the use of groundwater, nearby rivers and beaches for 'all year round bathing', preventing the collection of shellfish and detrimentally affecting marine farms.	Upgrades of WWTPs to cater for growth is planned as part of the Activity Management Plan meet high flows, and upgrading current facilities.
Increase in rates	Economic Improving the level of service delivered can result in increases in rates	Council uses competitive tendering processes to achieve best value for money for most capital works it undertakes.
Disturbance or destruction of historic and culturally sensitive sites	Operation, maintenance and construction of wastewater assets can potentially affect historic and culturally sensitive sites	Council maintains a record of historic and culturally sensitive sites in the TRMP. Council also undertakes consultation with affected parties prior to undertaking works, particularly in coastal areas or where it is suspected a site may have cultural significance. Council liaises with Historic Places Trust and ensures Authorities are obtained where necessary.

Policies and strategies for mitigation, monitoring and reporting of those effects are at various stages of development. Where a specific resource consent is applicable, reporting is part of the consent process.

10.2 Potential Positive Effects

Potential significant positive effects are listed below in Table 28.

Table 28: Positive Effects

Effect	Description
Public health benefits	Spread of disease is limited and public health improved by having a public wastewater collection and treatment system.
Environment and water quality	Treated wastewater is frequently discharged into, or nearby to, coastal and river environments. By providing efficient and effective treatment the environmental impact from WWTP discharges is minimised. These natural amenities are still safe for use by the public and the environmental values of the receiving environment are protected.

Effect	Description
Economic development	The Council's management of the wastewater activity uses best practice and competitive tendering to provide value for money for ratepayers and provides jobs for contractors. Providing a safe and efficient wastewater system allows for economic growth by providing for new developments where capacity exists.

10.3 Environmental Management

The statutory framework defining what activities require resource consent is the Resource Management Act (RMA) 1991. The RMA is administered locally by Tasman District Council, as a unitary authority, through the Tasman Resource Management Plan (TRMP). The following section discusses key consents that Council holds in order to undertake this activity.

10.3.1 Resource Consents

Councils Engineering Services Department has over 200 consents to manage and the number and type of resource consents relating to the wastewater activity has increased over recent years. Some consents require active management to ensure reporting and monitoring conditions are met allow the timely management for lodging new applications before existing consents expire. A register of all active consents including their conditions, compliance actions and expiry dates are managed in Bravegen.

Discharge Consent to Water, Land and Air

Under the RMA and TRMP, resource consents in the form of discharge permits are required for all discharges of treated wastewater and odours associated with wastewater activities. Council needs to demonstrate compliance with the TRMP and, in particular, Part VI of that Plan: Discharges, Chapter 36. Council has a legal obligation to manage adverse effects from wastewater discharges from its network. Limits and standards apply to most discharges and monitoring is required by the majority of the treatment plant discharge consents.

Land Use Consents

Resource consents may be required for installation and operation of wastewater infrastructure including WWTPs, pipelines and monitoring bores. Council has designated most of the wastewater treatment plant (WWTP) sites, which is an alternative way under the RMA of authorising the land use aspects of public works. Outline plans are usually required prior to the installation of wastewater facilities on designated sites.

Coastal Occupation/Structure Consent

Part III of the TRMP applies to the coastal marine area and some wastewater infrastructure such as pipelines buried in an estuary require a costal permit to disturb and occupy the foreshore and seabed. A separate permit is required for constructing infrastructure and another permit is required to undertake maintenance and repair work to existing infrastructure (e.g. the NRSBU pipeline across Waimea Inlet).

10.3.2 Resource Consent Reporting and Monitoring

Environmental monitoring conditions are reported on quarterly, six monthly and/or annually as determined by the consent conditions. Council has invested in a programme, Samplyzer which is used by Council staff to produce chain of custody forms for all wastewater monitoring. This allows Council, the operation and maintenance contractor and testing laboratories to all use the same sample identifiers. Samplyzer also allows the automated input of monitoring data direct from laboratory reports into Hilltop, Council's database for storing monitoring data.

While this database has the ability to store data it has not proven useful for viewing, managing, or manipulating data. Council continues to maintain a duplicate set of all monitoring data and use alternative software for managing the data. As each laboratory analysis report or field data sheet (collected by the operations and maintenance contractor), is received the data is checked for compliance with consent conditions.

Auditing

Regualr site audits are completed to ensure the Council's maintenance contractor is operating in accordance with a number of key performance indicators aligned to any relevant consent conditions or other legislative requirements.

Environmental Reporting and Monitoring

Council aims to achieve minimum compliance with all consents and / or operating conditions. Use of the Council's BraveGen database allows the accurate programming of all condition and actions required by the consents including renewal prior to consent expiry. Each consent has specific resource consents conditions. Any non-compliance incidents are recorded and notified to the Council's compliance team in accordance with pre-agreed notification procedures. Investigations, additional sampling or other mitigation measures may be undertaken depending on the potential impact on the receiving environment.

Council's Annual Report

The extent to which Council has been able to meet all of the conditions of each permit is reported in its Annual Report.

10.3.3 Property Designations

Designations are a way provided by the RMA of identifying and protecting land for future public works. There is a suite of designations are held in the TRMP and these allows Council to plan and conduct wastewater activities. Once given effect, a designation remains valid for the life of the TRMP or until the requiring authority removes or alters the designation. It is not always necessary to retain the designations for sites where wastewater facilities have been developed, unless there is a likelihood of future expansion or other upgrades being required. Alterations to some designations (e.g., boundaries) and outline plans for proposed work may be required from time to time. Designations do not negate the ongoing need for regional resource consents (e.g., discharge permits) required for the designated site. Table 29 provides a summary of current designations. Council have an indefinite designations for pump stations, WWTP, and pipelines.

Table 29: Summary of Wastewater Designations

ID	Location of Site	Site Name/Purpose
D176	121 Beach Road, Richmond	Beach Road Pump Station and Tanks
D177	Tapawera-Glenhope Road	Tapawera Wastewater Treatment Pond
D178	SH 6, Murchison	Murchison Wastewater Treatment Pond
D179	Thorp Street, Motueka	Motueka Wastewater Treatment Pond
D180	Haldane Road, Takaka	Takaka Wastewater Treatment Pond
D181	Collingwood/Bainham Road	Collingwood Wastewater Treatment Pond
D182	Patons Rock	Future Wastewater Treatment Pond
D203	3 Spencer Place, Brightwater	Brightwater Pump Station
D204	SH 60, Upper Takaka	Upper Takaka Wastewater Treatment Pond
D243	Headingly Lane, Richmond	Wastewater pipeline
D244	Lower Queen Street and McShane Road, Richmond	Wastewater pump station

Council has planned strategic studies specifically for Motueka and Waimea to determine network requirements. Council expects that designations will be required for a new inland WWTP in Motueka and other wastewater assets. The location of these will be determined by the strategy.

11 Risk Management and Assumptions

This AMP and the financial forecasts within it have been developed from information that has varying degrees of completeness and accuracy. In order to make decisions in the face of these uncertainties, assumptions have to be made. This section documents the uncertainties and assumptions that Council considers could have a significant effect on the financial forecasts, and discusses the potential risks that this creates.

11.1 Our Approach to Risk Management

A risk is any event that has the potential to impact on the achievement of Council's objectives. The potential impact of a risk is measured by a combination of the likelihood it could occur, and the magnitude of its consequences on objectives.

Council adopted a Risk Management Policy in November 2017 and is in the process of improving our risk management processes. The main purpose of these improvements is to support better planning and decision-making, and to increase the chance of achieving Council's objectives.

Council's Risk Management Framework is still being developed but key components will be:

- Risk Categories:
- Service delivery
- Financial
- Governance and Leadership
- Strategic
- Reputation
- Legal
- Regulatory
- Health & Safety
- Security
- Business Continuity
- Table of Consequences which help set the Risk Appetite
- Enterprise Risk Register
- identifying risks
- measuring likelihood, consequence and severity
- documenting controls, actions and escalation
- Monitoring and Reporting, including to Senior Management and Audit and Risk Committee as appropriate

Council has adopted an approach to risk management following the Australian/New Zealand Standard ISO 31000:2009 Risk Management – Principles and guidelines.

Refer to Council's Risk Management Policy for further information.

11.2 Activity Risks and Mitigation

The key risks relevant to the wastewater activity are summarised in Table 30 below:

Table 30: Keys Risks

Risk Event	Mitigation Measures
Catastrophic failure of reticulation and plant due to a natural hazard	Current • Reactive inspection following extreme weather events • Emergency generation • Septic tankers • Some redundancy at WWTPs • Improved design standards for new assets Proposed • New assets designed to improved standard

Risk Event	Mitigation Measures
Insufficient capacity to discharge responsibilities associated with managing wastewater infrastructure	Current • Training, conferences, networking • Multi skilling staff • System Operating Plans Proposed • Improving System Operating Plans • Improving asset knowledge and data and systems that capture the data
Inadequate knowledge of infrastructure	Current • System Operating Plans • As-builts • Confirm asset database Proposed • Improving System Operating Plans • Improving asset knowledge and data and systems that capture the data • Improving as-built data collection and verification
Ineffective stakeholder engagement e.g. iwi, Historic Places Trust, community groups	Current • Council attends regular iwi meetings. • The Council's GIS software includes layers identifying cultural heritage sites and precincts. Council staff apply for Historic Places Trust authorities there is a potential risk of damage or destruction of sites. • Project management processes and the Council's consultation guidelines are followed. • Involve key stakeholders at planning stages of projects

11.3 Assumptions and Uncertainties

This AMP and the financial forecasts within it have been developed from information that has varying degrees of completeness and accuracy. In order to make decisions in the face of these uncertainties, assumptions have to be made. This section documents the uncertainties and assumptions that Council considers could have a significant effect on the financial forecasts, and discusses the potential risks that this creates.

Table 31: Generic Assumptions and Uncertainties

Type	Uncertainties	Assumption	Discussion
Financial	Unless stated it can be unclear whether financial figures include inflation or not, as well as whether GST has been included or not.	That all expenditure has been stated in 1 July 2017 dollar values and no allowance has been made for inflation and all financial projections exclude GST unless specifically stated.	The LTP will incorporate inflation factors. This could have a significant impact on the affordability of each activity if inflation is higher than allowed for. Council is using the best information practically available from Business and Economic Research Limited (BERL) to reduce this risk.

Type	Uncertainties	Assumption	Discussion
Asset Data Knowledge	Council has inspection and data collection regimes in place for assets. These regimes do not allow for entire network coverage at all times. The Council's aim is to strike the right balance between adequate knowledge and what is practical.	That Council has adequate knowledge of the assets and their condition so that planned renewal works will allow Council to meet the proposed levels of service.	There are several areas where Council needs to improve its knowledge and assessments, but there is a low risk that the improved knowledge will cause a significant change to the level of expenditure required.
Growth Forecasts	Growth forecasts are inherently uncertain and involve many assumptions. Council uses Stats NZ projections as the basis for its growth planning, but these will vary depending on actual birth and death rates as well as net migration.	That the district will grow or decline as forecast in its Growth Model.	Growth forecasts are used to determine infrastructure capacity and when that capacity will be required. If actual growth varies significantly from what was projected, it could have a moderate impact on the Council's plans. If higher, new or additional infrastructure may be required quicker than anticipated. If lower, Council may be able to defer the delivery of new or additional infrastructure.
Project Timing	Multiple factors affect the actual timing of projects e.g.: • Consents • Access to land • Population growth Timing of private developments	That projects will be undertaken when planned.	The risk of the timing of projects changing is high due to factors like resource consents, third party funding, and land acquisition and access. Council tries to mitigate these issues by undertaking the investigation, consultation and design phases sufficiently in advance of when construction is planned. If delays occur, it could have an impact on the levels of service and the Council's financing arrangements.
Project Funding	Council cannot be certain that it will receive the full amount of anticipated subsidy or contribution. It depends on the funder's decision making criteria and their own ability to raise funds.	That projects will receive subsidy or third party contributions at the anticipated levels.	The risk of not securing funding varies and depends on the third party involved. If the anticipated funding is not received it is likely that the project will be deferred which may impact levels of service.

