KAIPARA DISTRICT COUNCIL

Kaipara District Council

Asset Management Plan 2018

Wastewater

November 2017

Status: Draft

Kaipara ki Oraanui

KAIPARA DISTRICT

Two Oceans Two Harbours

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Quality Statement

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1						

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1 Executive summary

1.1 Introduction

KDC operates six community wastewater schemes for Dargaville, Glinks Gully, Kaiwaka, Te Kopuru, Mangawhai and Maungaturoto.

The wastewater systems focus on protecting public and environmental health by collecting and treating wastewater prior to release into receiving environments.

As per the LGA 2002:

1. The purpose of local government is –
    a. To enable democratic local decision making and action by, and on behalf of, communities; and
    b. To meet the current and future needs of communities for good-quality local infrastructure, local public services and performance of regulatory functions in a way that is most cost-effective for households and businesses.
2. In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are –
    a. Efficient; and
    b. Effective; and
    c. Appropriate to present and anticipated future circumstances

The purpose of this Asset Management Plan (AMP) is to summarise in one place Kaipara District Council's (Council) strategic and long term management approach for the provision and maintenance of its wastewater assets.

The AMP provides discussion of the key elements affecting management of Council's wastewater assets, including the legislative framework, links to community outcomes, policies and strategy, the proposed Levels of Service (LOS) and performance measures and demand, environmental and service management.

Asset performance, condition and value are examined and a financial and lifecycle strategy is presented to define the investment planned to address issues and to ensure that an uninterrupted service is provided to customers now and into the future.

The provision of sustainable wastewater systems requires all those connected to take on a degree of responsibility towards various aspects of the system operation. Just because a public system exists does not mean those connected can have a 'flush and forget' mentality.

In wastewater systems certain sanitary wastes should not be flushed down toilets as they cause blockages in pipes and pumps which leads to system overflows and adversely affect the environment. Costs are incurred when maintenance staff respond to such incidents which are ultimately passed back to the users who have concerns regarding rising costs.

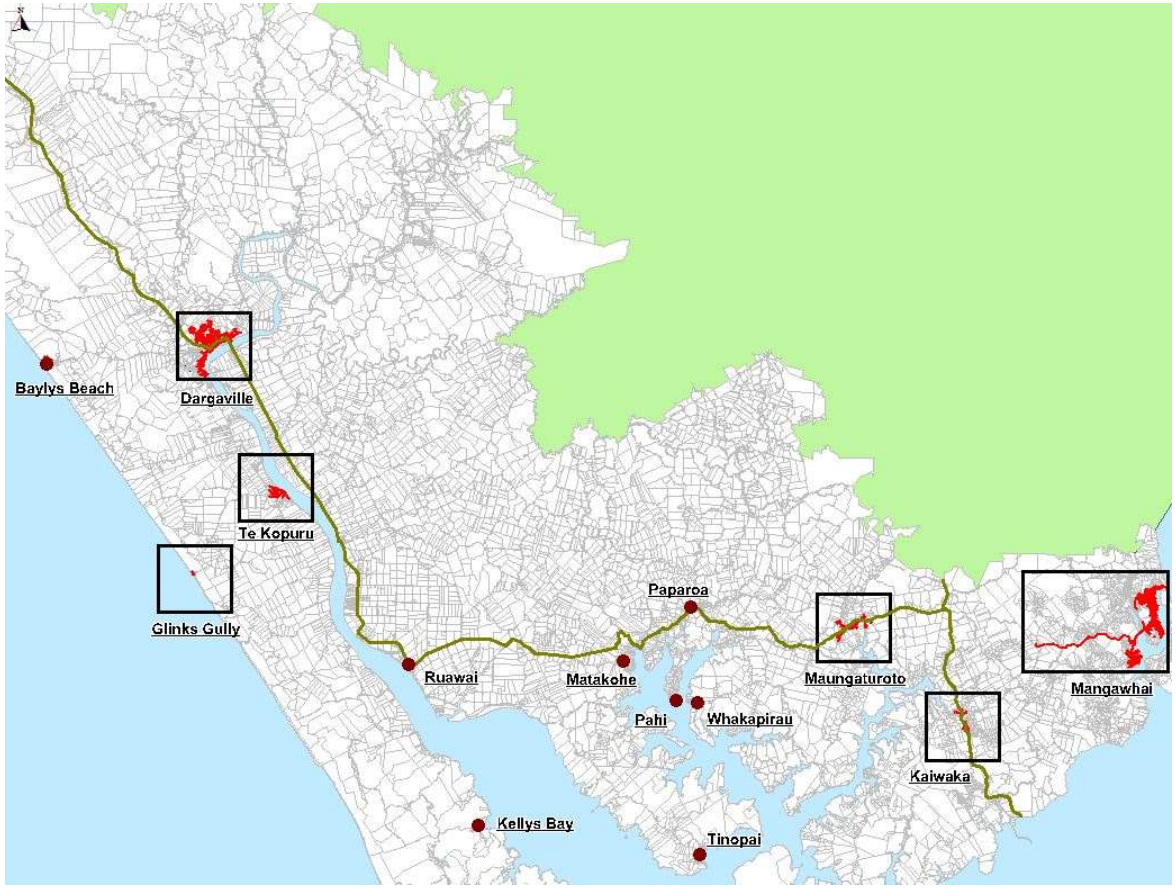
Allowing surface water to access the wastewater system causes overflows from the wastewater system in rain events. System providers are required to prevent such overflows which can require huge storage facilities for wet weather events. These come at significant cost and the preferred solution is to prevent entry of surface water in the first place. Again, individuals can assist with this by taking on board a degree of responsibility and noting where surface water flooding may be entering their house wastewater system and preventing this. Another area that causes system overflows is allowing roof water downpipes to be directed into the wastewater gully traps.

Council looks forward to working with the community in the provision of sustainable wastewater systems.

1.2 The assets

Council operates six community wastewater schemes for Dargaville, Glinks Gully, Kaiwaka, Maungaturoto, Te Kopuru and Mangawhai in order to protect public health by providing Kaipara district with reliable wastewater service in a manner that minimises adverse effects on the environment. The location of each of these communities within Kaipara district is illustrated in the figure below.

Figure 1-1: KDC WW schemes



An overview of the wastewater assets in the district is provided in the Asset Overview and Asset Valuation summary tables below.

1.3 Asset overview

Table 1-1: Asset overview

Community	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manhole	Connections	Condition
Dargaville	1	15	5,942	39,435	714	2,278	Started 2015, ongoing assessment
Glinks Gully	1	1	340	155	8	26	Largely unknown, Capacity study to start 2019
Kaiwaka	1	1	1,266	4,090	71	192	Assessment to start 2019
Maungaturoto	1	3	1,301	11,295	198	423	Assessment commenced, to continue 2018
Te Kopuru	1	0	0	6,669	89	222	Commenced 2013/2014
Mangawhai	1	12	23,214	46,794	509	2,473	Commenced 2013/2014
TOTAL	6	32	32,063	108,438	1,589	5,614	

Note: These quantities are sourced from 2017 valuation using the most direct identifier. The number of connections has not been reconciled with the rating database.

Table 1-2: Summary WW revaluation

Wastewater Renewal Value						
	Gravity Lines	Connections	Points	Rising Mains	Plants	Total
Dargaville	$8,308,365	$4,412,781	$2,567,258	$1,897,130	$4,062,242	$21,247,775
Glinks Gully	$23,839	$50,365	$28,156	$53,355	$123,752	$279,467
Kaiwaka	$790,194	$371,929	$252,642	$205,225	$370,175	$1,990,165
Maungaturoto	$2,268,078	$819,406	$730,839	$243,644	$2,206,073	$6,268,040
Te Kopuru	$1,290,484	**$430,043**	$341,796		$296,697	$2,359,019
TOTAL Excl Mangawhai	$12,680,960	$6,084,523	$3,920,691	$2,399,354	$7,058,939	$32,144,467
Mangawhai	$9,384,940	$4,790,521	$4,470,300	$9,812,103	$17,910,065	$46,367,928
TOTAL Incl Mangawhai	$22,065,900	$10,875,044	$8,390,991	$12,211,457	$24,969,003	$78,512,395

(Source 2017 Wastewater Revaluation)

1.4 Financial strategy

1.4.1 Capital cost projections

A summary of the planned CAPEX expenditure by community and by category is shown in the charts below. The graphs illustrate (in order) :

- Total renewals predicted over the next 30 years;
- Total CAPEX by driver over the next 10 years;
- Total CAPEX by driver for Mangawhai over the next 10 years;
- Total CAPEX by driver for Dargaville over the next 10 years; and
- Total CAPEX by driver for the small schemes over the next 10 years

Figure 1-2: WW total renewals

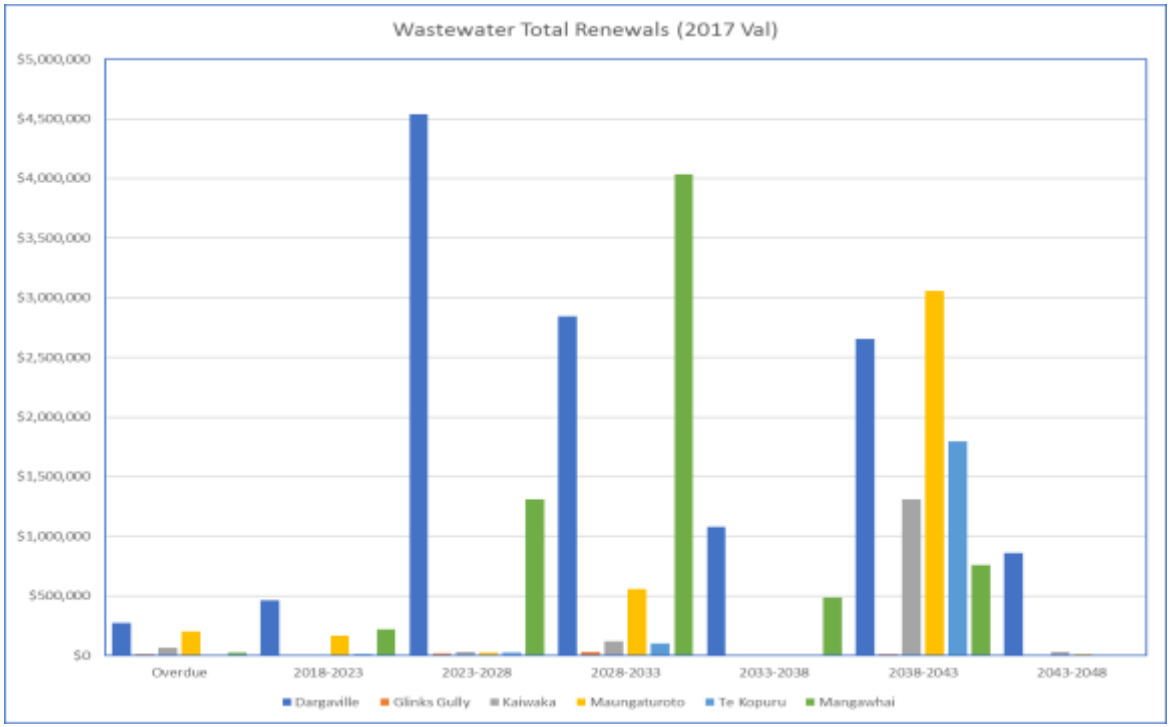


Figure 1-3: WW total CAPEX

Fig 1-3

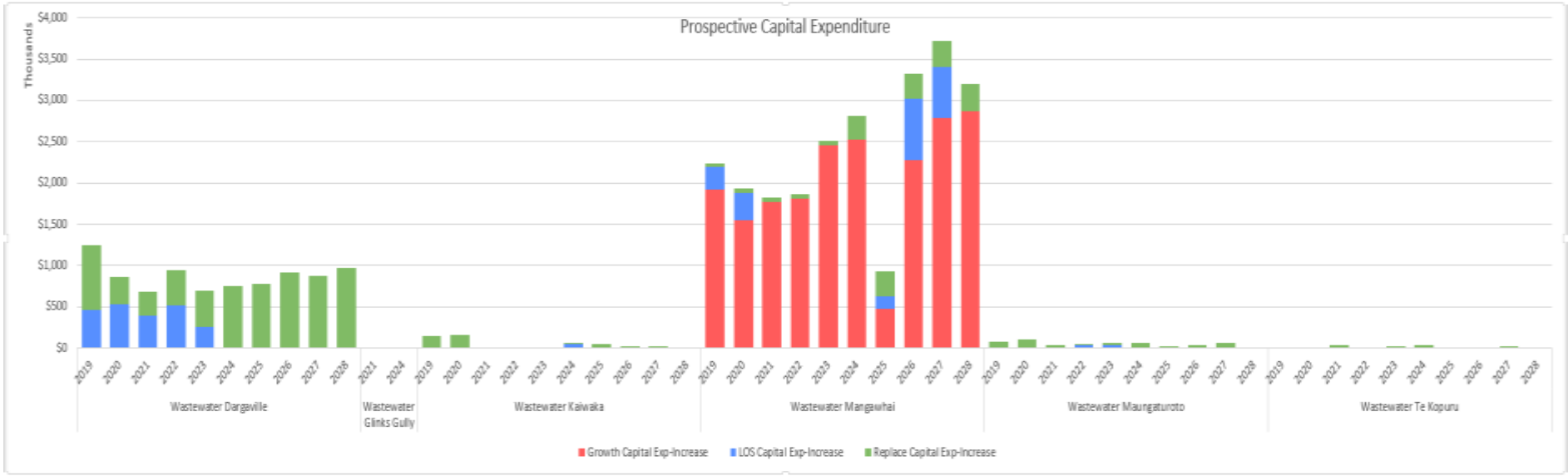


Figure 1-4: Mangawhai CAPEX

Fig 1-4

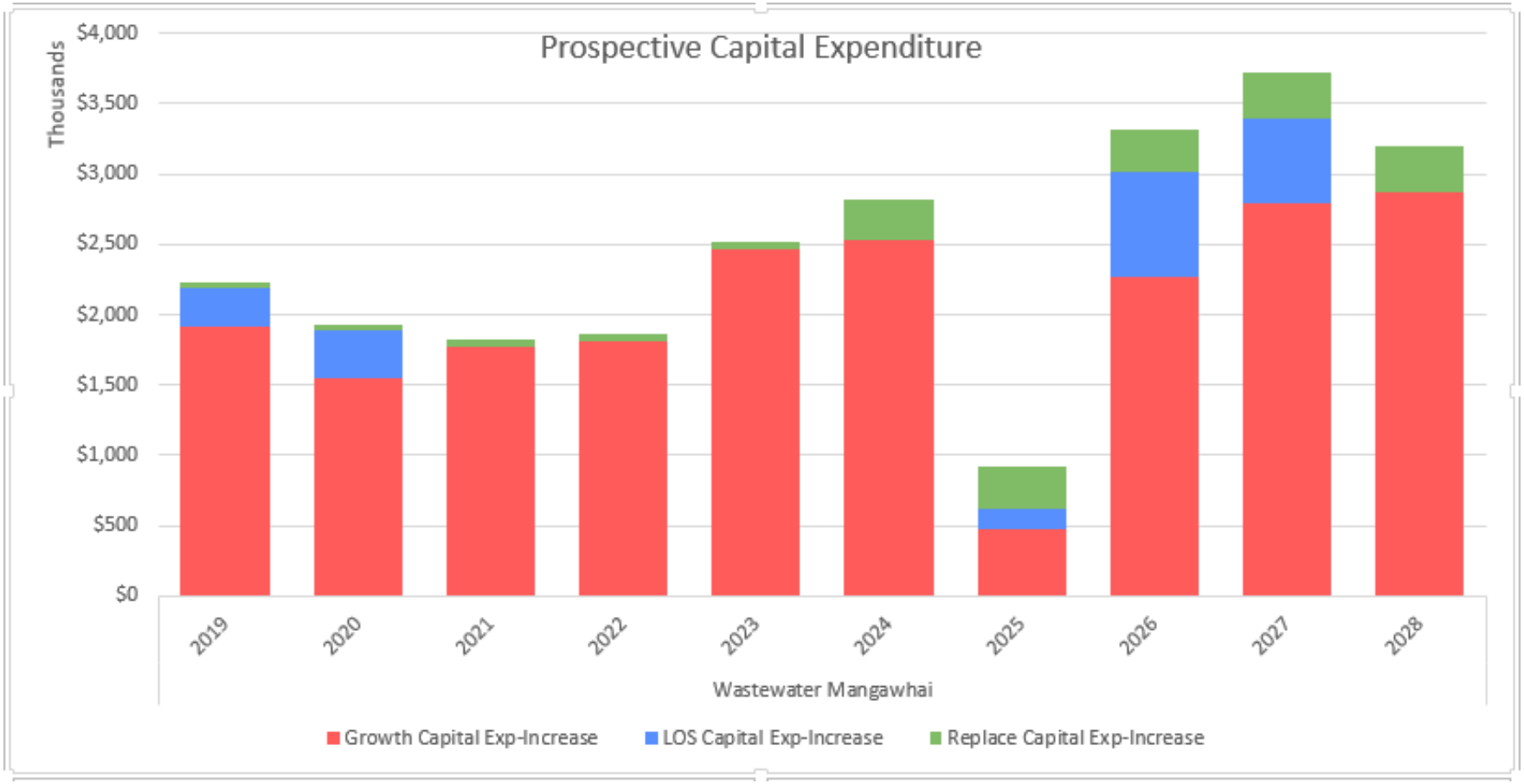


Figure 1-5: Dargaville CAPEX

Fig 1-5

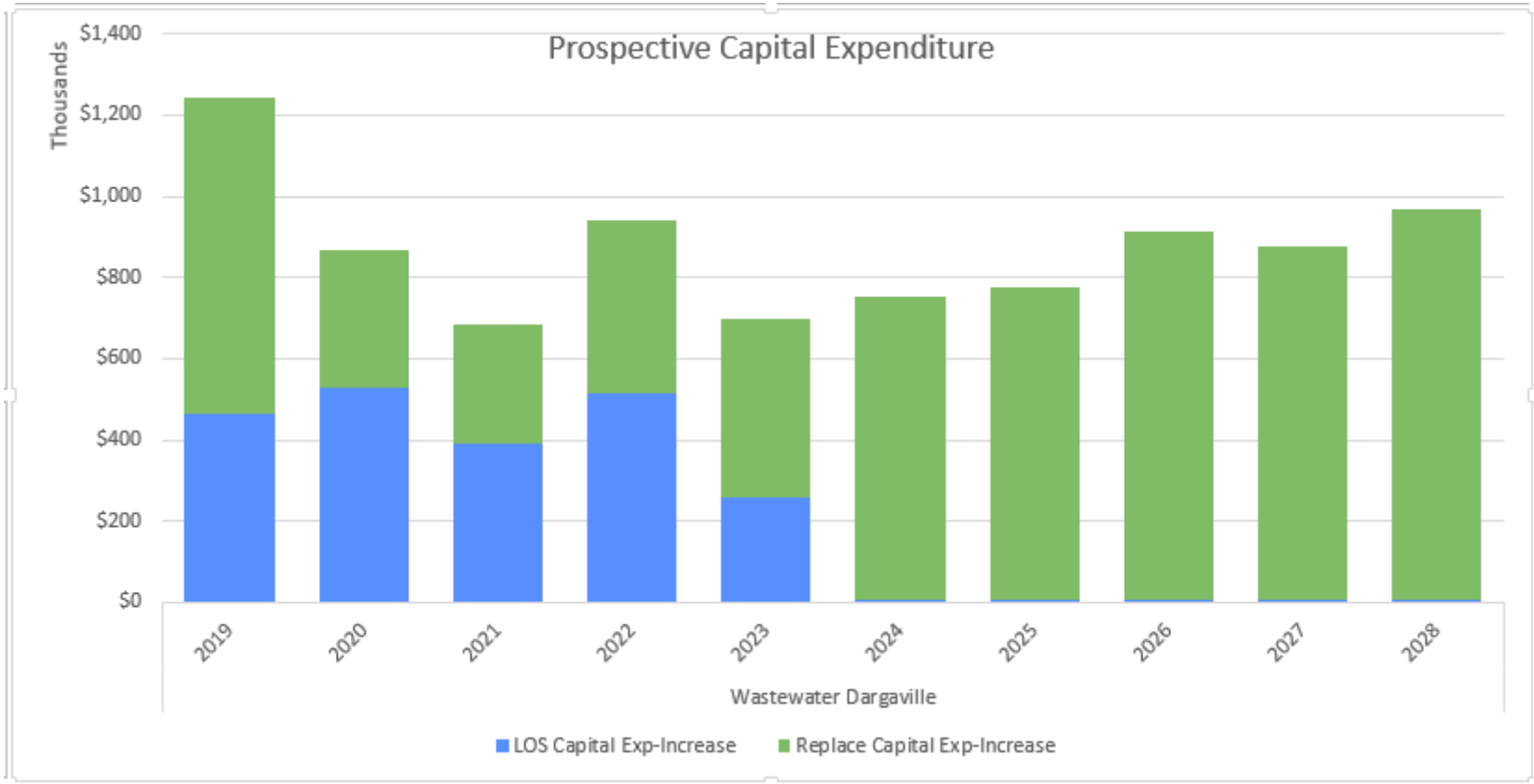
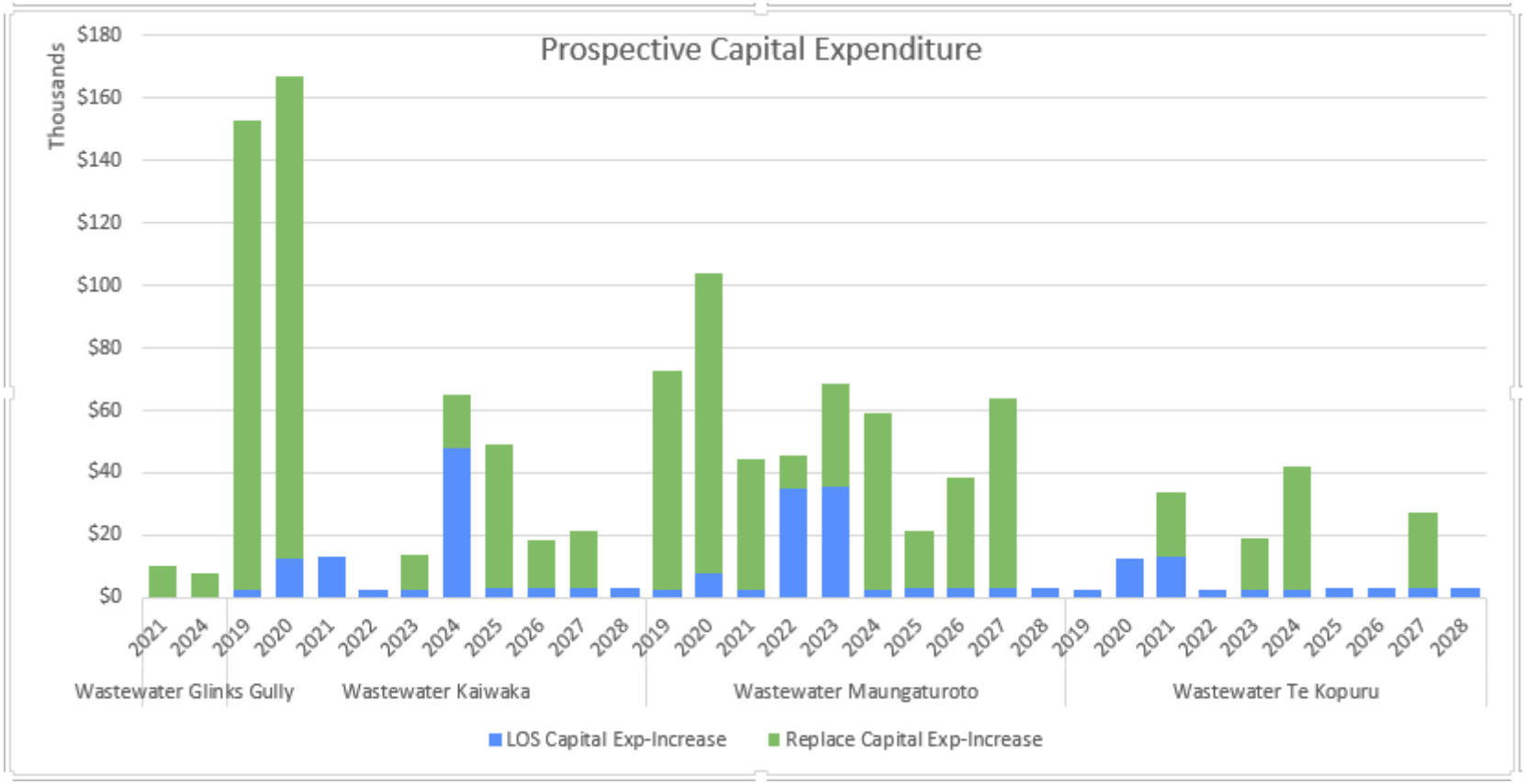


Figure 1-6: KDC Small WW scheme CAPEX

Fig 1-6



1.5 Operating costs

Projected operating costs over the next 10 years are presented below. These include operating and maintenance costs plus Database Management and Management Services. Excluded are finance-related costs such as depreciation and interest and rates charged on land. Also excluded are the staff costs associated with the Water Services department.

Key variables that are evident include :

- De-sludging of Dargaville ponds over two years;
- Expected reduction in operating costs for Mangawhai scheme in 2019; and
- Other minor variations largely relate to changes in Management Services costs.

Figure 1-7: Projected op costs Dville/Mwhai

Fig 1-7

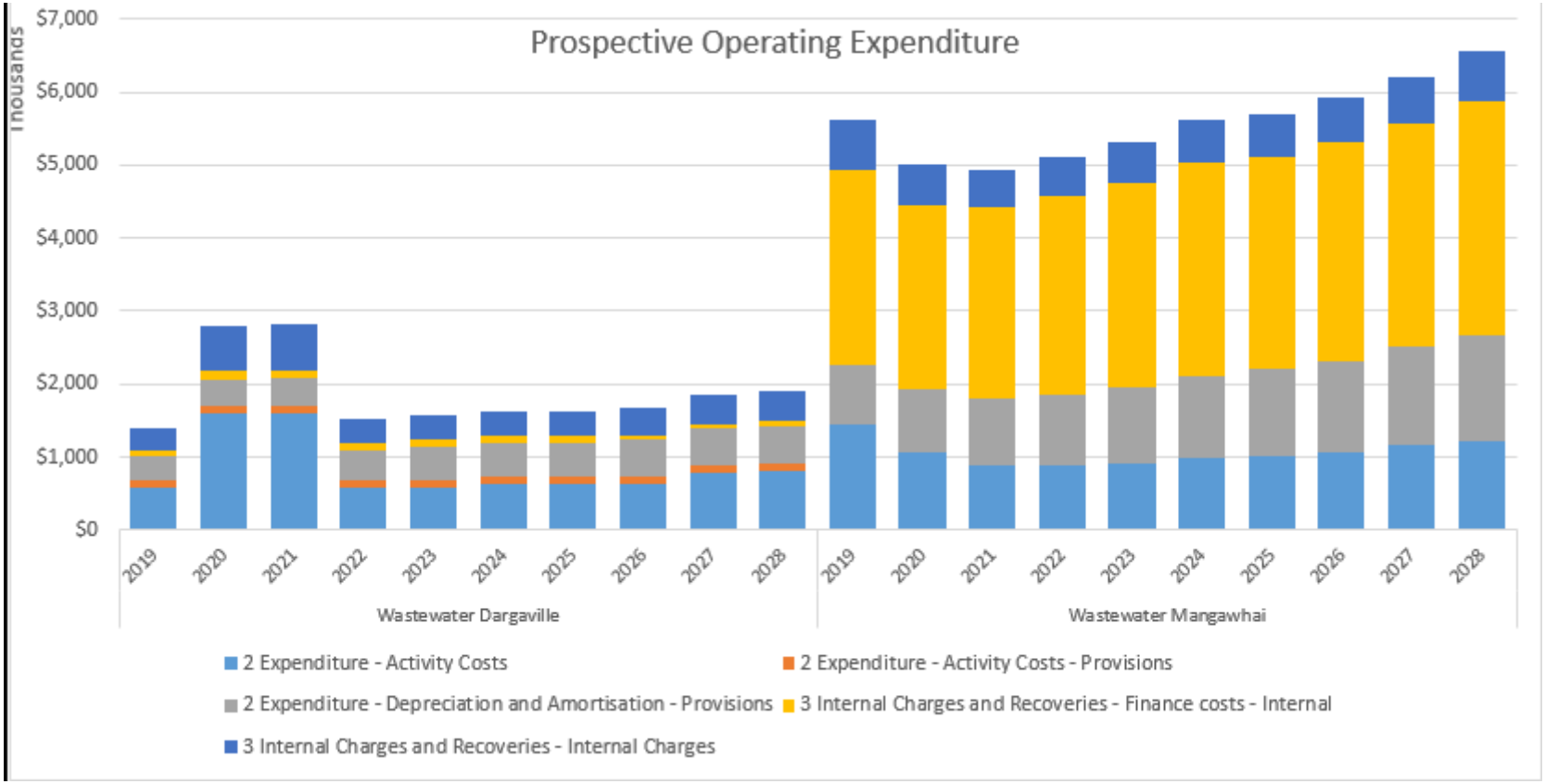
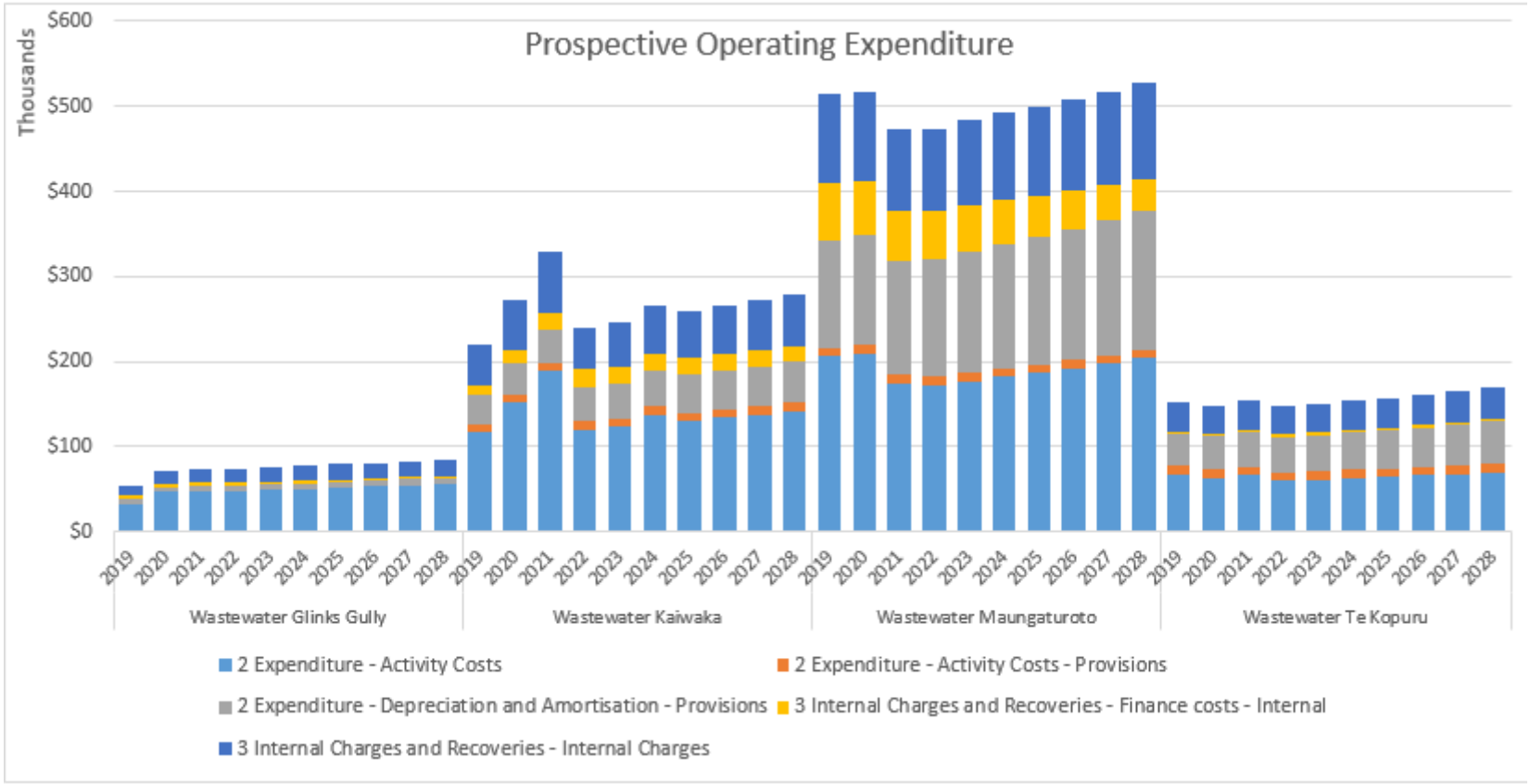


Figure 1-8: Projected op costs other

Fig 1-8



1.6 Continuous improvement

The continuous improvement activity is largely captured within the management services budget line. Previously the Engineering Services budget line was also used but this has been discontinued.

Over the next three years the focus will be on the following major improvement initiatives:

- **Capacity studies**

  The various Council wastewater systems have evolved over time and none have defined hydraulic models. As varying degrees of growth occur and as Council moves into a period of more intense renewal activity it is important to know that the work that is being done is appropriately sized for future demand.

  The studies will identify the current demand being generated by the systems and the current capacity of the various elements. Provision will be made for future growth and key constraints on the system identified together with proposed remedies. This will cover reticulation, pumping and treatment. Also included in the capacity studies will be an assessment of the degree of infiltration and inflow that is occurring and this will be used to define the extent of control measures that are required.

  Over the three years studies are proposed for Dargaville, Mangawhai, Maungaturoto, Glinks Gully and Kaiwaka.

- **Condition assessment**

  Provision is included for ongoing CCTV inspection and assessment of the gravity drains plus provision for sampling of pressure wastewater pipes (rising mains). The extent of this activity aligns with the ProjectMax recommendations of 2016.