Type	Uncertainties	Assumption	Discussion
Accuracy of Cost Estimates	Project scope is often uncertain until investigation and design work has been completed, even then the scope can change due to unforeseen circumstances. Even if the scope has certainty there can be changes in the actual cost of work due to market competition or resource availability.	That project cost estimates are sufficiently accurate enough to determine the required funding level.	The risk of large underestimation is low; however, the importance is moderate as Council may not be able to afford the true cost of the project. Council tries to reduce this risk by undertaking reviews of all estimates and including an allowance for scope risk based on the complexity of the project.
Land Access and Acquisition	Land access and acquisition is inherently uncertain. Until negotiations commence, it is difficult to predict how an owner will respond to the request for access or transfer.	That Council will be able to secure land and/or access to enable completion of projects.	The risk of delays to projects or changes in scope is high due to the possibility of delays in obtaining access. Where possible, Council undertakes land negotiations well in advance of construction to minimise delays and scope change. If delays do occur, they may affect the level of service that Council provides.
Legislation Changes	Often Central Government changes legislation in response to events where the need for change is identified. It is difficult to predict what events may occur and the associated response. Election of a new Government also introduces uncertainty as to what policies they will implement.	That there will be no major changes in legislation or policy.	The risk of major change is high due to the changing nature of the Government and its policies. If major changes occur, it is likely to have an impact on the required expenditure. Council has not planned expenditure to specifically mitigate this risk.
Emergency Reserves	It is impossible to accurately predict when and where a natural hazard event will occur. Using historic trends to predict the future provides an indication but is not comprehensive.	That the level of funding reserves combined with insurance cover will be adequate to cover reinstatement following emergency events.	Funding levels are based on historic requirements. The risk of requiring additional funding is moderate and may have a moderate effect on planned works due to reprioritization of funds.

Type	Uncertainties	Assumption	Discussion
Network Capacity	Council uses a combination of as built data, network modelling and performance information to assess network capacity. The accuracy of the capacity assessment is based on the accuracy of asset and performance data.	That the Council's knowledge of network capacity is sufficient enough to accurately programme works.	If the network capacity is higher than assumed, Council may be able to defer works. The risk of this occurring is low; however, it should have a positive impact on the community because the level of service can be provided for longer before requiring additional capital expenditure. If the network capacity is lower than assumed, Council may be required to advance capital works projects to provide the additional capacity sooner than anticipated. The risk of this occurring is low; however, it could have a significant impact on expenditure.

Type	Uncertainties	Assumption	Discussion
Climate change	Continued emissions of greenhouse gases will cause further warming and changes in all parts of the climate system. The International Panel on Climate Change (IPCC) has developed four scenarios named RCPs (Representative Concentration Pathways). They represent different climate change mitigation scenarios with varying levels of CO2 emission (low – medium – high). The likelihood of any of the scenarios occurring as predicted is uncertain and depends on many different factors.	Council uses the latest climate predictions that have been prepared by NIWA for New Zealand and more specifically for the Tasman District. The anticipated effects from climate change in Tasman District include: • An increase in seasonal mean temperature and high temperature extremes • An increase in rainfall in winter for the entire district and varying increases of rainfall in other seasons in different areas. • Rising sea levels, increased wave height and storm surges. Floods, landslides, droughts and storm surges are likely to become more frequent and intense	It is likely that risk of low lying land being inundated from the sea, and damage to Council property and infrastructure from severe weather events, will increase. Council will need to monitor the level of sea level rise and other impacts of climate change over time and review its budgets, programme or work and levels of service accordingly.

Table 32 Wastewater Specific Assumptions and Uncertainties

Type of Uncertainty	Description
Inflow and infiltration and pipe renewals	Currently, there are high levels of inflow and infiltration in the Motueka wastewater network taking up capacity that could otherwise be used by new connections. Council has assumed that this inflow and infiltration will be addressed by on-going pipe renewals and targeted inflow and infiltration repairs. Council expects that this work will reduce demand enough to be able to provide capacity to support the level of growth predicted for Motueka (excluding Motueka West). It is possible for the works to achieve insufficient capacity, or for the rate of growth to exceed the rate of inflow and infiltration reductions. If this is the case, Council will need to programme additional pipe upgrades to enable growth, or potentially limit the rate and location of new connections.
Renewals	Council cannot be certain how long each individual asset will last. To address this uncertainty, Council assigns an average expected life for types of assets to assist with renewal planning. Some assets will fail before reaching the end of their expected life useful life, and some will last longer. Council has assumed that it will be able to manage this variance within its budges it set by prioritizing renewals annually.

Type of Uncertainty	Description
Pipe renewals	Council cannot be certain about how pipe rehabilitation technology will evolve in the future. Council has planned the renewals programme based on fully replacing (excavating) aging and faulty pipes. Technology may evolve using new and trenchless construction methods that will reduce renewal budgets.
NRSBU costs	Council is uncertain about NRSBU costs because operational costs are based on the use of individual subscribers and this can be variable. Council has planned budgets based on historic usage. If usage is different to assumed, costs may change.
Low pressure pumping systems	Council is responsible for maintaining low-pressure pumping system assets (where a whole catchment is serviced) and cannot be certain about the number of assets that will be vested in the future because it depends on where and how fast growth occurs. Council has assumed maintenance budgets based on growth occurring as per the growth model. If the rate and location of growth exceeds Council will need to programme additional maintenance budget.
Asset information	Council is uncertain about the impact that improved asset information (condition & performance data) will have on asset management. Council assumes that planned data, process and systems improvements will be realised. Improvements will likely affect the renewals budget and programme in the future.
Weather Patterns	Council is uncertain about the frequency and duration of wet weather but assumes it will change in the future. If wet weather gets worse there will be implication from inflow and infiltration in the wastewater network.
Sea Level Rise	Council is uncertain about the precise nature of climate change. Council assumes there will be sea level rise, increased wave height and storm surges in the future. Many wastewater assets are located close to the coast and the impact of sea level rise will influence the timing of capital works for new assets and facilities (e.g. Motueka WWTP). Furthermore, there may be projects required that Council has not yet have identified.
Trade Waste	Council is planning to increase trade waste charges commencing July 2018 and is uncertain about the income in the future. Council assumes trade waste volumes and income with be in line with historic usage and budgets.

12 Asset Management Processes and Practices

Good quality data and asset management processes are the heart of effective planning. This section describes our approach to asset management, defines the appropriate practice levels, and provides an overview of our asset management systems and data that underpins the wastewater activity.

12.1 Appropriate Practice Levels

The Office of the Auditor General (OAG) has chosen to use the International Infrastructure Management Manual (IIMM) as the benchmark against which New Zealand councils measure their activity management practices. There are five maturity levels in the IIMM: Aware, Basic, Core, Intermediate and Advanced. The IIMM sets out what the requirements are for each level against each area of the activity management system.

In February 2017, Council reviewed its Activity Management Policy and adopted an updated version. The Policy sets out the Council's activity management objectives and appropriate levels of practice. For the wastewater activity, Council has determined that the appropriate level of practice is an 'intermediate level' with 'advanced level' of practice for demand forecasting, asset register data and asset condition.

12.2 Service Delivery

12.2.1 Activity and Asset Management Teams

Council has an organisational structure and capability that supports effective asset management planning. Multiple teams across Council are responsible for the different aspects of activity and asset management. The focus of the teams ranges from a strategic focus at the Long Term Plan/Infrastructure Strategy level, which involves a cross-Council team, through to detail/operational focus at the Operational team level.

Within the Engineering Services department, the asset management planning function is managed by the Activity Planning team. Operations are the responsibility of the Utilities and Transportation teams, while Projects and Contracts are managed by the Programme Delivery team.

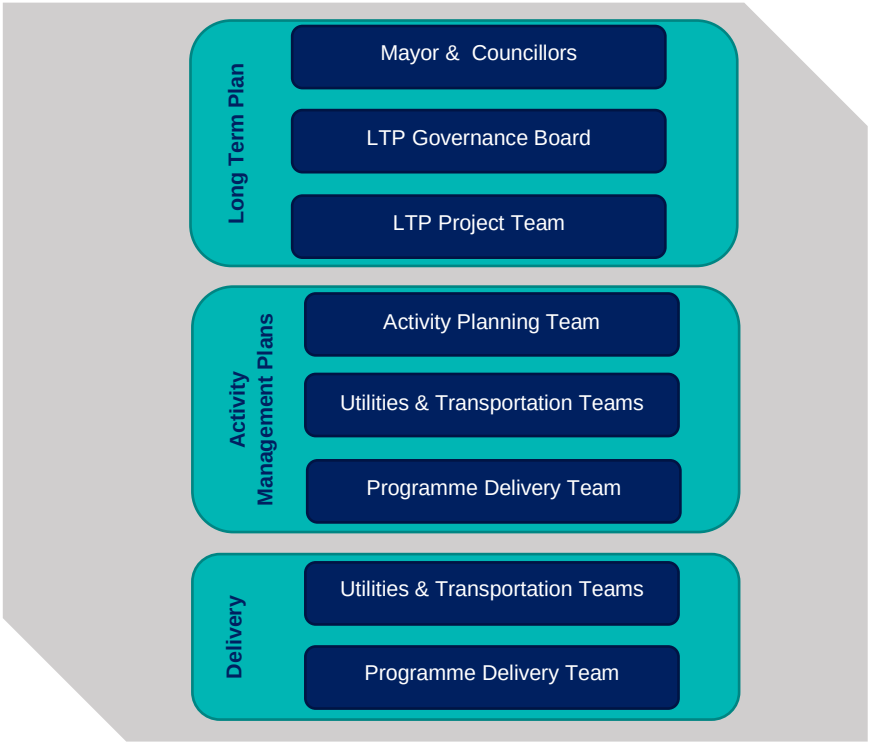


Figure 25: Council teams for responsible for aspects of activity and Asset Management

The Activity Planning Team is responsible for the update of the activity management plans every three years, as well as implementation of the improvement plan. Each plan is assigned to the respective Activity Planning Advisor who is responsible for updating it. The Activity Planning Advisor works in with the activity's Asset Engineer to ensure that the current and future operating and maintenance aspects of the activities are adequately incorporated into the document. All activity management plans are reviewed by the Activity Planning Programme Leader who holds a National Diploma in Infrastructure Asset Management. The quality assurance process for the Engineering Services activity management plans is provided below.

- Preparation Activity Planning Advisor
- Check Utilities or Transportation Manager, and relevant Asset Engineer
- Review Activity Planning Programme Leader
- Approve Engineering Services Manager
- Adopt Full Council

12.2.2 Staff Training

Council maintains an annual budget for staff training that is managed by the Engineering Services Manager for the Engineering Services department. This budgets allows for continued development of staff to ensure that best practice is maintained and that Council retains the skills needed to make improvements in asset management practices. This includes on-going technical and professional training as well as specific asset management training.

12.2.3 Professional Support

The Engineering Services Department has a need to access a broad range of professional service capabilities to undertake investigation, design and procurement management in support of its wastewater activity. There is also a need to access specialist skills for design, planning and policy to support the in-house management of the Council's networks, operations and maintenance.

To achieve this Council went to the open market in late 2013 for a primary professional services provider as a single preferred consultant to undertake a minimum of 60% in value of the Council's infrastructure professional services programmes. The contract was awarded to MWH New Zealand Ltd (now Stantec NZ), beginning on 1 July 2014 with an initial three-year term and two three-year extensions to be awarded at the Council's sole discretion. In 2017, the first of these discretionary three-year extensions was granted, with the proportion of Council's professional services programmes reduced to 50%. In addition to this, a secondary professional service panel was also appointed through an open market tender process for a period of three years, to provide professional services that will not be supplied by Stantec.