- **Mangawhai plant renewal review**

  The Mangawhai WWTP is a complex and sophisticated system with a large number of electro-mechanical components. Many of these have relatively short economic life expectations and this reflects in a significant predicted need for renewals. This study will assess the actual condition and life expectancy of this equipment and generate a more robust forecast. This will be combined with an assessment of equipment criticality and will also serve to assess the condition of the equipment as Trility potentially ends its operation and maintenance contract.

2 Strategic context

2.1 Purpose

The purpose of this AMP is to summarise in one place Kaipara District Council's (KDC/Council) strategic and long term management approach for the provision and maintenance of its wastewater assets.

The AMP demonstrates responsible management of the district's assets on behalf of customers and stakeholders and assists with the achievement of strategic goals and statutory compliance. The AMP combines management, financial, engineering and technical practices to ensure that the LOS required by customers are provided at the lowest long term cost to the community and is delivered in a sustainable manner.

Territorial authorities have numerous responsibilities relating to the supply of wastewater services. One such responsibility is the duty under the Health Act 1956 to provide 'sanitary works for villages, towns and cities', which amongst other things are defined as 'drainage works, sewerage works, and works for the disposal of sewage'. 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 provide it either directly themselves or to maintain an overview of the service if it is provided by others.

This AMP outlines and summarises Council's strategic and long term management approach for the provision and maintenance of wastewater collection and treatment infrastructure throughout the district (excluding properties serviced by septic tanks).

A list of the acronyms used in this document is included in Appendix D.

2.2 Service description and scope

Council operates six community wastewater schemes for Dargaville, Glinks Gully, Kaiwaka, Maungaturoto, Te Kopuru and Mangawhai in order to protect public health by providing Kaipara district with reliable wastewater service in a manner that minimises adverse effects on the environment.

In addition to these community schemes, there are a number of smaller wastewater treatment facilities owned, operated or managed by Council. These facilities generally service camp grounds and other community facilities:

- Taharoa Domain – Kai Iwi Lakes camp grounds;
- Pahi Domain camp ground;
- Tinopai camp ground; and
- Ruawai public toilet wastewater system.

The above facilities are not included in this AMP as the costs related to the operations and maintenance of these assets are funded from the community facilities budgets and they are managed under separate service agreements.

Extension of connections, disconnections to Council systems and exit from a scheme will be progressed where a business case shows benefits are in line with costs.

The key objectives of this AMP are to determine standards, LOS and funding levels for Council to maintain sustainable and affordable wastewater schemes. The AMP is used to manage and plan throughout the year and is a living document requiring progressive updating to reflect the changing situation.

The wastewater activity focuses on protecting public and environmental health by collecting and treating wastewater prior to release into receiving environments. Growth and the need to provide for visitors in peak periods, especially in coastal communities, have resulted in Council's ongoing commitment to significant wastewater infrastructure development. The increasing cost of wastewater infrastructure and environmental compliance is placing a considerable amount of pressure on smaller communities. However, ensuring waste does not threaten people or the environment they live in is of high importance to communities.

2.3 Key issues

Key matters requiring attention for the wastewater service are summarised in Table 2.1 below. These matters are further addressed in sections 3.1 (Asset Details) and 10 (Continuous Improvement) of this AMP.

Table 2.1: Key matters requiring attention

Issue	Location
System capacity and constraints	Dargaville, Mangawhai, Maungaturoto, Kaiwaka, Glinks Gully
Stormwater inflow and infiltration	Dargaville, Kaiwaka, Maungaturoto
Unplanned discharges	Dargaville, Kaiwaka, Maungaturoto
Instances of discharge consent non-compliance	Kaiwaka, Te Kopuru
Treatment pond de-sludging	Dargaville
Significant deferred renewals	Dargaville
Telemetry control system	All
Asset information • Condition • Lack of maintenance history	All

2.4 Assumptions

Council has made a number of assumptions in preparing this AMP, which are described in Table 2-2 below.

Table 2-2: Key assumptions

Assumption type	Assumption	Discussion
Financial assumptions.	That all expenditure has been stated in 01 July 2018 dollar values and no allowance has been made for inflation.	The LTP will incorporate inflation factors. This could have a significant impact on the affordability of the plans if inflation is higher than allowed for, however Council is using the best information practicably available from Business and Economic Research Limited (BERL).
Growth forecasts.	A reasonable degree of reliability can be placed on the population and other growth projections that have been used as forecast assumptions. However, these are projections and need to be carefully tracked to ensure that they continue to be a reliable indicator of likely future trends.	If the growth is significantly different it will have a significant impact. If higher, Council may need to advance capital projects. If it is lower, Council may have to defer planned works.
Network capacity.	That Council's knowledge of network capacity is sufficient enough to accurately programme capital works.	If the network capacity is lower than assumed, Council may be required to advance capital works projects to address congestion. The risk of this occurring is low; however the impact on expenditure could be large. If the network capacity is higher than assumed, Council may be able to defer works. The risk of this occurring is low and is likely to have little impact.
Changes in legislation and policy.	That Council will be granted the necessary resource consents for key projects.	If these consents are not granted, Council will need to consider alternative arrangements for these projects which may impact the budget and timeframe of the projects. If existing consents are not renewed, a new asset may be required to replace the existing asset, through a new capital project.

2.5 Relationship to community outcomes, council policies and strategies

Council has adopted a new Vision Statement that includes specific reference to managing (maintaining and improving) its infrastructure.

The Long Term Plan 2018/2028 (LTP) is still being generated. It is not expected that the role of wastewater will significantly change from the LTP 2015/2025 i.e. Council's mission is to ensure that the district's wastewater is collected, treated and disposed of in a cost-effective, sustainable and environmentally friendly manner.

Figure 2-1: KDC Vision Statement

The Values: Ko nga uara

Our purpose is to make a positive difference for Kaipara. We aspire to work with:

Integrity

- ✓ We will do what we say we will
- ✓ We will act with good intent
- ✓ We will do the right thing in the right way

Team Work

- ✓ We will work together
- ✓ We will support each other

Delivering Value

- ✓ We will seek to understand needs and deliver to them
- ✓ We will apply our skills and knowledge for the benefit of others

The overall approach acknowledges that the focus and priorities will vary with different geographical areas, for example:

- West Coast: Increasingly attractive to tourism and lifestyle. An area with high ecological, historical, environmental and cultural values;
- Dargaville: An attractive place to shop, visit, live and works. A service and tourist centre;
- Kaipara Harbour: A taonga preserved for all to enjoy, retaining a rural atmosphere. Balancing the competing demands of commercial and recreational activities; and
- Mangawhai: Fully serviced urban centre located in an outstanding coastal environment.

This overall vision for the district provides a broad initial direction for the development of wastewater priorities and how those assets may be managed. This information, along with community consultation and discussion with other interested parties contribute to the development of the community outcomes identified in the LTP. These outcomes have a direct influence on the management of the various wastewater schemes.

The community outcomes that the wastewater activity contributes to most are shown in Table 2-3 below. These are from the LTP 2015/2025.

Table 2-3: Wastewater services and community outcomes

Wastewater services contribute to the following Community Outcomes	How this service contributes
Safety and good quality of life	To maintain a good standard of health
Strong communities	Treatment of pollutants to reduce the impact on the environment
Sustainable economy	To process the wastewater generated from industry and commercial activities

A more detailed interpretation of the above in relation to wastewater services translates to the following goals and activities :

- To collect and treat wastewater in a cost-effective manner;
- To dispose of treated effluent in an environmentally sustainable manner; and
- To prevent wastewater spills.

In order to achieve this Council undertakes the following activities:

- Customer services;
- Network operations and maintenance;
- Capital and refurbishment programme; and
- Consent monitoring.

2.6 Stakeholders and consultation

There are many individuals and organisations that have an interest in the management and/or operation of Council's assets. The following key external and internal stakeholders are identified for this AMP:

External

- Kaipara district's community, including citizens and ratepayers;
- Government agencies (e.g. Department. of Health, Ministry for the Environment, Audit New Zealand);
- Local Iwi;
- NRC;
- Service contractors;
- Industry;

- Environmental groups;
- Visitors to the district; and
- Developers.

Internal

- Mayor and Councillors
- Council's Chief Executive;
- Policy Manager;
- Regulatory Manager;
- Asset Manager and AM staff;
- Finance Manager;
- Information Services Manager; and
- Records and Information Manager.

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

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

- feedback from surveys;
- public meetings;
- feedback from Elected Members, advisory groups and working parties;
- analysis of customer service requests and complaints; and
- consultation via the Annual Plan and LTP process.

2.7 Legislative framework and linkages

This AMP is related to a range of national and local legislation, regulatory and policy documents as listed in Tables 2-4 to 2-7.

The legislation and guidelines below are listed by their original title for simplicity. Amendment Acts have not been detailed in this document, but are still considered in the planning process. For the latest Act information refer to http://www.legislation.govt.nz/

Table 2-4: Relevant legislation

National policies, regulation, standards and strategies
The Health Act 1956
The Local Government Act 2002
The Climate Change Response Act 2002
The Civil Defence Emergency Management Act 2002 (Lifelines)
The Resource Management Act 1991
The Local Government (Rating) Act 2002
The Health and Safety in Employment Act 1999
The Building Act 2004
The Consumer Guarantees Act 1993
The Sale of Goods Act 1908
The Fair Trading Act 1986
Public Records Act 2005

Table 2-5: Relevant regulatory requirements

National policies, regulation, standards and strategies
The Government's Sustainable Development Action Plan
Code of Practice for Urban Subdivision
NAMS Manuals and Guidelines http://www.nams.org.nz
Office of the Auditor-General's publications http://www.oag.govt.nz
Standards New Zealand • AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines; • NZS 4404:2010 Land Development and Subdivision Infrastructure; • AS/NZS ISO 9001:2008 Quality Management Systems; and • AS/NZS 4801:2001 Occupational Health and Safety Management Systems.

Table 2-6: Relevant KDC planning and policy documents

Local policies, regulations, standards and strategies
KDC District Plan
Northland Regional Plan
KDC Engineering Standards and Policies 2011
KDC Procurement Strategy

Table 2-7: Relevant KDC Bylaws

Council Bylaws
Wastewater Drainage Bylaw 2016

Preparation and implementation of this AMP and associated long term financial strategies aids Council compliance with these requirements.

Local Government Act 2002:

As per the LGA 2002:

1. The purpose of local government is –
    a. To enable democratic local decision making and action by, and on behalf of, communities; and
    b. To meet the current and future needs of communities for good-quality local infrastructure, local public services and performance of regulatory functions in a way that is most cost-effective for households and businesses.
2. In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are –
    a. Efficient; and
    b. Effective; and
    c. Appropriate to present and anticipated future circumstances

This Act requires local authorities to:

- Prepare a range of policies, including significance and engagement, funding and financial policies;

- Prepare an LTP (formerly the Long Term Council Community Plan or LTCCP), at least every three years or as required due to significant changes in asset management practices or budget. The LTP must identify:
  - Activities and assets;
  - How the AM implications of changes to demand and service levels will be managed;
  - What and how additional capacity will be provided, and how the costs will be met;
  - How the maintenance, renewal and replacement of assets will be undertaken and how the costs will be met; and
  - Revenue levels and sources.

Regarding significance, all local councils must adopt a policy that sets out their approach to determining the significance of proposals or decisions relating to issues, asset or other matters, and any thresholds, criteria or procedures to be used by Council in assessing whether these are significant.

Schedule 10 of the Act provides further detail for the LTP, which is relevant to this AMP. This Act supersedes the 1996 Local Government Amendment Act, which required the adoption of a long term financial strategy, prudent AM and formal accounting for the "loss of service potential" of assets.

The new legislation puts a stronger emphasis on strategic planning (s121) that encompasses:

- The systems for supply of water and disposal of wastewater and stormwater (cl.3(a));
- The quality of drinking water and wastewater (including stormwater) (cl.3(b));
- Current and future demands for water and wastewater (including stormwater) services and related effects on the quality of supply and the discharges to the environment (cl.3(c)); and
- Options for meeting current and future demands with associated assessments of suitability (cl.3(d)).

The definition of "wastewater services" includes sewerage, sewage treatment and disposal.

As set out in Council's 2014 Significance and Engagement Policy wastewater assets discussed within the AMP are deemed Strategic Assets and come under Council ownership.

Section 261B now includes non-financial performance measures rules 2013.

These came into effect on 30 July 2014 and affect Water, Wastewater and Stormwater. The measures have been incorporated into this AMP.

Trade Waste Bylaw

Following public consultation under the special consultative procedures of the Local Government Act 2002, Council adopted a Policy for the Discharge and Acceptance of Wastewater and an associated Wastewater Drainage Bylaw in June 2016.

The Policy sets out the manner in which Council will address issues surrounding wastewater, including, but not limited to how applications for new connections are to be made, maintenance responsibilities and other general customer and Council roles and responsibilities. The bylaw sets out the specific conditions and quality parameters that must be met in order to discharge into the wastewater system. The bylaw standards are legally enforceable and breaches of these standards could lead to disconnection and/or prosecution.

Where a discharge into the wastewater system cannot meet the requirements of the bylaw, a separate trade waste agreement must be entered into. This agreement identifies the maximum allowable values that establish an acceptable quality of the wastewater being discharged into the system. These parameters are based on the existing schedule contained within the bylaw. In addition, specific conditions can be included to ensure the discharge can be more easily accommodated at Council's WWTP.

Local Government (Rating) Act 2002, the funding companion to this proposed new LGA:

- Removes the prohibition on charging for domestic wastewater discharge by flow that was a feature of the Rating Powers Act 1988
- Permits councils to strike a rate or charge for any activity they choose to get involved in (s16).

Resource Management Act 1991 (RMA) and amendments:

- Governs the discharge of contaminants to the environment (s15 and s107)

Building Act 2004:

- Sets the minimum standards for buildings (including the provision of sanitary appliances) necessary for public health and safety through the associated codes (G13 of the New Zealand Building Code covers foul water).

Health Act 1956 contains:

- Measures for the prevention or management of outbreaks of disease;
- A requirement (s25) for territorial authorities to provide "Sanitary works for villages, towns and cities" which amongst other things are defined as:
    - Drainage works, sewerage works, and works for the disposal of sewage;
    - Works for the collection and disposal of refuse, night soil and other offensive matter;
    - Sanitary conveniences for the use of the public;

- Any other works declared by the Governor General by Order in Council to be sanitary works, and includes all lands, buildings, machinery, tanks, pipes, and appliances used in connection with any such sanitary works; and
- Authority for the raising of loans to build such works (s27).

Health and Safety at Work Act 2015:

- The Act introduces a new term, "Person Conducting a Business or Undertaking" (PCBU), which captures employers, self-employed, principals to contracts, manufacturers, designers, etcetera who have the primary health and safety duties. Workers also have duties under the Act. Workers include employees and contractors, the PCBU must ensure that it's duties are carried out as per subpart 2 – Duties of PCBUs of the Act.

Civil Defence Emergency Management Act 2002:

- Requires utility lifelines (such as wastewater) to function to the fullest possible extent during and after an emergency and to have plans for such functioning (business continuity plans);
- Crown Public Health has prepared a Response Manual for Accidental Wastewater Discharges, which is a basic set of procedures to prevent threats to public health; and
- NRC regulates the discharge of wastewater and wastewater solids in the Kaipara area. Resource consents issued by NRC are a significant driver of the AM programme. Key NRC documents are noted below:
  - NRC Regional Policy Statement;
  - NRC Regional Water and Soil Plan;
  - NRC Regional Coastal Plan; and
  - NRC Regional Air Quality Plan.

Public Records Act 2005

Council is required to create and maintain full and accurate records including all matters that are contracted out to an independent contractor. This includes records which relate to property or assets owned by and/or administered by the local authority such as: roading, drainage, sewerage and stormwater, water supply, flood control, power generated and supply, refuse disposal and public transport.

National Environmental Standards

The RMA promotes the sustainable use of resources. Its primary vehicle for addressing the discharge of effluent to the environment is via the Regional Waste and Soil Plan at Regional Level; and District Plans at District level. Given these plans are controlled at their respective jurisdictive levels, there are now varying, inconsistent standards across the regions and districts.

One method of ensuring consistent application across New Zealand is provided in s43 and s44 of the RMA. These allow the Minister for the Environment (MfE) to enact regulations called National Environmental Standards. When a National Environmental Standard is enacted the same standard must be applied regardless of jurisdiction.

The following National Environmental Standards are in force:

- Air quality standards;
- Sources of human drinking water standard;
- Telecommunications facilities;
- Electricity transmission; and
- Assessing and managing contaminants in soil to protect human health.

The National Environmental Standards listed below are at various stages of development, ranging from initiating consultation to being legally drafted.

- Ecological flows and water levels;
- Future sea level rise; and
- Plantation forestry.

The proposed National Environmental Standard for onsite wastewater systems has been withdrawn. These would have developed a warrant of fitness regime for onsite wastewater systems and had the potential to impose significant costs on ratepayers although it was argued that this would have benefited the environment.

This AMP has considered the impact of those National Environmental Standards that are in force at the time of the current update.

Links with other documents

This AMP is a key component in Council's strategic planning function. This AMP supports and justifies the financial forecasts and the objectives laid out in the LTP. It also provides a guide for the preparation of each Annual Plan and other forward work programmes.

2.8 Demand management

This section of the AMP analyses factors affecting demand including population growth, social and technology changes. The impact of these trends is examined and demand management strategies are recommended to address demand and ensure:

- Existing assets' performance and utilisation are optimised;
- The need for new assets is reduced or deferred;
- Council's strategic objectives are met;
- Provision of a more sustainable service; and
- Council is able to respond to customer needs.

Demand forecasting for this AMP has been based on forecast population growth for each community applied to measured or theoretical per capita flow rates and has included discussion with key discharges where relevant (for example Silver Fern Farms (SFF)).

No allowance has been included for infiltration or inflow reduction.

Loading reduction refers to the reduction of raw material entering the treatment plant. This is not achieved by simply reducing the flow volume (for example by households using less water), as this results in the same amount of raw material being transported by less water and can lead to an increase in blockages with more concentrated waste. Such a scenario can also result in an increase in reticulation system odour as the more concentrated material is transported less efficiently to the treatment plant and decays in the pipes.

A more effective means of achieving loading reduction may be to eliminate food scraps entering the network via under sink waste disposal grinders, implementing a Trade Waste Bylaw or having agreements with major dischargers requiring pre-treatment.

Demand management strategies provide alternatives to the creation of new assets in order to meet demand and look at ways of modifying customer demands so that the utilisation of existing assets is maximised and the need for new assets is deferred or reduced.

The components of demand management are shown in Table 2-8.

Table 2-8: Examples of WW demand management strategies

Demand component	Wastewater examples
Operation	• Infiltration/inflow reduction, reduction in trade waste loads; and • Reduction in the number of public wastewater systems.

Demand component	Wastewater examples
Incentives	Wastewater collection and treatment pricing.
Education	Public education on water conservation and efficiency.
Demand substitution	Promote grey water re-use for toilets etcetera.
Connection denial	Where treatment plants are at maximum capacity it is necessary to refuse connection to new users.
Low flow fixture and fittings	Promoting the installation of six by three dual flush toilet suites and low flow taps in bathrooms and kitchens.

Loading reduction principles currently practiced include:

- Infiltration inflow reduction – Council has developed a strategy for resolving infiltration issues previously.

Council has adopted a Wastewater Bylaw that provides greater control on wastewater discharges. Silver Fern Farms is operating under a Trade Waste Agreement and their effluent quality has improved significantly such that the Dargaville WWTP is receiving much lower loading.

There is uncertainty in forecasting demands. The key assumptions are:

- Growth will be low and restricted to certain communities; and
- No major changes to industrial usage.

If the growth significantly exceeds that expected there is a risk that capacity of the infrastructure will be exceeded sooner than anticipated. To minimise this risk Council will need to review capacity requirements based on actual demand growth as new assets are planned.

2.8.1 Population growth

The last Census undertaken in 2013 recorded the population at 18,960 of the district. This is an increase of 825 or 4.5% since 2006. Prior to this there was a growth increase of 5.6% following the 2006 Census.

Historically, population growth figures have been much lower than currently with a 2.8% increase in population for the Kaipara district over the 10 year period from 1996 to 2006.

The focus of growth recently has been Mangawhai with most other areas experiencing little growth and for Dargaville and Maungaturoto the populations have retracted.

The LTP 2015/2025 predicted little or no growth in the long term and that outlook has not changed. A key consideration is how this growth is split across the district, with significantly less growth in western and northern areas of the district. The predicted level of growth as set out in the LTP 2015/2025 is presented in Table 2-9. There has not been another census since these growth forecasts were generated and no changes have been made.

Table 2-9: Annual rating unit growth forecasts 2015/2025

Area	Census population (2013)	Years 1 – 3 2015/16 –2017/18	Years 4 – 10 2018/19 – 2024/25
Dargaville	4,251	0.4%	0.4%
Kaiwaka	576	1.00%	1.00%
Maungaturoto	895	0.50%	0.50%
Te Kopuru, Glinks Gully and Ruawai	920 (approx.)	0.00%	0.00%
Mangawhai	2,415	3.00%	1.30%
District (including all other areas)	18,960	1.00%	1.00%

While the above growth predictions are relatively low, the district is growing in other ways as an increasing number of visitors are in the district during the summer season from October to April, particularly during the weekends. The large number of non-residential owners of holiday homes in the district is one of the main contributors to growth, especially in Mangawhai and its surrounding areas, but also Maungaturoto, Pahi, Tinopai, Baylys Beach, Kai Iwi Lakes and Paparoa.

In general, the forecasts assume that any additional demand for services created by the increased growth levels will be absorbed by the rating base growth and by more efficient delivery of services.

2.8.2 Silver Fern Farms (SFF)

The Silver Fern Farms (SFF) meat processing plant in Dargaville generates effluent as a by-product of day-to-day processing activities and is the largest contributor of effluent to the Dargaville WWTP. Excluding SFF, the current average treatment plant inflow is approximately 550m^3 per day. Water consumption figures from 2015 for SFF indicate a wastewater flow rate of 750 to 1,000m^3 per day (six days per week) or around 650m^3 per day on average over seven days. SFF indicate that this flow is unlikely to change and that a long term planning figure for capacity assessments would be a peak of 1,000m^3 per day.

SFF currently treat their own wastewater prior to discharging it into the Dargaville WWTP. Their effluent quality now generally conforms to the trade waste consent issued to SFF in 2009.

2.8.3 Increase in demand for wastewater services

As the population increases in the growing coastal areas such as Pahi, Tinopai, Whakapirau and Baylys, there is an increasing expectation from ratepayers for Council to provide wastewater collection and disposal services for these areas. This is being driven by the ratepayers increasing awareness of the natural environment and the desire to minimise the adverse impacts of activities upon the environment. There is also a need to monitor demand in smaller rural communities such as Ruawai and Paparoa due to the potential inability of the environment to cope with growth.

2.9 Operational efficiencies

The cost of operating and maintaining public wastewater systems, and achieving compliance with ever increasing environmental standards, needs to be considered in the overall assessment of the schemes viability to continue as a public wastewater scheme, and with consideration of the financial demand on ratepayers contributing to the ongoing operability of the system.

For schemes serving larger populations the costs are shared across a larger population base. The system is usually cost-effective, with a greater emphasis on health and safety via the provision of adequate treatment to ensure effluent discharges meet consent requirements and minimise impacts on the receiving environment.

For schemes serving smaller populations, the costs per ratepayer may be disproportionately larger, as the same quality standards should be provided. An example could be the Glinks Gully system, which is currently serving a population of approximately 72 people and consists of a gravity collection system, single pump station and rising main to transfer the wastewater to an evapotranspiration soakage field. The operational costs of the system may not be cost-effective from a Council perspective, but requirements contained in the LGA make transfer back to a community-based scheme, or individual onsite systems, difficult to progress unless the community itself is advocating for this. Such arrangements still hold risks for Council as the 'provider of last resort' should alternative arrangements fail to meet environmental and/or health targets.

2.10 A changing environment

2.10.1 Technological change

Changes in technology have a significant potential to alter the demand placed on the utility services and also have the potential to provide techniques and processes for the more efficient provision of wastewater services. For example, low pressure wastewater systems eliminate the need for deep pipe systems in order to establish minimum flushing grades. The further development of membrane filtration in waste treatment process means very high treatment levels can be achieved for less cost than previously expected.

The recent improvement in the cost of membrane filtration technology has allowed its adoption at Maungaturoto as an addition to the pond treatment system. This technology produces a very high quality effluent that provides good removal of viruses. Accordingly, it is ideally suited for discharges into the Kaipara Harbour where shellfish gathering is undertaken.

Monitoring of the Maungaturoto scheme should prove instructive and allow assessment of its application to both larger and smaller schemes. The key point of interest will be the running costs in terms of both power and filter unit replacement rates. In addition, the current scheme allows a staged development that is well suited to a staged scheme development due to the uncertain rate of growth in Maungaturoto. Recent developments in pipeline rehabilitation techniques such as grouting, patch lining and replacement with pipes of better material and with more watertight jointing have been shown to be valuable tools in managing the infiltration problem. Whilst the use of modern pipelines in urban growth areas are able to significantly reduce infiltration, by themselves these technologies will not prevent a long term increase in groundwater intrusion due to the deterioration of jointing in older catchments. There is also emerging evidence that achieving targets for flow reduction may not be possible without including the complete length of service laterals in rehabilitation programmes.

A constant awareness of technology changes is necessary to effectively predict future trends and their impact on the utility infrastructure assets.

2.10.2 Economic trends

New Zealand is currently experiencing a significant growth in various sectors and areas of the country. The area from Tauranga to Auckland is experiencing considerable growth and outlying areas such as Mangawhai are beginning to see the positive effects of this growth with increased interest in building and property sales.

Extension of the Northern Motorway to Warkworth may see more commuters prepared to settle in Mangawhai and/or growth of the retired population.

2.10.3 Legislative change

Legislative change can significantly affect Council's ability to meet minimum LOS and may require improvements to infrastructure assets. Changes in environmental standards and the RMA 1991 may affect wastewater treatment options. In addition, changes in legislation can influence the ease at which new consents are obtained or existing consents are renewed. Experience demonstrated that consent conditions are becoming more stringent with increased monitoring requirements being commonplace and the likelihood of additional treatment necessary.

The MfE is promoting a series of National Environmental Standards that can be enforced as regulations under the RMA. Whilst the Onsite Wastewater Systems National Environmental Standard has been withdrawn, other standards have the potential to impose costs on ratepayers including those not connected to a Council wastewater system. One such standard is the proposed standard for Ecological Flows and Water Levels. Whilst this will have a greater impact on water supply services it has potential to impact on wastewater services by imposing conditions on receiving water quality requirements.

2.10.4 Customer expectations

Customers are demanding a higher standard of wastewater services and will need to be kept informed as to the impact of changes in the legislative requirements for wastewater treatment and the subsequent impact on individual schemes. The cost of maintaining or improving treated wastewater quality standards will need to be clearly communicated to the communities.

This increased customer demand has been witnessed in the Far North and Whangarei districts where tolerance for unplanned wastewater discharges, such as during storm events, has reduced. Improving the management of unplanned discharges is a LOS and key task under this AMP.

2.10.5 Environmental considerations

Where the absence of a reticulated wastewater collection and treatment scheme could result in continued adverse effects on the environment, Council may be required to extend existing schemes or provide a new scheme to mitigate such impacts. Where such issues are identified a full range of solutions will be investigated with preference given to privately managed solutions.

2.10.6 Changes in weather pattern

The MfE advises that climate scientists estimate Northland's temperature could increase 0.9°C by 2040, and 2.1°C by 2090. This compares to a temperature increase in New Zealand during last century of about 0.7°C. To put this in perspective, the 1997/1998 summer, which was particularly long, hot and dry, was only about 0.9°C above New Zealand's average for the 1990s. Northland is expected to experience more frequent and intense heavy rainfall events which will increase the risk of flooding and could become up to four times as frequent by 2090.

The effects of this on the wastewater activity are that high intensity rainfalls causing overflows may occur more frequently. Also, wastewater assets near sea level may be affected by higher sea levels or tidal surges.

The development of Council's Engineering Standards 2011 provides design rainfall for Dargaville, Tinopai, Maungaturoto and Mangawhai areas of the district, being the main population centres. The rainfall depths provided in the Engineering Standards have been estimated up to the 100-year event; 72-hour duration and include adjustment for 95% confidence.

For developments in other areas the Engineering Standards acknowledges NIWA's High Intensity Rainfall Design System (HIRDS) version 2, which outlines rainfall depths + 1.65 standard error + 17% climate change allowance.

The impact of long term changes in weather patterns have not been built into this AMP given the lack of detailed information available, although development of an unplanned discharge mitigation plan has been included. Inclusion of possible risk imposed by global warming to the wastewater assets will need to be included as the AMP is developed in future.

2.10.7 Changes in water discharge volumes

Changes in water consumption patterns can affect wastewater assets. This can occur by an increase in per capita usage resulting in more wastewater or decreases in water usage which may result in more concentrated and possibly corrosive wastewater. It is considered unlikely that there will be significant changes in per capita water use throughout the planning period of this AMP, although loss or gain of a commercial discharger is possible.

The current economic climate forces businesses to reconsider how and where they operate. Council works with both Fonterra in Maungaturoto and SFF in Dargaville to provide mutual beneficial arrangements. Fonterra takes water from Council's water supply system but discharges wastewater through its own treatment system, whereas SFF is supplied water by Council and discharges wastewater that is partially treated into Council's system. Council is currently working with SFF to introduce a trade waste agreement.

Any changes to these arrangements with commercial users will have impacts on the cost structure of each scheme. If Council is to be successful in developing and growing business within the district it will be necessary to work with the existing and new businesses to provide sufficient wastewater treatment capacity. Providing economic wastewater treatment will be a key benefit to encourage business growth and development in Kaipara.

2.10.8 Summary of changes

Table 2-10 below shows a summary of how the above issues will impact on the management of wastewater assets.

Table 2-10: Summary of issues affecting WW assets

Issues	Impact on wastewater assets
Population growth	Potential future new schemes for the high growth communities would have a large impact.
Technical change	Little or no impact.
Economic trends	Potential high impact for Dargaville and Mangawhai. Currently little or no impact for other schemes.
Legislative changes	Unknown impact. Resource consent conditions could have a significant impact, particularly where wastewater is discharged direct to water.
Customer expectations	Unknown impact, drive towards a reduction in unplanned discharges.
Environmental considerations	Potentially high impact in reticulated communities such as Ruawai.
Weather changes	Possibly an increasingly important impact. As weather changes are likely to be gradual, in terms of medium term asset management planning timeframes, these effects are raised here and need to be reviewed as the AMPs are developed in the future.

Issues	Impact on wastewater assets
Water discharge volumes	Potentially significant if large discharger leaves or enters a reticulated area. The effect of this occurrence would need to be assessed on a case-by-case basis.

The main impact of the above trends is the expectation for Council to design, construct and operate wastewater collection, treatment and disposal systems in coastal communities to meet the growing demands of population growth and urban development or to upgrade treatment facilities for existing serviced areas in order to discharge treated effluent to land. The immediate and long term costs associated with these possible schemes is presently unknown.

Thorough investigation of all options to provide wastewater solutions will be required and any decision for Council to become involved in the creation of additional systems would only proceed where a business case supports the financial sustainability of the scheme funded entirely by the users.

2.11 Environmental management

An important aspect of the wastewater activity is ensuring that any discharge of contaminants to the district's land, air and natural water resources is managed responsibly. The statutory framework defining what activities require resource consent is the RMA 1991. The RMA deals with:

- The control of the use of land;
- Structures and works in riverbeds and in the CMA; and
- The control of the taking, use, damming and diversion of water, and the control of the quantity, level and flow of water in any water body, including:
  - The setting of any maximum or minimum levels or flows of water;
  - The control of the range, or rate of change, of levels or flows of water; and
  - The control of discharges or contaminants into water and discharges of water into water.

Council's wastewater reticulation and treatment plants (including oxidation ponds) have an essential role in ensuring that wastewater produced across the district is properly collected, treated and disposed of in ways that meet community and cultural expectations and avoid causing significant adverse effects on the environment.

The RMA requires resource consents in the form of discharge permits for all discharges of treated wastewater. Other resource consents may also be required for installation and operation of wastewater infrastructure (e.g. pipelines across rivers and streams, and in coastal areas, monitoring of water supply bores for wastewater activities). Council holds a number of resource consents for its wastewater activities. A summary of current wastewater consents held by Council is presented in Appendix B.

Environmental and treatment plant performance monitoring is required by many of the consents held by Council. A new measure was recently introduced by NRC to limit the number of annual discharge events into local rivers or streams from Council's reticulation, to a maximum level of 5. Recent studies in the Dargaville wastewater network have identified issues with infiltration from the stormwater network. This increased loading on the wastewater system could potentially create overloading at wastewater treatment facilities and increased discharges to the receiving environment.

Infiltration issues have also been identified in the Maungaturoto wastewater system with flows during heavy rainfall events likely to exceed the allowed maximum daily discharge consented for Maungaturoto. A small sub-catchment within the Maungaturoto network was selected to undergo smoke testing to identify potential sources of inflow/infiltration during 2012/2013. The findings of this survey identified that it was the private connections and roof guttering connections to the wastewater reticulation that were the primary sources of inflow/infiltration. These instances were to be forwarded to the Regulatory department of Council to follow up and to get rectified. Whilst in this instance, the public wastewater network was not found to be contributing significantly to the inflow/infiltration issue, it is still being considered to extend the exercise to the wider Maungaturoto network and possible other communities.

Significantly the WaterNZ National Performance Review for 2015/2016 identified that the Dargaville wastewater system was the worst of the 44 councils in New Zealand who contributed data. Wet weather overflows were reported at approximately nine events per 1,000 properties with the median for 'small' councils being around three. This data is based on self-reporting and incomplete information and should not be taken too literally. However, it does indicate that the Dargaville system is performing, or being reported, significantly differently to other communities.

The extent of inflow and infiltration is one of the desired outcomes from the Capacity Studies that are proposed in this AMP.

The oxidation pond in use at Te Kopuru is also monitored through sampling by NRC. Recent samples have indicated instances of non-compliance with consent conditions, thought to be due to sludge accumulation in the pond. De-sludging of the oxidation pond at Te Kopuru has been completed as a step toward improving the performance of the system.

NRC undertakes summer monitoring at popular swimming locations in the district, two freshwater and eight coastal sites. Samples are taken weekly between December and April each year to ensure the water is safe for swimming. Each site is given a grading based on the results compared to the MfEs "*Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Area*" publication (2002).

The results of this monitoring programme can be used to identify non-compliant locations and instigation of investigations into possible sources of contamination which may include contamination of stormwater from the wastewater network during intense rainfall events.

There is a growing awareness of the environmental issues related to wastewater discharge on the receiving environments and its impact on our cultural, social and economic well-being.

2.12 Proposed LOS and performance measures

A key objective of this AMP is to match LOS associated with the wastewater collection/treatment activity to agreed expectations of customers and their willingness to pay for that LOS. LOS provide the basis for the lifecycle management strategies and works programmes identified in the AMP.

With wastewater assets, there are often higher levels of maintenance and renewal requirements proposed (increased LOS) than the resources allow for. Trade-offs then have to be made as to what impacts on the ability of an asset to provide a service against the 'nice to have' aspects.

LOS can be strategic, tactical, operational or implementation and should reflect the current industry standards and be based on:

- **Customer research and expectation** Information gained from stakeholders on expected types and quality of service provided.
- **Statutory legislation**, regulations, environmental standards and Council bylaws that impact the way assets are managed. These requirements set the minimum LOS to be provided.
- **Strategic and corporate goals guidelines** for the scope of current and future services offered and manner of service delivery, and define specific LOS that Council wishes to achieve.
- **Best practices and standards** Specify the design and construction requirements to meet LOS and needs of stakeholders.

Council's current LOS and associated performance measures for the wastewater activity are presented in Table 2-11 below. These have now had the non-financial performance measure rules 2013 incorporated. The current LOS have been developed to contribute to the achievement of the stated Community Outcomes that were developed in consultation with the community and taking into account:

- Council's statutory and legal obligations;
- Council's policies and objectives; and
- Council's understanding of what the community is able to fund.

LOS that Council has adopted for this AMP are those included in the measures reported in the Annual Report 2016/2017 as follows:

Table 2-11: Adopted LOS

Sewerage and the Treatment and Disposal of Sewage – Performance Measures (Measures 1 to 4 are statutory requirements)

Performance indicator/service level	LTP Year 2 Target 2016/2017	Actual 2015/2016	Actual 2016/2017	Comments
1 System and adequacy *Legal compliance with all Resource Consents for discharges into the environment from Council systems. The exception, provided for in the consent, is severe weather events and power failure.* **Measured by:**				
The number of dry weather sewage overflows from Council's sewerage systems, expressed per 1,000 sewerage connections to that sewerage system. The resource consent provides for severe weather events and power failure exceptions.	0	2	2	Not achieved Both failures were attributed to non-weather events. One was from stock entering a pond and the other a broken rising main.
2 Discharge compliance *Compliance with the Council's Resource Consents for discharge from its sewerage system.* **Measured by:**				
The number of abatement notices received by the Council in relation to its resource consents for discharge from its sewerage system.	0	0	0	Achieved
The number of infringement notices received by the Council in relation to its Resource Consents for discharge from its sewerage system.	0	0	1	Not achieved Hay bales were in place to filter the wetland discharge, stock had entered the pond and disrupted the process, and hay ended up blocking an outlet causing overflows, which in turn resulted in an infringement notice.

Performance indicator/service level	LTP Year 2 Target 2016/2017	Actual 2015/2016	Actual 2016/2017	Comments
The number of enforcement orders received by the Council in relation to its Resource Consents for discharge from its sewerage system.	0	0	0	Achieved
The number of convictions received by the Council in relation to its Resource Consents for discharge from its sewerage system.	0	0	0	Achieved
3 Fault response times *Where the Council attends to sewerage overflows resulting from a blockage or other fault in the Council's sewerage system.* **Measured by:**				
Attendance time: from the time that the Council receives notification to the time that service personnel reach the site.	1 hour	34 minutes	50 minutes	Achieved
Resolution time: from the time that the Council receives notification to the time that service personnel confirm resolution of the blockage or other fault.	4 hours for minor blockages 3 days for significant blockages	2 hours 33 minutes	30 hours 29 minutes	Not achieved Resolution time data was not distinguished between minor blockages / significant blockages. Therefore a median of the total resolution time has been calculated.

Performance indicator/service level	LTP Year 2 Target 2016/2017	Actual 2015/2016	Actual 2016/2017	Comments
4 Customer satisfaction *The total number of sewerage system complaints received by the Council.* **Measured by**				
The total number of complaints received by the Council about sewage odour. *Expressed* per 1,000 sewerage connections to that sewerage system.	16	2.3	3.7	Achieved
The total number of complaints received by the Council about sewerage system faults. *Expressed* per 1,000 sewerage connections to that sewerage system.	16	3.4	9.8	Achieved
The total number of complaints received by the Council about sewerage system blockages. *Expressed* per 1,000 sewerage connections to that sewerage system.	15	6.2	15	Achieved
Council's response time to complaints regarding its sewerage system.	1 hour	34 minutes	6 hours	Not achieved Due to a one odour complaint attendance time being two days - Maungaturoto. Median based on third and fourth quarter results as no measures were available for first two quarters.

The AMIP includes an item for Council to review its wastewater system LOS to identify if there is further opportunity for improved efficiencies and/or best practice that can be incorporated into Council's LOS framework.

3 The assets

The assets section of the AMP is set out as follows:

- Asset Details – summary of Council's six wastewater schemes, their condition and performance;
- Critical Assets – summary of Council's critical wastewater assets and how these will be managed; and
- Asset Values – summary of the wastewater asset valuation.

3.1 Asset details

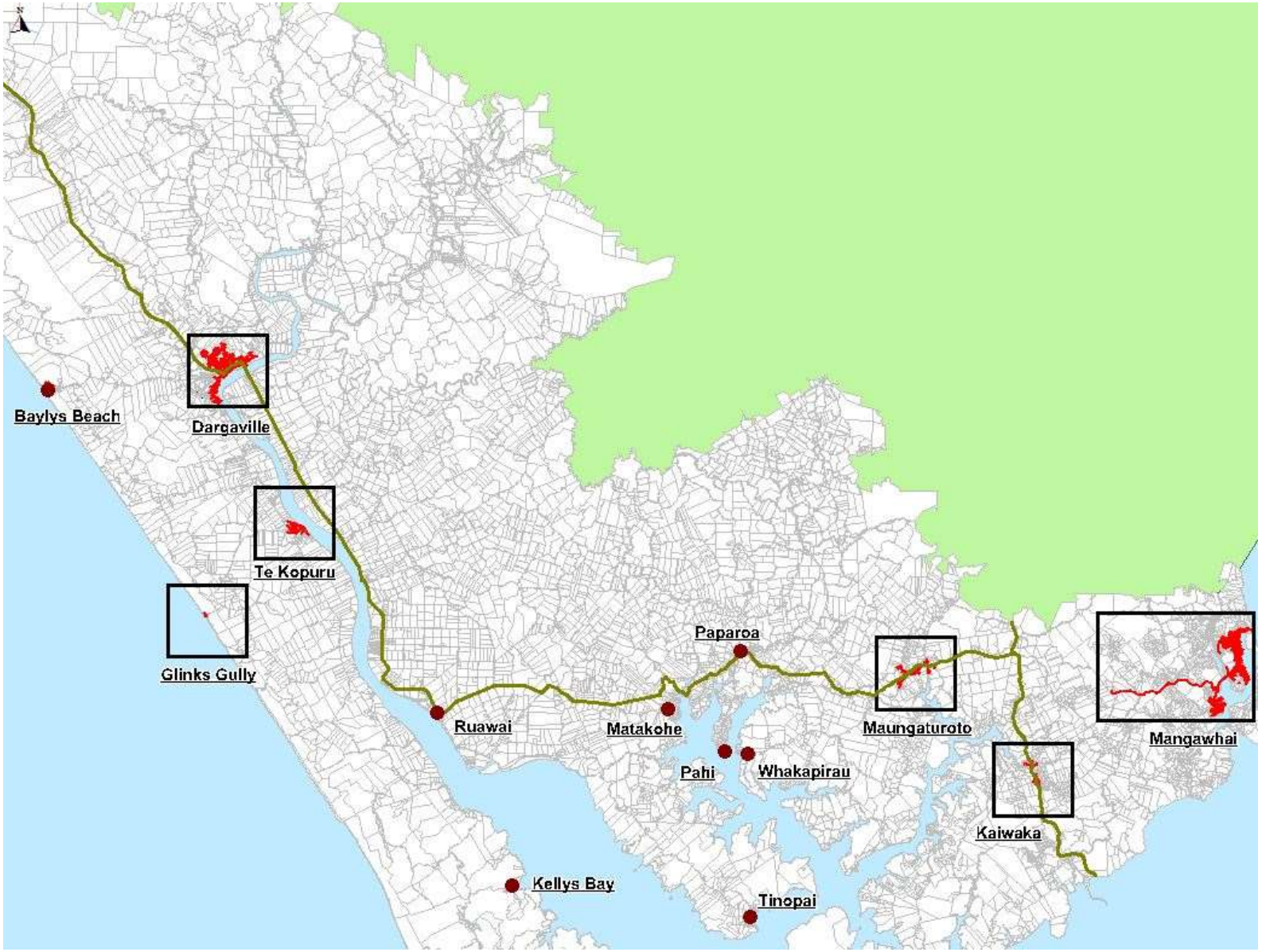
3.1.1 Overview

The wastewater assets that are within the scope of this AMP are spread throughout the district with six separate wastewater collection and treatment schemes in operation:

- Dargaville;
- Glinks Gully;
- Kaiwaka;
- Maungaturoto;
- Te Kopuru; and
- Mangawhai.

The location of each of these communities within the Kaipara district is illustrated in Figure 3-1 below.

Figure 3-1: Location of communities with WW schemes



An overview of the wastewater assets in the district is provided in Table 3-1 below. See Section 0 for discussion of the asset valuations.

Table 3-1: Asset overview summary

Community	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manhole	Connections	Condition
Dargaville	1	15	5,942	39,435	714	2,278	Partially known
Glinks Gully	1	1	340	155	8	26	Partially known
Kaiwaka	1	1	1,266	4,090	71	192	Partially known
Maungaturoto	1	3	1,301	11,295	198	423	Partially known
Te Kopuru	1	0	0	6,669	89	222	Partially known
Mangawhai	1	12	23,214	46,794	509	2,473	Partially known
TOTAL	**6**	**32**	**32,063**	**108,438**	**1,589**	**5,614**	

Note: These quantities are sourced from 2017 valuation using the most direct identifier. The number of connections has not been reconciled with the rating database.

3.1.2 Asset data

Council has a number of systems and processes in place where they are able to store and analyse asset information data to assist with management of the wastewater business. Details of each system and its capabilities are included in Section 8 (Asset Management Systems and Processes).

It is recognised that the current level of condition and performance data relating to the wastewater assets is not well documented. The current asset register contains a number of unknown, incomplete and incorrectly coded asset attributes. This affects Council's asset knowledge, asset valuations and data confidence, and does not provide a sound basis for determining maintenance needs and forecasting renewals of wastewater assets.

The improvement of Council's data collection and entry processes has been identified as an activity to be completed within the AMIP, along with a "data cleansing" project to reduce the number of unknown/incorrect asset attributes currently in the asset register.

Following completion of the above activities, Council will move towards using previously un-utilised functions of their support tools, such as the recording of maintenance history at asset component level in Assetfinda each time a works order is completed.

As more information is recorded, an initial assessment and listing of renewal needs will be able to be created from Assetfinda. This could create a risk of significant changes to the level of expenditure required, and will need to be reviewed and assessed by Council in line with Council's Renewals Policy.

The data improvement actions included in the AMP are listed in Table 4.1.

Advice has been received regarding an ongoing CCTV inspection programme for gravity wastewater pipes together with a sampling and testing programme for pressure pipes (rising mains). This is included in the Management Services budget.

Ongoing data cleansing will also be undertaken in the Assetfinda database to provide more robust information on which to base asset valuation and renewal forecasts.

3.2 Dargaville

Dargaville has a population of approximately 5,000 and is serviced by 40 kilometres of pipeline, 15 pump stations, 6 kilometres of rising main and a single treatment plant. Wastewater is collected from the urban area, apart from a section of the Beach Road industrial area that has onsite treatment.

Most recent census data indicates Dargaville's population has declined 4.6% from 2006 to 2013.

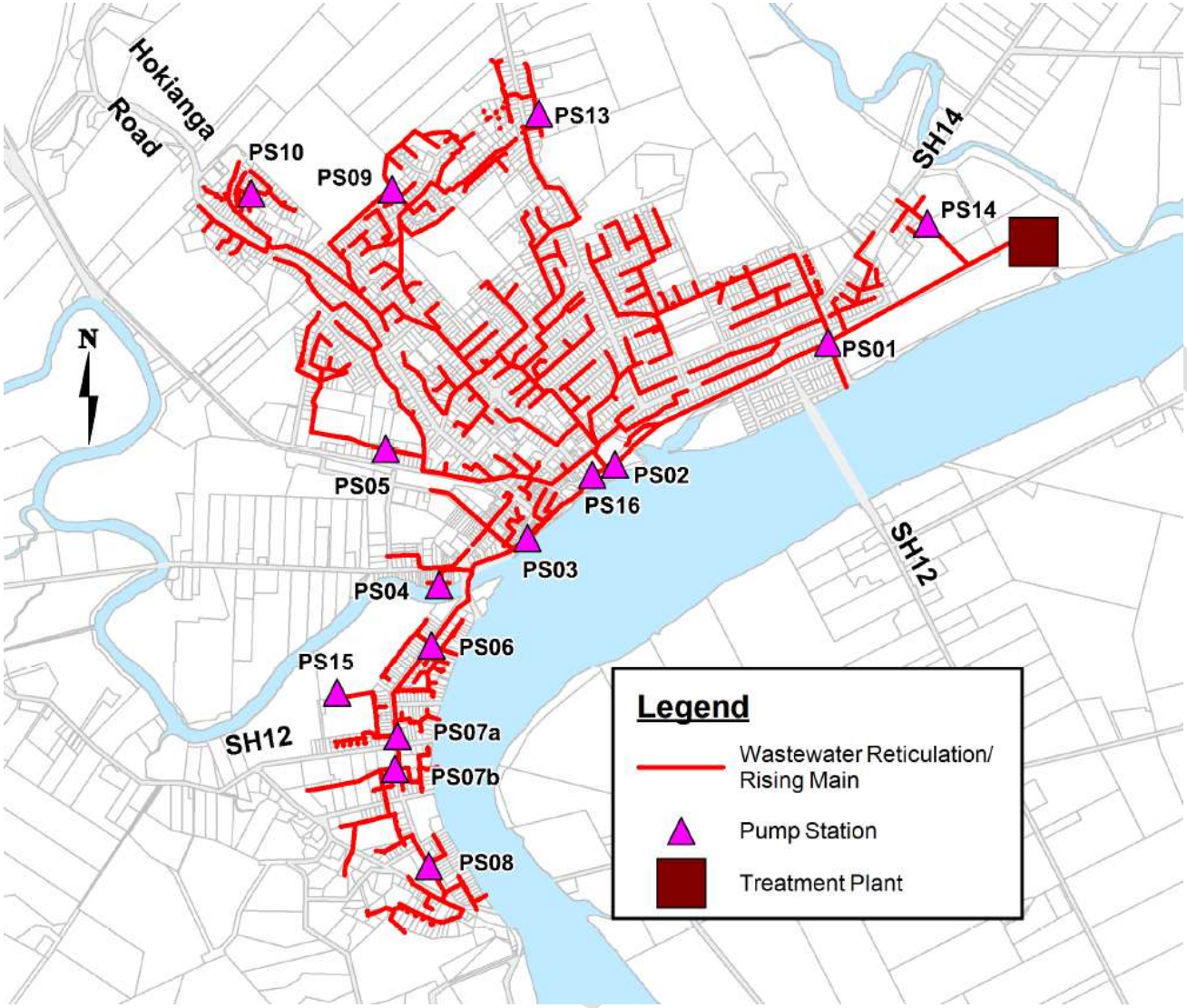
A summary of Dargaville's wastewater assets is included in Table 3-2.

The layout and location of Dargaville's wastewater assets are illustrated in the Asset Map in Figure 3-x.

Table 3-2: Dargaville asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	15	5,942	39,435	714	2,278 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme commenced	Assessment programme commenced	Unknown at present
Replacement cost		$21,247,775				
Depreciated replacement cost		$6,898,026				
Annual depreciation		$336,543				

Figure 3-2: Dargaville asset map



The Sunset West development installed at Baylys (Dargaville) was originally to be vested to Council as a public system. Due to downturn in development and a change in the owner of the subdivision, as of June 2013, the scheme will be retained as a privately-owned and operated scheme.

3.2.1 Reticulation

Dargaville was first reticulated in the 1940s when the major residential area of town was connected to a network that discharged directly into the river. The majority of the original (pre-1940) network was replaced from 1978 to 1983. Figure 3-3 and Figure 3-4 illustrate the breakdown of material and size of the reticulation network respectively.

Figure 3-3: Dargaville reticulation material composition

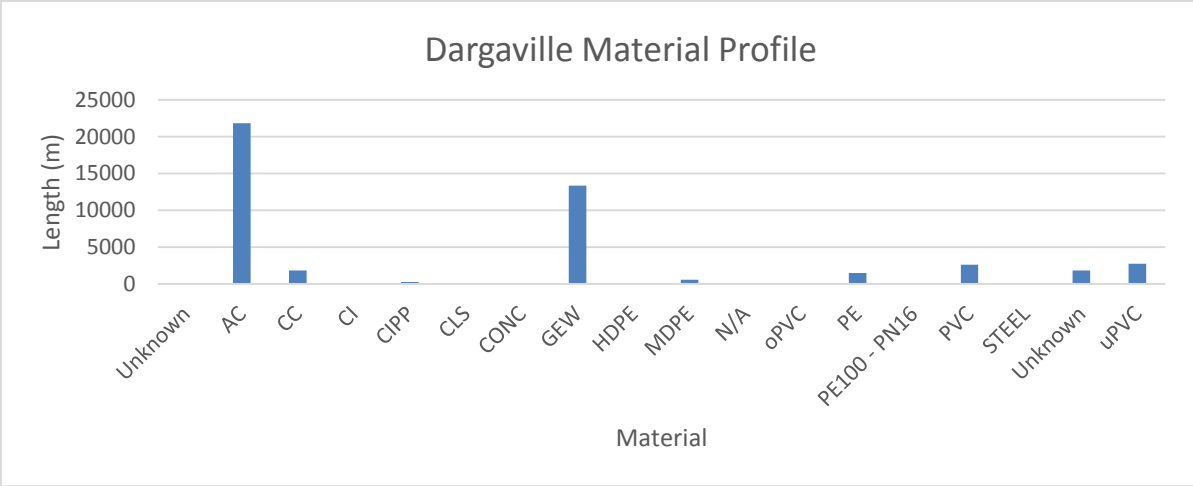
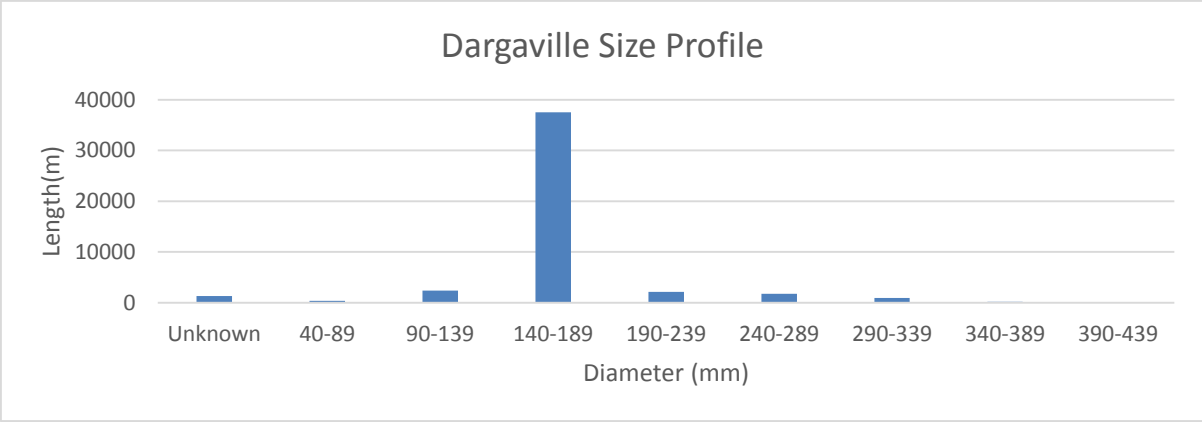


Figure 3-4: Dargaville reticulation diameter breakdown



The condition of the Dargaville wastewater pipes is now being assessed through an ongoing programme of CCTV inspection and specialist assessment by ProjectMax.

Inspection records from previous CCTV programmes were assessed and these covered 47 mains with installation dates ranging from 1944 to 1970.

Of these, 24 were considered to have a Likelihood of Failure (LOF) of 1 or 2 translating to pipes that are in good condition. Nine pipes had a LOF of three and the remaining 14 had a LOF of 4 or 5. This last group is almost entirely comprised of GEW pipes from 1944 and is considered to need renewal or repair in the near future. Of the 14 graded LOF 4 and 5 there were four that were considered to have useful remaining life if a structural repair was undertaken and this would be considerably cheaper than rehabilitating the entire line.

The results to date of the assessment indicate that 70% of the pipes surveyed are in good to reasonable condition (LOF 1-3) and this is a favourable outcome in relation to long term renewal predictions. It would also seem to confirm that a life prediction of 40 years for AC pipes is unduly pessimistic.

Dargaville's reticulation suffers from a significant level of stormwater/groundwater infiltration. The hydraulic modelling and analysis of pump station telemetry will assist in identifying the source of the infiltration.

3.2.2 Pump stations

The Dargaville wastewater scheme incorporates 15 pump stations that have been built as the network has expanded. These pump stations either pump wastewater into neighbouring catchments or other pump stations and as a result a number of stations are connected in a 'daisy-chain' series. For example, flow from all pump stations, with one exception, enters pump station 1 (PS1) before being pumped to the WWTP.

Generally, all of the pumps and electric equipment in Dargaville's pump stations are considered to be in average to excellent condition. Most pump stations received significant upgrades in 2004. This included the installation of telemetry to aid data acquisition and remote control of pumps.

The telemetry system is fully operational and adequate for controlling the pumps and generating alarms if target levels are reached. However, the system does not readily generate information about system operation for analysis. There are also significant information gaps about how and when overflows occur and the volumes that might be involved.

Recent inspections have indicated significant rags in some stations and more proactive management of the system has been proposed.

As a health and safety measure the installation of grills under the lids is also proposed.

Dargaville's pump stations are believed to have sufficient peak capacity to cater for dry weather flows. However, during rainfall events, inflow can exceed the combined pumping capacity at any station and the capacity of the station depends on the storage volume within the wet well and net inflow.

A number of investigations have been proposed to determine the best way to manage unplanned discharges, which may include additional storage, back-up power generation, increase in pumping capacity, or other methods such as overflow treatment, increase in redundancy, improved control and pipeline rehabilitation. The proposed Dargaville Capacity Study will identify constraints within the system and possible remedies.

3.2.3 Pump Stations 1 and 2 upgrade

Concerns about the number of overflows occurring from the system led to investigations into upgrading PS1 which brings all of the flow to the WWTP (other than SSF which pumps independently).

The design of the upgrade was progressed and new pumps and switchboards were purchased.

A review of this proposal led to a change of approach and the revised proposal is to upgrade PS2 instead as this also pumps most of the flow that is subsequently pumped by PS1. The intent is to then downgrade PS1 to a local pump station rather than a bulk transmission station. Some upgrading of the rising mains will also be required to achieve this.

A conceptual design has been generated by consultant Harrison Grierson and at December 2017, Calibre Consulting are working on the detailed design of the proposal. At this time the following timeline and budgets are envisaged for the project.

Table 3-3: PS1 and PS2 upgrade

Year	Item	Budget
2017/2018	Investigation and design	$105,600
2018/2019	PS2 to 1 rising main upgrade	$1,056,000
2019/2020	PS2 upgrade	$506,000
2020/2021	PS1 reconstruction	$363,000
2021/2022	Emergency storage at PS2	$473,000
2022/2023	Emergency storage at PS1 Treatment pond upgrade	$143,000 $88,000
Total		**$2,734,600**

3.2.4 Treatment

Dargaville is served by a single WWTP situated adjacent to the Northern Wairoa and Awakino Rivers. The site comprises a 4.7 hectare (47,000m^2) facultative oxidation pond, with aerators, in the western part of the site and a 20,000m^2 maturation pond in the eastern part of the site. Figure 3-5 illustrates the layout of the WWTP (source: Google maps). A photograph of the oxidation pond is included as Figure 3-6.

Effluent enters the oxidation pond for initial treatment and is then pumped into the maturation pond where it circulates over a seven day period (varies according to infiltration level) for further polishing of the effluent, particularly with regard to pathogen reduction. The treated effluent discharges via a spray irrigation field onto the riparian strip bordering the Northern Wairoa River.

The Dargaville WWTP was partially upgraded in 2007 by converting the originally constructed wetlands to a maturation pond and constructing an effluent land dispersal system along the banks of the Northern Wairoa River. Then in early 2009 the maturation pond was desludged to remove an historical build-up of sludge carried over from the main oxidation pond. It is now believed that the main pond is 80% full of sludge and desludging is urgently required. An Oxidation Pond Management Study is proposed for 2018/2019 which will provide the information required to progress the desludging over two years in 2012/2021 and 2021/2022.

Figure 3-5: Dargaville WWTP layout

Figure 3-6: Dargaville WWTP oxidation pond

Dry weather flows from Dargaville are typically in the range 600 to 1000m^3 per day. However, flow from the urban area is significantly affected by stormwater infiltration, with flows well over 5000m^3 per day occurring in heavy rainfall conditions. Average flows were assessed (CPG Report November 2009 "Report on Dargaville Wastewater Treatment Plant Performance and Trade Waste Review") to be around 1,340m^3 per day.

The Dargaville sale yards operate weekly through the year and generate stock effluent from runoff from hard standing areas. The volumes of effluent produced by the stockyards are typically low, however the effluent exhibits a high Biological Oxygen Demand (BOD) loading.

The SFF meat processing plant generates effluent as a by-product of day-to-day processing activities and is the largest contributor of effluent to the Dargaville pond. The SFF plant operates seasonally, with a shutdown period during October. During the peak season the plant operates six days per week killing for 16 hours a day, with an eight hour per day washdown period. Water consumption figures for SFF indicate a wastewater flow rate of 750 to 1,000m^3 per day (six days per week) or around 600m^3 per day on average over seven days. SFF indicate that this flow is unlikely to change and that a long term planning figure for capacity assessments would be a peak of 1,000m^3 per day.

The Dargaville oxidation pond was constructed in 1978/1979 and was designed for a population of 5,500, the projected population of Dargaville in 2003. Dargaville's population is approximately 5,000; however the combined loading from the non-industrial wastewater and SFF effluent is equivalent to a population significantly higher than the design population.

In an assessment of WWTP performance undertaken by Waste Solutions Ltd in 1996, it was found that the loading on the oxidation pond was high when compared with conventional design criteria; however, the system was identified as operating successfully. The capacity to treat higher flows and loads was restricted.

Pre-treatment of waste, or the use of other treatment options was identified as possibly being required to accommodate wastewater flows generated by further population or industrial growth within Dargaville's reticulated area.

Going forward the installation of a step screen is a possibility to deal with the excessive rags that the wastewater system receives but is not included in detailed CAPEX proposals at this time.

There are a number of factors or projects currently underway that have an effect on the current and future capacity of the Dargaville treatment system. These include:

- The desludging of the oxidation pond and the potential for Bioremediation to manage sludge in the whole system continually;
- The ongoing performance and management of the SFF discharge;
- The effect of pipeline renewals on inflow and infiltration; and

- New connections (growth or other communities).

3.2.5 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

Current overdue renewals of $273,000 are primarily for pump stations and that aligns with general observations about their condition.

The spike of gravity main renewals in the 2023/2028 period mainly arises from pipes laid in the 1940s with an 80 year life expectancy. This is predominantly earthenware pipe and this is considered to be a realistic life expectancy assessment. In reality the pipes will not all need renewing in this five year window and the renewals will be spread over a longer period. However, some of these renewals may be required before this period to maintain an acceptable LOS.

In total terms, it is expected that some 60% of the Dargaville wastewater system (by value) will be renewed over the next 30 years.

Figure 3.7: Projected Dargaville renewals (30 years)

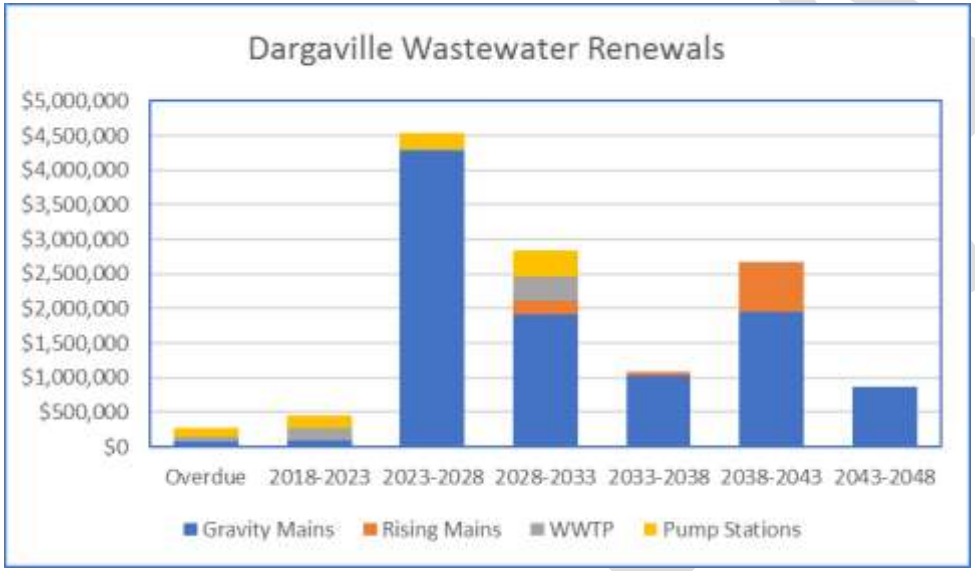


Table 3-2: Projected Dargaville renewals (30 years)

Dargaville	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections	$77,698	$92,885	$4,289,641	$1,913,698	$1,028,152	$1,958,222	$862,137
Rising Mains				$204,971	$52,656	$694,042	
WWTP	$60,118	$171,148	$20,110	$344,938		$3,645	
Pumpstations	$135,184	$196,972	$227,228	$381,089			
Total	$273,000	$461,005	$4,536,979	$2,844,696	$1,080,808	$2,655,909	$862,137

Dargaville	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$10,222,433	$15,288,403	67%
Rising Mains	$951,669	$1,897,130	50%
WWTP	$599,959	$1,371,817	44%
Pumpstations	$940,473	$2,690,426	35%
Total	$12,714,534	$21,247,776	60%

3.3 Glinks Gully

Glinks Gully is a small holiday community located 20km southwest of Dargaville on the west coast of Northland. The wastewater scheme servicing Glinks Gully is designed to service a peak period population of 72.

A summary of Glinks Gully's wastewater assets is included in Table 3.5. The layout and location of Glinks Gully's wastewater assets are illustrated in the Asset Map in Figure 3.8.

Table 3.5: Glinks Gully asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	15	340	155	8	26 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Replacement Cost		$279,467				
Depreciated Replacement Cost		$121,279				
Annual Depreciation		$6,158				

Figure 3-8: Glinks Gully asset map

3.3.1 Reticulation

Glinks Gully is serviced by 150 metres of gravity reticulation and eight manholes constructed in 1989, one pump station, 300 metres of rising main and a single WWTP constructed in 1990.

The piped reticulation connects to 18 septic tanks serving 24 houses, located on private property but maintained by Council. Effluent from the septic tanks is gravity fed through the pipe network to the pump station before being pumped to the WWTP.

The condition of Glinks Gully's reticulation is generally unknown due to a lack of data. As discussed in s 3.1.2, Council has committed to improving its knowledge of asset condition and condition assessments commenced in 2014. Comparing average daily discharge volume with average daily rainfall indicates that flows are not significantly affected by rainfall, which is an indication that the condition of the network is reasonably good.

Appendix E shows the age, material and size profiles of the Glinks Gully reticulation

3.3.2 Pump stations

The Glinks Gully pump station is a typical small pump station that includes the following components:

- A 1,200mm diameter wet well that stores incoming wastewater;
- Dry mounted duty/assist progressive cavity pumps;
- An additional 2,300mm diameter chamber that stores 2.7m^3 of wastewater gives a combined storage of 4.0m^3 (approximately 24 hours storage of current off-peak flow);
- Pipes and valves associated with the pump and rising main;
- A large cabinet housing electrical equipment, pump control devices and telemetry; and
- Connections to incoming gravity pipe and outgoing riser mains.

A photograph of the pump station is included in Figure 3-9 and Figure 3-10.

The pump station pumps domestic wastewater from the coastal margin up to the WWTP located near the camp ground.

Council does not have a clear picture of the pump station's capacity at times of peak flow as instantaneous peak flow information is not readily available. When data is available it will be necessary for Council to assess in detail the capacity of the pump station.

As the number of permanent residents increase in Glinks Gully, so too will the off-peak volume of wastewater and additional capacity for 12 hour storage may be required in the future.