12.2.4 Procurement Strategy

Council has a formal Procurement Strategy that it follows in order to engage contractors and consultants to assist the Engineering Services department. This strategy describes the procurement environment that exists within the Tasman District. It was developed following a three-year review of the strategy and was approved in November 2013. It principally focuses on Engineering Services and is consistent with whole-of-government procurement initiatives.

12.2.5 Service Delivery Reviews

In 2014, Section 17A was inserted into the Local Government Act, which requires Council to review the cost effectiveness of its current arrangements for providing local infrastructure, services, and regulatory functions at regular intervals. Reviews must be undertaken when service levels are significantly changed, before current contracts expire, and in any case not more than six years after the last review. In addition to the regular reviews, the Act requires Council to complete an initial review of all functions by August 2017.

Table 33 below summarises the review that have been completed to date and when the next review is required for this activity.

Table 33: Summary of Review

Scope of Review	Summary of Review	Review Date	Next Review
Three Waters Operations & Maintenance Contract	An initial review found that current operations & maintenance contract arrangements were appropriate and that the new contract would be procured on a similar basis. A full review is to be conducted in collaboration with Nelson City Council at a later date.	2017	2022

In addition to the Section 17A reviews, the Engineering Services department reviewed its current capability and capacity against the requirements of the future programmes of work set out in its activity management plans. To enhance the department's ability to deliver the capital works programme the following actions have been taken:

- undertaken a detailed review of the capital programme for the next five years to better understand project complexities and delivery requirements;
- implemented Planview a new project management system to track and report project delivery progress;
- increased the number of Project Managers from 4 to 5.5 full time equivalent staff resources;
- introduced enhanced performance requirements for our lead technical consultant for delivery of technical advice and engineering design;
- tendered for a new supporting professional services paned with enhanced performance requirements.

12.3 Asset Management Systems and Data

12.3.1 Information Systems and Tools

Council has a variety of systems and tools that support effective operation and maintenance, record asset data, and enable that data to be analysed to support optimised life-cycle management. These are detailed below in XX below. There is a continual push to incorporate all asset data into the core asset management systems where possible; where not possible, attempts are made to integrate or link systems so that they can be easily accessed.

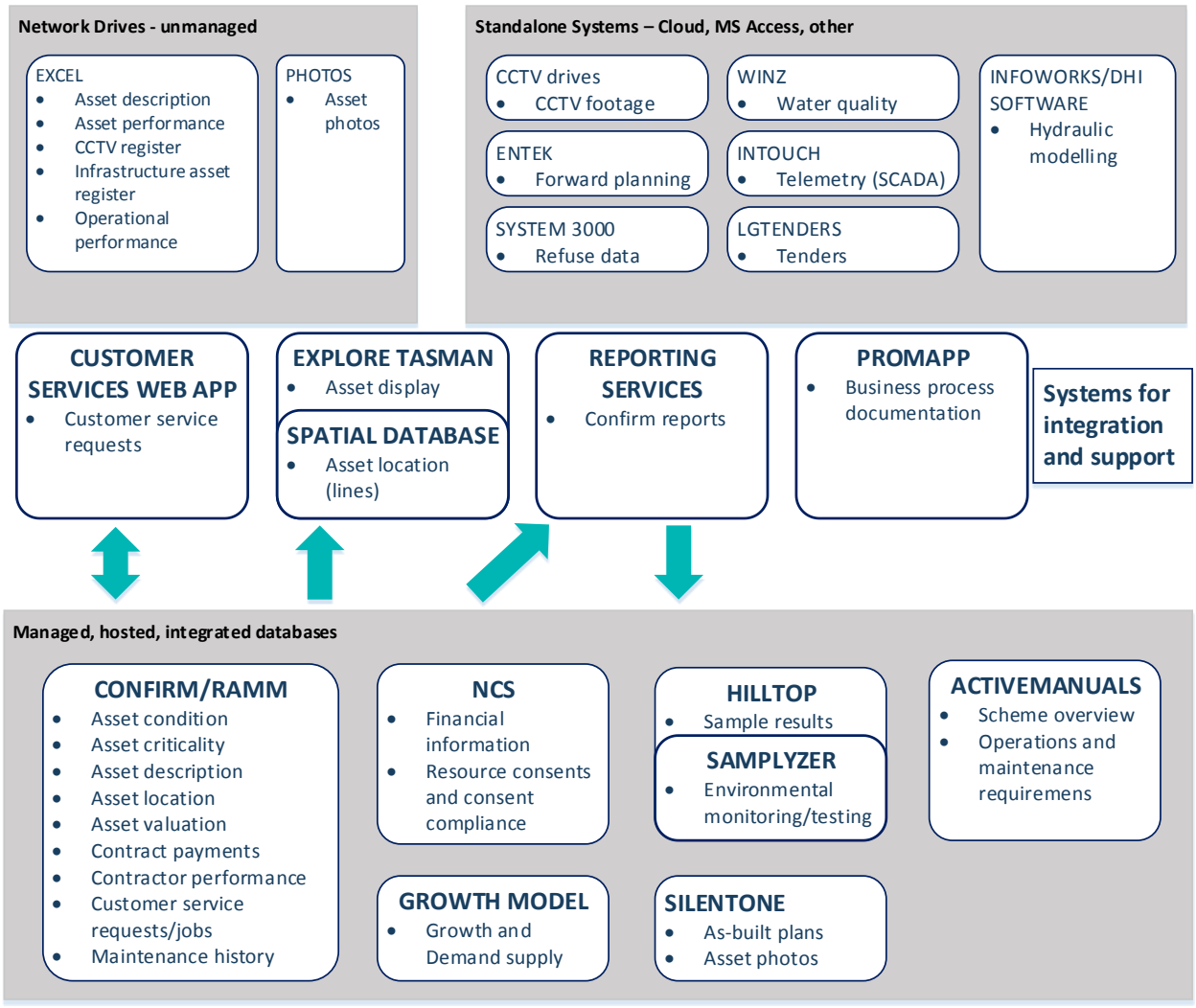


Figure 26: Systems Used for Asset Management

12.3.2 Asset Data

Table 34 summarises the various data types, data source and how they are managed within Council. It also provides a grading on data accuracy and completeness where appropriate.

Table 34: Data Types and Information Systems

Data Type	Information System	Management strategy	Data Accuracy	Data Completeness
As-built plans	SilentOne	As-built plans are uploaded to SilentOne, allowing digital retrieval. Each plan is audited on receipt to ensure a consistent standard and quality.	2	2
Asset condition	Confirm	Assets are inspected by a consultant or staff and the inspection information in entered directly into Confirm using the Connect mobile application.	N/A	N/A

Data Type	Information System	Management strategy	Data Accuracy	Data Completeness
Asset criticality	Confirm	When a new asset is created, the activity planner and engineer will make an assessment on criticality. Criticality of asset can be modified by authorized users should circumstances change.	N/A	N/A
Asset description	Confirm / spreadsheets	All assets are captured in Confirm's Site and Asset modules, from as-built plans and maintenance notes. Hierarchy is defined by Site and three levels of Asset ID (whole site, whole asset or asset). Assets are not broken down to component level except where required for valuation purposes. It is also possible to set up asset connectivity, but this hasn't been prioritised for the future yet. Detail on some datasets held in spreadsheets relating to Utilities Maintenance Contract 688; work is in progress to transfer this detail to Confirm as resourcing allows.	2	2
Asset location	Confirm (point data) / GIS (line data)	Co-ordinates for point data completely (NZTM) describe spatial location. Line data links to GIS layers that describe the shape.	2	2
Asset valuation	Confirm	Valuation of assets done based on data in Confirm and valuation figures stored in Confirm.	2	2
Contract payments	Confirm	All maintenance and capital works contract payments are done through Confirm. Data on expenditure is extracted and uploaded to NCS.	N/A	N/A
Contractor performance	Confirm	Time to complete jobs is measured against contract KPIs through Confirms Maintenance Management module.	N/A	N/A
Corporate GIS browser	Explore Tasman	Selected datasets are made available to all Council staff through this internal GIS browser via individual layers and associated reports.	N/A	N/A
Customer service requests	Customer Services Application / Confirm	Customer calls relating to asset maintenance are captured in the custom-made Customer Services Application and passed to Confirm's Enquiry module or as a RAMM Contractor Dispatch.	N/A	N/A
Environmental monitoring / testing	Hilltop / spreadsheet	Laboratory test results performed on monitoring and testing samples (from treatment plants and RRCs) are logged direct into Hilltop via an electronic upload from the laboratories. Due to historical difficulties in working with Hilltop data, it is duplicated in spreadsheets.	2	2

Data Type	Information System	Management strategy	Data Accuracy	Data Completeness
Financial information	NCS	The Council's corporate financial system is NCS, a specialist supplier of integrated financial, regulatory and administration systems for Local Government. Contract payment summaries are reported from Confirm and imported into NCS for financial tracking of budgets. NCS also holds Water billing information, while asset details and spatial component are recorded in Confirm and cross-referenced.	N/A	N/A
Infrastructure Asset Register	Spreadsheet	High level financial tracking spreadsheet for monitoring asset addition, disposals and depreciation. High level data is checked against detail data in the AM system and reconciled when a valuation is performed.	2	2
Forward planning	Spreadsheets, GIS Mapping	Forward programmes for the Council's activities are compiled in excel, These are loaded onto GIS based maps for information and in order to identify clashes and opportunities.	N/A	N/A
Growth and Demand Supply	Growth Model	A series of linked processes that underpin the Council's long term planning, by predicting expected development areas, revenues and costs, and estimating income for the long term.	2	2
Hydraulic modelling	Infoworks / DHI Software	Models have been developed for a number of schemes and catchments. Copies of the models are held on the Council's network drives.	2	4
Maintenance history	Confirm	Contractor work is issued via Confirms Maintenance Management module. History of maintenance is stored against individual assets. Prior to 2007 it was logged at a scheme level.	2	2
Photos	Network drives / SilentOne	Electronic photos of assets are mainly stored on the Council's network drives. Coastal Structures and Streetlight photos have been uploaded to SilentOne and linked to the assets displayed via Explore Tasman.	N/A	N/A
Processes and documentation	Promapp	Promapp is process management software that provides a central online repository where Council's process diagrams and documentation is stored. It was implemented in 2014 and there is a phased uptake by business units.	2	5
Resource consents and consent compliance	NCS	Detail on Resource Consents and their compliance of conditions (e.g. sample testing) are recorded in the NCS Resource Consents module.	2	2

Data Type	Information System	Management strategy	Data Accuracy	Data Completeness
Reports	Confirm Reports	Many SQL based reports from Confirm and a few from RAMM are delivered through Confirm Reports. Explore Tasman also links to this reported information to show asset information and links (to data in SilentOne and NCS).	N/A	N/A
Tenders	LGTenders	Almost all New Zealand councils use this system to advertise their tenders and to conduct the complete tendering process electronically.	N/A	N/A
Operations & Maintenance Information	ActiveManuals™	ActiveManuals™ is a repository of operations and maintenance manuals, manufacturer manuals, technical documents, drawings and photographs. The system enables shared access for Council staff and its partners responsible for operating and maintaining Council assets.	N/A	Ongoing

Table 35: Data Accuracy and Completeness Grades

Grade	Description	% Accurate
1	Accurate	100
2	Minor Inaccuracies	+/- 5
3	50 % Estimated	+/- 20
4	Significant Data Estimated	+/- 30
5	All Data Estimated	+/- 40

Grade	Description	% Complete
1	Complete	100
2	Minor Gaps	90 – 99
3	Major Gaps	60 – 90
4	Significant Gaps	20 – 60
5	Limited Data Available	0 – 20

12.4 Critical Assets

Knowing what is most important is fundamental to managing risk well. By knowing this, Council can invest where it is needed most, and it can tailor this investment at the right level. This will avoid over investing in assets that have little consequence of failure, and will ensure assets that have a high consequence of failure are well managed and maintained.