Figure 3.9: Glinks Gully PS

Figure 3.10: Glinks Gully WWTP effluent Field

Fig 3-9

Fig 3-10

3.3.3 Treatment

The Glinks Gully WWTP is a simple 320m^3 evapotranspiration soakage field located adjacent to the Glinks Gully camp ground. The soakage fields consist of 50mm uniformly graded aggregate 225mm deep, overlain with filter cloth and sand. The field consists of two equal beds that are alternatively rested. A photograph of the effluent field is included in Figure 3-10.

The soakage fields have been assessed as performing well. Their asset life is to be revisited in the next valuation planned for 2014 and a major flushing and replacement of blocked pipes together with the installation of cleaning risers and reinstatement of media is planned for 2023. The soakage fields were originally designed to service a total of 18 properties. There are now a total of 24 properties connecting to the system which is designed for a peak flow of 15m^3 per day at a loading rate of 50mm per day.

While regular flow data has been intermittent due to issues with the telemetry system records indicate the peak flow has only been exceeded once over the past six years. Peak flow occurs at about New Year with approximately 20 days of the year where the flow is in double digits. The free-draining soils and nature of the loading combine to reflect a low loading rate and should mean the field's life should be approximately 50 years with no justification for a substantial reserve area.

An application to renew the Discharge Resource Consent for Glinks Gully treatment was lodged with NRC in January 2014.

A commitment to implement the conditions will be required, these include upgrading the telemetry so that appropriate flow data can be gathered and compliant reports produced.

One condition the NRC is keen to see enacted that has been identified previously is the installation of effluent filters on each septic tank. This aspect will be consulted with the community with a view to arranging the upgrades in association with the desludging of the tanks.

3.3.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

No pipe renewals are due within the next 30 years. There is a small amount of overdue renewals for the pump stations of $13,000 but this is a nominal amount that would require further investigation to confirm an actual requirement.

Figure 3.11- Glinks Gully projected renewals (30 years)

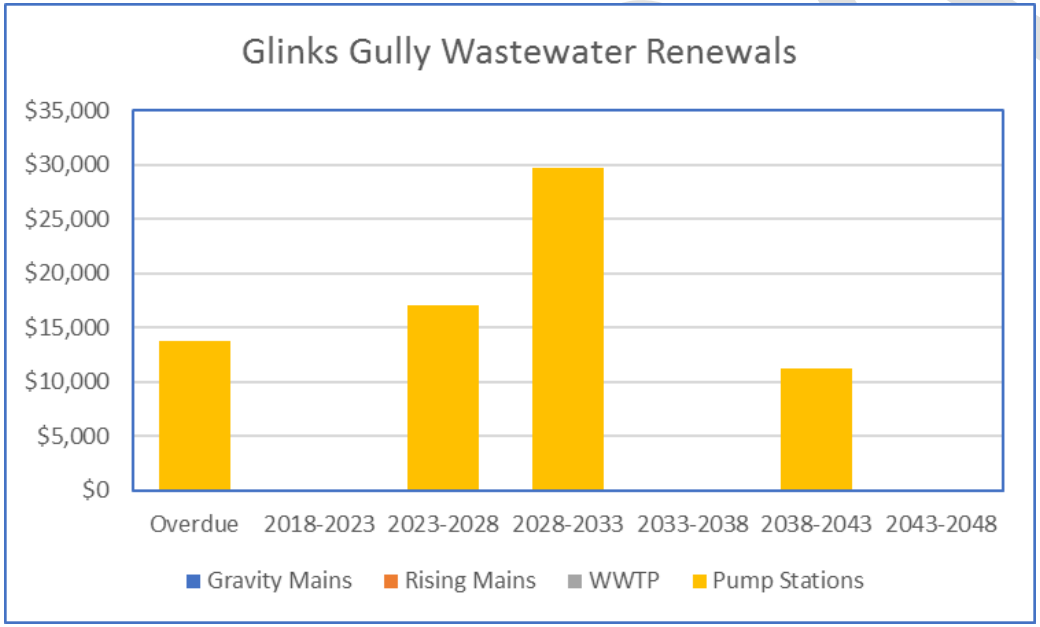


Table 3-6: Glinks Gully projected renewals (30 years)

Glinks Gully	Overdue	2018/2023	2023/2028	2028/2033	2033/2038	2038/2043	2043/2048
Gravity pipes incl. points and connections							
Rising mains							
WWTP							
Pump stations	$13,779		$17,099	$29,711		$11,179	
Total	**$13,779**	**$0**	**$17,099**	**$29,711**	**$0**	**$11,179**	**$0**

Glinks Gully	Total renewals	2017 replacement value	% of total replace
Gravity pipes including points and connections		$103,362	
Rising mains		$53,355	0%
WWTP			
Pump stations	$71,768	$123,752	58%
Total	**$71,768**	**$280,469**	**26%**

3.4 Kaiwaka

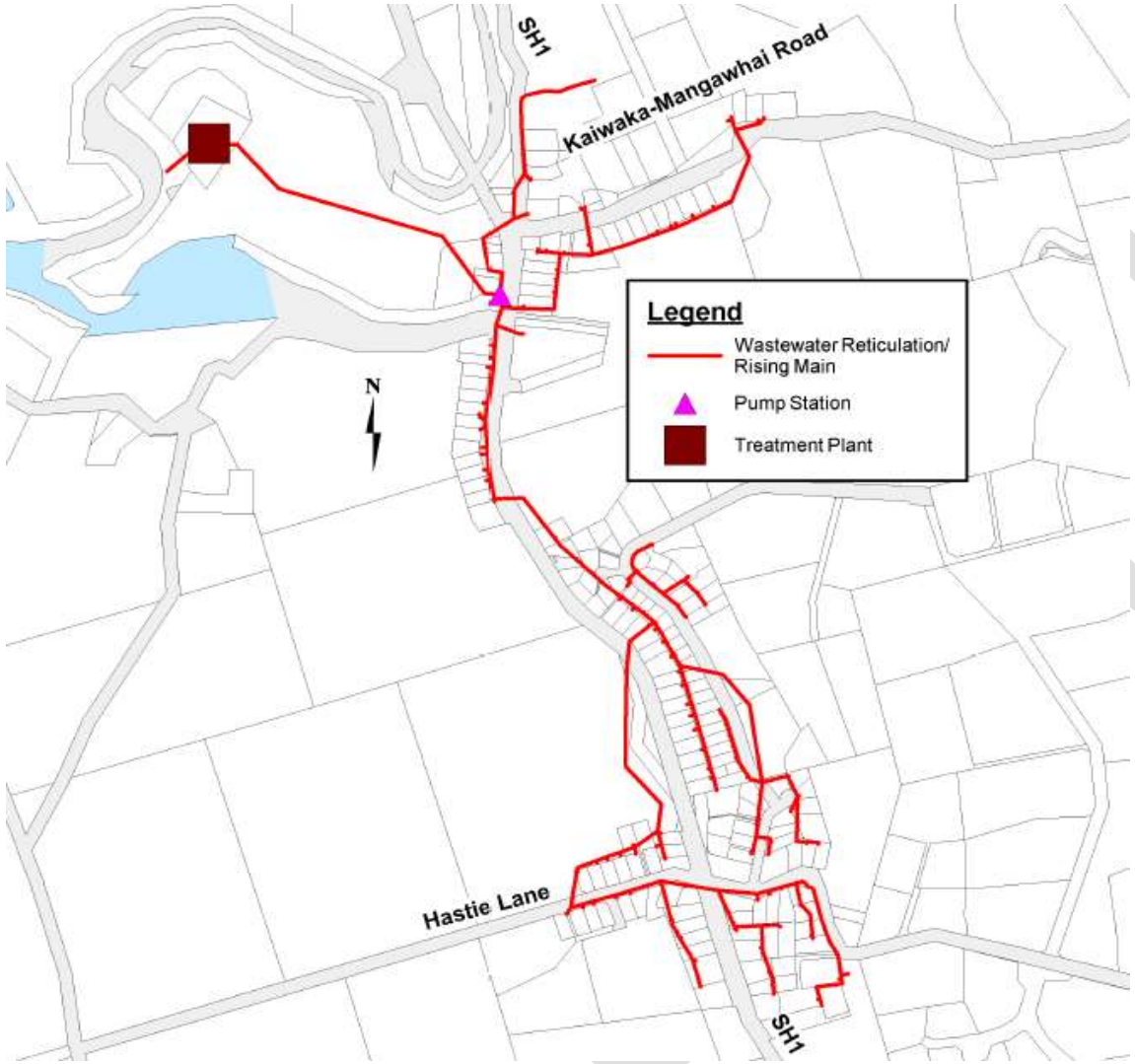
Kaiwaka is a small community located on State Highway 1 (SH1) in the southern part of the Kaipara district. The population as of 2013 was approximately 640 and is expected to be 700 by 2018. Kaiwaka is serviced by four kilometres of gravity pipeline, 69 manholes, one pump station and a single WWTP. Most recent Census data indicates Kaiwaka's population has grown from 537 usually resident population in 2006 to 640 in 2013. This is according to the latest revised calculations by Statistics New Zealand, published on 22 February 2017.

A summary of Kaiwaka's wastewater assets is included in Table 3-7. The layout and location of Kaiwaka's wastewater assets are illustrated in the asset map in Figure 3-12.

Table 3-7: Kaiwaka asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	1	1,266	4,090	71	192 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present
Replacement cost		$1,990,165				
Depreciated replacement cost		$570,559				
Annual depreciation		$30,676				

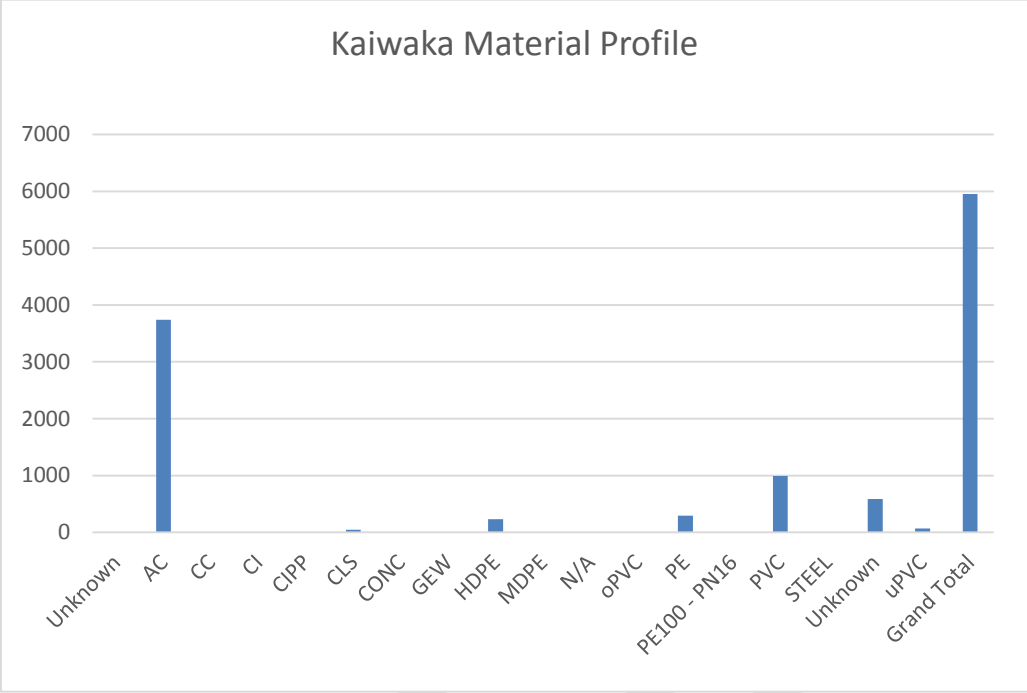
Figure 3-12 : Kaiwaka asset map



3.4.1 Reticulation

Kaiwaka's wastewater scheme was constructed in one contract let in 1990 and the original network is still in place. A breakdown of the reticulation by material is shown in Figure 3-13.

Figure 3-13: Kaiwaka reticulation material breakdown



The condition of Kaiwaka's reticulation is generally unknown due to a lack of data. As discussed in s3.1.2, Council has committed to improving its knowledge of asset condition and a strategy for data capture and assessment will be developed during the lifespan of this AMP.

Appendix E shows the age and size profiles of the Kaiwaka reticulation.

3.4.2 Pump stations

The Kaiwaka pump station is a typical small pump station that includes the following components:

- A wet well that stores incoming wastewater;
- One duty and one standby pump;
- Pipes and valves associated with the pump and rising main;
- A large cabinet housing electrical equipment, pump control devices and telemetry; and
- Connections to incoming gravity pipe and outgoing rising main.

The pump station pumps domestic wastewater from the lowest point in the network up to the WWTP located northwest of the township.

The electrical and control components of the Kaiwaka pump station were replaced in 2005 and are in good condition. Mechanical and civil/structure components are of average condition.

An estimate of capacity has been based on run hours and comparison with rainfall for 2008. The maximum pump run time in 2008 was 15 hours per day, with a median run time of 1.1 hours. Although the diurnal pump pattern is not available this data indicates that the pumps have more than sufficient capacity to pump the average daily flows and have spare capacity. It is unknown if the pumps have sufficient capacity to meet peak wet weather flows experienced at the station.

An assessment of pump station emergency storage was undertaken for compliance with the Regional Water and Soil Plan.

The investigation findings need to be considered with an assessment of the storage volume available in the reticulation before the final additional storage volume allowance for compliance is identified. It is likely that some additional storage will be required and an allowance of 25m^3 has been included in future budgets.

The installation of safety grills under all pump station lids is proposed across the district and this sum is included in the maintenance budgets.

3.4.3 Treatment

The Kaiwaka WWTP consists of a single 6,500m^3 oxidation pond constructed in 1988 with aerator, and a 2,600m^2 wetland constructed in 1995. The wetland discharges into a diffused discharge trench via a v-notch weir before final release into the upper reaches of the Kaipara Harbour. A photograph of the WWTP is included in Figure 3-34.

The quality of effluent being discharged from the Kaiwaka system is generally of good quality for a treatment plant of this type however the discharge quality can be variable, with levels of faecal coliforms exceeding consent limits. A report undertaken in 2013 has identified that short-circuiting is contributing to this based on theoretical analysis using first order kinetic equations.

A proposal to install a curtain across the pond is suggested as a means to address this.

Sludge levels have been identified as low.

The wetland is considered to be in generally good condition and has had recent maintenance works undertaken.

Questions around whether wildlife is contributing to the raised faecal coliform levels shall be investigated with brief testing regime.

Figure 3-3: Kaiwaka WWTP

3.4.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

The renewal profile reflects that the system was largely constructed in 1980. The large spike in pipe renewals results from the 60 year life expectancy of the AC pipes that were used for much of the system. This is not an immediate concern and as the time approaches there will be more, and better, information about the actual condition and life expectancy of these pipes. However, it cannot be assumed that this will defer this renewal requirement as the 60 year life expectancy is considered to be reasonable.

Overdue renewals relate to the WWTP and pump stations (($36,000 and $29,000 respectively) and require further investigation to confirm the actual works required. It is expected however that some work will be required but can be spread over the next five years.

Figure 3-15: Kaiwaka projected renewals (30 years)

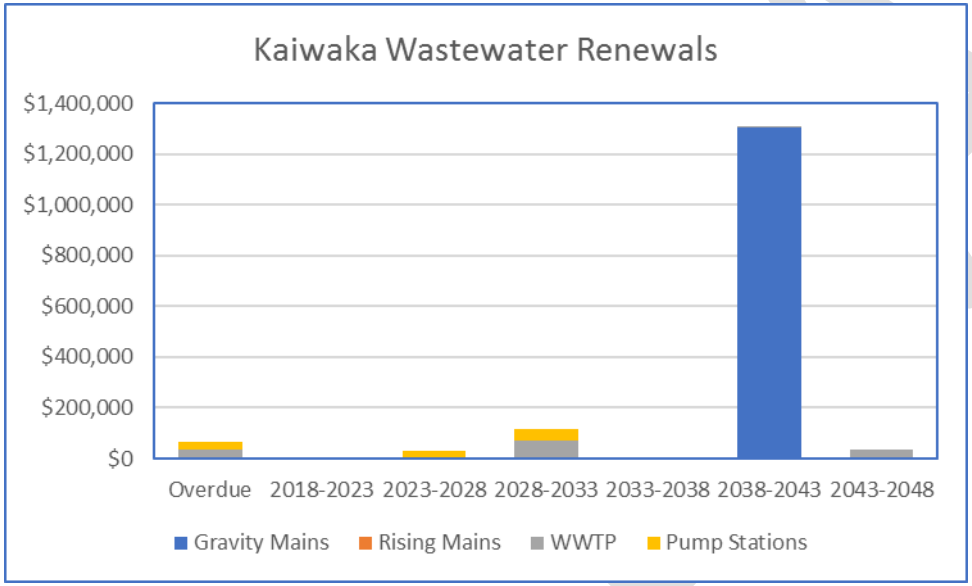


Table 3-8: Kaiwaka projected renewals (30 years)

Kaiwaka	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections						$1,305,556	
Rising Mains							
WWTP	$36,240		$6,349	$71,777		$6,379	$32,965
Pumpstations	$29,032		$22,952	$46,175			
Total	$65,272	$0	$29,301	$117,952	$0	$1,311,935	$32,965

Kaiwaka	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$1,305,556	$1,414,765	92%
Rising Mains	$0	$205,225	0%
WWTP	$153,710	$272,016	57%
Pumpstations	$98,159	$98,159	100%
Total	$1,557,425	$1,990,165	78%

3.5 Maungaturoto

Maungaturoto and the Maungaturoto Rail Village have a population of 895 and are situated on State Highway 12 (SH12), approximately 10kms west of the intersection between SH1 and SH12. The main township straddles the ridgelines which fall towards the fringes of the Kaipara Harbour and the Wairau River.

Maungaturoto is serviced by 11kms of gravity reticulation pipelines, 3 pump stations and 1.2kms of rising main and a single WWTP constructed in 1992.

Most recent Census data indicates Maungaturoto's population has growth 7.2% from 537 resident population in 2006 to 576 in 2013.

A summary of Maungaturoto's wastewater assets is included in

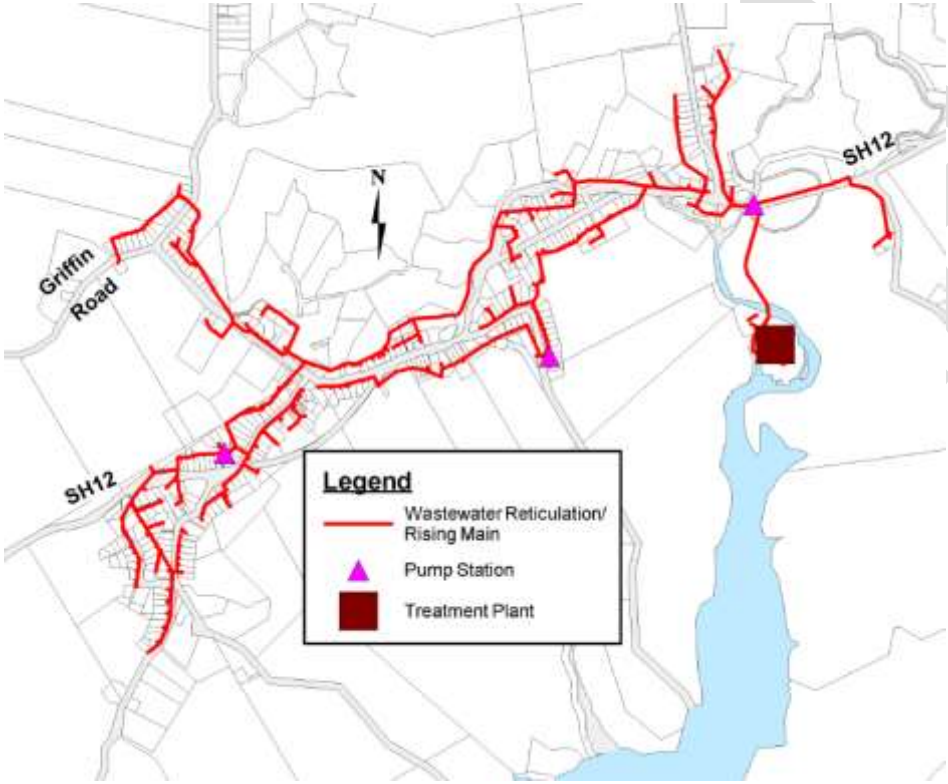
Table 3-9.

The layout and location of Maungaturoto's wastewater assets are illustrated in the asset map in Figure 3-166.

Table 3-9: Maungaturoto Asset Summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	3	1,301	11,295	198	423 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present
Replacement cost	$6,268,040					
Depreciated replacement cost	$2,424,518					
Annual depreciation	$117,884					

Figure 3-16 : Maungaturoto asset map



In addition to the main collection and treatment system in Maungaturoto there is a small stand-alone system for seven houses in the Railway Village to the west. This system drains to a communal septic tank and drainage field. The assets are included in the main Maungaturoto valuation.

The disposal field has a new resource consent running through to 2025 and there are no specific issues with the system.

Figure 3-17 - Railway Village reticulation

3.5.1 Reticulation

The condition of Maungaturoto's reticulation is generally unknown due to a lack of data. As discussed in s3.1.2, Council has committed to improving its knowledge of asset condition and condition assessment have commenced in 2014.

Little is known on the capacity of Maungaturoto's wastewater pipe network. It is necessary to identify the capacity of the reticulated pipe network in order to aid decision-making processes and identify growth constraints. With the current level of growth in Maungaturoto this has become a pressing issue.

Appendix E shows the age, material and size profiles of the Maungaturoto reticulation

3.5.2 Pump stations

Maungaturoto has three pump stations that are typical small pump stations and include the following components:

- A wet well that stores incoming wastewater;
- Submersible pumps (one duty, one standby);
- Pipes and valves associated with the pump and rising main;
- A cabinet housing electrical equipment, pump control devices and telemetry;
- Connections to incoming gravity pipe and outgoing rising mains; and
- Lifting gantries.

The pump stations pump domestic wastewater from the low points of each catchment area over to the next catchment or in the case of PS1 to the WWTP located on Council land adjacent to the Maungaturoto Country Club.

From discussion with the operators all components of the Maungaturoto pump stations have been assessed as being of average to very good condition. The pumps in PS1 were replaced in 2009 and the pumps in PS3 are also reasonably new. PS2 still has the old Flygt pumps, installed in 1980. These were reconditioned in 2007. All pumps stations had new electrical components installed circa 2005.

The recent upgrade of the pumps at PS1 has resolved a historical overflow issue. This indicates that pump capacity was an issue prior to the upgrade.

3.5.3 Treatment

The Maungaturoto WWTP consists of a single 8,300m^3 oxidation pond constructed in 1980 and located adjacent to the Country Club. The oxidation pond is protected by a waveband and dissolved oxygen levels are maintained by an aerator. Photographs of the oxidation pond/membrane building and the aerator and included in Figure 3-9 and

Figure 3- respectively.

The WWTP was upgraded in 2009 to provide a higher level of effluent treatment to comply with new resource consent conditions. This work included: Installation of an influent step-screen, new membrane filtration plant and construction of a new 650m^3 treated effluent storage pond and new rock discharge structure into the Wairoa River. As per the previous consent requirement, wastewater is discharged into the upper reaches of the Wairoa River via a tidal discharge immediately after high tide.

Stormwater infiltration into the Maungaturoto wastewater system is a significant issue. Present dry weather flows are around 180-250m^3 per day. In heavy rainfall conditions inflows to the WWTP have exceeded 2,500m^3 per day and with rainfall on the pond reached a total daily flow of nearly 3,500m^3 per day. As the resource consent provides for a maximum daily discharge of only 1,200m^3 per day (which is the design flow for the new membrane filtration plant), excess flows are taken into storage in the pond and released over subsequent days. The treated effluent storage pond also helps with flow buffering. The flow buffering facilities at the WWTP are however pushed to their limits during heavy rainfall events and could well be exceeded without further work completed to reduce stormwater infiltration within the reticulation system.

Since commissioning of the membrane plant in mid-2009 algal levels in the pond have tended to be higher than historically observed. This could be aggravated by dryer summers however could be related to the backwash return from the membrane plant. The main effect higher algal populations have is an increased cleaning requirement of the membrane plant, which has caused maintenance costs to be significantly higher than expected. Further work is required to understand the operation efficiency and a capacity study has been budgeted for in 2018 to 2020

3.5.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

The spike in pipe renewals relates to AC pipe laid in the 1980s with a 60 year life expectancy. Overdue renewals mainly relate to pumps stations at $199,000 and this would be credible. Further work is required to identify the particular assets that would generate the greatest benefits from renewal and this work could be spread over a number of years.

Figure 3-18: Maungaturoto projected renewals (30 years)

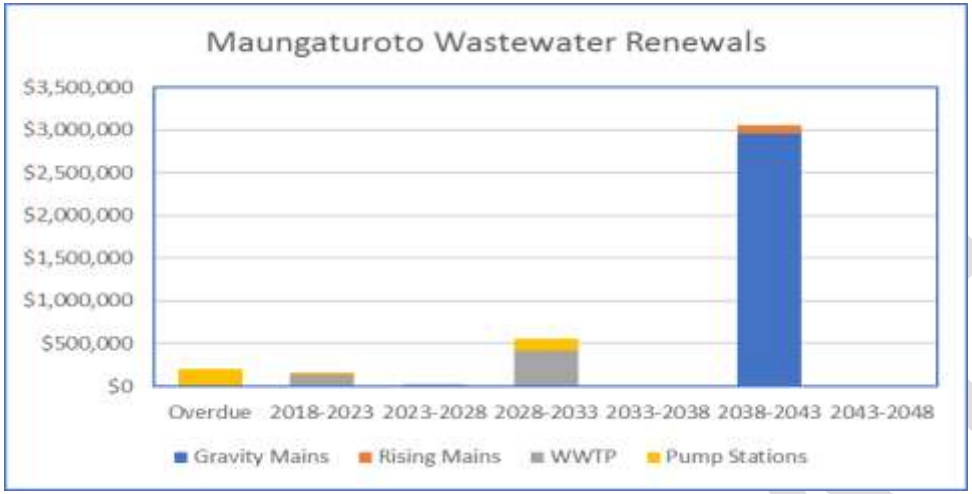


Table 3-10: Maungaturoto projected renewals (30 years)

Maungaturoto	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections						$2,965,013	
Rising Mains						$83,581	
WWTP	$2,017	$133,959	$26,025	$415,447		$6,379	$10,139
Pumpstations	$199,098	$31,897		$144,040			
Total	$201,115	$165,856	$26,025	$559,487	$0	$3,054,973	$10,139

Maungaturoto	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$2,965,013	$3,818,322	78%
Rising Mains	$83,581	$243,644	34%
WWTP	$593,966	$1,831,039	32%
Pumpstations	$375,035	$375,035	100%
Total	$4,017,595	$6,268,040	64%

Figure 3-19: Maungaturoto WWTP oxidation pond and membrane building

Figure 3-20 : Maungaturoto WWTP aerator

3.6 Te Kopuru

Te Kopuru lies 10km south of Dargaville on the Pouto Peninsula. The township has been built on a revetment above the Northern Wairoa River. The wastewater system uses the benefit of the elevation of the revetment to develop a reticulation network that discharges to the treatment plant without the need for pump stations or rising mains.

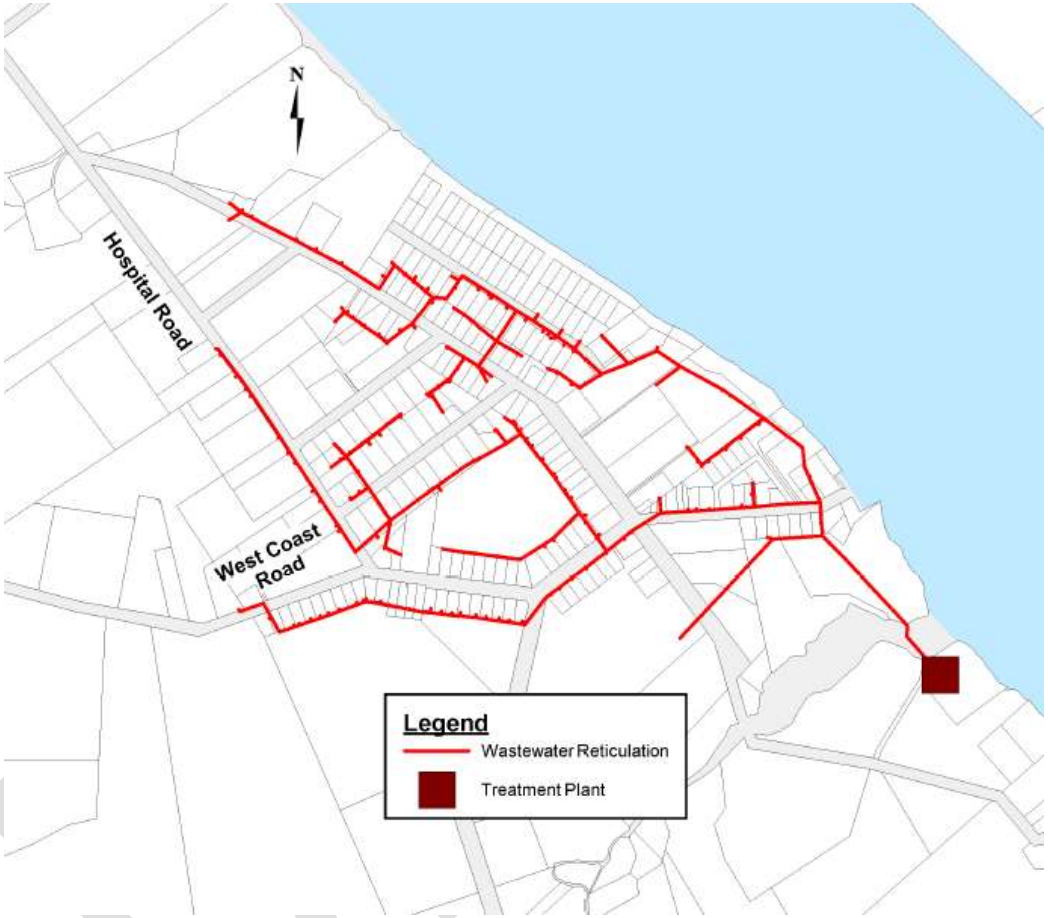
A summary of Te Kopuru's wastewater assets is included in Table 3-.

The layout and location of Te Kopuru's wastewater assets are illustrated in the Asset Map in Figure 3-214.

Table 3-11: Te Kopuru asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	0	0	6,669	89	222 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present
Replacement cost		$2,359,019				
Depreciated replacement cost		$614,397				
Annual depreciation		$34,827				

Figure 3-214: Te Kopuru asset map



3.6.1 Reticulation

Te Kopuru is serviced by 6,300m of gravity wastewater pipelines constructed in 1981 and a single oxidation pond constructed in 1980. A wetland was constructed in 2001 to provide additional treatment to effluent before it is discharged.

The condition of Te Kopuru's reticulation is generally unknown due to a lack of data. As discussed in s3.1.2, Council has committed to improving its knowledge of asset condition and condition assessments of assets is commencing in 2014.

The network is located in an area with sandstone close to the surface which provides a stable platform for the network, although there is a tendency for tree roots to grow along pipe trenches and into manholes. Some pipe fractures have occurred at the joints as a result.

Information on the Te Kopuru network indicates that the system was designed for an equivalent population (adjusting for school attendees) of 570 people, producing 140 litres per person per day. With the current population of Te Kopuru area at approximately 500 (and not all connected to the scheme) the system will be at 88% of its capacity. No capacity issues relating to the reticulation network have been experienced to date.

Recent census data indicates the population of Te Kopuru increased 2.65% from a usually resident population in 2006 of 453 to 465 in 2013.

Appendix E shows the age, material and size profiles of the Te Kopuru reticulation

3.6.2 Pump stations

There are no pump stations in Te Kopuru.

3.6.3 Treatment

The Te Kopuru WWTP consists of a single stage oxidation pond and wetlands area located immediately adjacent to the Northern Wairoa River, south of Makaka Creek. The oxidation pond has a surface area of 0.52 hectares and a nominal depth of 1m and is protected by a concrete waveband. The wetlands have a surface area of 1.5 hectares. A photograph of the oxidation pond is included in Figure 3-2.

The Te Kopuru network was originally designed to service a total population of 570. The Environmental Effects prepared for the resource consent renewal assessed the current population of the Te Kopuru area discharging to the scheme as 487 (including the school). This is less than the design capacity and it is considered that the scheme has sufficient capacity for the next 20 year period.

Both the oxidation pond waveband and wetland plantings are considered to be in average condition. Sampling of the effluent has indicated that there are instances of non-compliance with consent conditions. The cause of the breaches was understood to be the high level of accumulated sludge in the oxidation pond and desludging of the pond has been completed in 2013.

3.6.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

As with Maungaturoto the spike in pipe renewals relates to AC pipe laid in the 1980s with a 60 year life expectancy.

Minor renewal of the treatment plant is indicated over the next 10 years and requires only a nominal response.

Figure 3-22: Te Kopuru projected renewals (30 years)

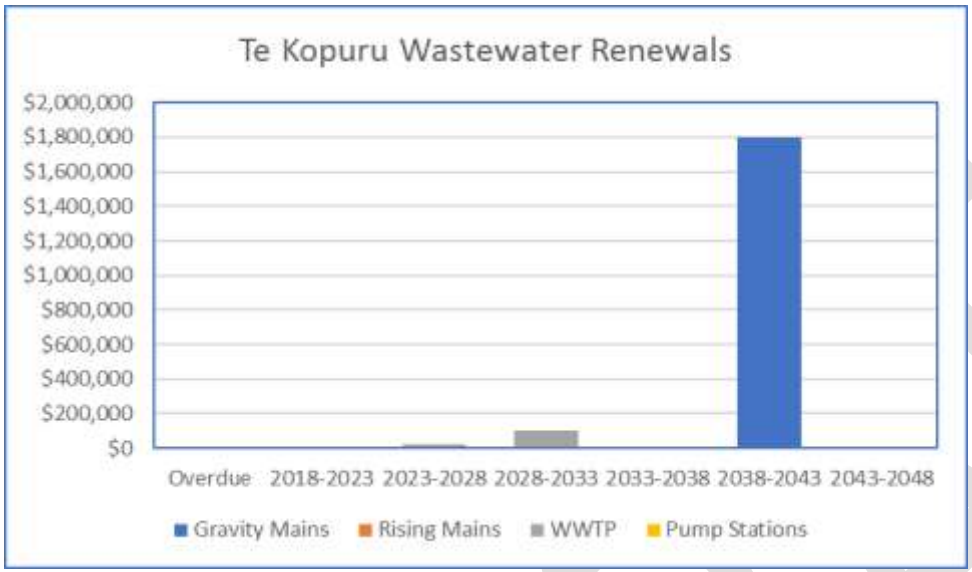


Table 3-32: Te Kopuru projected renewals (30 years)

Te Kopuru	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections						$1,797,341	
Rising Mains							
WWTP	$5,786	$10,277	$23,145	$101,336			
Pumpstations							
Total	$5,786	$10,277	$23,145	$101,336	$0	$1,797,341	$0

Te Kopuru	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$1,797,341	$2,602,322	69%
Rising Mains			
WWTP	$140,544	$296,697	47%
Pumpstations			
Total	$1,937,885	$2,899,019	67%

Figure 3-23 : Te Kopuru WWTP oxidation pond

3.7 Mangawhai

The majority of the wastewater scheme in Mangawhai is operated by the Water Infrastructure Group (WIG) under a Build Operate Transfer procurement scheme (named 'EcoCare') that commenced operation in the 2010 financial year. The operation and maintenance contract for Mangawhai will expire in 2019 although it has a renewal option. No decision has been made at this time about extending the contract, extending the recently let operation and maintenance contract with Broadspectrum or going to market.

Recent census data indicates the usually resident population of Mangawhai increased 36.2% from 1,773 in 2006 to 2,415 in 2013.

This AMP does not include the EcoCare wastewater scheme other than to present the financial forecasts, as the scheme is operated and maintained by WIG under the MCWWS O&M Project Management Plan.

A small portion of the Mangawhai wastewater assets (sections of the original gravity wastewater reticulation) are not part of the EcoCare scheme. These assets are maintained by WIG under a separate arrangement with Council.

A summary of Mangawhai's wastewater assets is included in Table 3-13.

The layout and location of Mangawhai's wastewater assets are illustrated in the asset maps in Figure 3-5 and Figure 3-5.

Table 3-13: Mangawhai asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	12	23,214	46,794	509	2,473 From valuation
Asset condition rating	Assessment programme proposed	All assets are largely new in 2009				
Replacement cost	$46,367,928					
Depreciated replacement cost	$34,733,334					
Annual depreciation	$893,359					

3.7.1 Mangawhai wastewater system

The MCWWS is a state of the art collection treatment and reuse system.

The collection system is a mix of low pressure and traditional gravity system built to minimise the potential for infiltration.

As at March 2017 the Mangawhai wastewater system had 1,862 properties (including commercial) connected and 533 properties capable of connecting.

The new District Plan published in 2013 identified a new urban boundary and a study was under taken to identify what network extensions were required to maximise the number of properties classed as connectable for Mangawhai.

The WWTP utilises a CASS system with two CASS tanks followed by pressure filtration and disinfection. Sludge is dewatered via belt press and disposed of in the landfill.

The treated wastewater is sent to a Council-owned farm in Browns Road some 10 km from the WWTP where the water is stored in a buffer dam and irrigated to a portion of the farm land. The farm runs drystock and the grass is managed by a contractor.

Appendix E shows the age, material and size profiles of the Mangawhai reticulation.

Figure 3-54 : Mangawhai asset map – Mwhai Heads

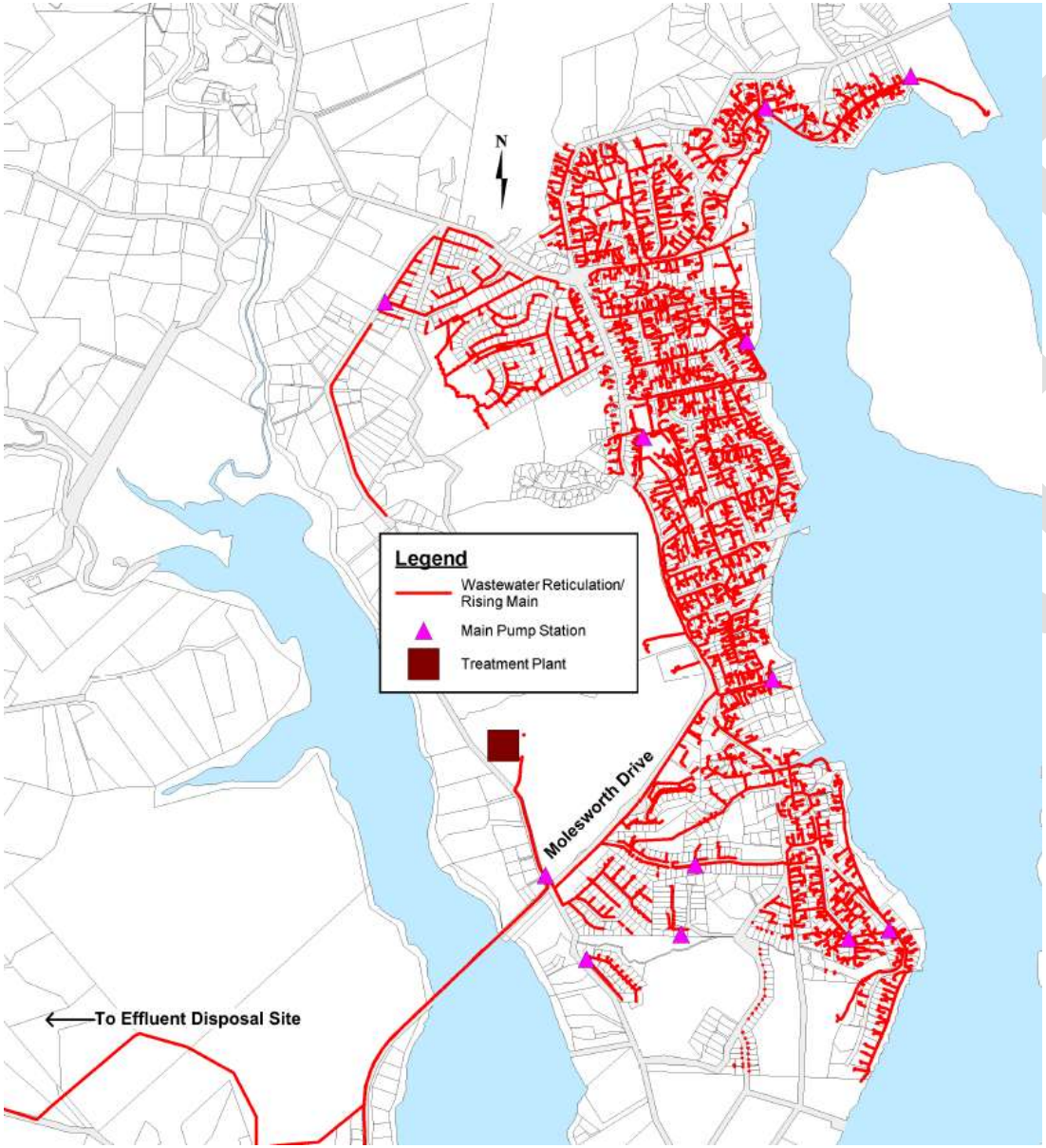
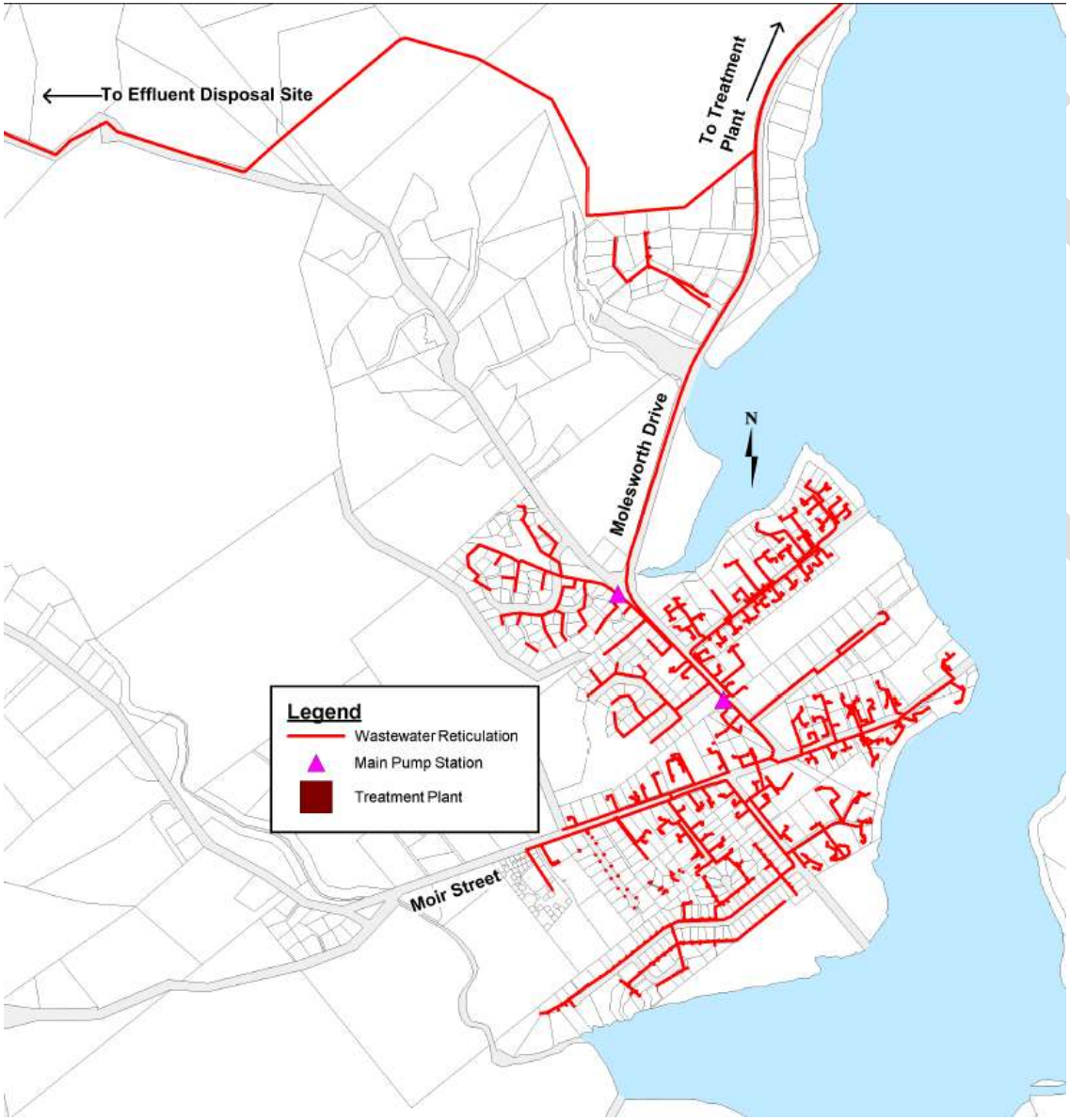


Figure 3-25: Mangawhai asset map – Mwhai Village



3.7.2 Growth and extension

Reuse system expansion options

As the connected population grows expansion of the irrigation system at the farm will be required. Experience gained in operating the system has highlighted practical constraints combining irrigation and stock and also the conservative loading rate that the consent imposes. Before committing additional funds to extending the irrigation system a review of options was undertaken to develop a sustainable wastewater reuse strategy going forward.

This included looking at alternative reuse options to local golf course, farmland, other developments and to water as well as renegotiating the application rate at the farm.

Reticulation system extensions

To maximise the return on the investment made establishing the MCWWS a reticulation expansion plan has been developed that maximises the number of properties classed as serviceable and also encourages developers to connect.

A supporting policy to encourage connections and provide a level playing field for all, irrespective of what type of connection to a property, was also developed.

The ultimate yield from the DP defined urban area is estimated to be in the order of 4,500 properties.

Assessment of growth projections was undertaken and high and low growth projections were developed which indicated up take of the 4,500 properties between 2045 and 2058.

The system extensions were presented as two projects with a combined value of $3 million. An investment of $2 million would however see the majority of land classed as serviceable.

In addition, upgrades to the WWTP, pump stations and land application area are estimated to cost a further $1 million.

A prioritisation assessment for the extensions combining economic, environmental, social, strategic and cultural assessment criteria was prepared and the community consulted for feedback.

In addition, financial modelling was undertaken to align with LTP programmes.

At this time a proposal known as Option 2 has been adopted for planning purposes and is detailed below. Council's ability to implement this proposal is very dependent on funding from development as it occurs and/or the construction of some of these works by developers as part of their development.

Figure 3-66: Proposed upgrade of MCWWS

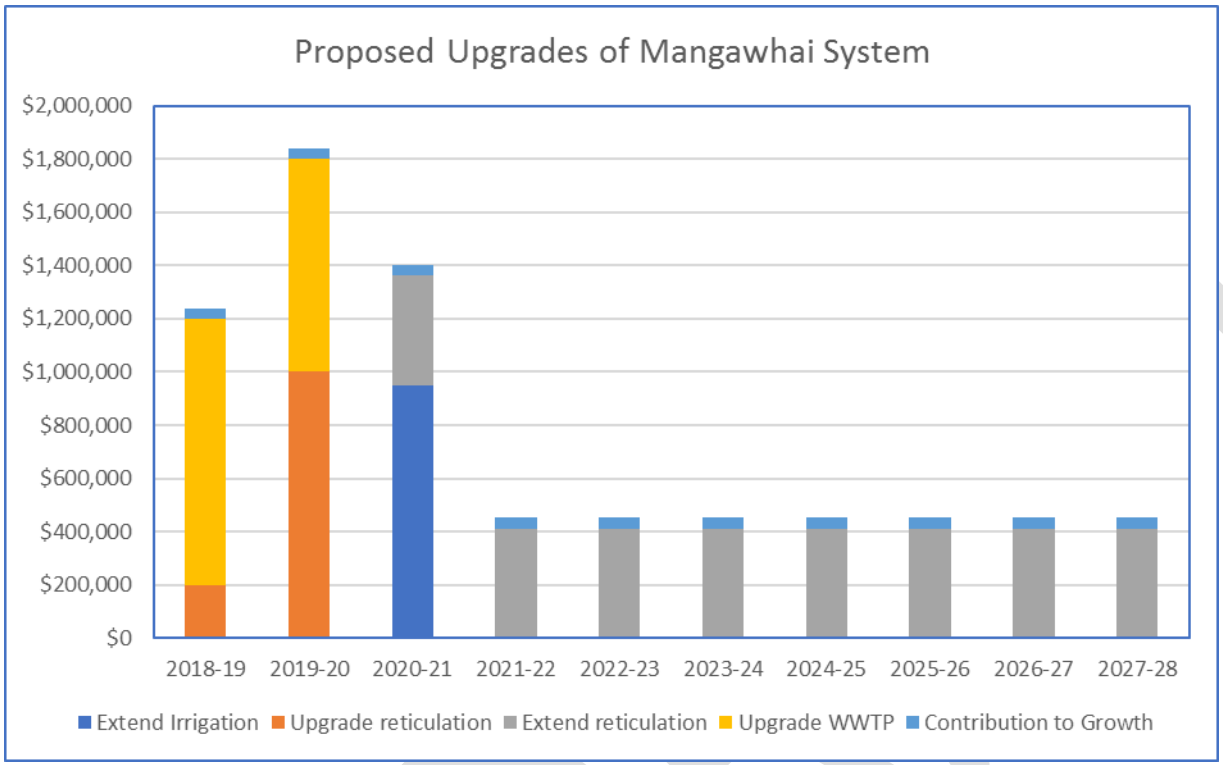


Table 3-44: Proposed upgrade of MCWWS in $'000s

Option 4 - Golf Course ($000s)	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2039-40
Extend irrigation system			950																
New disposal system																	1,485		742.5
Upgrade existing reticulation	200	1,000																	
Extend reticulation (13 years)			1,400	1,400	1,400	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300				
Augment WWTP	1,000	800								500	2,000	2,500				500	2,500	3,000	
Additional Capacity for Growth - Council Contribution	40	40	40	40	40	40	40	40	40	40									
Totals	1,240	1,840	2,390	1,440	1,440	1,340	1,340	1,340	1,340	1,840	3,300	3,800	1,300	1,300	1,300	500	3,985	3,000	742.5

3.7.3 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

The Mangawhai system is largely very new with most assets having an install date of 2009.

No reticulation pipe renewals are indicated over the next 30 years.

The treatment system is much more sophisticated and mechanised than any of the other plants with many components having relatively short lives e.g. pumps and electrical equipment. This is reflected in a significant expenditure forecast in the period 2018/2033 of $2.7 m on the plant. This may be somewhat pessimistic and the assets may remain serviceable for longer than this. However it is the nature of such assets that they do have relatively short lives compared to pipes and manholes and this potential expenditure needs to be provided for.

Figure 3-77: Mangawhai projected renewals (30 years)

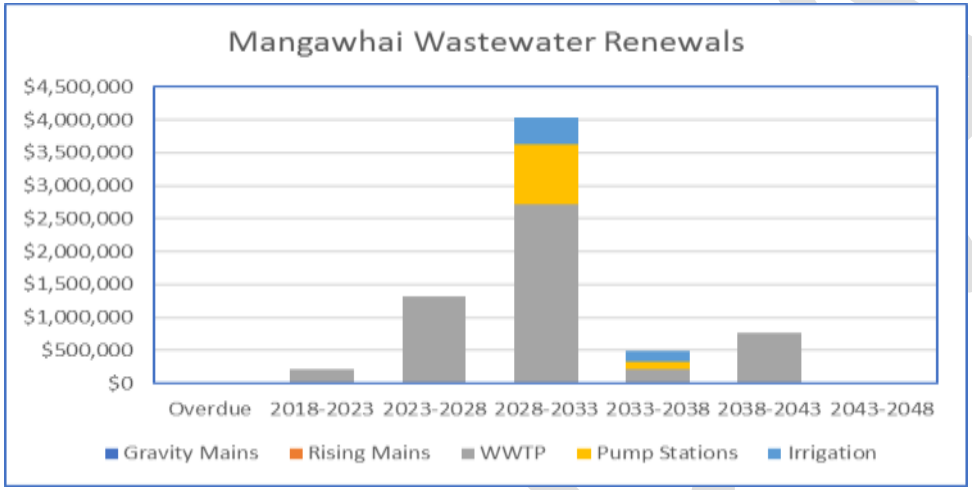


Table 3-55: Mangawhai projected renewals (30 years)

Mangawhai	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections							
Rising Mains							
WWTP	$6,115	$218,535	$1,311,691	$2,712,327	$218,535	$760,563	
Pumpstations	$17,702			$921,704	$100,961		
Irrigation				$402,248	$166,877		
Total	$23,817	$218,535	$1,311,691	$4,036,279	$486,373	$760,563	$0

Mangawhai	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$0	$18,645,760	0%
Rising Mains	$0	$9,812,103	0%
WWTP	$5,227,766	$11,965,782	44%
Pumpstations	$1,040,367	$1,227,382	85%
Irrigation	$569,125	$4,716,901	12%
Total	$6,837,258	$46,367,928	15%

3.8 Critical assets

Critical assets have been defined by the NAMS Group as being 'assets with a high consequence of failure'.[1] They are often found as part of a network, in which, for example, their failure would compromise the performance of the entire network.

A formal criticality assessment was undertaken for Kaipara's wastewater assets in 2016. The assessment incorporated local knowledge and identified the assets listed in Table 3-66 as being "critical". Failures of the items on this list would lead to serious impacts on the ability of Council to meet its customer LOS.

The assessment also included a range of recommendations on how assets with elevated criticality should be managed and this is incorporated into the AMIP.

Table 3-66: Critical WW assets

Critical wastewater assets		
Local wastewater reticulation	Local wastewater reticulation for • Pipes ≥ 200mm in residential areas • Pipes in CBD of Dargaville • Pipes within, or crossing, State Highways – unless otherwise defined by Business and Community Customers.	Moderate
Local wastewater reticulation	Bridge crossings of streams.	Moderate
Pump stations	Stations other than Dargaville PS 1, 2, 3, and 4 and major Mangawhai stations.	Moderate
Rising mains	Rising mains other than large mains at Mangawhai and lower end of 'Daisy Chain' at Dargaville.	Moderate
Treatment plants	Maungaturoto.	Moderate
Local wastewater reticulation	Pipes running under buildings.	High (Major)
Pump stations	• Dargaville main collection and transmission stations i.e. PS 1,2,3 and 4; • Mangawhai major effluent and treated effluent pump stations.	High (Major)
SCADA system		High (Major)
Rising mains – specific large mains	• Mangawhai Heads – under management of Build/Operate scheme; • Lower end of 'Daisy Chain' at Dargaville.	High (Major)
Treatment plants	Mangawhai – under management of Build/Operate scheme.	High (Major)

4 Issues and remedial actions

A review of the issues associated with the KDC wastewater schemes reveals a number of common themes that are discussed below. Funding for the various projects is included in the Management Services Operational budget.

Table 4-1: Projects associated with issues

Issue	Discussion
System capacity	None of the KDC wastewater systems have hydraulic models or an overall assessment of the capacity of the various key elements that make up the systems. This generates a number of issues including: • Unknown capacity for growth to occur and difficulty approving extensions when impact on downstream system is unknown; • With the extent of renewals increasing it is critical to ensure that correct capacity is provided for future growth through that process; • Extent to which infiltration and inflow is present, what issues are associated with excessive Inflow and Infiltration (I/I) and how growth can be accommodated if I/I is reduced; • Pump station capacity relative to demand, ability to manage peak flows and what, if any, emergency capacity would optimally be required; • Capacity constraints within reticulation system, particularly pipes that are serving an arterial role; • Treatment capability relative to consent requirements and growth capacity. This also highlights fundamental limitations of the simple pond systems relative to likely future consent requirements; and • Ability to charge development contributions when balance of current and growth capacity not known. The proposed system capacity studies are to obtain an overview of these issues for the subject schemes. This may lead to future more detailed studies being required. Given the relatively small size of most of the schemes the actual extent of the network needing to be properly modelled is expected to be relatively small with large parts of the network able to be simply specified by minimum pipe sizes. The studies will therefore focus on key elements and identifying the main constraints. To be effective these studies will require reliable flow measurement in both dry and wet weather flow situations and this may require the installation of temporary flow gauging. Schemes proposed for inclusion in first three years are Dargaville, Kaiwaka, Maungaturoto, Glinks Gully and Mangawhai.

Issue	Discussion
	Dargaville is driven mainly by renewal considerations and management of pump stations and WWTP. Kaiwaka is driven partially by growth considerations but also by consent renewal in 2022. Maungaturoto is driven by growth considerations. Glinks Gully is driven by consent renewal in 2024 and consideration of whether the scheme should be extended and potential for needing to renew the seepage beds. Mangawhai is driven by growth considerations.
Infiltration and Inflow Management	Many of the KDC schemes experience containment issues during wet weather and this is a clear indicator that Inflow and Infiltration (I/I) is present. This will be contributed to by the age of the networks and the low-lying nature of several of them. NRC is known to be concerned about the extent and frequency of wastewater overflows. The WaterNZ National Performance Review indicates that the Dargaville system has the highest number of overflows per 1,000 properties of any reported. The accuracy and validity of this measure is however highly suspect. Some of the problem may be caused by pipes and pump stations simply being too small for the connected demand and the system capacity studies above will provide some indication of such situations.
Oxidation Pond Study	Dargaville, Te Kopuru, Maungaturoto and Kaiwaka all utilise oxidation ponds in various formats. These systems are cheap and simple to operate however have their limitations in relation to the extent and type of treatment that they can provide. While daily costs are low the periodic desludging costs can be considerable and are considered to be an Operational cost. The proposed study will align with the system capacity study with a specific focus on providing a view on the ongoing viability of oxidation ponds as a treatment process, what can be done to optimise their performance and providing a future outlook on necessary maintenance and upgrading. It is intended that this be undertaken before the desludging of the Dargaville oxidation ponds.
Kaiwaka Consent Renewal	The Kaiwaka discharge consent expires in 2022. This funding provides for initial scoping of the process for renewal and gathering of information that will contribute to that process.
Specific Discharge Non-compliance	Some of the WWTPs regularly have periods of non-compliance with specific requirements of their discharge consents. With oxidation ponds this can be difficult to manage as they are biological systems with key adjustable controls other than aeration. A specific issue at this time is ammoniacal nitrogen at Te Kopuru and a study is provided for to identify the cause and propose remedies.

Issue	Discussion
Condition Assessment	The KDC systems comprise a mix of pipes of varying diameters, gravity/pressure, materials, ages, criticalities and operating environments. All of these factors influence that effective working life of the pipe and the drivers for renewal. Given the costs involved in renewals as the major driver of capital expenditure it is important that KDC has good information to both predict when renewal might be required (long term planning) and justifying the actual renewals to be undertaken (short term planning). Condition assessment is a key tool for both these disciplines and for gravity pipes it typically CCTV-based while pressure pipes utilise a range of technologies. KDC now has a structured CCTV inspection process in place that is essentially driven by criticality, age and size.
Mangawhai WWTP Renewals	The Mangawhai WWTP is very different to all other KDC WWTPs in relation to the extent and nature of the technology utilised. Much of this equipment has a relatively short life expectancy and therefore renewal expenditure is both large and frequent. A valuation base renewal forecast indicates renewal of $1.5 million being required over the next 10 years, including overdue renewal of $6,000 even with the plant only eight years old. The study is intended to focus on the renewal profile of the plant and review the actual condition of the subject equipment to determine if the life expectancy used for valuation purposes can effectively be utilised for renewal planning. It is hoped that lives can be extended but the WWTP is a hostile environment for much of this equipment and this cannot be a guaranteed outcome.
Advice on Mangawhai Operations Contract Renewal	The current Trility contract for the operation of the Mangawhai scheme expires in 2019, although it has a renewal option that Council could utilise. The current operating cost is over $1 million per year, excluding power. It would be appropriate as this time approaches that KDC considers what options it has going forward and whether the required levels of resourcing and performance can be achieved at a lower cost. This funding provides for advice that may be required during this process but is not intended to provide for a full open tender for the service.
Valuation, AMP updating and LOS Review	These are time-bound processes that need to be provided for during the three years of the LTP.

Table 4-2: Budget provisions for issues

Project	Total budget	2018-19	2019-20	2021-21	Short description (see detail above)
Dargaville Capacity Study	$120,000	$60,000	$60,000	0	Study of current flows, Inflow and Infiltration (I/I), current capacity, growth forecast and main constraints.
Kaiwaka Capacity Study	$60,000	0	$30,000	$30,000	Study of current flows, I/I, current capacity, growth forecast and main constraints. Kaiwaka forecast to grow.
Kaiwaka preparation for consent renewal	$20,000	0	0	$20,000	Consent renewal required in 2022. Further funding will need to be provided in 2021/2022
Maungaturoto Capacity Study	$70,000	$35,000	$35,000	0	Study of current flows, I/I, current capacity, growth forecast and main constraints. Maungaturoto forecast to grow.
Mangawhai Capacity Study	$120,000	$60,000	$60,000	0	Study of current flows, I/I, current capacity, growth forecast and main constraints. Mangawhai growing rapidly.
Condition assessment	$249,000	$83,000	$83,000	$83,000	Ongoing CCTV inspections plus sampling of rising mains per report.
Review Mangawhai plant renewal predictions	$25,000	$25,000	0	0	Valuation indicates large current backlog of renewals. This needs to be assessed in detail to determine actual need and future profile.
Advice on Mangawhai Operations contract	$20,000	$20,000	0	0	Current contract will expire in June 2019. There is a renewal option but also option to award to maintenance contractor. Potentially large dollars involved.
Oxidation pond management options	$40,000	$40,000	0	0	KDC has a number of oxidation ponds. Seek initial advice on aeration management, desludging and future upgrading.
Te Kopuru ammoniacal nitrogen study	$30,000	$30,000	0	0	Te Kopuru ponds are non-compliant for ammoniacal nitrogen. Initial advice on cause and remedy.
Asset Revaluation	$25,000	0	$25,000	0	Wastewater revalued every three years.

Project	Total budget	2018-19	2019-20	2021-21	Short description (see detail above)
Glinks Gully Capacity Study	$25,000	0	$12,500	$12,500	Study of current flows, Inflow and Infiltration (I/I), current capacity, growth forecast and main constraints. Glinks Gully has issues about connection of additional properties and capacity of current system.
AMP and LOS Review	$70,000	0	$35,000	$35,000	Preparation for next LTP.
Other (unspecified)	$80,000	$20,000	$0	$60,000	Unknown projects at this time allocated across all schemes.

5 Asset valuation

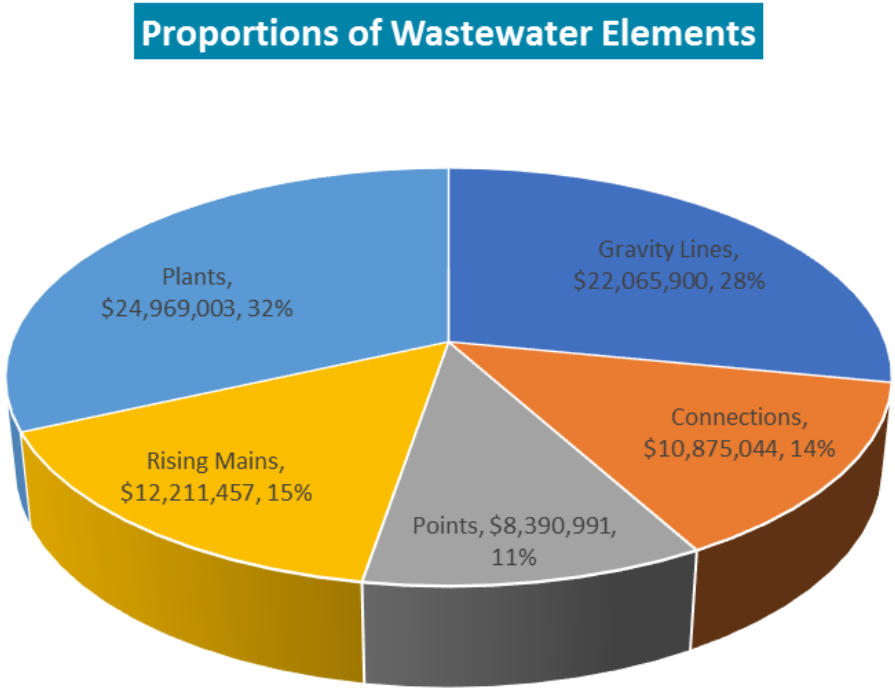
The 2017 wastewater valuation for the district is summarised in the tables below.

5.1 Asset renewal valuation

Table 5-1: 2017 wastewater valuation

Wastewater Renewal Value						
	Gravity Lines	Connections	Points	Rising Mains	Plants	Total
Dargaville	$8,308,365	$4,412,781	$2,567,258	$1,897,130	$4,062,242	$21,247,775
Glinks Gully	$23,839	$50,365	$28,156	$53,355	$123,752	$279,467
Kaiwaka	$790,194	$371,929	$252,642	$205,225	$370,175	$1,990,165
Maungaturoto	$2,268,078	$819,406	$730,839	$243,644	$2,206,073	$6,268,040
Te Kopuru	$1,290,484	**$430,043**	$341,796		$296,697	$2,359,019
TOTAL Excl Mangawhai	$12,680,960	$6,084,523	$3,920,691	$2,399,354	$7,058,939	$32,144,467
Mangawhai	$9,384,940	$4,790,521	$4,470,300	$9,812,103	$17,910,065	$46,367,928
TOTAL Incl Mangawhai	$22,065,900	$10,875,044	$8,390,991	$12,211,457	$24,969,003	$78,512,395

Figure 5-1: Proportions of WW elements based on 2017 valuation



5.2 Asset current depreciated value

Table 5-2: 2017 Wastewater depreciated valuation

Current Depreciated Value from 2017 Valuation					
	Pipes (Gravity, Rising & Connections)	Points	Plants	Total	% of Renewal
Dargaville	3,533,713	949,185	2,415,128	6,898,026	32%
Glinks Gully	50,176	18,302	52,801	121,279	43%
Kaiwaka	255,286	139,183	176,090	570,559	29%
Maungaturoto	669,183	439,089	1,316,246	2,424,518	39%
Te Kopuru	239,962	190,024	184,411	614,397	26%
TOTAL Excl Mangawhai	4,748,320	1,735,783	4,144,676	10,628,779	33%
Mangawhai	17,114,141	3,634,709	13,984,484	34,733,334	75%
TOTAL Incl Mangawhai	21,862,461	5,370,492	18,129,160	45,362,113	58%

5.3 Asset annual depreciation

Table 5-3: 2017 Wastewater annual depreciation

Annual Depreciation from 2017 Valuation					
	Pipes (Gravity & Rising)	Connections	Points	Plants	Total
Dargaville	146,304	55,160	32,222	102,857	336,543
Glinks Gully	965	630	352	4,211	6,158
Kaiwaka	15,556	4,649	3,158	7,313	30,676
Maungaturoto	39,593	10,243	9,301	58,747	117,884
Te Kopuru	21,031	5,376	4,272	4,148	34,827
TOTAL Excl Mangawhai	223,449	76,057	49,305	177,277	526,088
Mangawhai	243,816	59,882	100,997	488,665	893,359
TOTAL Incl Mangawhai	467,265	135,938	150,302	665,942	1,419,447

5.3.1 Implied average asset life from valuation

Table 5-4: 2017 Wastewater implied average asset life

Implied Average Life (Years) from Renewal/Annual Depreciation					
	Pipes (Gravity & Rising)	Connections	Points	Plants	Total
Dargaville	70	80	80	39	63
Glinks Gully	80	80	80	29	45
Kaiwaka	64	80	80	51	65
Maungaturoto	63	80	79	38	53
Te Kopuru	61	80	80	72	68
TOTAL Excl Mangawhai	67	80	80	40	61
Mangawhai	79	80	44	37	52
TOTAL Incl Mangawhai	73	80	56	37	55

5.4 Changes in valuation 2014 to 2017

The following extract is from the 2017 asset valuation by OPUS and details the valuation changes that have occurred.