For infrastructure, this is knowing Tasman's critical assets and lifelines. These typically include:

- Wastewater treatment plants
- Trunk mains
- Main pump stations

During 2016, Council in partnership with Nelson City Council, the Regional Civil Defence Emergency Management Group and other utility providers, prepared the Nelson Tasman Lifelines Report. This report summarises all lifelines within Nelson and Tasman. Within the report there was a number of actions identified to improve the Region's infrastructure resilience.

Over the next three years, as part of Council's risk, resilience and recovery planning work, it will focus on the identification, planning and management of its critical assets and lifelines. This will help to ensure that the appropriate level of effort is being made to manage, maintain and renew them, and will extend to ensuring that Council has adequate asset data to enable robust decisions to be made regarding the management of those assets.

12.5 Quality Management

Council has not implemented a formal Quality Management system across the organisation. Quality is ensured by audits, checks and reviews that are managed on a case by case basis. Table 36 outlines the quality management approaches that support Council's asset management processes and systems.

Table 36: Quality Management Approaches

Activity	Description
Process documentation	Council uses Promapp software to document and store process descriptions. Over time, staff are capturing organisational knowledge in an area accessible to all, to ensure business continuity and consistency. Detailed documentation, forms and templates can be linked to each activity in a process. Processes are shown in flowchart or swim lane format, and can be shared with external parties.
Planning	The Long Term Plan and associated planning process are formalised across Council. There is a LTP project team, LTP governance team, and AMP project team that undertakes internal reviews prior to Council approval stages. Following completion of the AMPs, a peer review is done, and the outcomes used to update the AMP improvement plans.
Programme Delivery	This strictly follows a gateway system with inbuilt checks and balances at every stage. Projects cannot proceed until all criteria of a certain stage have been completely met and formally signed off.
Subdivision Works	Wastewater infrastructure is inspected throughout its installation and then CCTV'd and pressure tested before Council sign-off and acceptance. Defects and poor workmanship will not be accepted. All work is bonded for a 2-year maintenance period.
Asset Creation	As-built plans are reviewed on receipt for completeness and adherence to the Engineering Standards and Policies. If anomalies are discovered during data entry, these are investigated and corrected. As-built information and accompanying documentation is required to accompany maintenance contract claims.
Asset Data Integrity	Monthly reports are run to ensure data accuracy and completeness. Stormwater, water, wastewater, coastal structures, solid waste and streetlight assets are shown on the corporate GIS browser, Explore Tasman, and viewers are encouraged to report anomalies to the Activity Planning Data Management team.
Operations	Audits of a percentage of contract maintenance works are done every month to ensure that performance standards are maintained. Failure to comply with standards is often linked to financial penalties for the contractor.
Levels of Service	Key performance indicators are reported annually via the Council's Annual Report. This is audited by the Office of the Auditor General.
Reports to Council	All reports that are presented to Council by staff are reviewed and approved by the Senior Management Team prior to release.

13 Improvement Planning

The activity management plans have been developed as a tool to help Council manage their assets, deliver on the agreed levels of service and identify the expenditure and funding requirements of the activity. Continuous improvements are necessary to ensure Council continues to achieve the appropriate level of activity management practice along with delivering services in the most sustainable way while meeting the community's needs.

Establishment of a robust, continuous improvement process ensures that Council is making the most effective use of resources to achieve an appropriate level of asset management practice. Assessment of our Activity Management Practices

13.1 Maturity Assessments

In 2017, Council undertook an assessment of its current asset management practices for the wastewater activity. This was a self-assessment with the targets developed in consultation with Waugh Infrastructure Management Ltd to ensure they were appropriate for the activity given:

- Criticality of the Assets;
- Value of the Assets;
- Value spent on maintaining the assets.

The maturity levels were based on the International Infrastructure Management Manual descriptions to maturity.

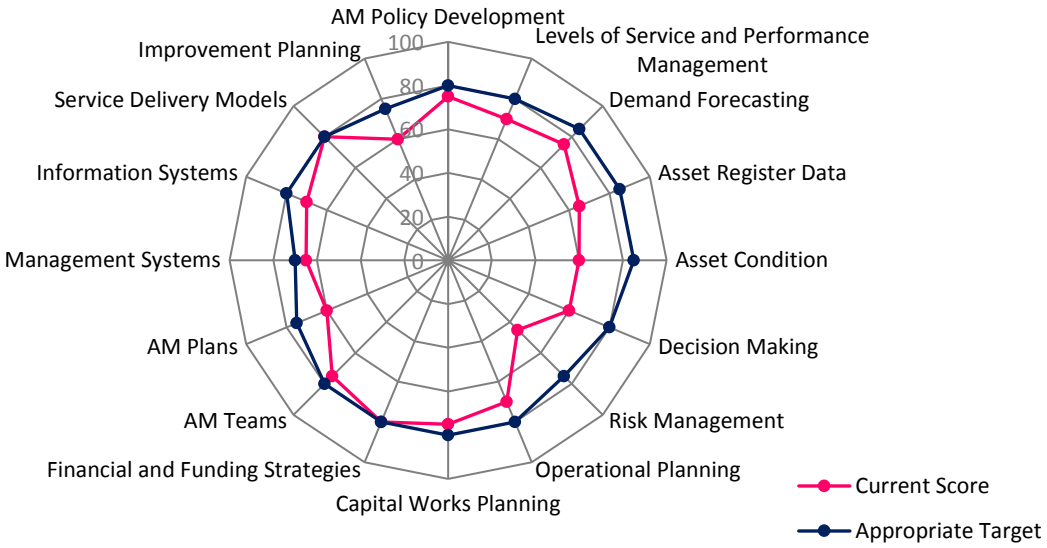


Figure 27: Wastewater Maturity Assessment Levels

Figure 27 shows there are some gaps between where Council's current practice is and where it is desired to be. Focus areas for improvements are Asset Register Data, Asset Condition, Decision Making, and Risk Management. The actions required to close these gaps have been included in the Improvement Plan.

13.2 Peer Reviews

13.2.1 Waugh Review

13.2.2 In early 2018, Council engaged Waugh Infrastructure Management Ltd to undertake a peer review on the consultation version of this activity management plan. The peer review considered all Engineering Services activities and included the following analysis:

- Overview analysis and consideration of AMP progress completed since the Waugh Infrastructure detailed 2011 AMP Compliance Report (in summary not detail);
- Review of AMPs against general industry practice as observed by Waugh Infrastructure in the past 12 months;

- Review and commentary on the adequacy of the AMP structure against current industry practice and requirements, as set out in IIMM 2015, ISO 55000;
- Analysis of AMP individual section strengths and emphasis, including analysis of overall AMP 'message' verses issues identified;
- Overview analysis of AMP status against appropriate asset management practice levels adopted in Council's Activity Management Policy (summary not detail);
- Analysis of the AMPs against Local Government Act 2002 amendment requirements, both 2012, and 2014 – identification of any issues or 'misses';
- Provide review comments of AMP strengths and weaknesses identified, with commentary on any suggested priority changes to be completed before LTP 2018;

It is important to note that the peer review only considered what was included in the consultation version of this activity management plan. There are aspects of the Council's asset management processes that are not discussed in this activity management plan and are therefore not incorporated into the scoring.

The overall findings of the Peer Review were that the Council's AMPs are well developed to support the Council's Long Term Plan. Some of the AMPs had sections that required completion, but overall missing elements noted were relatively minor.

The AMP template has been updated to incorporate recent Local Government Act changes. The AMP template developed and used by Council has allowed clear, concise presentation of information in a logical manner.

The overall compliance status is shown below in Figure 28.

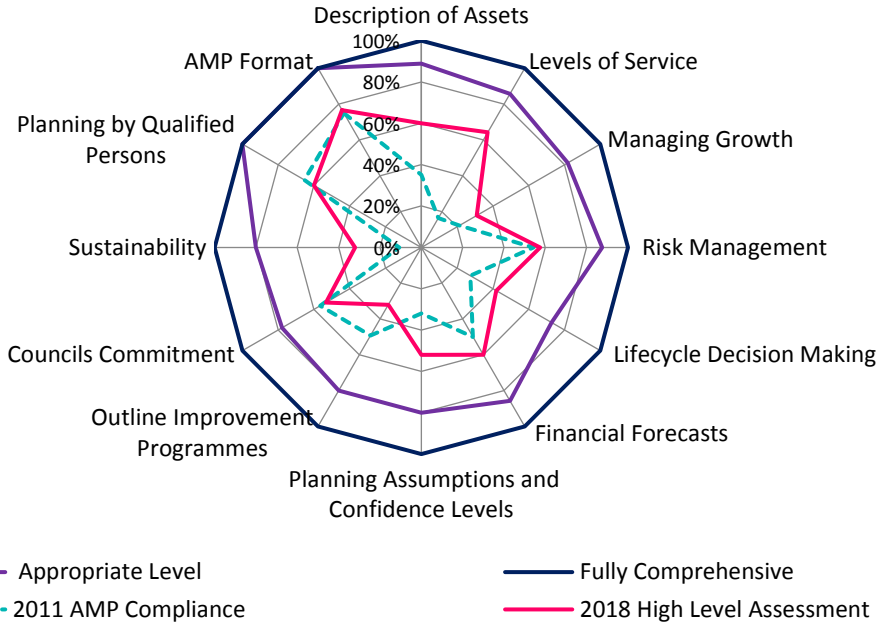


Figure 28: 2018 Peer Review Compliance Status Summary

Council staff have reviewed and prioritised the feedback received in the peer review report. Improvements that could be made immediately have been incorporated into the final version of this activity management plan. Other improvements have been ranked and included in the Improvement Plan.

There has been a minor decrease in scores for Outline Improvement Programmes, Council's Commitment, and Planning by Qualified Persons. This is not due to a change in Council's practice or performance, but due to a change in the activity management plan template. After receiving the peer review feedback, additional discussion has been included in Section 12 and Section 13 to address these issues.

13.2.3 Water New Zealand's National Performance Review

Council voluntarily participate in Water New Zealand's National Performance Review (NPR). It is an annual benchmarking exercise of the Three Waters (water supply, wastewater and stormwater) service delivery. NPR benchmarks are used to identify potential opportunities to improve service delivery and compare specific performance results against other District, City Council and Council-Controlled Organizations. The report provides decision makers and the public with a transparent picture of Council's performance within the sector.

13.3 Improvement Plan

Based on the peer review by Waugh Infrastructure Management Ltd and internal evaluations and reviews, Council has made improvements to its activity management plan and asset management processes. For the Wastewater activity, areas of strengths include:

- asset descriptions;
- summary and discussion of key issues;
- discussion of levels of service and performance analysis;
- well documented assumptions, uncertainties and risks;
- well defined financial forecasting;
- identification of appropriate asset management maturity;
- sustainability is well defined, progressed and audited (including achievement of milestones);
- acknowledgement of NZ Metadata Standard and progress of improving As-built standards.

13.3.1 Summary of Recent Improvement

Some of Council's key achievements in the asset management process over the previous three years include:

- Continued to development of the System Operating Plans (available on ActiveManuals);
- Staff continued to undertake targeted CCTV survey inspections in areas where inflow and infiltration and blockages occur. An annual CCTV data collection and inflow and infiltration programme has been budgeted over the next 30 years to help address the issue.
- Trade Waste Implementation - approvals issued for the majority of the identified large (conditional) trade waste dischargers. Approvals issued for some of the registered dischargers and work is in progress for the remainder of the registered dischargers and the remaining smaller conditional dischargers.
- The renewed Operation & Maintenance contract results in better and more efficient asset management as well improved data collection.

13.3.2 Summary of Planned Improvements

A list of the Wastewater activity specific improvement items are summarised in Table 37 below.

Table 37: Wastewater Improvement Plan

Improvement Item	Further Information	Need for Improvement	Priority	Status	Expected Completion Date	Team Responsible	Cost / Resource Type
Improve asset condition data	New operations and maintenance contact set up includes more responsibility to contractor to collect and populate condition data	Some asset condition data is incomplete. Improved understanding of condition data will help Council with the renewals programme.	High	Commences July 2018	Ongoing	Maintenance Contractor & Engineering Services (Activity Planning)	Maintenance Contract & Staff time
Improve data, processes and systems	Council is planning to develop as built standards, and asset data and metadata standards	Improved data standards will enhance data reliability and accuracy.	Medium	Started	June 2019	Asset Information Team	Staff time
Create Critical Asset Framework	Describe in AMP how it is used to prioritise asset information and condition assessments, adjust economic lives (renewal profiles) prioritise renewals and expenditure, operation and maintenance	Only the initial assessment has been undertaken, the framework was never re-tested.	High	In Progress	June 2020	Activity Planning	Staff Time

Improvement Item	Further Information	Need for Improvement	Priority	Status	Expected Completion Date	Team Responsible	Cost / Resource Type
Provide data confidence ratings for groups of assets within the valuation for each activity.		In the valuation reports, data confidence is only assessed across the activity and not for the different types of asset groups. It is likely that data confidence varies considerably between buried assets and above ground assets and this is not reflected in the reports.	Medium	Not started	June 2020	Utilities - Data Analyst	Consultants and staff time Budget $33,500 in 2019/20
Consider how levels of service options are presented to the community	Consider how to better engage the community in agreeing appropriate levels of service through specific work streams (e.g. Risk, Resilience, Recovery Planning).	Engagement is required to determine an appropriate level of service	Medium	Not started	2021	Activity Planning	Staff Time
Capture and track maintenance cost data	Historical costs should be analysed to calculate forward budgets	Improve the consistency and confidence when planning operations and maintenance budgets	Medium	Not started	Ongoing	Activity Planning and Utilities Data Analyst	Staff Time

Appendix A: Detailed Operating Budgets

ID	Name	Description	Total Budget	Financial Year Budget ($)										Total Budget	
			2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
92001	H&S Assessments	Developing and updating hazards register incl review every 5 years	60,000	0	0	0	10,000	0	0	0	0	10,000	0	20,000	20,000
92002	Legal Fees	Professional services associated with development and bylaws	600,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	200,000	200,000
92003	Consultants	Consultants for expert advise where required	4,422,000	147,400	147,400	147,400	147,400	147,400	147,400	147,400	147,400	147,400	147,400	1,474,000	1,474,000
92004	O&M Contract Tender	Every 9 years 3 Waters contract is re-tendered	450,000	0	0	0	0	0	0	0	75,000	75,000	0	150,000	150,000
92005	Development Costs	Costs that Council recover from third parties for work that contractor does on their behalf	1,230,000	65,000	65,000	65,000	65,000	55,000	55,000	55,000	35,000	35,000	35,000	350,000	350,000
92007	AMP Operational Support	External assistance with AMP/LTP development and producing estimates	188,000	2,000	11,500	5,300	2,000	11,500	5,300	2,000	11,500	5,300	2,000	67,900	61,700
92008	Reticulation Other O&M	O&M to cover third party costs where Council is at fault. (Overflows, blockages)	450,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	150,000	150,000
92009	Treatment Plant Other O&M	O&M for non-routine costs. (Non contract - external consultants)	450,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	150,000	150,000
92010	Pump Stations Other O&M	O&M to cover non-routine & unforeseen works (not associated with O&M Contract)	1,050,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	350,000	350,000
92011	WW Modelling	External expert advice and services for modelling networks	800,000	100,000	100,000	40,000	40,000	20,000	20,000	20,000	20,000	20,000	20,000	200,000	200,000
92012	Reticulation Contract Routine	Routine Works under 3 Waters Contract	1,324,080	44,136	44,136	44,136	44,136	44,136	44,136	44,136	44,136	44,136	44,136	441,360	441,360
92013	Treatment Plant Contract Routine	Routine Works under 3 Waters Contract	19,049,880	634,996	634,996	634,996	634,996	634,996	634,996	634,996	634,996	634,996	634,996	6,349,960	6,349,960
92014	Pump Stations Contract Routine	Routine Works under 3 Waters Contract	7,495,410	249,847	249,847	249,847	249,847	249,847	249,847	249,847	249,847	249,847	249,847	2,498,470	2,498,470
92018	Reticulation Contract Reactive	Reactive works under 3 Waters Contract	3,936,570	131,219	131,219	131,219	131,219	131,219	131,219	131,219	131,219	131,219	131,219	1,312,190	1,312,190
92019	Treatment Plant Contract Reactive	Reactive works under 3 Waters Contract	3,369,330	112,311	112,311	112,311	112,311	112,311	112,311	112,311	112,311	112,311	112,311	1,123,110	1,123,110
92020	Pump Stations Contract Reactive	Reactive works under 3 Waters Contract	6,646,920	221,564	221,564	221,564	221,564	221,564	221,564	221,564	221,564	221,564	221,564	2,215,640	2,215,640
92021	Wastewater Electricity	General District Wastewater Electricity costs	8,965,500	275,100	287,600	300,100	300,100	300,100	300,100	300,100	300,100	300,100	300,100	3,001,000	3,001,000
92022	Wastewater Asset Insurance	Councils insurances cover for damage	2,891,400	96,380	96,380	96,380	96,380	96,380	96,380	96,380	96,380	96,380	96,380	963,800	963,800
92023	Rates and Water	Rates and Water Usage	7,236,000	241,200	241,200	241,200	241,200	241,200	241,200	241,200	241,200	241,200	241,200	2,412,000	2,412,000
92024	General Operations	Specialist advice and support	810,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	270,000	270,000
92025	SCADA/Telemetry	Telemetry and Scada Maintenance	725,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000	225,000
92026	Trade Waste Implementation	Trade waste implementation of bylaw. including admin and monitoring and audit- survey & data capture	600,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	200,000	200,000
92027	Inflow & Infiltration Strategy & Programme	Inflow and Infiltration Strategy & Programme: Focus on Richmond, Motueka & Takaka	4,950,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	1,650,000	1,650,000
92028	CCTV Inspections & Data Capture	CCTV Inspections and Data Capture	3,750,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	1,250,000	1,250,000
92029	Consent Monitoring	Specialist sampling and monitoring associated with resources consents	330,000	16,000	16,000	16,000	16,000	16,000	10,000	10,000	10,000	10,000	10,000	100,000	100,000
92030	NRSBU User Charge	Nelson Regional Sewerage Business Unit- variable loading charges	30,221,438	1,036,411	1,038,451	1,009,752	1,032,072	1,002,002	1,002,002	1,002,622	1,020,602	1,023,702	1,002,622	10,024,980	10,026,220
92031	NRSBU Quota	Nelson Regional Sewerage Business Unit- agreed quota. Fixed costs	70,124,260	1,576,320	1,712,980	1,889,540	2,181,200	2,381,840	2,400,460	2,415,280	2,447,200	2,477,220	2,540,680	24,127,340	23,974,200

ID	Name	Description	Total Budget	Financial Year Budget ($)										Total Budget	
			2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
92033	Sludge Management Strategy	Development and review of Sludge Management Strategy (10 year cycle)	30,000	0	0	0	0	0	10,000	0	0	0	0	10,000	10,000
92035	Valuations	Valuations conducted every 3 years for LTP, data required to set depreciation & renewal budgets	25,000	0	2,500	0	0	2,500	0	0	2,500	0	0	10,000	7,500
92036	Waimea Long Term Wastewater Strategy	Strategic studies to consider the long term impact of climate change and future population requirements	200,000	100,000	100,000	0	0	0	0	0	0	0	0	0	0
92037	WW Remissions	Wastewater Remissions	4,650,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	1,550,000	1,550,000
92038	Risk, Resilience & Recovery	Undertake risk, resilience and recovery planning	130,000	20,000	20,000	0	0	10,000	0	0	10,000	0	0	40,000	30,000
92039	Wastewater Corridor Access	Corridor Access Requests	150,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	50,000	50,000
92040	Motueka Long Term Wastewater Strategy	Strategic studies to consider the long term impact of climate change and future population requirements	300,000	150,000	150,000	0	0	0	0	0	0	0	0	0	0
92041	Structure Planning & Designations	Long term infrastructure planning for new growth areas	220,000	20,000	20,000	0	20,000	0	0	20,000	0	0	20,000	60,000	60,000
	Feasibility Studies	Feasibility Studies	92,172	0	0	0	0	32,920	0	0	37,008	0	0	0	22,244

Appendix B: Detailed Capital Budgets

ID	Name	Description	Project Driver %			Total Budget	Financial Year Budget ($)										Total Budget	
			Growth	IncLOS	Renewals	2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
96001	Retrofit Inspection Points on Wastewater Laterals	Retrofit inspection points at boundaries of properties in areas of high inflow and infiltration	0	100	0	750,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000	250,000
96002	Sludge Removal	The removal of sludge from all WWTPs	0	0	100	3,890,000	0	590,000	0	0	0	0	100,000	0	0	0	1,710,000	1,490,000
96003	Growth Allowance - 11 to 20 yr	Growth allowance for infrastructure	100	0	0	200,000	0	0	0	0	0	0	0	0	0	0	200,000	0
96004	Kaiteriteri Rising Main Replacement	Replace 300m of existing 200mm PVC rising main with 280mm OD PE through 39 School Road, Riwaka	0	15	85	313,500	0	0	0	313,500	0	0	0	0	0	0	0	0
96005	Ligar Bay Pump Station and Rising Main Upgrade	Replace rising main with PE pipe and upgrade pump station with emergency storage	21	79	0	1,105,400	0	0	0	0	0	0	0	0	143,000	481,200	481,200	0
96006	Tata Beach Pump Station and Rising Main Upgrade	Upgrade main with PE pipe and install emergency storage	0	100	0	1,208,600	0	0	0	0	0	0	0	0	0	0	1,208,600	0
96007	New Stafford Dr Pump Station and Rising Main	New Stafford Dr pump station with storage, odour control and new pumps. New rising main from Stafford Dr to Mapua Wharf pump station.	30	70	0	2,063,800	2,063,800	0	0	0	0	0	0	0	0	0	0	0
96008	Higgs Road Pump Station Upgrade	Upgrade of pumps in line with population growth, new storage chamber and odour control	30	70	0	217,200	0	0	0	0	31,200	186,000	0	0	0	0	0	0

ID	Name	Description	Project Driver %			Total Budget	Financial Year Budget ($)										Total Budget	
			Growth	IncLOS	Renewals	2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
96009	Toru Street Pump Station Upgrade and Storage	Upgrade of pumps in line with population growth, new storage chamber and odour control	30	70	0	235,200	0	0	0	0	35,700	199,500	0	0	0	0	0	0
96010	Aranui-Higgs Rd Pump Station Upgrade and Storage	Upgrade of pumps in line with population growth, new storage chamber and odour control.	30	70	0	256,800	0	0	55,900	200,900	0	0	0	0	0	0	0	0
96011	Ruby Bay Pump Station Upgrade and Storage	Upgrade of pumps in line with population growth, new storage chamber and odour control. Odour control is a priority.	30	70	0	561,800	561,800	0	0	0	0	0	0	0	0	0	0	0
96012	Aranui Road Pump Station Upgrade	Upgrade of pumps in line with population growth, new storage chamber and odour control	30	70	0	329,300	66,300	263,000	0	0	0	0	0	0	0	0	0	0
96013	New Rising Main Across Mapua Channel	New 355mm PE replacement pipe across channel between Rabbit Island and Mapua	25	75	0	1,850,400	0	0	0	0	0	0	0	0	240,700	332,600	1,277,100	0
96014	New Mobile Generators	Purchase additional mobile generators that can be used across the District	0	100	0	315,000	0	0	90,000	0	45,000	0	45,000	0	45,000	0	90,000	0
96015	New Brightwater North Pump Station & Rising Main	New pump station and rising main connecting to existing pump station to accommodate growth	76	24	0	1,646,000	0	0	0	0	0	213,700	307,700	1,124,600	0	0	0	0
96016	NRSBU Capital Growth		100	0	0	2,563,784	0	177,562	1,179,546	1,206,676	0	0	0	0	0	0	0	0