Table 5-5: Extracts from OPUS valuation report

5.2. Wastewater Valuation

The wastewater asset group comparison with 2014 valuation is shown in Table. 5.5. The total change and percentage change for each asset group is shown in Table 5.6 and the change in asset register quantities is shown in Table 5.7. A breakdown of wastewater assets by region and a breakdown of wastewater points by asset type is supplied in appendix A.

Table 5.5: Comparison with the Previous Valuations (2014-17)

ASSET	2017 ($)			2014 ($)		
	ORC	ODRC	AD	ORC	ODRC	AD
Gravity Pipes	$22,065,899	$13,416,658	$308,883	$24,597,503	$15,724,887	$377,347
Non-Gravity Pipes	$12,211,457	$10,322,295	$158,381	$4,940,200	$3,539,540	$76,092
Service Connections	$10,875,044	$5,437,522	$135,938	$0	$0	$0
Subtotal Pipes	**$45,152,400**	**$29,176,476**	**$603,203**	**$29,537,703**	**$19,264,426**	**$453,439**
Wastewater Points	$8,390,991	$5,370,491	$150,302	$15,725,562	$9,898,096	$223,309
Wastewater Plant	$24,827,382	$18,043,569	$659,172	$24,783,126	$19,601,896	$654,004
Total for Wastewater	**$78,370,773**	**$52,590,536**	**$1,412,678**	**$70,046,391**	**$48,764,418**	**$1,330,752**

Table 5-6: Extracts from OPUS valuation report

Table 5.6: Change in Wastewater Valuation (2014-17)

ASSET	CHANGE 2014-17 ($)			CHANGE 2014-17 (%)		
	ORC	ODRC	AD	ORC	ODRC	AD
Gravity Pipes	-$2,531,604	-$2,308,228	-$68,463	-10%	-15%	-18%
Non-Gravity Pipes	$7,271,257	$6,782,756	$82,289	147%	192%	108%
Service Connections	$10,875,044	$5,437,522	$135,938	-	-	-
Subtotal Pipes	**$15,614,696**	**$9,912,049**	**$149,764**	**53%**	**51%**	**33%**
Wastewater Points	-$7,334,571	-$4,527,605	-$73,007	-47%	-46%	-33%
Wastewater Plant	$44,257	-$1,558,326	$5,168	0%	-8%	1%
Total for Wastewater	**$8,324,382**	**$3,826,118**	**$81,925**	**12%**	**8%**	**6%**

The valuation of KDC's wastewater assets has increased overall since 2014 by **$8.324M (12%)** Replacement Cost and **$3.826M (8%)** Depreciated Replacement Cost. The Annual Depreciation has increased by **$81.925k (6%)**.

ASSET	REASON FOR CHANGE
Gravity Pipes	Gravity pipes has seen a decrease in quantity of 6%. The reasons for this may be because of a transfer of assets from gravity pipes to non-gravity. Overall the quantity of gravity and non-gravity pipes has increased 4.3%. The other reason for the change in value of gravity pipes is because of the increase lives of AC pipes from 40 to 60 years. This change changes an increase in ODRC by $1.6M and a decrease in AD of $45K
Non-Gravity Pipes	Increase in quantity of non-gravity pipes by 63%.
Connection Services	Connection services were valued in wastewater points in 2014 valuation.
Wastewater Points	The cause for the decrease in WW points is the shift in service connections from WW points to WW pipes. This has offset the increase in unit rates for manholes and general cost increase for WW points.
WWTP and Pump Stations	A new dataset for WWTP has been used in the 2017 valuation. This has resulted in a group of asset IDs, making it difficult to completely transfer values used in 2014 to the 2017 valuation. It has also made it impossible to fully compare or explain reasons for change. Through the site inspections, it became apparent that several assets for the Mangawhai WWTP were grossly overvalued in the 2014 valuation. Revaluing these assets and giving them a more reasonable replacement cost has decreased ODRC by $1.8m. These changes are included in the WW points spreadsheets under the tab major unit rate changes.

5.5 Pipeline unit rates and expected life from valuation

Table 5-7: Pipeline unit rates and life expectancy

Pipe Life Expectancy		2017 Unit Rates $/m (excluding overhead)		
Pipe Material	Base Life (Yrs)	Diameter (mm)	Gravity Pipes	Non-Gravity Pipes
AC	60	25	$90.00	$94.88
CC	80	32	$93.00	$94.88
CI	60	40	$93.00	$94.88
CIPP	40	50	$102.52	$104.59
CLS	60	63	$111.58	$113.84
CONC	60	75	$119.96	$122.38
GEW	80	80	$123.44	$125.94
HDPE	80	90	$130.42	$133.05
MDPE	80	100	$137.39	$140.17
PE	80	110	$144.16	$147.07
PE100 - PN16	80	125	$154.30	$157.42
PN	80	150	$175.00	$180.00
PN9	80	160	$200.81	$204.86
PVC	80	180	$259.99	$265.24
STEEL	80	200	$305.00	$315.00
Unknown	60	225	$327.63	$335.00
oPVC	80	250	$394.57	$402.54
uPVC	80	300	$528.44	$539.11
		315	$570.00	$580.00
		375	$665.83	$679.28
		400	$720.00	$725.65

Table 5-8: WW points unit rates and life expectancy

Point Assets	2017 Unit Rates $/ea (without overhead)	2017 Useful Life Assumption
Boundary Kit	$228.29	80
Connection	$1,697.28	80
Dummy Node	$0.00	80
FlushPoint	$228.29	80
Grinder Pump	$6,500.00	25
Inspection Shaft	$1,527.11	80
Isolation Kit	$228.29	80
Lamp hole	$525.50	80
Maintenance Shaft	$3,142.45	80
Manhole - < 1m	$3,000.00	80
Manhole - > 4m	$3,650.00	80
Manhole - 1m-2m	$3,100.00	80
Manhole - 2m-3m	$3,350.00	80
Manhole - 3m-4m	$3,500.00	80
Manhole - Surface	$3,142.45	80
Meter	$1,985.12	20
Outlet	$420.40	80
Rodding Eye	$1,780.66	80
Sand Filter	$525.50	40
Storage Chamber	$1,051.00	40
Storage Tank	$1,051.00	40
Valve - Air	$1,238.80	40
Valve - Check Valve	$840.80	40
Valve - Flushing	$264.38	30
Valve - Heavy Duty Cover	$1,051.00	50
Valve - Isolation & Scour	$6,194.02	30
Valve - Non Return	$840.80	30
Valve - Scour	$6,194.02	30
Valve - Unkown	$6,194.02	30
Valve - Valve Chamber	$1,051.00	40
Valve Chamber	$1,051.00	40

Table 5-9- Electro-mechanical life expectancy

Pump Station and WWTP Life Expectancy	
Element	**Base Life (Yrs)**
Control telemetry	20-25
Electrical	20-25
Mechanical (pumps)	12-25
P/S structurual / civil	50
Oxidation Pond	50-80
Waveband	50
Magflow	20
Aerators	20-25
Telemetry	20
Note : The above relate to non-Mangawhai sites. Specific valuation data should be reviewed for Mangawhai.	

5.6 Notes on asset valuation

5.6.1 Replacement value

The replacement value is the cost of building the asset "today". In arriving at the value, it is assumed that modern construction techniques and modern equivalent materials are used but that the physical result replaces the asset as it exists.

Included costs

The replacement rates calculated include the following:

- Material supply and delivery;
- Labour;
- Plant costs;

- Contractor preliminary and general costs; and
- Engineering costs have been added to the estimated base rate to cover such things as detailed design, surveying, project management and construction supervision based on ACENZ guidelines.

Excluded costs

The replacement rates used in the revaluation exclude the following:

- GST;
- Council corporate overheads;
- Investigation and feasibility costs; and
- Borrowing costs during construction (these costs generally apply to large projects having a construction period of over one year. KDC projects are generally small and have maximum construction periods of only two to three months). In addition, Public Benefit Entities are given the option, under IAS 23 (borrowing costs), whether to exclude or include borrowing costs. KDC has opted to exclude borrowing costs.).

5.6.2 Depreciated replacement cost

Depreciated replacement cost is the estimate of the current replacement cost of assets less allowance for physical deterioration, optimisation for obsolescence and relevant surplus capacity.

5.6.3 Depreciation

Depreciation is a systematic allocation of the depreciable amount of an asset over its estimated useful life. Thus, depreciation only applies to those assets with finite lives. Assets with indefinite lives e.g. earthworks and wetlands are not depreciated. Straight-line depreciation is used in this revaluation.

5.6.4 Annual depreciation

The annual depreciation is the amount the asset depreciates in a year. It is defined as the replacement cost divided by the adjusted total useful life for the asset.

5.6.5 Residual value

The residual value is the value of the asset when it reaches the end of its life. For the purposes of this revaluation it is assumed that all assets (except land) have no residual value.

5.6.6 Useful lives

Useful lives are explained and detailed in the individual component revaluations.

5.6.7 Minimum remaining useful life

The minimum remaining useful life is applied to assets that are near or have past than their useful life. It recognises that although an asset is near or older than its standard useful life it may still be in service and therefore have some value. Where an asset is near or older than its standard useful life (i.e. remaining useful life is less than the minimum remaining useful life), the minimum remaining useful life used in the calculation of the depreciated replacement cost.

5.6.8 Data confidence

The following tables were extracted from the 2017 OPUS Valuation report regarding the data confidence limits of the valuation.

Table 5-10: Data confidence extract from OPUS report

4.2. Confidence Ratings

Confidence ratings were assigned to the source data and unit cost rates and to other items as appropriate. The confidence ratings used are summarised in Table 4.2 below.

Table 4.2: Confidence Ratings

GRADE	LABEL	DESCRIPTION	ACCURACY
A	Accurate	Data based on reliable documents	±5%
B	Minor inaccuracies	Data based on some supporting documentation	±15%
C	Significant data estimated	Data based on local knowledge	±30%
D	All data estimated	Data based on best guess of experienced person	±40%

4.3. Confidence Levels

The major above ground water utilities asset registers were checked by an onsite asset inspection as part of this valuation. With consideration of this and the other data used for this valuation, an overall confidence rating of A-B (±10%) has been assigned to the 2017 valuation.

The breakdown of this is set out in the following table.

Table 5-6: OPUS data confidence rating

Asset group	Asset	Quantity	Replacement cost	Life expectancy	ODRC
Wastewater	Pipes	A-B	B	B	B
	Points	A-B	B	B	B
	Plant	B	B	A	B

6 Financial and lifecycle strategy and management

6.1 Lifecycle management plan

6.1.1 Introduction

This section identifies Council's strategy for managing, maintaining and renewing its wastewater assets. The strategies described within this section have been developed to achieve the LOS identified in Proposed LOS and performance measures s2.12 of this AMP.

Management of the lifecycle of each asset should optimise performance whilst minimising the total lifecycle costs of both the reticulation and treatment systems. The management process balances the various competing demands and investigates the capacity and performance constraints of each component to establish a regime to achieve the overall objectives.

The objectives of each Lifecycle Management Plan are to:

- Optimise performance; and
- Minimise total lifecycle costs.

Whilst this section notes the generic strategies used by Council, it is supplemented by specific strategies for each scheme detailed in the sections that follow.

This section identifies Council's strategies and programmes for managing, maintaining and renewing assets within its wastewater schemes. The programme described within this section has been developed to deliver the LOS identified in s2.12 of this AMP.

The Lifecycle Management Plan for each asset component incorporates the following strategies:

- Operations and maintenance strategies to keep the assets operational;
- Renewal strategies to replace assets as they reach the end of their useful life;
- New asset strategies to address growth and demand;
- Decommissioning/disposal strategies for when the asset is no longer required; and
- Work programmes and the associated financial forecasts for each scheme.

6.1.2 Design parameters

The design parameters for all new Council wastewater assets are set out in Council's Engineering Standards 2011. The key design assumptions include the following:

- Number of persons per household equivalent – 4;
- Average dry weather flow – 210 litres per day per person;
- Industrial flow and trade waste shall be calculated as follows:
  - When the industrial waste and trade waste from a particular industry are known, these shall be used for the reticulation design; and
  - When this information is not available, the dry weather flow rates shown in Table 6-1 may be used as a design basis for industrial area.

Table 6-1: Default Dry Weather Flows from Industrial Areas

Minimum design flow	Flow rates (l/s/ha)
Light water usage	0.4
Medium water usage	0.7
Heavy water usage	1.3

6.1.3 Work categories

The lifecycle management strategies are divided into the following five work categories:

Asset operations: These are the active processes of utilising an asset which will consume resources such as manpower, energy, chemicals and materials. The Operations category also incorporates funding to address the AMIP actions and the provision of professional services. The AMIP is generally focused on a three year timeframe (covering the lifespan of this AMP) with a nominal allowance for years 4-10. As the actions in the programme are addressed, and the AMP reviewed, new initiatives will be identified and added to the programme and budgets will be revised accordingly.

Asset maintenance: The ongoing day-to-day work activity required to keep assets serviceable and prevent premature deterioration or failure. Three categories of maintenance are carried out:

- **Planned maintenance**: Work carried out to a predetermined schedule (e.g. pump station inspection, mains scouring) or programmed as a result of identified needs (e.g. pump overhaul);
- **Preventative maintenance**: Work additional to scheduled inspections and maintenance identified during inspections as essential to continued operation; and
- **Responsive maintenance**: Work carried out in response to reported problems or defects (e.g. repair burst rising main).

Asset renewal: Major work that restores an asset to its original capacity or the required condition. This includes both planned and reactive renewals.

New capital: This section of the AMP covers tactics for the creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capacity or performance in response to changes in supply needs or customer expectations.

Development works fall into two separate categories as follows:

- Council funded; and
- Developer funded as part of subdivision development or by way of contributions.

Asset decommissioning/disposal: Decommissioning and disposal of assets when they are no longer needed. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation;
- Obsolescence;
- Provision exceeds required LOS;
- Uneconomic to upgrade or operate;
- Policy change;
- Service provided by other means (e.g. private sector involvement); and
- Potential risk of ownership (financial, environmental, legal, social, vandalism).

Council currently obtains the day-to-day operational services for Wastewater through Contract 527 Water Supply and Wastewater Operations and Maintenance Services. This is managed by Council staff. The day-to-day operation work categories include:

- Routine work;
- Ordered work;
- Priority work; and
- Emergency work.

The relationship of each of these categories to the lifecycle management strategies together with a description of the work involved is shown in Table 6-2.

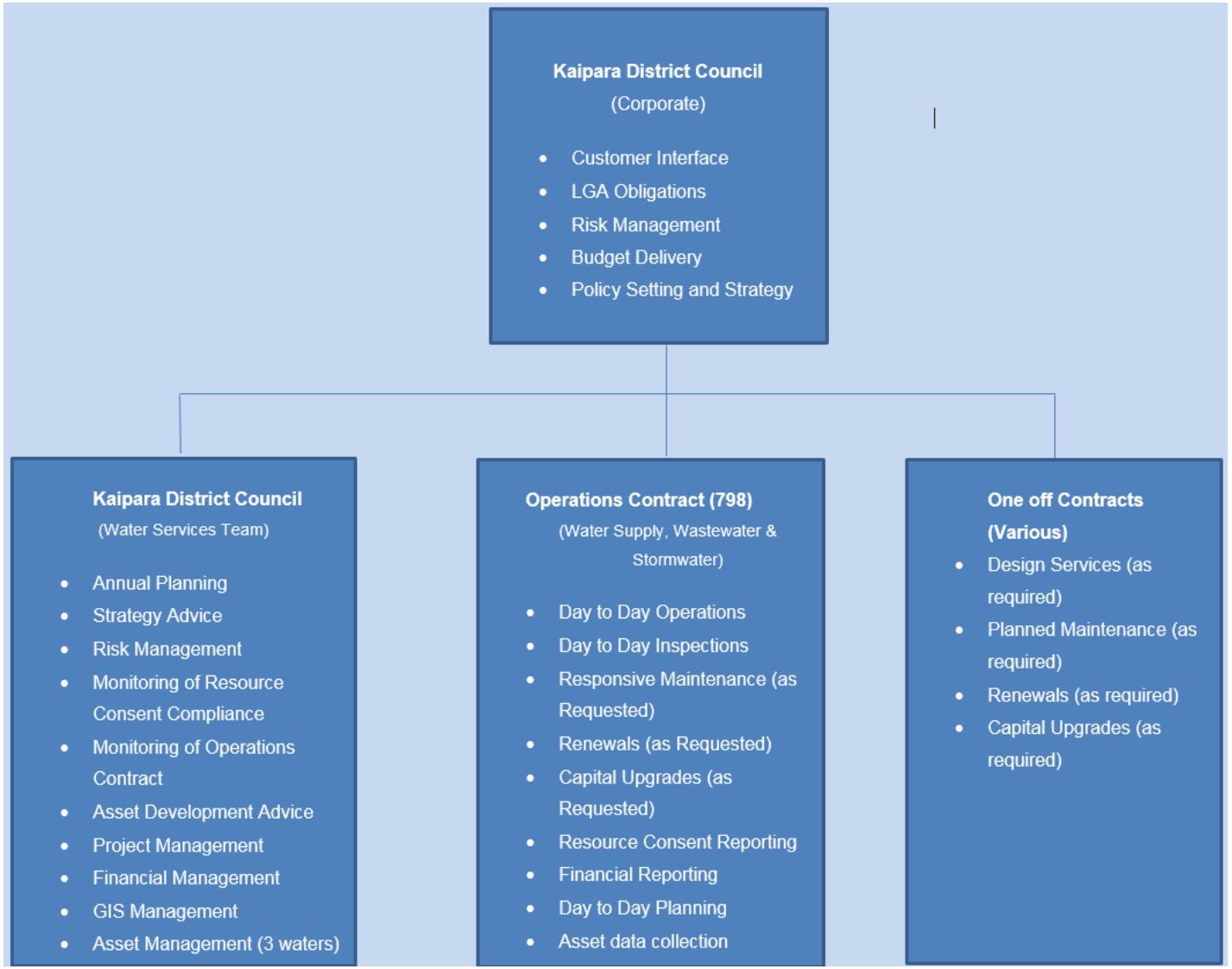
Table 6-2: Contract work group relationship with lifecycle management strategies

Contract work category	Description of works	Planned Maintenance	Preventative Maintenance	Responsive Maintenance	Asset Renewals Reactive
Routine work	Work carried out on cyclical basis.	X			
Ordered work	Specific order issued by Engineer.		X	X	X
Priority work	Urgent routine or ordered work to address operational issues.	X	X	X	X
Emergency work	System malfunction, service disrupted.			X	X

6.1.4 Contractual setting

Council continues to build its internal capacity to act as a 'smart buyer' in relation to AM and the overall operation of the water services. In July 2017, a new operations and maintenance contract commenced with Broadspectrum. Additional services to support the Water Services team will be procured on an 'as required' basis and may include investigation and design services. The various functions are noted in Figure 6-1 below. The figure refers to the previous Contract 527 but has not otherwise changed.

Figure 6-1: Contractual setting



The Operations contract delivers the lifecycle management outcomes on a day-to-day basis. The specification of the Operations contract incorporates the various inspections that monitor asset condition/capacity and provide the basis for programmed maintenance. The frequency of the programmed inspections regime is established in the specification of the Operations contract. This is supplemented as required by inspections generated from Council's customer Help Desk system.

When programmed inspections are undertaken by the Operations contractor, the act of inspection may initiate a series of responses based on the observations of the contractor. These could include:

- Programmed maintenance tasks, based on usage or time;
- Responsive maintenance based on condition or capacity;
- Planning of a Preventative Maintenance Response based on a prediction of future failure;
- Reporting for upgrading or renewal through to the professional services provider. This occurs when the scope of the intervention is not covered by the Operations contract and requires consideration of alternatives (upgrades) or prioritisation within existing budgets (renewals;
- Ad-hoc inspections of breaks or infrastructure that allow an opportunity to inspection reticulation when responding to an incident; and
- Collection of data from inspections and interventions for incorporation into Council's GIS system

The inspections are recorded in either onsite logs or the monthly report that is forwarded to Council. Any key actions are discussed at monthly contract meetings between Council, the professional service contractor and the operations contractor.

These monthly meetings are also supplemented with quarterly Utility Improvement meetings where the performance of the system is reviewed and a more strategic review of performance is undertaken to aid the annual planning process for the next financial year. These meeting will review issues that have arisen over the past period and assess current programmes and budgets. This may lead to the re-evaluation of the following years Annual Plan or, in extreme cases, initiate a review within the current financial year to address critical infrastructure issues.

6.1.5 Environmental compliance

Council holds resource consents for all its wastewater treatment facilities. A list of the consents is included in Appendix B. The discharges from these facilities are monitored by NRC. KDC works closely with NRC in monitoring the performance of wastewater assets.

The day-to-day monitoring of performance of wastewater systems is a requirement of the operations contract. This is in turn monitored by the professional services contract. Where resource consent non-conformances are observed by either supplier, the non-compliances are reported to both NRC and KDC. This will in turn be reported in the Annual Report.

6.2 Maintenance and operating strategy and expenditure forecast

6.2.1 Strategy

Table 6-3 shows the Council maintenance and operating strategies to ensure that the defined LOS are provided. The table shows the key service criteria affected and mode and impact of failure if the action is not carried out.

Table 6-3: Maintenance and operating strategies for WW assets

Activity	Strategy	Service criteria	Impact
General maintenance.	Council will maintain assets in a manner that minimises the long term overall total cost while ensuring efficient day-to-day management.	Maintaining existing LOS. Cost/affordability.	Low – Medium Increased overall costs and risk of failure.
Unplanned maintenance – disaster i.e. climatic event, major spillage, system malfunction.	Council will maintain a suitable level of preparedness for prompt and effective response to civil emergencies or system failures by ensuring the availability of suitably trained and equipped suppliers. Specifically: electrical contractors and water/wastewater works contractors.	Responsiveness.	Potential wastewater overflows to private property.
Unplanned maintenance – pump stations – blockages WWTPs and pump stations – mechanical or electrical failure	Provide a 24-hour repair service and respond to and repair or overcome broken or leaking pipes, power outages, and equipment or system failures.	Responsiveness. (Response time for unplanned priority works is 30 minutes in the Dargaville central business area and 1 hour for all other areas)	Medium – Wastewater Overflows.
Unplanned maintenance – pipelines – blockages, odour, pipe breaks	Sufficient spares to be stocked (by contractor) to address regular failures.	Responsiveness. (Response time for unplanned priority works is 30 minutes in the Dargaville central business area and 1 hour for all other areas)	Medium – Wastewater Overflows

Activity	Strategy	Service criteria	Impact
Planned inspections Pump stations, WWTP, pipelines	Council will undertake scheduled inspections in accordance with good industry practice and as justified by the consequences of failure on LOS, costs, public health, safety or corporate image.	Maintaining existing LOS Pump stations are inspected twice weekly (Dargaville PS01 daily) and oxidation ponds are inspected as follows: • Dargaville – twice weekly; • Glinks Gully and Kaiwaka – weekly; • Maungaturoto and Te Kopuru – twice weekly (summer) and weekly (winter).	Medium – Wastewater Overflows
Planned inspections	Modify the inspection programme as appropriate in response to maintenance trends.	Maintaining existing LOS.	
Planned – preventative maintenance pump stations, WWTPs, pipelines	Council will undertake a programme of planned asset maintenance to minimise the risk of critical equipment failure (e.g. pump overhaul) or where justified economically (e.g. Access Road re-seal).	Maintaining existing LOS. Cost/affordability.	Medium – Wastewater Overflows

Reticulation

The maintenance and operating strategy for wastewater reticulation is to retain the current LOS and acceptable level of risk while minimising costs. The strategies designed to meet the objectives of this AMP are described in Table 6-4.

Table 6-4: Pipeline maintenance and operating strategies

Asset failure mode	Action	Service criteria	Impact
Pipes – blockages,	Blockages to wastewater pipes cleared by rodding, root cutting or water blasting,	System capacity/reliability.	Medium – Reduced network capacity Wastewater Overflows
Reduced capacity,	Regular flushing by water blasting as identified by visual or video inspection.		
	Use of a suction truck to remove accumulations of material and raw wastewater.		

Asset failure mode	Action	Service criteria	Impact
Stormwater infiltration,	Video and smoke testing to identify illegal connections, breakages, obstructions and infiltration,		
Manholes infiltration, degradation,	All manholes inspected over a six year period to identify structural or infiltration problems.	System capacity/reliability.	Medium – Reduced capacity

Pump stations

The operating and maintenance strategy for pump stations is that all reasonable measures will be taken to ensure a continuous service is provided. The maintenance and operating strategies are summarised in Table 6-5.

Table 6-5: PS maintenance and operating strategies

Asset failure mode	Action	Service criteria	Impact
Pump stations – Mechanical or electrical failure.	Pump stations will be operated so that real time knowledge of flows and pumping hours can be obtained through the telemetry system.	Availability/reliability	Medium – Wastewater Overflows
	The pump stations will be inspected twice weekly to ensure pumps are operating satisfactorily.	System capacity	
	Annual mechanical overhaul, electrical check and general operational check of facilities.	Availability/reliability	
Pump stations complaints of odour.	Check ozone units for odour control (where applicable), twice weekly (daily for PS1) pump out wet wells and hose down grease and sludge.	Customer service	Low – Complaints on odour

The inspection requirements for pump stations required by the maintenance contract are detailed below, with the frequency noted as twice weekly, with the exception of the Dargaville PS1 which has a daily inspection frequency:

- Log book completed including pump hours and AMPs drawn while running;
- Check operation of all pumps and clear blockages;
- Check ozone units and/or odour control devices;
- Pump out and clean wet wells, remove all grease and sludge;
- Record evidence of overflows and advise of damage or impact, advise NRC;
- Test alarms; and
- Download telemetry data and record any relevant information for monthly report.

This inspection programme is supplemented by more detailed annual inspection that is used to determine any renewal or upgrading requirements. The timing of the annual inspection is undertaken to enable the results of the inspection to be incorporated into the annual planning round.

The annual inspection includes:

- Detailed mechanical check of all pumps, motors and valve gear;
- Electrical check of all electrical equipment;
- Review of all telemetry;
- Maintenance of accesses, water-blasting of the wet well and removal of accumulated debris;
- Preparation of a report to note maintenance, renewal and upgrading requirements;
- To date maintenance of pump stations has been restricted largely to where a problem obviously exists. Diagnosis of problems other than by cursory inspection has been very restricted; and
- Pump station maintenance is currently conducted only on ‘essential’ or ‘critical’ equipment on a contract basis. All maintenance work is carried out by the Utilities Contractor. Emergency work is also undertaken under this contract and is commenced upon notification received from the Help Desk or SCADA-GSM alarm. Other upgrades are contracted separately in accordance with the technical demands of the work.

Treatment

Each WWTP is operating under a resource consent approved by NRC. This considers the various legislative requirements along with the views of the community. During the consent application process, Council will liaise with the various affected parties and particularly the Department of Conservation and relevant Iwi groups.

The Operational Plan will be driven by resource consent conditions in the first instance and then the technical requirements of each system. Typical considerations include:

- Monitoring the quality of effluent discharge;
- Control of the quantity of discharge;
- Monitoring the operation of the plant in terms of odour or appearance;
- Control of vegetation;
- Amenity issues relating to operation; and
- Reporting performance to NRC.

With the negotiation of trade waste agreements it will be necessary to add requirements to monitor the quality of the effluent coming into WWTPs from various commercial users.

The majority of the WWTPs in the Kaipara district are very simple operations and require only periodic inspection to ensure continuous operation. Human input is limited to:

- Cleaning and calibrating equipment;
- Remove floating debris from the oxidation pond;
- Regulate the operation of the aerators to achieve desired levels of dissolved oxygen;
- Remove any build-up of weeds;
- Testing oxidation pond parameters; and
- Unblocking spray system.

The exception is the Maungaturoto membrane filtration plant, which requires a number of additional operation/maintenance tasks.

The maintenance and operating strategies for WWTPs are summarised in Table 6-6.

Table 6-6: WWTP maintenance and operating strategies

Asset failure mode	Action	Key service criteria	Impact
WWTP – treatment process not effective.	Regulate dissolved oxygen levels through use of the aerators.	System effectiveness.	Medium/High.
	Monitor effluent pH levels.		Abatement notice for non-complying discharge.
Cost efficiency.	The plant will be operated to minimise electricity and maintenance costs while achieving effluent quality standards.	Cost/affordability.	Low – increased costs.
Mechanical equipment.	Regularly check the operation of mechanical assets and on monthly basis, service the aerators and arrange repairs as required by the contract. Monitor spray irrigation system and unblock as required.	Reliability	Medium/High.
Premature failure.			Abatement notice for non-complying discharge.

6.2.2 Expenditure forecast

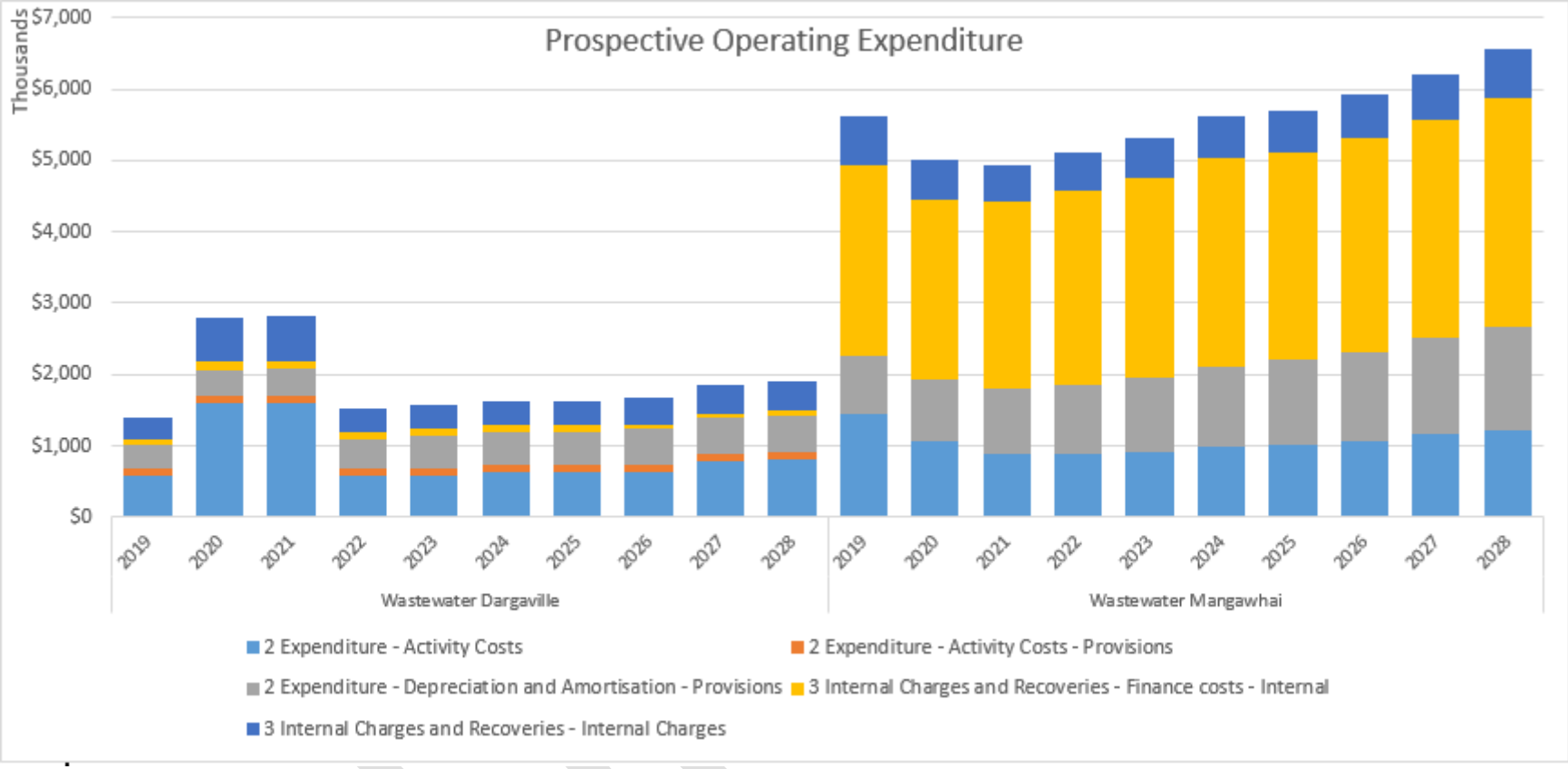
The 10 year forecast for operations and maintenance costs for wastewater assets in the Kaipara District are shown in the following graphs.

They do not provide for inflation over the 10 year period and do not include the following :

- Costs that would be allocated by Finance including depreciation, interest charges, write-offs and land rates payable for land occupied by facilities
- Costs associated with Water Services staff

The graphs do not differentiate between operational and maintenance costs as this distinction is somewhat arbitrary and does not provide useful information.