ID	Name	Description	Project Driver %			Total Budget	Financial Year Budget ($)										Total Budget	
			Growth	IncLOS	Renewals	2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
96017	Thorp Street Rising Main Renewal	Upgrade rising main to 450mm PE	0	55	45	2,952,200	0	0	0	0	0	0	0	0	0	0	2,952,200	0
96018	District Wide Reticulation Renewals	Renewal of reticulation and manholes	0	0	100	18,825,000	210,000	210,000	210,000	210,000	210,000	375,000	375,000	375,000	375,000	375,000	10,900,000	5,000,000
96019	New Motueka WWTP - Designations and Land Acquisition	Secure designations and land for new inland WWTP	0	100	0	5,608,000	0	0	100,000	0	0	0	0	0	0	0	5,508,000	0
96020	New Motueka WWTP - Construction	Construct new inland WWTP	0	100	0	48,343,000	0	0	0	0	0	0	0	0	0	0	48,343,000	0
96021	Pohara/Tarakohe Pump Station and Rising Main Upgrades	New pump station with emergency storage and 250mm rising main	17	83	0	4,336,100	78,200	556,900	0	0	506,600	1,064,800	1,064,800	1,064,800	0	0	0	0
96022	Four Winds Pump Station and Rising Main Upgrade	New pump station with emergency storage and 250mm rising main	17	83	0	2,022,300	2,022,300	0	0	0	0	0	0	0	0	0	0	0
96023	Richmond Gladstone Road Pipeline Upgrade	Replace 300m of existing 225mm concrete pipe with 300mm PE pipe, includes replacing manholes	11	89	0	413,200	0	0	0	0	0	0	22,900	390,300	0	0	0	0
96024	NRSBU Capital Renewals		0	0	100	11,723,319	1,116,090	910,003	2,648,412	2,892,764	399,458	281,710	733,735	678,575	1,784,422	278,150	0	0
96025	Growth Allowance - 21 to 30 yr	Growth allowance for infrastructure	100	0	0	200,000	0	0	0	0	0	0	0	0	0	0	0	200,000
96026	Leisure Park Rising Main replacement	Replace rising main with 80mm PE pipe, on more direct alignment through camp	0	0	100	392,000	0	0	0	0	0	0	92,600	299,400	0	0	0	0
96027	Trunk Main Wakefield to Richmond - Easement	Acquire easement for existing and new trunk main	31	69	0	401,100	0	133,700	133,700	133,700	0	0	0	0	0	0	0	0
96028	Wakefield to 3 Brothers Corner Pipeline Upgrade	New pipeline from Wakefield to 3 Brothers Corner to enable growth	85	15	0	8,009,673	243,452	356,521	1,832,462	0	2,796,119	2,781,119	0	0	0	0	0	0

ID	Name	Description	Project Driver %			Total Budget	Financial Year Budget ($)										Total Budget	
			Growth	IncLOS	Renewals	2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
96029	Motueka Bridge to Motueka WWTP Rising Main Upgrade	Upgrade rising main to provide capacity from Motueka West development	45	55	0	975,600	0	222,800	752,800	0	0	0	0	0	0	0	0	0
96030	Growth Allowance - 11 to 20 yr	Growth allowance for infrastructure	100	0	0	300,000	0	0	0	0	0	0	0	0	0	0	300,000	0
96031	NRSBU Capital LOS		0	100	0	2,824,026	1,303,050	1,459,562	0	0	0	0	0	61,414	0	0	0	0
96032	Growth Allowance - 21 to 30 yr	Growth allowance for infrastructure	100	0	0	300,000	0	0	0	0	0	0	0	0	0	0	0	300,000
96035	Takaka WWTP Generator	New dedicated 165kVA generator to operate the WWTP during power outages	0	100	0	55,000	55,000	0	0	0	0	0	0	0	0	0	0	0
96039	Mechanical & Electrical Renewals at Pump Stations & WWTPs	Renewals of all mechanical and electrical assets: pumps, valves, odour mitigation, flow meters, electrical, telemetry and back flow	0	0	100	30,027,631	868,167	704,229	801,198	709,858	607,980	722,888	956,602	540,000	992,157	474,421	12,273,133	10,376,998
96042	Wastewater Resource Consent Renewals	Renewal of resource consents for all wastewater facilities and assets	0	0	100	770,000	5,000	0	0	0	0	0	0	0	0	0	625,000	140,000
96043	Safety Improvements	Implement safety improvements , fall protection, bollards, other modifications at pump stations	0	100	0	626,200	134,600	134,600	39,000	39,000	39,000	48,000	48,000	48,000	48,000	48,000	0	0
96046	New Telemetry	Convert the last remaining sites from analogue to digital	0	100	0	260,700	260,700	0	0	0	0	0	0	0	0	0	0	0
96048	Emergency Storage Tanks at Pump Stations	Installation of storage tanks at key sites across the District	0	100	0	1,291,900	37,800	412,000	385,000	330,400	126,700	0	0	0	0	0	0	0

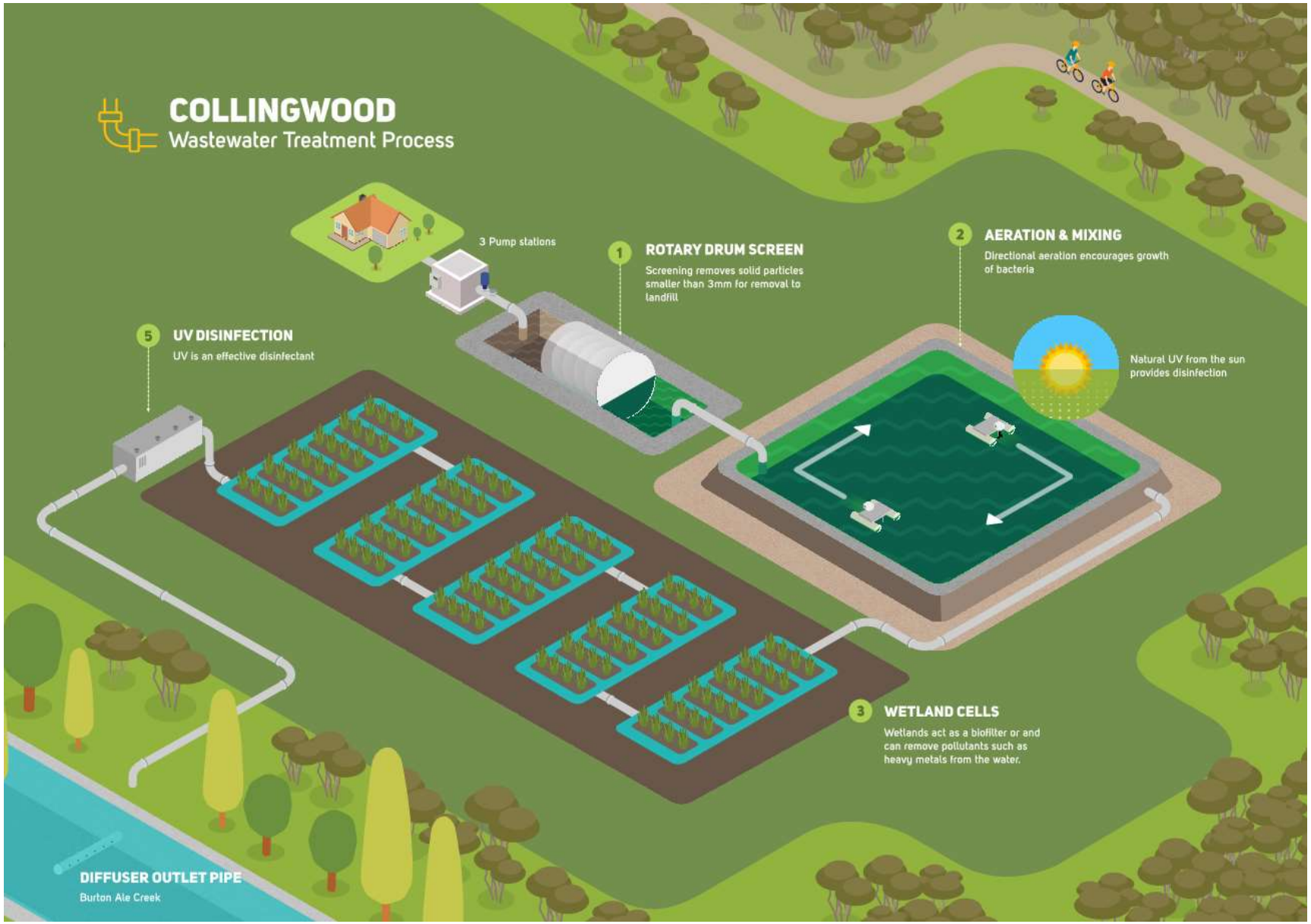
ID	Name	Description	Project Driver %			Total Budget	Financial Year Budget ($)										Total Budget	
			Growth	IncLOS	Renewals	2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
96049	Level Sensors in Storage Chambers	Install ultrasonic or pressure transducer to calibrate storage volumes, includes cleaning alarm	0	100	0	77,500	22,500	20,000	15,000	20,000	0	0	0	0	0	0	0	0
96050	Courtney & Woodlands Pump Stations Improvements	Install variable speed drives on all pumps at Courtney and Woodlands pump stations	0	100	0	37,800	0	37,800	0	0	0	0	0	0	0	0	0	0
96051	SH6 Murchison Rising Main Replacement	Replace two remaining sections of PVC with PE pipe (Waller Street to bridge)	0	0	100	289,500	0	0	0	0	0	0	56,000	233,500	0	0	0	0
96052	Motueka WWTP Inlet Upgrades	Build 2nd inlet channel with PE lining and install an additional screen	0	100	0	241,000	241,000	0	0	0	0	0	0	0	0	0	0	0
96054	Oxford and Cambridge Streets Gravity Upgrades	Upgrade 225mm to 375mm on Oxford, new 225mm pipe connection between manholes in intersection.	0	100	0	450,100	0	0	0	0	0	0	0	0	0	0	450,100	0
96055	Install Network Flow Meters	Installation of flow meters at older pump stations, data helps assessing upgrade needs	0	100	0	435,000	75,000	90,000	105,000	75,000	90,000	0	0	0	0	0	0	0
96057	Kaiteriteri Vessel Dosing System Replacement	Liquid dosing of MagOx required and greater storage area is needed	0	89	11	87,500	87,500	0	0	0	0	0	0	0	0	0	0	0
96058	Headingly Lane Pump Station & Rising Main Upgrade	Upgrade of pump and rising main to accommodate growth in Richmond West area	77	23	0	1,960,000	45,000	65,000	1,850,000	0	0	0	0	0	0	0	0	0

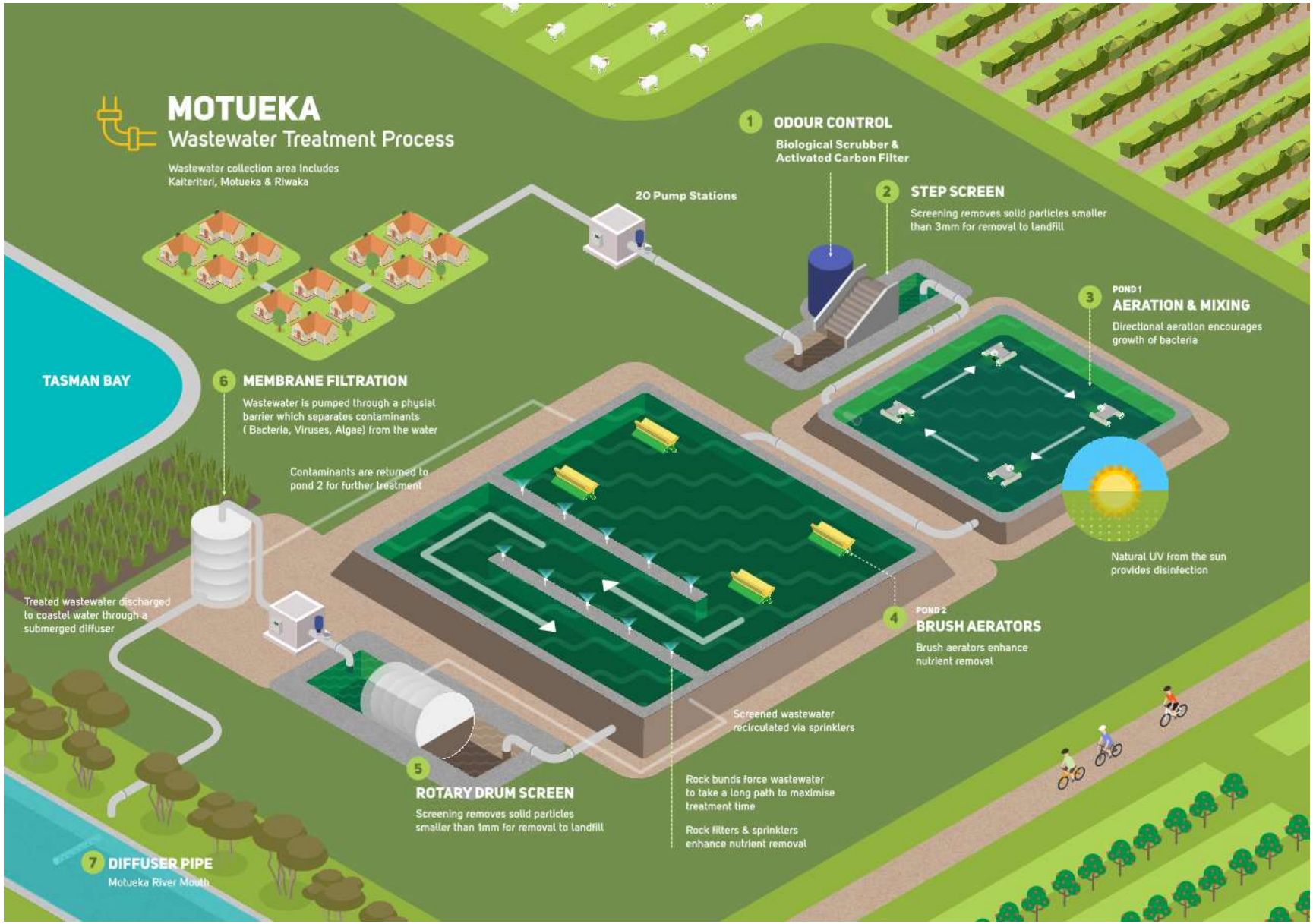
ID	Name	Description	Project Driver %			Total Budget	Financial Year Budget ($)										Total Budget	
			Growth	IncLOS	Renewals	2018-48	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028-38	2038-48
96061	Upgrade of Mapua Rise Pump Station & Rising Main	Upgrade in line with development, including increase pumping capacity, additional storage and upgrade of odour control	44	56	0	604,800	0	0	0	48,200	556,600	0	0	0	0	0	0	0
96062	Higgs 3 Pump Station Decommissioning	Decommission Higgs 3 Wastewater Pump Station	44	56	0	25,400	0	0	0	0	0	25,400	0	0	0	0	0	0
96063	New Seaton Valley Road Pump Station & Rising Main	New pump station and rising main to accommodate future growth along Seaton Valley Road	34	66	0	1,112,200	0	0	0	0	0	0	0	0	0	0	0	1,112,200
96064	New Rising Main Motueka West to WWTP	New150mm rising main from Motueka West to WWTP to accommodate growth	93	7	0	3,935,700	0	338,600	419,000	1,699,800	1,478,300	0	0	0	0	0	0	0
	Capital Programme Scope Risk Adjustment	Capital Programme Scope Risk Adjustment	0	100	0	-8,371,012	-476,113	-335,364	-532,101	-395,240	-347,383	-296,156	-191,367	-242,029	-182,664	-100,719	-4,328,417	-943,460

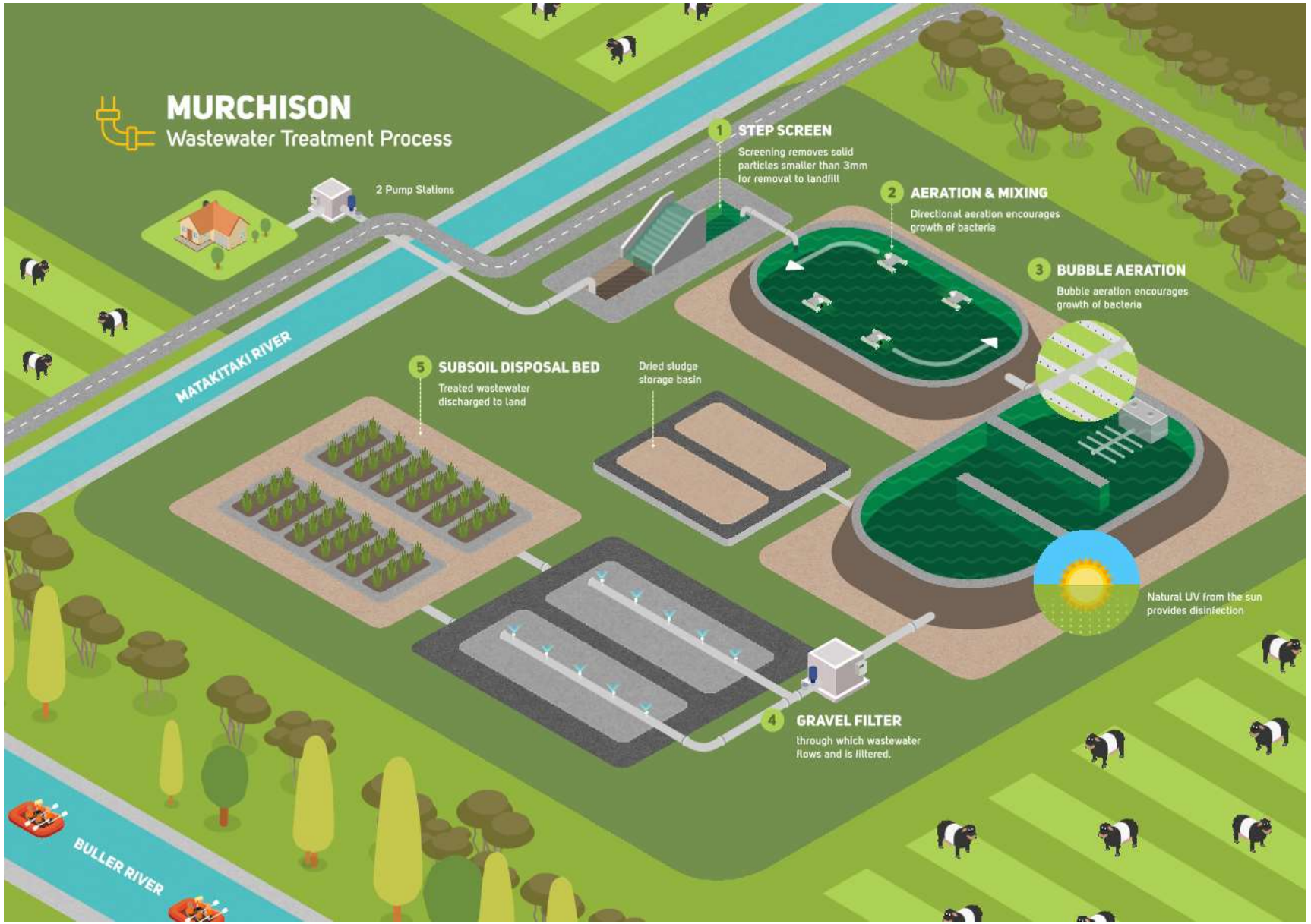
Appendix C: Wastewater Network Schematics

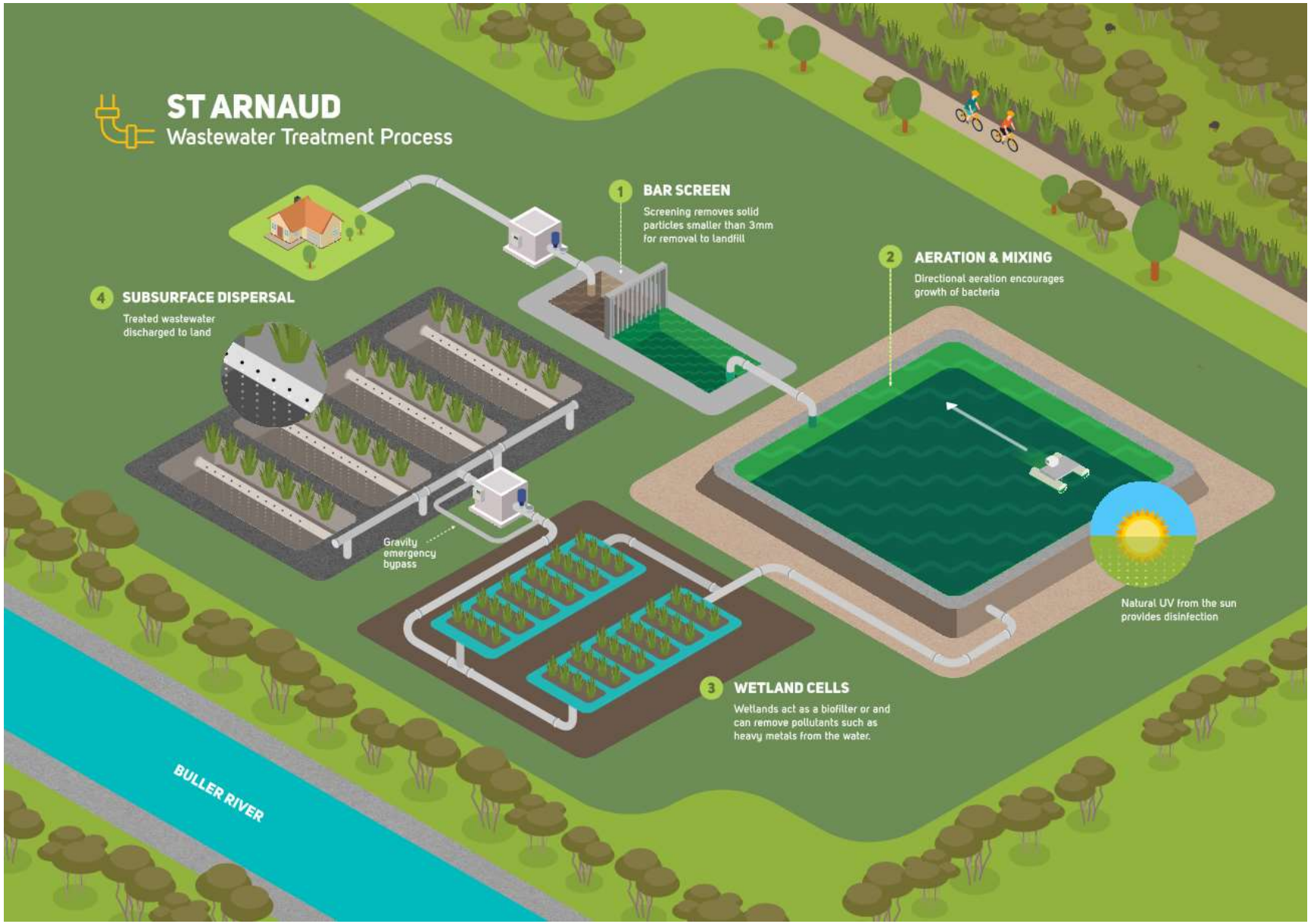
A network schematic has been produced for the following wastewater networks:

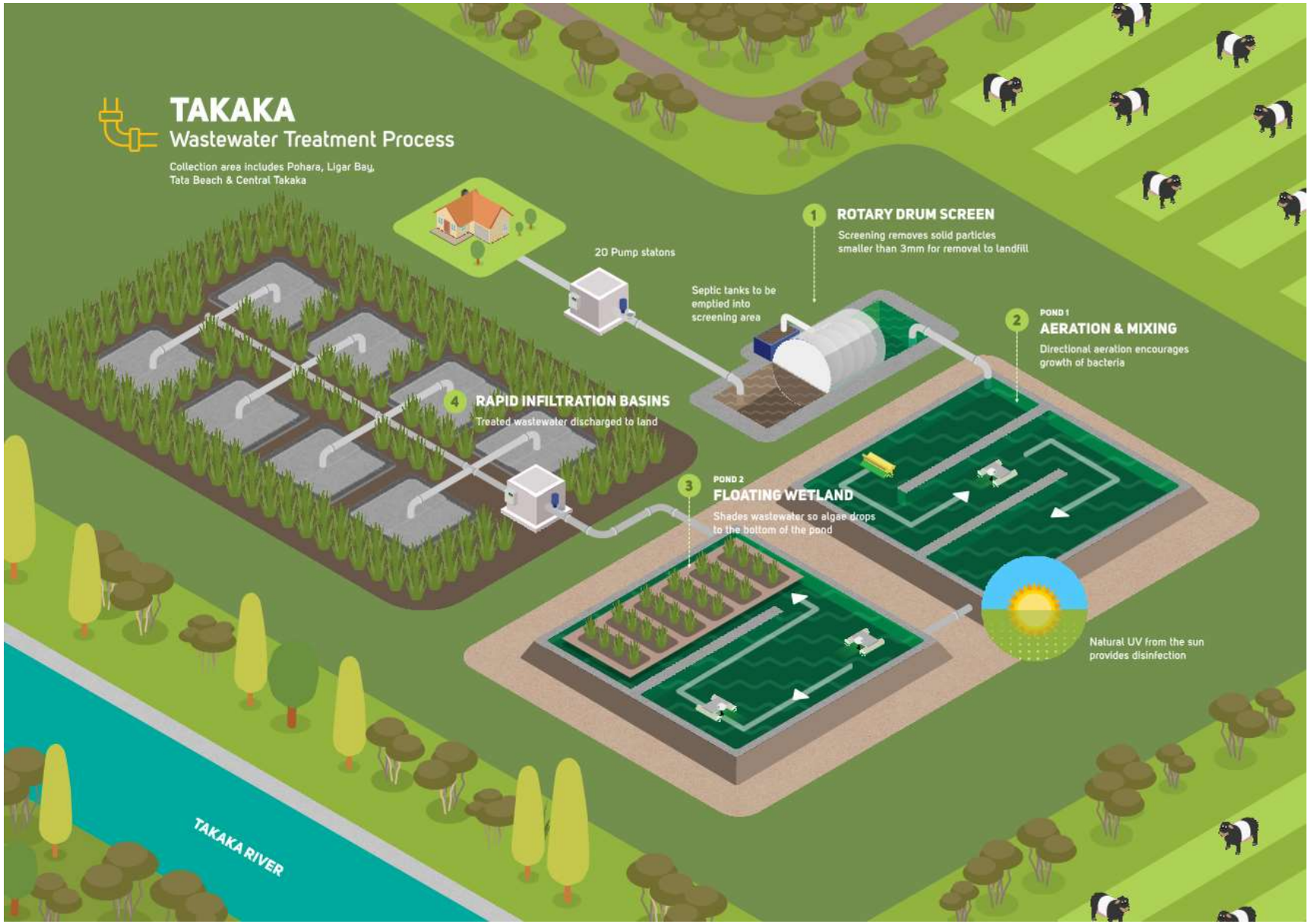
- Collingwood
- Motueka (includes Kaiteriteri and Riwaka)
- Murchison
- St Arnaud
- Takaka (includes Pohara, Ligar Bay and Tata Beach)
- Tapawera
- Waimea (includes Richmond, Brightwater and Wakefield)

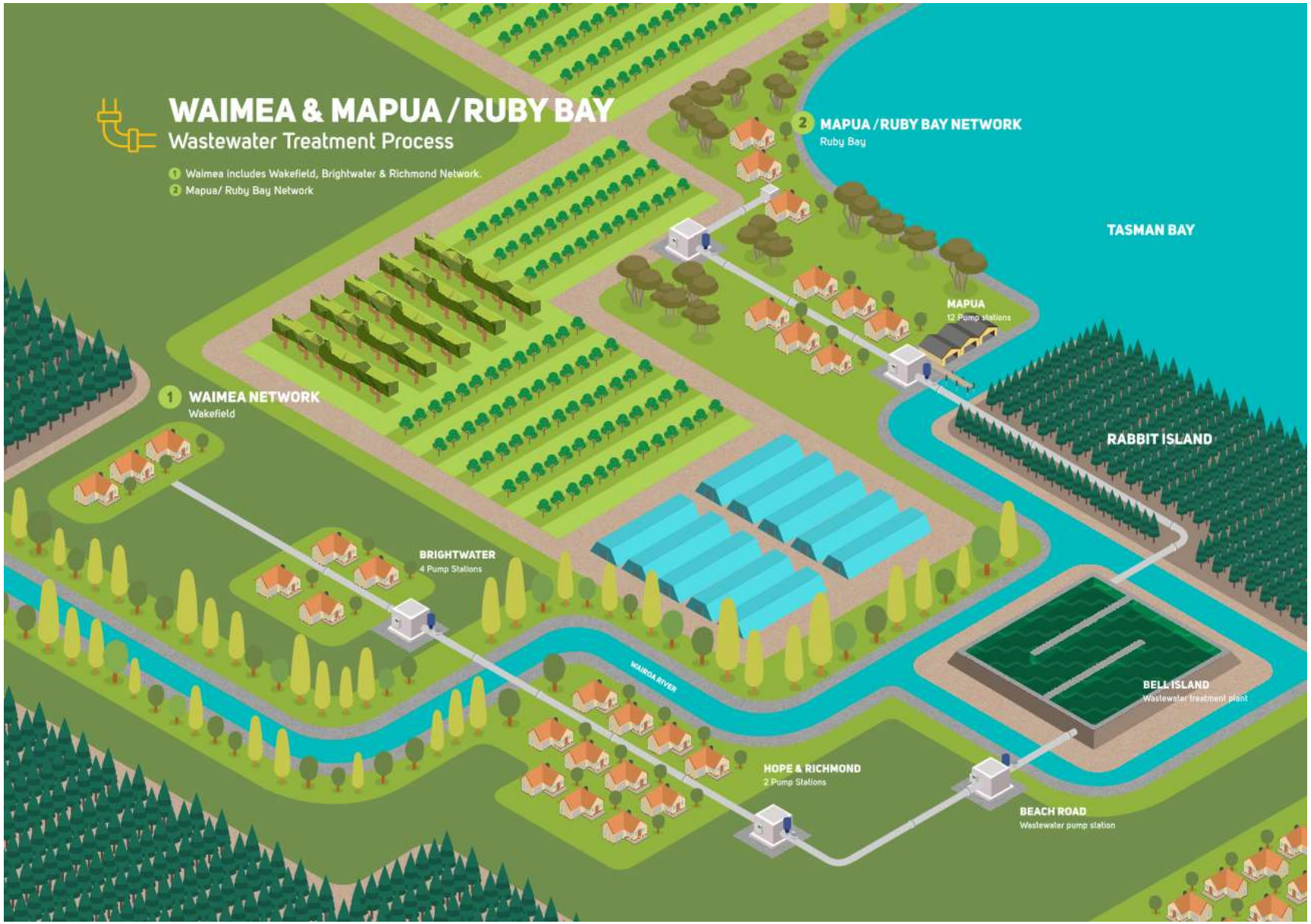

COLLINGWOOD
Wastewater Treatment Process
3 Pump stations
1 ROTARY DRUM SCREEN
Screening removes solid particles smaller than 3mm for removal to landfill
2 AERATION & MIXING
Directional aeration encourages growth of bacteria
Natural UV from the sun provides disinfection
5 UV DISINFECTION
UV is an effective disinfectant
3 WETLAND CELLS
Wetlands act as a biofilter or and can remove pollutants such as heavy metals from the water.
DIFFUSER OUTLET PIPE
Burton Ale Creek


MOTUEKA
Wastewater Treatment Process
Wastewater collection area includes Kaiteriteri, Motueka & Riwaka
20 Pump Stations
1 ODOUR CONTROL
Biological Scrubber & Activated Carbon Filter
2 STEP SCREEN
Screening removes solid particles smaller than 3mm for removal to landfill
POND 1
3 AERATION & MIXING
Directional aeration encourages growth of bacteria
TASMAN BAY
6 MEMBRANE FILTRATION
Wastewater is pumped through a physial barrier which separates contaminants (Bacteria, Viruses, Algae) from the water
Contaminants are returned to pond 2 for further treatment
Natural UV from the sun provides disinfection
Treated wastewater discharged to coastel water through a submerged diffuser
POND 2
4 BRUSH AERATORS
Brush aerators enhance nutrient removal
Screened wastewater recirculated via sprinklers
5 ROTARY DRUM SCREEN
Screening removes solid particles smaller than 1mm for removal to landfill
Rock bunds force wastewater to take a long path to maximise treatment time
Rock filters & sprinklers enhance nutrient removal
7 DIFFUSER PIPE
Motueka River Mouth


MURCHISON
Wastewater Treatment Process
2 Pump Stations
1 STEP SCREEN
Screening removes solid particles smaller than 3mm for removal to landfill
2 AERATION & MIXING
Directional aeration encourages growth of bacteria
3 BUBBLE AERATION
Bubble aeration encourages growth of bacteria
MATAKITAKI RIVER
5 SUBSOIL DISPOSAL BED
Treated wastewater discharged to land
Dried sludge storage basin
Natural UV from the sun provides disinfection
4 GRAVEL FILTER
through which wastewater flows and is filtered.
BULLER RIVER


ST ARNAUD
Wastewater Treatment Process
1 BAR SCREEN
Screening removes solid particles smaller than 3mm for removal to landfill
2 AERATION & MIXING
Directional aeration encourages growth of bacteria
4 SUBSURFACE DISPERSAL
Treated wastewater discharged to land
Gravity emergency bypass
Natural UV from the sun provides disinfection
3 WETLAND CELLS
Wetlands act as a biofilter or and can remove pollutants such as heavy metals from the water.
BULLER RIVER


TAKAKA
Wastewater Treatment Process
Collection area includes Pohara, Ligar Bay, Tata Beach & Central Takaka
20 Pump statons
1 ROTARY DRUM SCREEN
Screening removes solid particles smaller than 3mm for removal to landfill
Septic tanks to be emptied into screening area
POND 1
2 AERATION & MIXING
Directional aeration encourages growth of bacteria
4 RAPID INFILTRATION BASINS
Treated wastewater discharged to land
POND 2
3 FLOATING WETLAND
Shades wastewater so algae drops to the bottom of the pond
Natural UV from the sun provides disinfection
TAKAKA RIVER


WAIMEA & MAPUA / RUBY BAY
Wastewater Treatment Process
1 Waimea includes Wakefield, Brightwater & Richmond Network.
2 Mapua/ Ruby Bay Network
2 MAPUA / RUBY BAY NETWORK
Ruby Bay
TASMAN BAY
MAPUA
12 Pump stations
1 WAIMEA NETWORK
Wakefield
RABBIT ISLAND
BRIGHTWATER
4 Pump Stations
WAIROA RIVER
BELL ISLAND
Wastewater treatment plant
HOPE & RICHMOND
2 Pump Stations
BEACH ROAD
Wastewater pump station