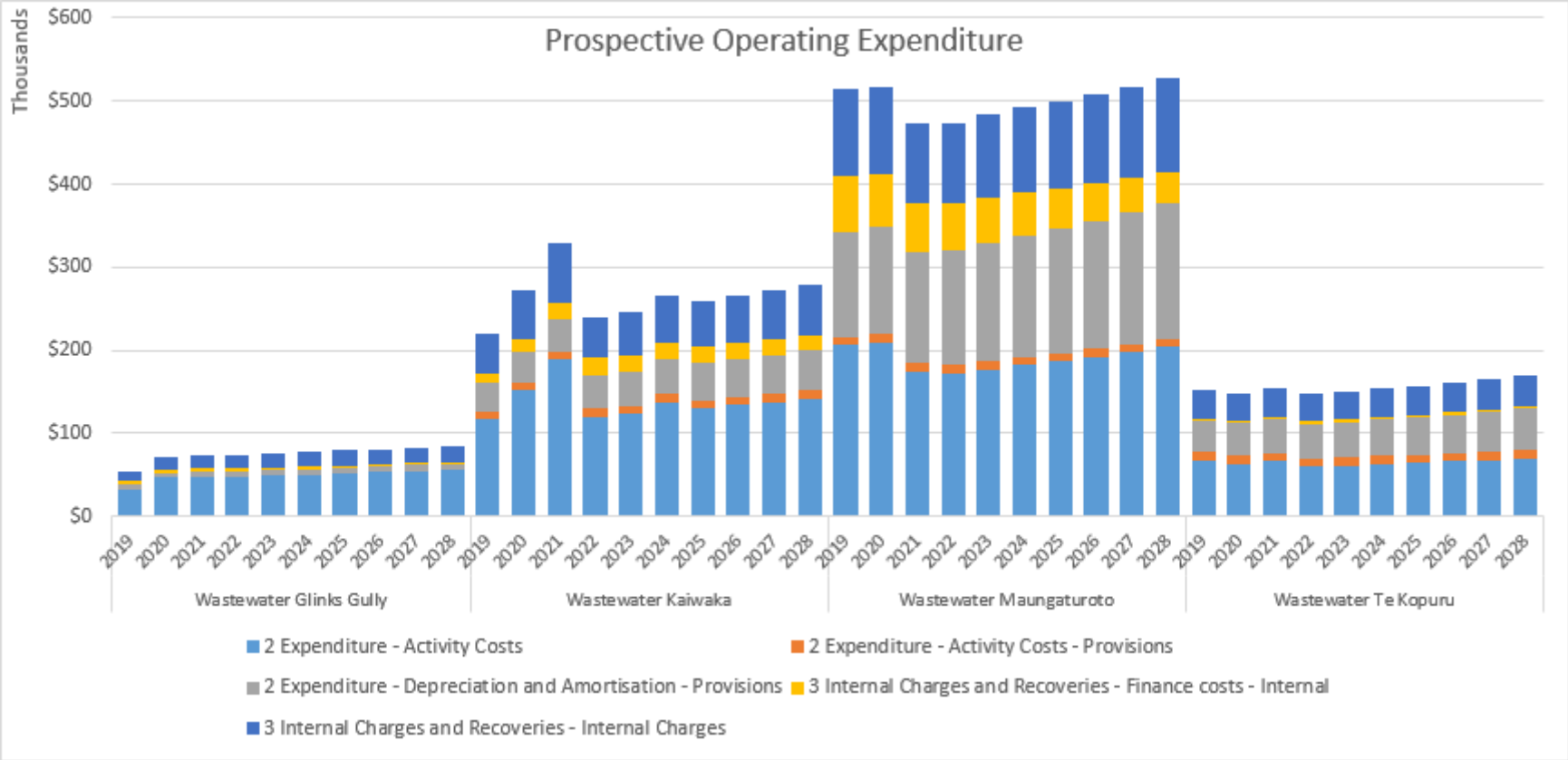
Figure 6-2: 10yr operating cost projections for Dargaville and Mangawhai



The cost spike for Dargaville as shown above relates to funds allocated over two years for pond desludging.

The gradual increase for Mangawhai reflects population growth influence on maintenance and operating costs and growth in power costs reflecting population growth and recent increases in power cost above the rate of inflation.

Figure 6-3: 10yr operating cost projections for small schemes



Variations over the first three years for all the small systems reflect activity in Management Services budgets for asset condition investigations and capacity assessments.

Details of the 10 year operational cost forecasts are included in Appendix A.

6.3 Renewals strategy and expenditure forecast

6.3.1 Strategy

Renewal expenditure is major work that does not increase asset 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.

Council's renewal strategy is focused on a "just in time" approach; to rehabilitate or replace assets when justified by condition and where there is a significant reduction in performance or where justified by the asset's criticality.

The current lack of data relating to asset condition, performance and/or maintenance history prevents Council from developing a renewal strategy based on these criteria. Consequently, the current renewals programme is broadly based on asset life, further modified through local knowledge and experience gained from the maintenance contract staff and local resources on asset performance. Council's current renewal strategy is presented below.

Assets are considered for renewal as they near the end of their effective working life or where the cost of maintenance becomes uneconomical and when the risk of failure of critical assets is sufficiently high.

Council's renewal programme has been developed by:

- Taking asset age and remaining life predictions from the valuation database, calculating when the remaining life expires and converting that into a programme of replacements based on valuation replacement costs; and
- Reviewing and justifying the renewals forecasts using the accumulated knowledge and experience of asset operations and AM staff. This incorporates the knowledge gained from tracking asset failures through the customer services system, known location of pipe breaks and overflows, and contractor knowledge.

When justifying renewals the following factors are considered:

- **Asset performance**: Renewal of an asset when it fails to meet the required LOS. The monitoring of asset reliability, capacity and efficiency during planned maintenance inspections and operational activity identifies non-performing assets. Indicators of non-performing assets include repeated and/or premature asset failure, inefficient energy consumption, and inappropriate or obsolete components.
- **Risk:** The risk of failure and associated financial and social impact justifies action (e.g. probable extent of damage, safety risk, community disruption);
- **Economics**: It is no longer economic to continue repairing the asset (i.e. the annual cost of repairs exceeds the annualised cost of renewal). An economic consideration is the co-ordination of renewal works with other planned works such as road reconstruction; and

- **Efficiency:** New technology and management practices relating to increased efficiencies and savings will be actively researched evaluated and, where applicable, implemented.

The renewal programme is reviewed in detail at each AMP update (three yearly) and every year the annual renewal programme is reviewed and planned with the input of the maintenance contractor.

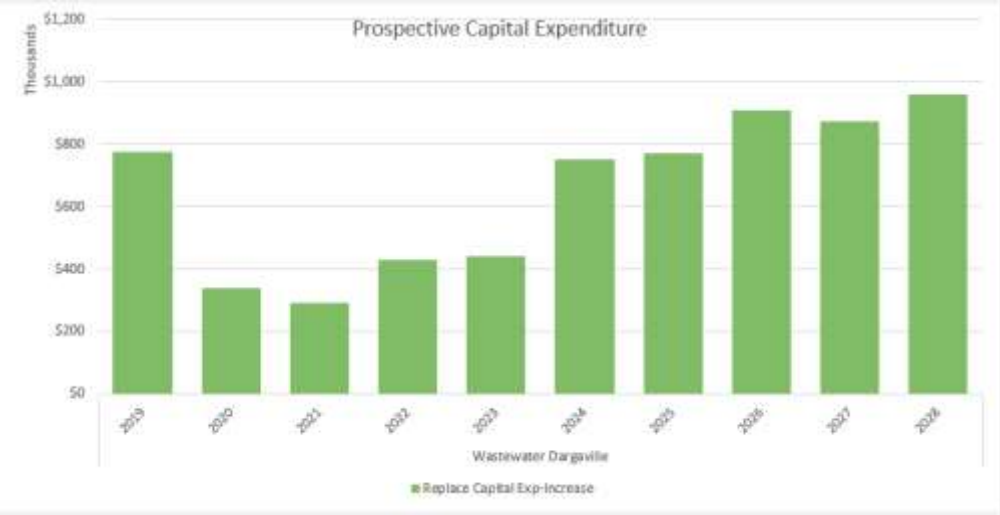
If work is deferred for any reason, this work will be re-prioritised alongside the next year's renewal projects and a revised programme established.

Renewal works identified by way of the above renewal strategies may be deferred if the cost is beyond the community's ability to fund it. This situation may arise if higher priority works are required on other infrastructure assets; short term peaks occur in expenditure or if an inadequate rating base exists.

When renewal works are deferred, the impact of the deferral on economic inefficiencies and the scheme's ability to achieve the defined service standards will be assessed. Although the deferral of some renewal works may not impact significantly on the short term operation of assets, repeated deferral will create a liability in the longer term.

6.3.2 Dargaville renewals

Figure 6-4: 10yr Dargaville projected renewals



Dargaville projected renewals over 10 years are visually represented above and in more detail in the financial tables in Appendix A of this document.

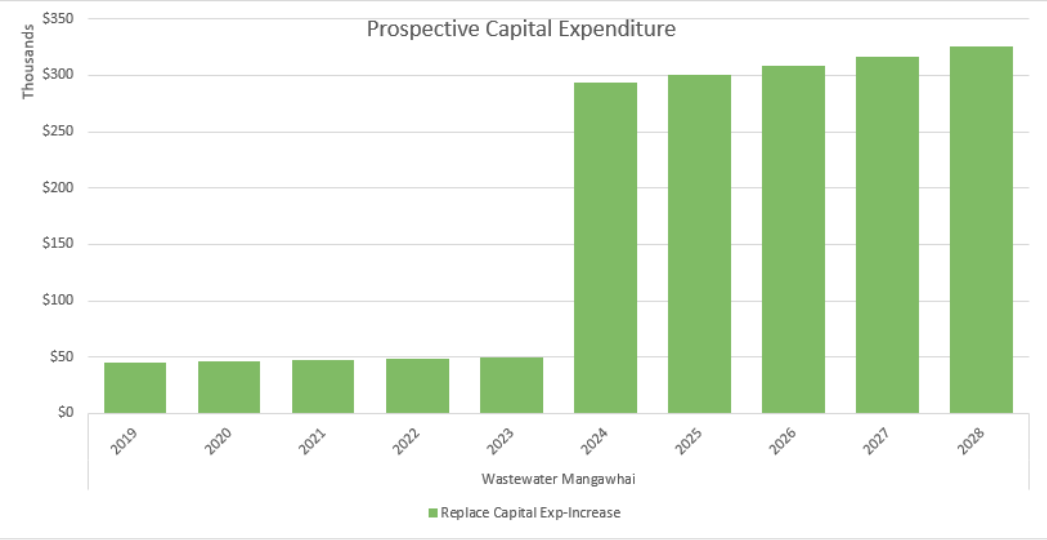
Reticulation –Reflects the expected need to renew the oldest GW pipes in the system with an expected life of 80 years. Revising the expected life of AC pipes to 60 years, from 40 years, has pushed the renewal expectation for these pipes out beyond the 10 year forecast.

Pump stations and rising mains – Dargaville has a large number of pump stations and renewal expenditure is forecast over 10 years. The major upgrade of PS1 and PS2 is included as a LOS project. Renewal expenditure is to provide for ongoing minor renewals as required.

Treatment –Desludging of the ponds is provided for in operational expenditure. Renewal expenditure is to provide for ongoing minor renewals as required.

6.3.3 Mangawhai renewals

Figure 6-5: 10yr Mangawhai projected renewals



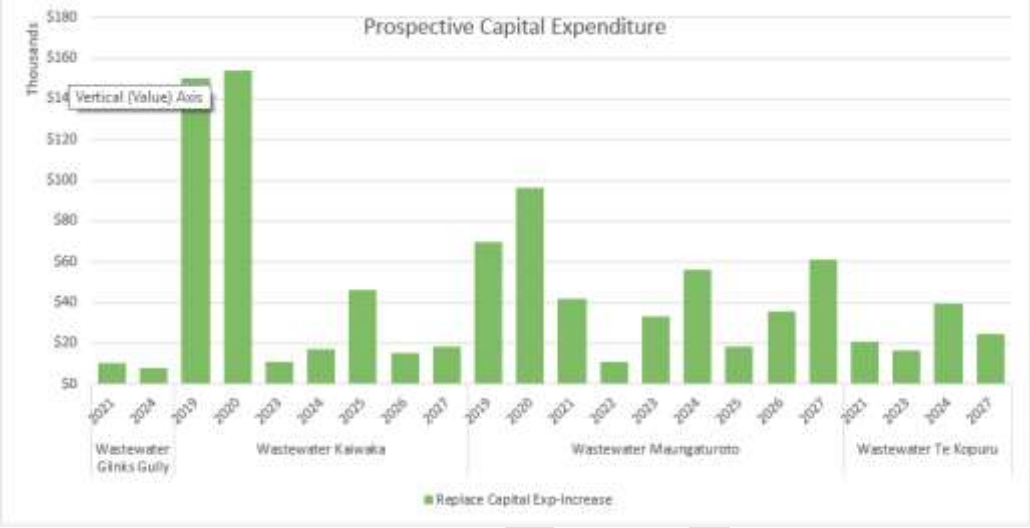
Mangawhai renewals are visually represented above and in more detail in the financial tables in Appendix A of this document.

Household pumps – Whilst the extent of this work is difficult to predict at this time. The work relates to the small pumps installed on properties for the pressure collection system which is believed to provide for some 300 households. Renewals are currently some $4,000 each and life expectancy is expected to be between 10 and 25 years. Many of the households connected to these pumps are holiday homes and it is not known if this will extend or shorten the expected life.

WWTP –Primarily relates to relatively short lived equipment that is part of the treatment process; some of which is already nominally overdue. This forecast is based on information contained in the asset valuation. A project is planned to look at this equipment in more detail and re-evaluate that likely renewal profile, and associated life expectancy of this equipment.

6.3.4 Small scheme renewals

Figure 6-6: 10yr small scheme projected renewals



Small scheme renewals are visually represented above and in more detail in the financial tables in Appendix A of this document:

Table 6-7: 10yr Small scheme renewal detail

Scheme	10 year renewals	Breakdown
Glinks Gully	As per table	Nominal provision for pump station and rising main renewals.
Kaiwaka	As per table	Nominal provisions for reticulation, pump station and treatment plant renewals.
Maungaturoto	As per table	Nominal provisions for reticulation, pump station and treatment plant renewals.
Te Kopuru	As per table	Nominal provisions for reticulation and treatment plant renewals.

6.4 New capital (asset creation, acquisition, enhancement) strategy and expenditure forecast

6.4.1 Strategy

New capital works are planned in response to identified service gaps, growth and demand issues, risk issues and economic considerations.

When evaluating significant development proposals, the following issues will be considered:

- The contribution the new or improved assets will make to the current and anticipated future LOS and community outcomes;
- The risks and benefits anticipated to be made from the investment;
- The risks faced by not proceeding with the development works. These could include safety risks, social risks and political risks;
- Ability and willingness of the community to fund the works; and
- Future operating and maintenance cost implications.

Significant development works will be prioritised and programmed with contributions from:

- Targeted user groups (e.g. special interest groups, industry groups, adjacent residents);
- The general community (through public consultation);
- Council staff and consultants that may be engaged to provide advice to Council;
- The LTP/Annual Plan process; and
- The elected Council (significant proposals are subject to Council decision and available funding).

When change within a community dictates changes to the infrastructure that services that community, Council will initiate preliminary studies to determine demand for a service or a change to the LOS provided to a community. To date the development of wastewater assets has largely been undertaken on a community by community basis.

Growth-related capital works are undertaken to extend the system to new properties or to provide additional capacity that is required to service those properties. It is important to separate out these costs as a portion of them may be recoverable as development contributions and it is also desirable that there is a degree of transparency in relation to what is being contributed by new residents versus existing residents.

LOS capital works are undertaken when the current asset is not able to provide/perform the desired LOS. This may relate to capacity, capability, safety, appearance etcetera. This may be driven by legislation change, resource consent requirements or customer aspiration. Continuing with the existing asset will generate a LOS gap.

In some cases a particular project may have elements of growth, LOS change and renewal. For instance a WWTP upgrade may increase capacity (to provide for growth), improve the level of treatment to comply with consent requirements (LOS change) and renew equipment that is reaching the end its economic life (renewal). Council's accounting rules will determine how this cost should be allocated as Council is required to report against these three drivers.

6.4.2 Growth CAPEX

The reported growth figures indicate that growth within reticulated communities in the Kaipara district will be low. There is no significant growth related projects in the district apart from Mangawhai.

Table 6-8: 10yr Mangawhai growth

It is anticipated that in the next 10 years, reticulation network of Mangawhai will grow significantly to cater for the growth. An investigation to identify the extensions necessary to the wastewater system to enable it to service most of the urban zoned area has been undertaken.

Various options were considered and **Option 2 : Reticulate pockets** is being pursued.

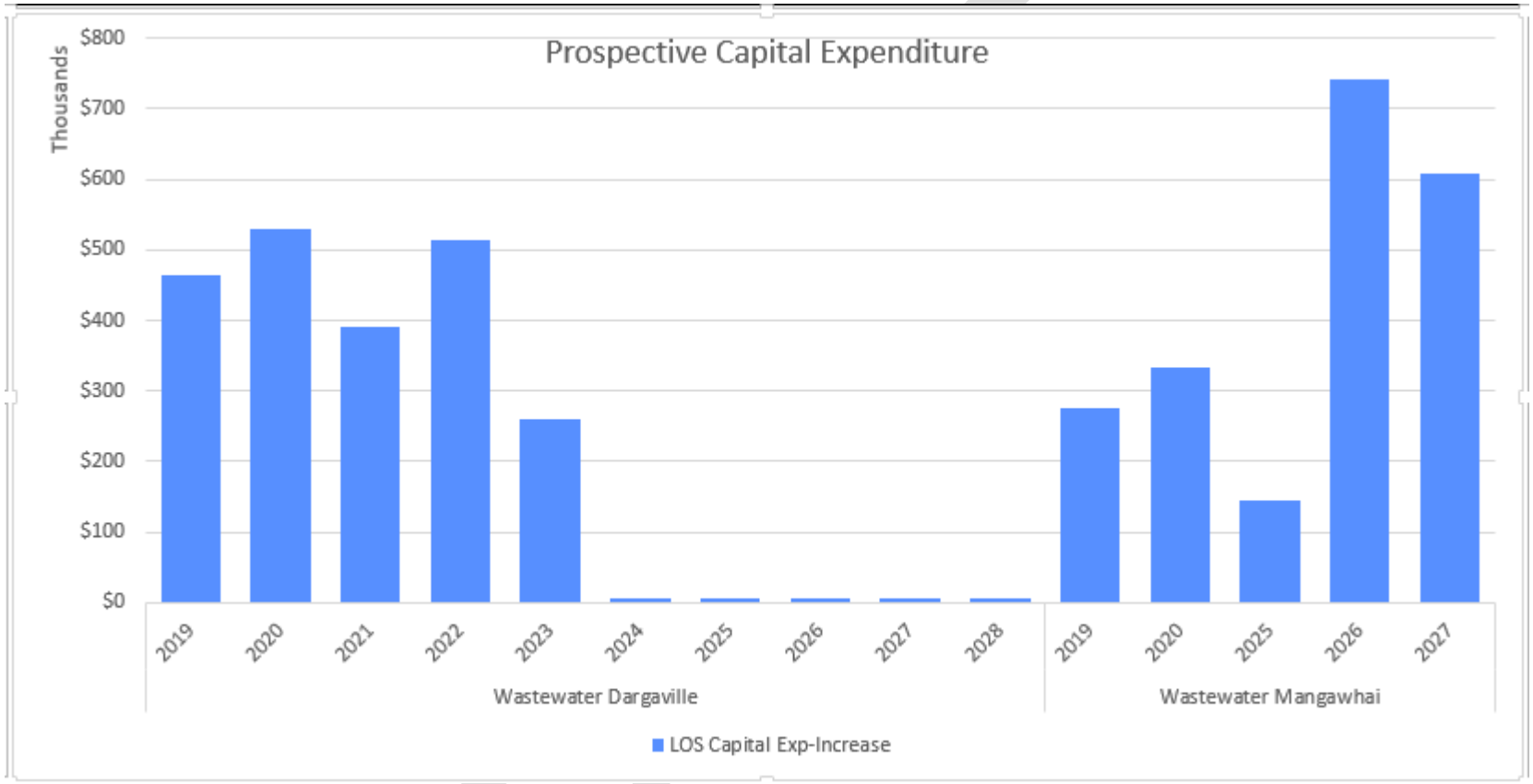
Table 6-9: 10yr Mangawhai growth detail

Item	Budget	Period
Extend irrigation system	As per table	2020/2021
Upgrade existing reticulation	As per table	Mostly 2019/2020
Extend reticulation	As per table	Evenly over 2020/2021 to 2030/2031
Upgrade WWTP	As per table	2018/2019 and 2019/2020
Additional capacity for growth – Council contribution	As per table	Evenly over 10 years

6.4.3 Level of Service (LOS) CAPEX

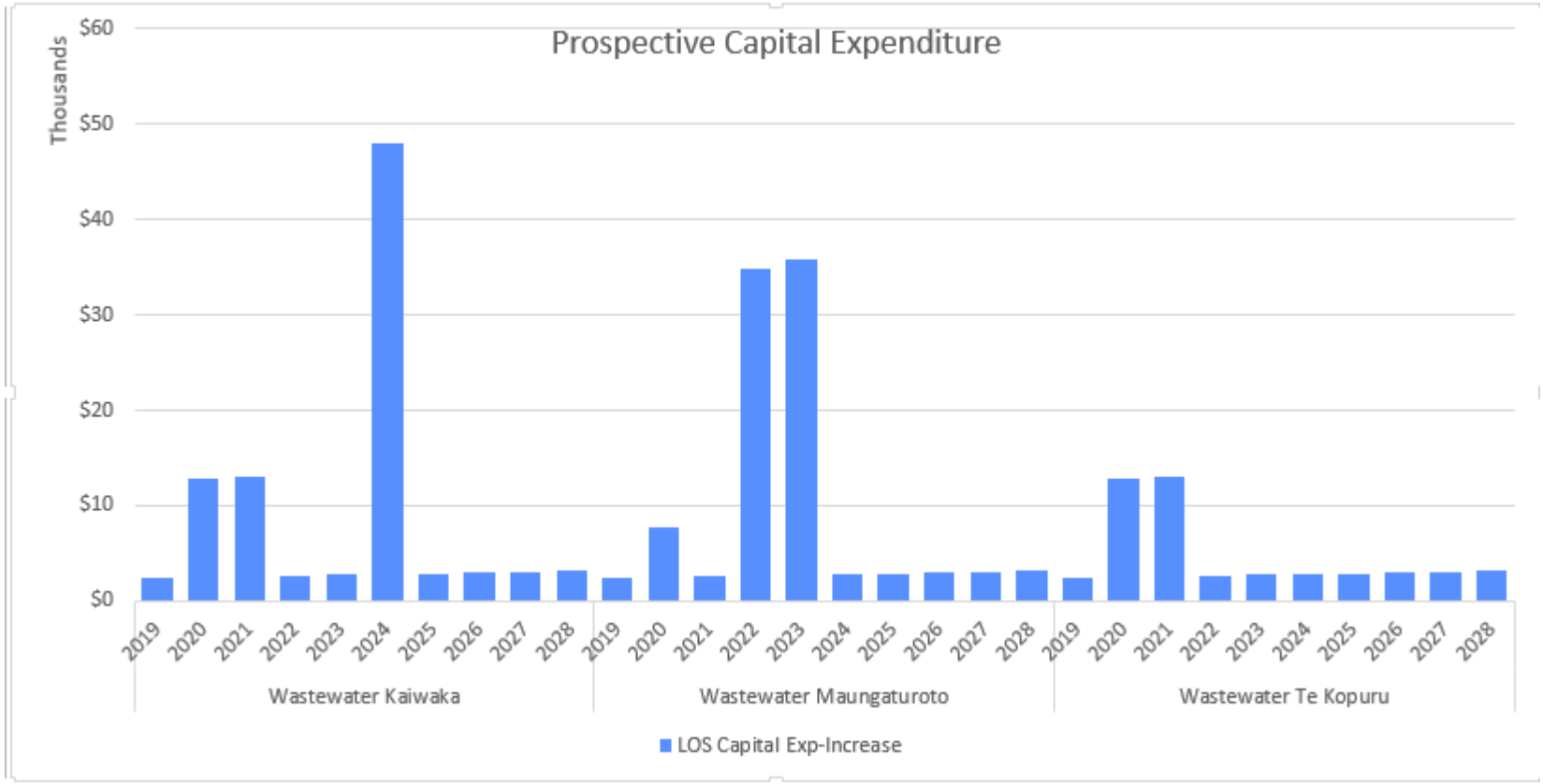
CAPEX related to LOS change is detailed below.

Figure 6-2: 10yr Dargaville and mangawhai LOS CAPEX



Dargaville and Mangawhai LOS CAPEX is shown above spread over 10 years. This is primarily associated with the upgrading of PS1 and PS2 and associated rising mains in Dargaville, and connecting current residents in Mangawhai to the existing WW scheme. While some of this can be associated with renewals the timing and nature of this project is primarily associated with reducing the number of wet weather overflows and this is a LOS driver. An amount of is also provided for installation of safety grilles on pump stations which is a safety enhancement.

Figure 6-3: 10yr small scheme LOS CAPEX



Small scheme LOS CAPEX over 10 years is shown above and in more detail in the tables in Appendix A :

Table 6-10: 10yr small scheme LOS detail

Scheme	10 year renewals	Breakdown
Kaiwaka	As per tables	SCADA upgrade for pump station Pond curtain for WWTP improvement Environmental compliance
Maungaturoto	As per tables	Pump station storage to improve wet weather containment (subject to capacity study Environmental compliance Grills on pump stations
Te Kopuru	As per tables	WWTP modifications (improve ammoniacal nitrogen removal) Environmental compliance

6.5 Asset decommissioning and/or disposal strategy and financial forecast

Council does not have formal strategy documents relating to asset disposals. When any such assets reach a state where disposal needs to be considered, Council will treat each case individually.

There are no current or planned areas of operation that Council wishes to divest itself of. Asset disposal therefore is a by-product of renewal or upgrade decisions that involve the replacement of assets.

Assets may also become surplus to requirements for any of the following reasons:

- under-utilisation;
- obsolescence;
- provision exceeds required LOS;
- uneconomic to upgrade or operate;
- policy change;
- service provided by another means (e.g. private sector involvement); and
- potential risk of ownership (financial, environmental, legal, social, vandalism).

Depending on the nature and value of the assets they are either:

- made safe and left in place;
- removed and disposed to landfill; and/or
- removed and sold.

Council follows a practice of obtaining best available return from the disposal or sale of assets within an infrastructural activity and any net income is credited to that activity.

As AC mains are replaced, they will often become an abandoned service, which then become the property of the roading authority and can be used as ducting for telecoms and other services.

Council propose to review the layout and hydraulic characteristics of the Dargaville wastewater network in order to identify opportunities to reduce the number of pump stations within the network. If any such opportunities do arise, the disposal of the pump stations will be considered at that time.

6.6 Depreciation (loss of service potential)

Service potential is defined as 'the economic benefit embodied in assets that over time declines as the assets age and deteriorate'. Depreciation is charged annually to recover from the users of services the equivalent annual decline in service potential. Renewals are undertaken to restore it. The loss (or gain) in service potential over time can therefore be described as the difference between the annual renewal and depreciation provisions.

If this figure is negative, the renewals undertaken in that year are lower than the financial depreciation. This would be expected when assets are young, but over the life of all assets the accumulated figure would be expected to be close to zero if the assets were being sustained indefinitely. Service potential is restored through renewals and is effectively funded through the annual depreciation charge.

The following graphs illustrate the renewal versus depreciation over 30 years based on the indicative extent of renewals indicated by the valuation information and then over 10 years based on actual renewals envisaged for this period (including the three years of the LTP).

They illustrate that over the next 10 years the depreciation charge exceeds that extent of renewals required over that period. Over 30 years the concentrated renewals associated with some of the smaller systems appears on the renewal profile and there will likely be five year periods where renewal expenditure exceeds the depreciation charges during that time. This illustrates the somewhat tenuous connection between renewals and depreciation. What is important is ensuring that Council has the financial capacity (from all funding sources) to undertake the necessary works as the need arises. This includes both operational and capital expenditure.

Previously, Kaipara district rates have not included a component for depreciation, meaning users of the asset were not contributing to the asset's eventual replacement costs. Council is now progressively moving towards a position whereby it is fully rate- funding depreciation.

Figure 6-4: 30yr depreciation vs projected renewals based on valuation data

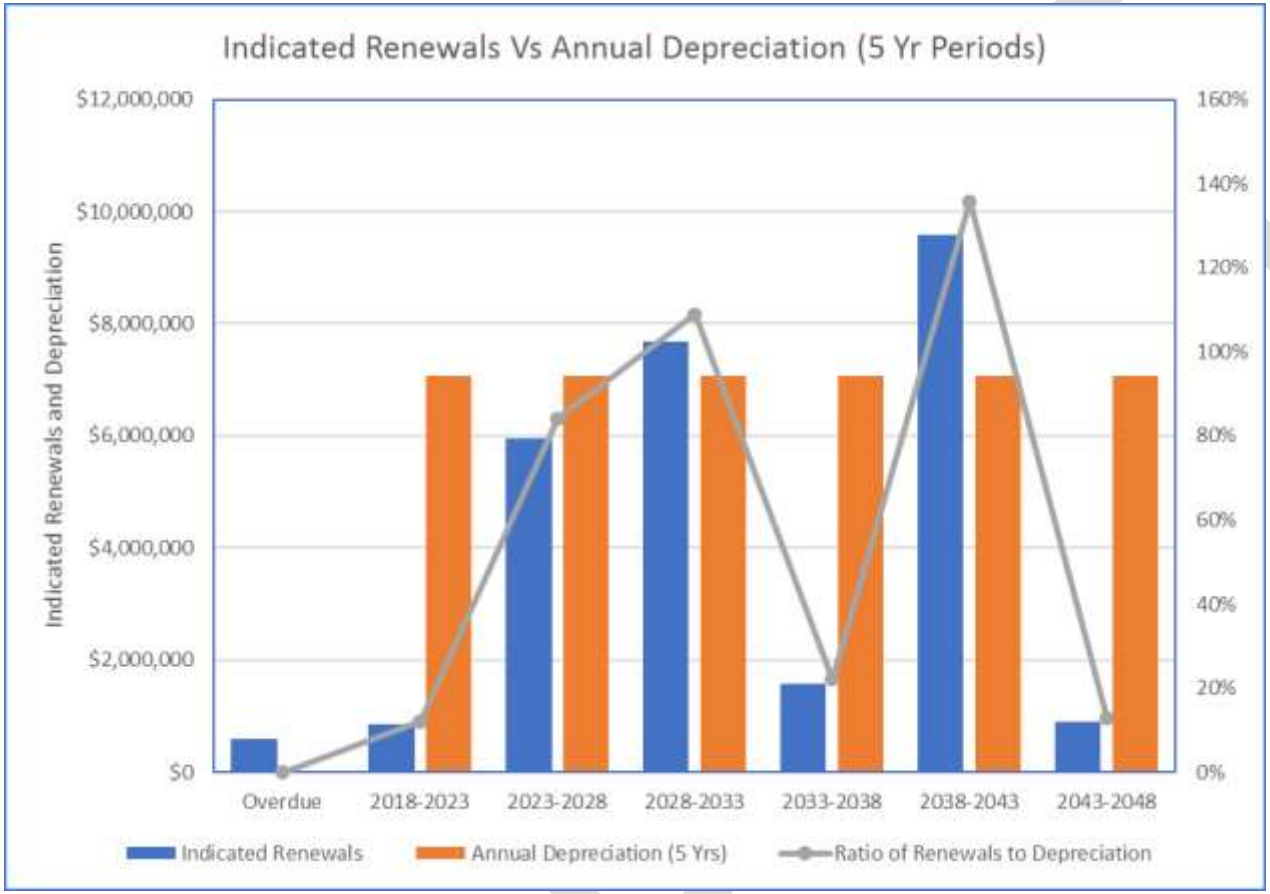
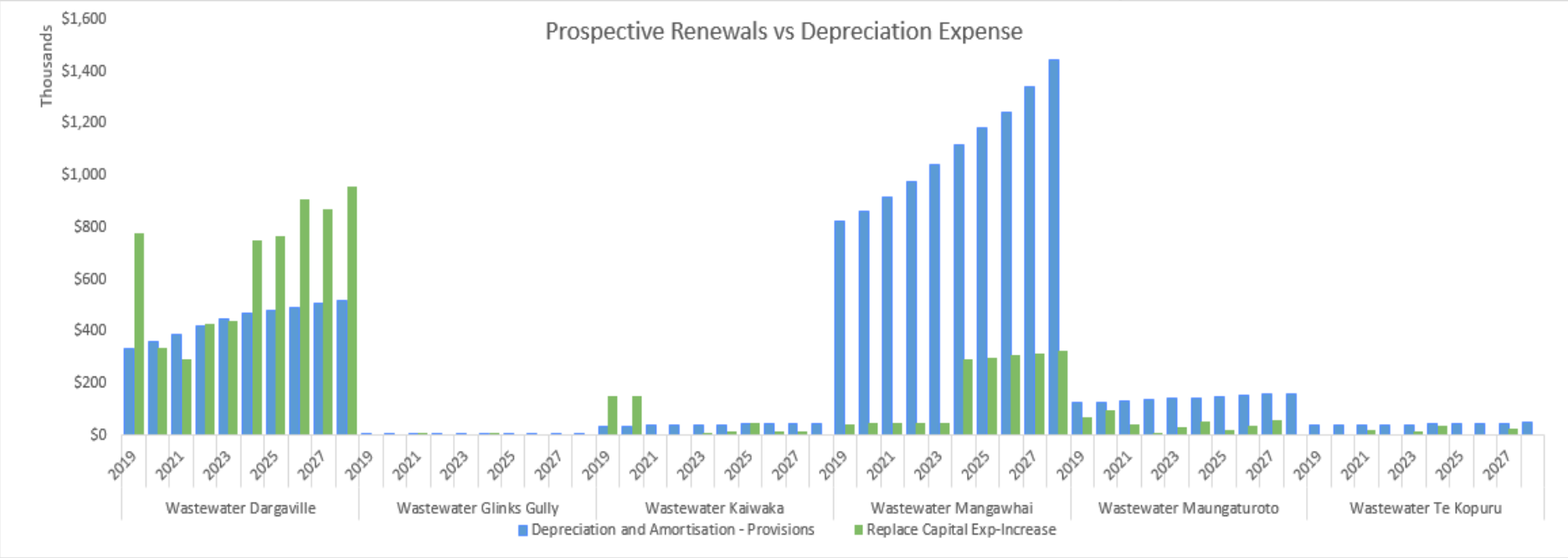
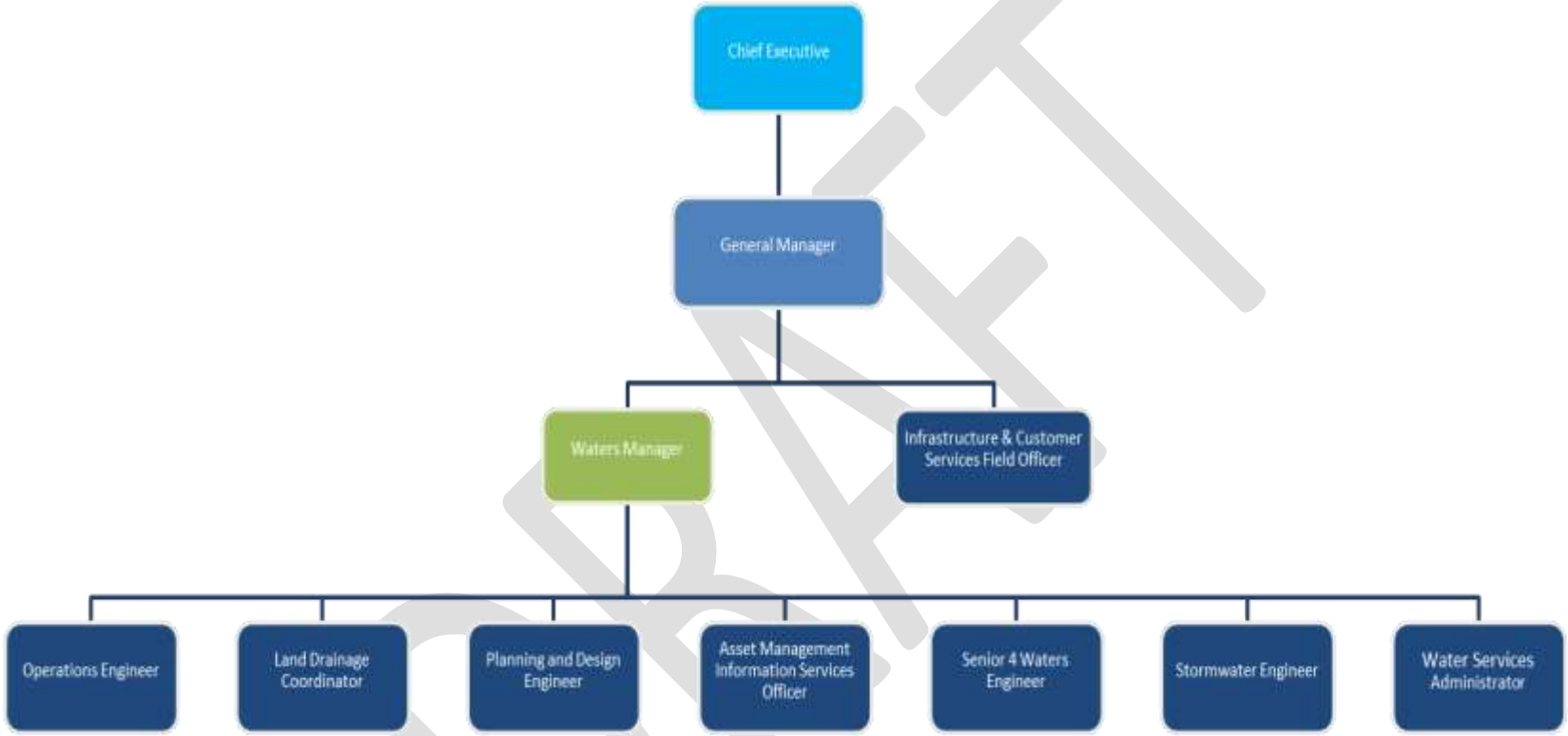


Figure 6-5: 10yr depreciation vs projected renewals



7 Organisation

Figure 7-1: Water Services Organisational structure



8 Asset management systems and processes

8.1.1 Asset management systems

Access to effective information systems is essential for asset managers to help them store and analyse asset information to make good AM decisions. Council uses the support tools listed in Table 8-1 to manage the wastewater business:

Table 8-1: AM support tools

System name	System purpose	Purpose
MapInfo (GIS)	Asset location	The location of assets are stored within tables and represented spatially via a series of points, lines or regions.
AssetFinda	Asset register	Details on the assets size, material, date of installation and other related information for water supply, wastewater and stormwater assets are recorded within AssetFinda.
NCS	Accounting	Council accounting and financial systems are based on NCS software and GAAP Guidelines.
Aquavision	Telemetry	The performance of the wastewater pumping stations is monitored via the Aquavision telemetry system.
Advanced information	Telemetry	The performance of the treatment plants and pumping stations is monitored via the advanced information telemetry system.
SCADA	Telemetry	Newly installed SCADA at various wastewater assets helps in daily operations of WWTPs and pump stations and also helps in meeting resource consent requirements.

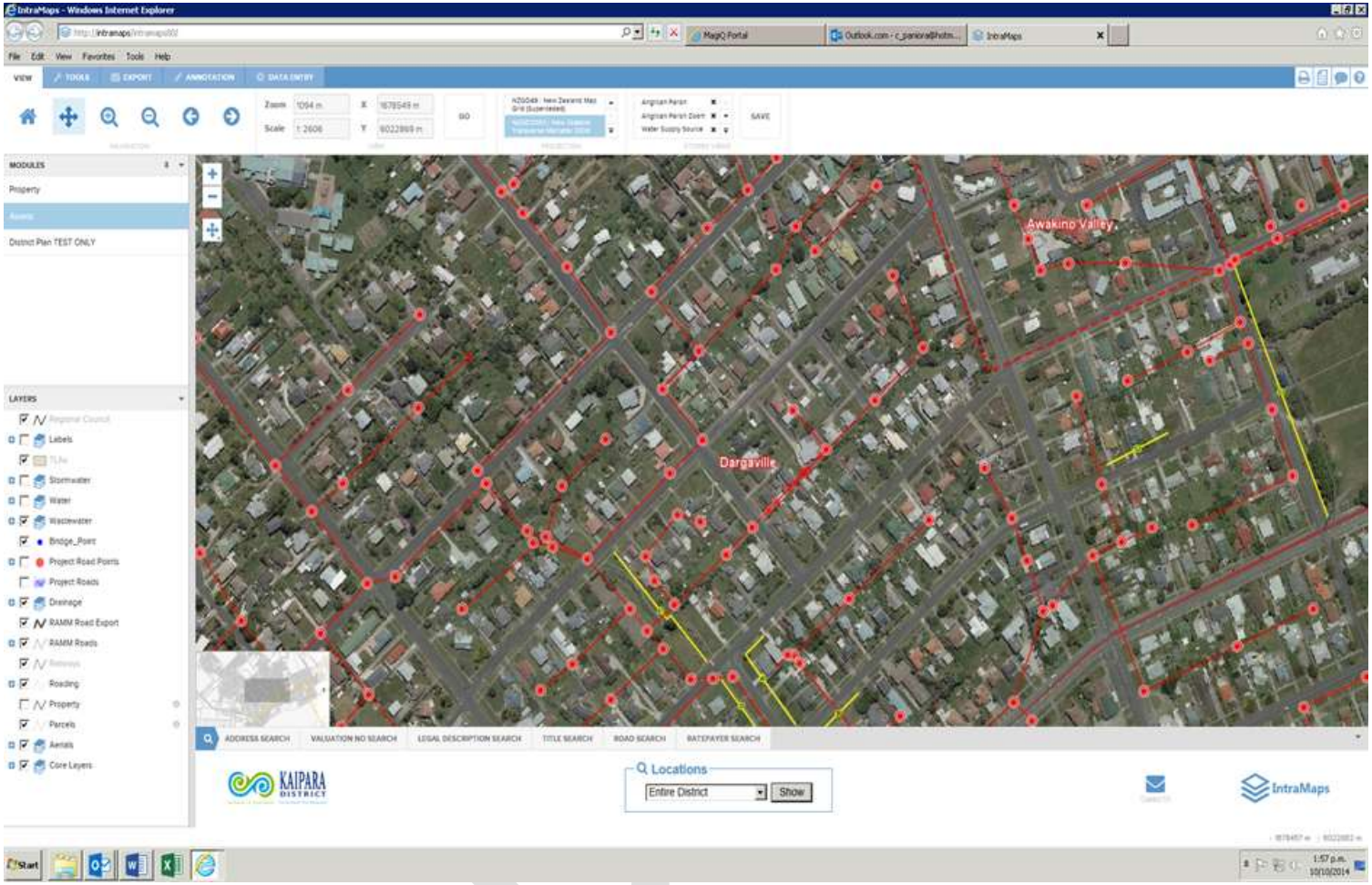
8.1.2 IntraMaps

The IntraMaps GIS system is the core system used to store and display the spatial data related to Council's water services assets i.e. water supply, wastewater and stormwater.

The MapInfo system provides the information supporting the IntraMaps system, which is widely used within Council as a user friendly interface to the GIS asset data, enabling quick access to asset location and asset attribute information.

A screenshot of the IntraMaps system is shown in Figure 8-1 below:

Figure 8-1: IntraMaps screenshot



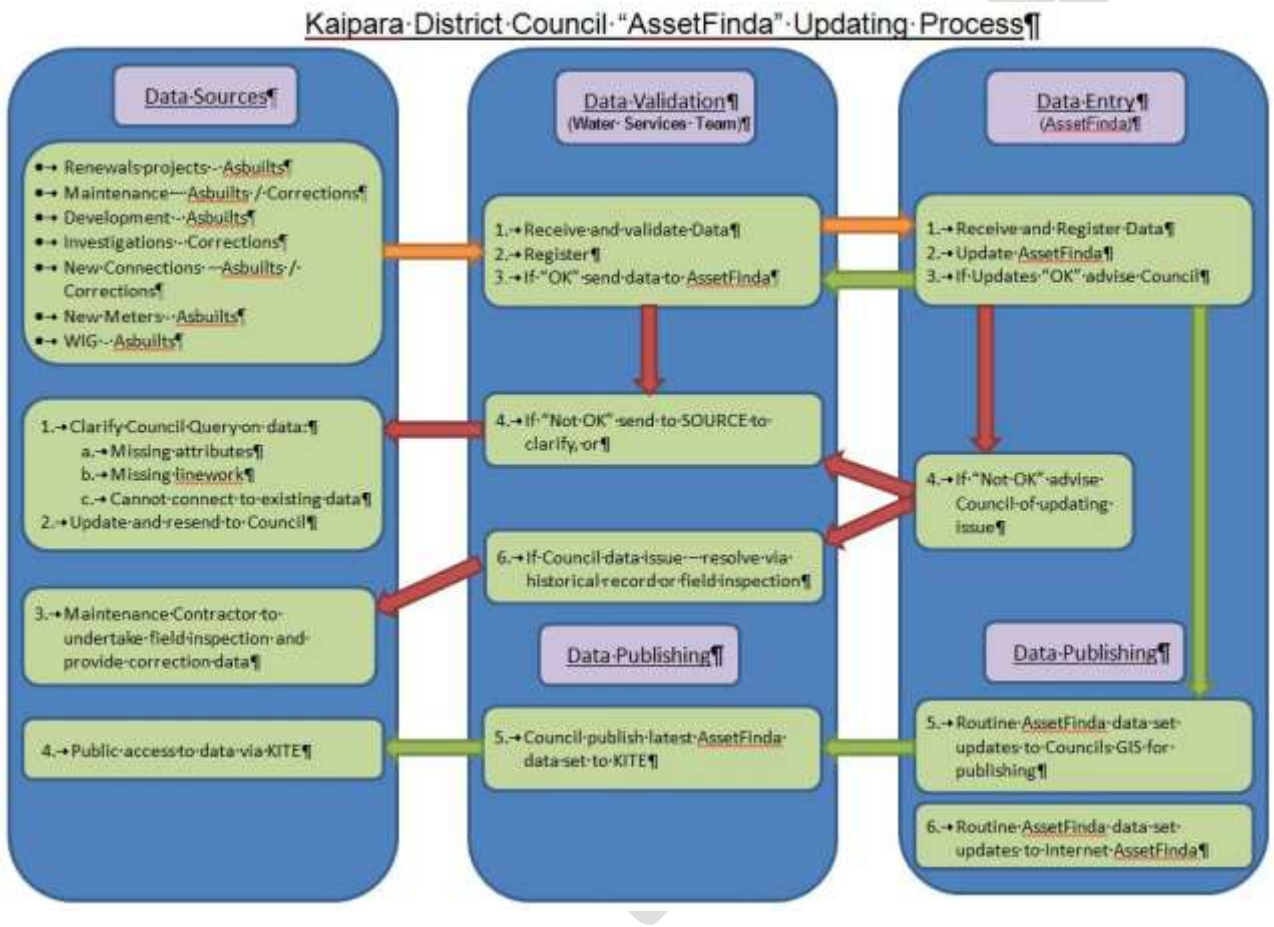
The representation of the assets within this system is believed to be reasonably comprehensive although gaps and inaccuracies in the data are known to exist. A data improvement task has been identified and included in the AMIP to investigate and resolve the known anomalies where possible.

Ongoing data improvement and identification and resolution of data anomalies will be resolved primarily through the maintenance contract and projects as works are completed on the network.

The MapInfo system is externally hosted and is updated as as-built information is received, and passed on via the data maintenance process. As-built data is sourced from new development, capital works projects and from the Maintenance Contractor.

The data maintenance process is represented in Figure 8-2 below.

Figure 8-2: Data maintenance process



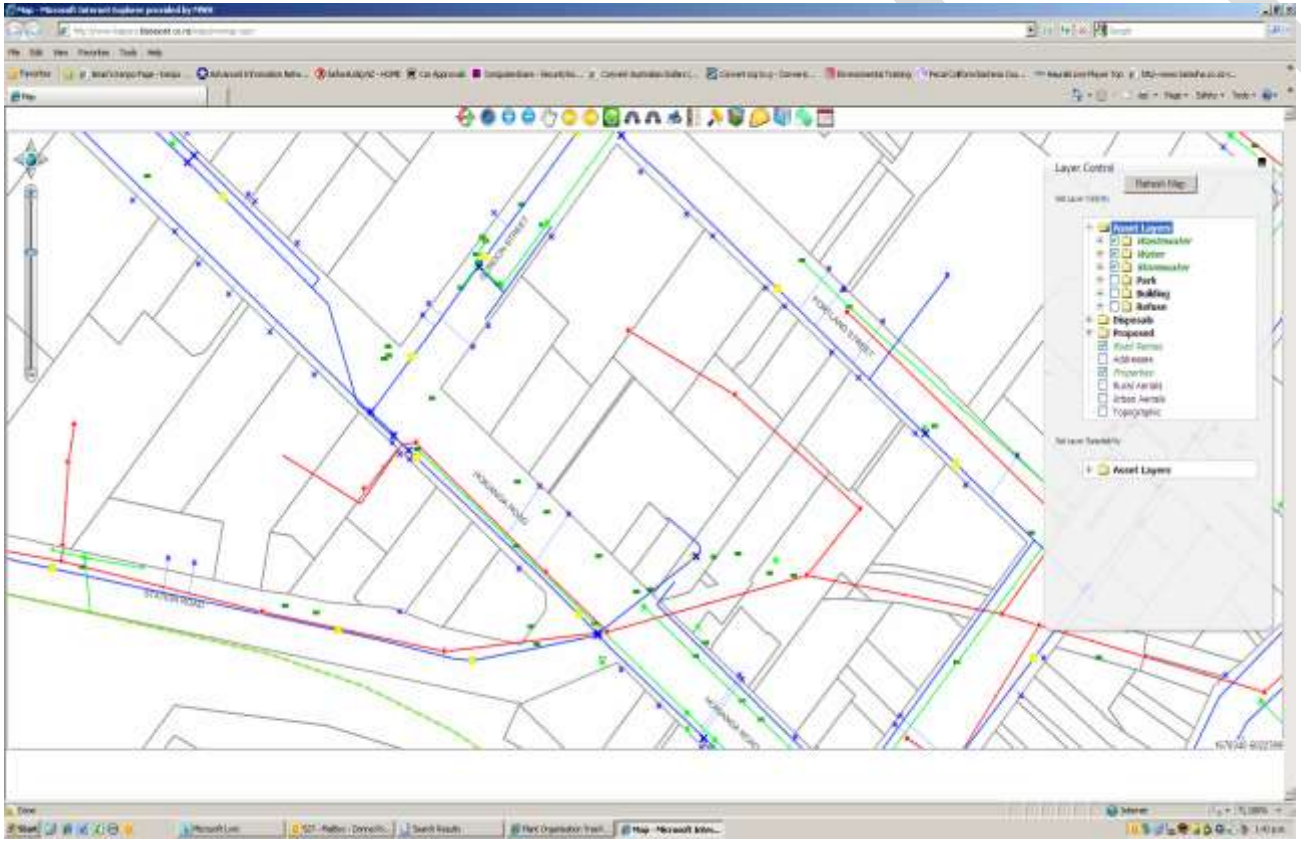
8.1.3 AssetFinda

The Assetfinda system is a MapInfo-based tool used to record asset-related information. This currently includes basic asset descriptors including asset name, size, material, install date, invert levels, condition and performance. The completeness of the data within these fields is highly variable and the accuracy cannot be currently qualified.

The system was recently upgraded from a table-based system to web enabled. The system is externally hosted and maintained.

A screenshot of the Assetfinda system is included in Figure 8-3 below:

Figure 8-3: AssetFinda screenshot



The system has the ability to:

- undertake asset valuations and depreciation calculations for the water supply, wastewater and stormwater assets, however, this functionality has yet to be implemented on Council's data; and
- record various maintenance activities against the asset. This capability has yet to be fully defined and implemented.

There is a need for this system to be further enabled and the supporting processes implemented to ensure appropriate maintenance activity data and condition and performance data collected from the field, can be uploaded in the system and used for monitoring the decline in asset serviceability and determination of timing for asset renewal.

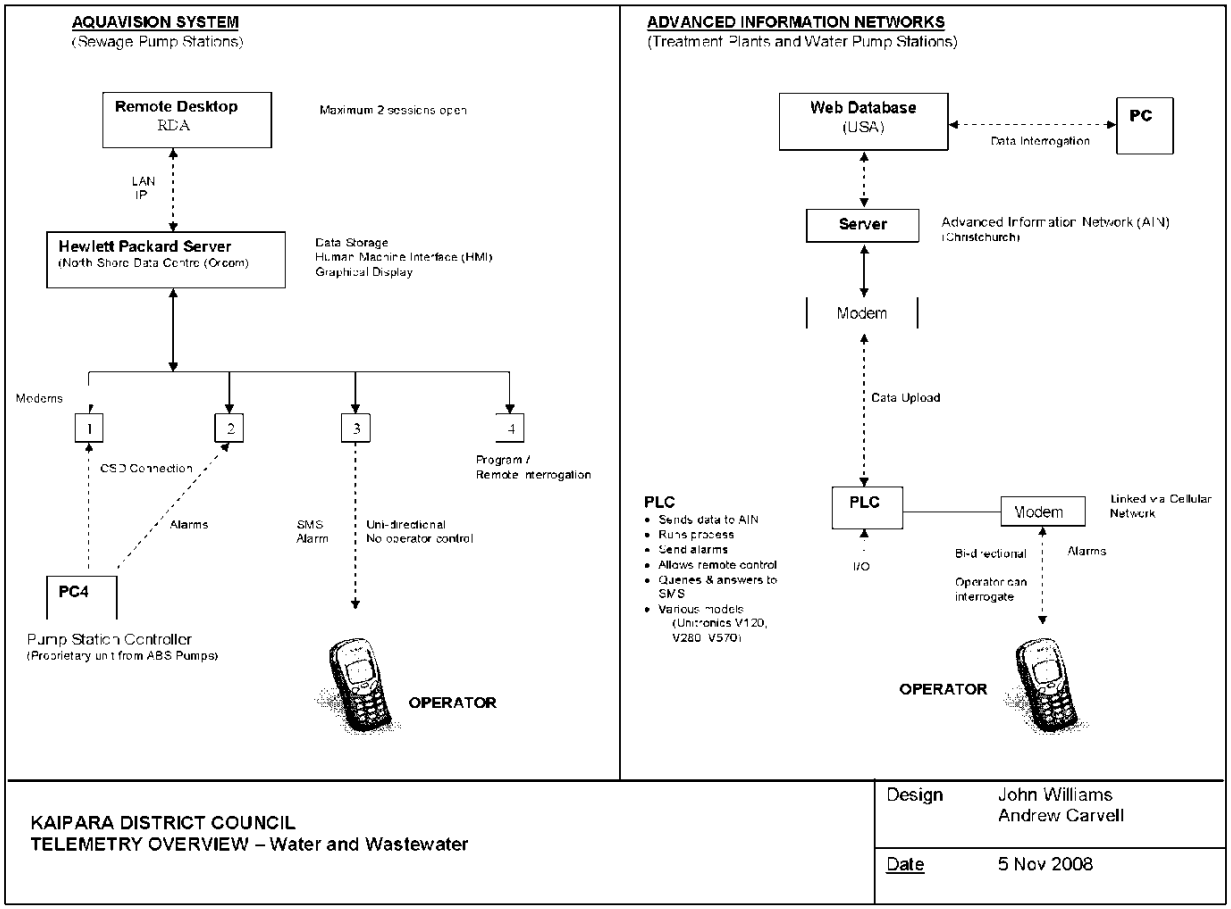
An improvement item has been identified to enable the AssetFinda system to be modified for the recording of this information.

8.1.4 Telemetry

Council operates a GSM telemetry system that monitors various characteristics (flows, levels, pH and turbidity) via daily email and SMS texts to operator's mobile phone. Council is in the process of upgrading the telemetry system to a full-blown SCADA system which will be rolled out to all sites progressively and will provide control, alarm notification, reporting and access to data.

An overview of the current system is provided in Figure 8-4 below.

Figure 8-4: Aquavision telemetry system overview



Data generated through telemetry monitoring is used to demonstrate compliance of treatment plants with the NZDWS, resource consent compliance and to monitor the performance of the treatment systems, reservoir levels and pumping station levels.

The current telemetry system has developed over a number of years and whilst initially providing adequate operational assistance, the Operators are frustrated at the lack of access to the monitoring system and data to assist with operational decisions and consent reporting.

The robustness and cost-effective nature of the service is now being questioned, and a more open web-based system is considered necessary. The development of a telemetry upgrade and implementation plan has been undertaken in 2013 and is being implemented in 2014.

It is anticipated that the system will be upgraded in a prioritised manner over 2014/2016.

8.2 Potential negative effects

The wastewater management activity is an essential service that we provide to our communities and the environment. Discharges from the wastewater network via system failures or pipeline breakages could result in contamination of waterways and environmental or public health risk and can impact upon cultural, social, environmental and economic well-being.

Guidance on the design and construction of new wastewater networks is provided in Chapter 7: Wastewater Reticulation and Onsite Treatment; Engineering Standards 2011, published by Council. Holistically the design of systems in accordance with the Standards will minimise the impacts of wastewater discharges on the receiving environment; however, it is acknowledged that differences in design standards between old and new systems can result in a disparity between LOS provided throughout the network.

This AMP describes Council's wastewater assets and details the practices used to manage those assets which helps to reduce possible negative effects and risks. Council mitigates these potential negative effects by a mix of asset management planning activities including:

- Asset development work;
- Monitoring and testing;
- Demand management initiatives; and
- Public education, including water conservation programmes.

9 Risk management

Risk Management is undertaken to identify specific business risks associated with the ownership and management of wastewater assets and to determine the direct and indirect costs associated with these risks.

Council has adopted a Risk Framework at a corporate level and this is included below.

Council is familiar with the risks associated with each wastewater scheme, however it has not formalised a risk management strategy. A Criticality Framework was defined in 2016 and this is summarised above. This utilises slightly different, but nonetheless aligned, definitions to the corporate Framework. However, this is only half of the risk equation with the other portion being the LOF. The highest risks are associated with assets that have elevated criticality and a relatively high LOF, typically generated by deterioration of the asset due to aging or environmental attack.

A detailed assessment of the LOF has not been undertaken for each of the wastewater assets considered to have Moderate or High criticality and generally these criticalities were assigned to types of assets, or specific circumstances, rather than specific assets.

While a particular type of asset will be assigned a criticality group e.g. pipes under buildings are ‘High’ the actual risk level of a particular pipe under a building could vary considerably. If the pipe was relatively new, or recently confirmed to be in good condition by CCTV survey, the risk might be appropriately described and managed, as Moderate. Conversely if the pipe is approaching the end of its expected working life and/or confirmed to be in poor condition then the Risk would elevate to High and a quite different management response would be required.

Generally, criticality relates to the impact of failure and this does not usually change during the life of the asset i.e. the vertical column that the asset is in does not change. LOF is closely aligned with asset condition and typically the likelihood of failure will increase as the asset ages i.e. the asset will move up the vertical column on the risk matrix to a higher risk level. Therefore risk management relies on ongoing review of the status of particular assets with the Criticality Framework providing a useful guide to which assets warrant the most attention.

Figure 9.1: KDC risk framework

Kaipara District Council Risk Framework for Water Services - November 2015

			Low Criticality		Moderate Criticality	High Criticality	
			Impact				
Likelihood		Inserted *AEP & Return Period (Yrs) ?*	**1 Insignificant** Little of no effect	**2 Minor** Some effects but well within tolerable limits	**3 Moderate** Will have effects but within tolerable limits	**4 Major** Will have effects beyond tolerable limits. Remedial action required.	**5 Extreme** Will have effects. Too late of costly to take remedial actions
Score	Name						
5	**Almost Certain** Event is a frequent occurrence and will generally have an established history of occurrence	*0.5* *2 years*	M *This could be L to align with approach*	H *This could be M to align with approach*	H	E	E
4	**Likely** Event is a regular event that is predictable	*0.2* *5 years*	M *This could be L to align with approach*	M	H	H	E
3	**Moderate** Event occurs occasionally but is not reliably predictable	*0.1* *10 years*	L	M	M	H	H
2	**Unlikely** Event occurs infrequently and is difficult to predict	*0.05* *20 years*	L	L	M	M	H
1	**Rare** **Event will only occur in exceptional circumstances and timeframe is usually unpredictable**	*0.01* *100 yrs*	L	L	L	M	M

Management of Risk Approach	Primary Response	Considered to be -	Action Required
	Avoid	Intolerable	Stopping the activity completely or replace with an alternative activity
	Reduce	Not tolerable	Take action to reduce the impact and/or likelihood of the event occurring
	Share	Tolerable	Transfer the risk
	Accept	Acceptable	Recognise that the risk exists but continue the activity

9.1 Potential alternative methods of service delivery

KDC is trying to explore options of shared services with the neighbouring districts and this could potentially reduce costs for both KDC and Kaipara ratepayers by lowering operational and maintenance costs through consolidation of contractor staff between the two or three councils and could also assist in providing a broader cross-section of skilled in-house resources to support the organisation going forward.

In 2019 Council will have the opportunity to consider how it manages the operation of the Mangawhai WWTP, irrigation system and collection system.

9.2 Health and safety

Council has a Health and Safety (2016) Policy aimed at providing and maintaining a safe and healthy working environment to Council employees, contractors and members of the public. With respect to asset management activities it is particularly important to protect staff, contractors and the public from hazards associated with Council assets. *"At the Kaipara District Council (Council) we will all keep everyone safe and healthy at work, and get better at being safe every year, by doing these things".*

10 Continuous improvement

The AMPs have been developed as a tool to help Council manage their assets, deliver the LOS and identify the expenditure and funding requirements of the activity. Continuous improvements are necessary to ensure Council continues to achieve the appropriate (and desired) level of AM practice; delivering services in the most sustainable way while meeting the community's needs.

Council has demonstrated its commitment to AM improvement over the last few years and wishes to meet core requirements as defined by the Office of the Auditor-General for the Wastewater AMP.

The following table is presented in Section 4 and contains a schedule of issues and proposed responses.

Contained within this list are significant improvements in Council's ability to manage its wastewater assets.

In particular, the capacity studies will provide Council with an overview of its main wastewater systems in relation to current capacity, the level of Inflow and Infiltration, capacity to absorb growth and key constraints. This will significantly influence future renewals and system upgrades.

The other significant element is the condition assessment programme. The investment in this programme is significant and will run over a number of years. This will provide the necessary justification for the renewal of assets that need to be renewed. For assets that are considered to have useful life remaining it will provide detailed information about the overall state of the asset, the rate of deterioration that is occurring (potentially split by size, material, operating environment) and arising from this information a more robust understanding of the extent and timing of future renewals. Some revision of asset valuation might also occur out of this but this is a somewhat academic improvement.

The detailed condition assessment of the Mangawhai WWTP will provide insight into the management of relatively short-lived assets which require quite a different approach to long lived assets such as pipes.

Table 10-1: Continuous Improvement Summary

Project	Short description (See detail above)
Dargaville Capacity Study	Study of current flows, Inflow and Infiltration (I/I), current capacity, growth forecast and main constraints.
Kaiwaka Capacity Study	Study of current flows, Inflow and Infiltration I/I, current capacity, growth forecast and main constraints. Kaiwaka forecast to grow.
Kaiwaka preparation for consent renewal	Consent renewal required in 2022. Further funding will need to be provided in 2021/2022.

Project	Short description (See detail above)
Maungaturoto Capacity Study	Study of current flows, Inflow and Infiltration I/I, current capacity, growth forecast and main constraints. Maungaturoto forecast to grow.
Mangawhai Capacity Study	Study of current flows, Inflow and Infiltration I/I, current capacity, growth forecast and main constraints. Mangawhai growing rapidly.
Condition assessment	Ongoing CCTV inspections plus sampling of rising mains per report.
Review Mangawhai plant renewal predictions	Valuation indicates large current backlog of renewals. This needs to be assessed in detail to determine actual need and future profile.
Advice on Mangawhai Operations contract	Current contract will expire in June 2019. There is a renewal option but also option to award to maintenance contractor. Potentially large dollars involved.
Oxidation pond management options	KDC has a number of oxidation ponds. Seek initial advice on aeration management, desludging and future upgrading.
Te Kopuru ammoniacal nitrogen study	Te Kopuru ponds are non-compliant for ammoniacal nitrogen. Initial advice on cause and remedy.
Asset revaluation	Wastewater revalued every three years.

Appendices

Appendix A: Detailed financial tables – operational and capital costs

Operational costs

Wastewater Dargaville

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1,320	1,492	1,914	1,860	1,710	1,786	1,854	1,850	1,804	1,995	2,027
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	8	8	9	9	9	9	9	10	10	10	10
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**1,329**	**1,501**	**1,922**	**1,869**	**1,719**	**1,795**	**1,864**	**1,860**	**1,813**	**2,005**	**2,037**
Application of operating funding											
Contractors costs	9	8	8	8	9	9	9	9	9	10	10
Professional services	100	190	182	130	68	70	94	74	76	78	80
Repairs and maintenance	286	310	1,347	1,379	426	437	449	462	475	613	633
Other operating costs	92	69	70	72	73	75	77	78	80	82	84
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	227	292	618	622	318	332	350	351	361	409	421
Finance costs	92	84	117	111	105	98	89	77	71	66	62
Total applications of operating funding	**806**	**953**	**2,343**	**2,322**	**999**	**1,020**	**1,067**	**1,051**	**1,072**	**1,258**	**1,290**
Surplus (deficit) of operating funding	**522**	**548**	**-421**	**-453**	**720**	**775**	**796**	**808**	**742**	**748**	**747**

Wastewater Glinks Gully

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	60	57	76	80	81	83	85	87	89	92	94
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**60**	**57**	**76**	**80**	**81**	**83**	**85**	**87**	**89**	**92**	**94**
Application of operating funding											
Contractors costs	1	1	1	1	1	1	1	1	1	1	1
Professional services	13	0	13	14	13	13	13	14	14	15	15
Repairs and maintenance	22	30	31	32	32	33	34	35	36	37	38
Other operating costs	2	2	2	2	2	2	2	2	2	2	2
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	11	12	16	17	17	17	18	18	19	19	20
Finance costs	4	4	4	4	4	3	3	3	3	2	2
Total applications of operating funding	**53**	**49**	**67**	**68**	**68**	**69**	**71**	**72**	**74**	**76**	**78**
Surplus (deficit) of operating funding	**7**	**8**	**10**	**12**	**13**	**14**	**14**	**14**	**15**	**16**	**16**

Wastewater Kaiwaka

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	167	235	294	350	272	280	304	287	296	303	303
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**167**	**235**	**294**	**350**	**272**	**280**	**304**	**287**	**296**	**303**	**303**
Application of operating funding											
Contractors costs	0	1	0	0	0	0	0	0	0	0	0
Professional services	12	8	41	75	4	4	15	4	4	4	4
Repairs and maintenance	63	100	102	105	108	110	113	117	120	124	127
Other operating costs	9	8	8	8	9	9	9	9	9	10	10
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	33	48	59	71	50	51	57	55	56	58	60
Finance costs	12	11	16	21	21	21	20	20	20	19	18
Total applications of operating funding	**129**	**176**	**227**	**281**	**192**	**195**	**214**	**205**	**210**	**215**	**220**
Surplus (deficit) of operating funding	**38**	**60**	**67**	**69**	**81**	**85**	**90**	**82**	**86**	**89**	**83**

Wastewater Mangawhai

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	2,050	1,337	1,346	1,412	1,490	823	893	949	1,032	1,096	1,207
Targeted rates	3,308	3,690	3,373	3,347	3,573	3,853	4,241	4,574	4,807	5,154	5,450
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	1	1	1	1	1	1	1	1	1	1	1
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**5,359**	**5,028**	**4,720**	**4,760**	**5,065**	**4,677**	**5,134**	**5,525**	**5,840**	**6,251**	**6,658**
Application of operating funding											
Contractors costs	1,141	1,146	776	637	653	670	745	765	788	873	901
Professional services	68	114	89	44	15	15	16	16	35	36	37
Repairs and maintenance	60	60	62	63	70	72	74	82	84	87	96
Other operating costs	104	129	133	137	141	146	151	156	164	171	179
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	576	687	573	524	529	543	575	592	615	653	675
Finance costs	2,675	2,414	2,291	2,394	2,501	2,599	2,720	2,705	2,793	2,854	3,033
Total applications of operating funding	**4,624**	**4,550**	**3,924**	**3,799**	**3,910**	**4,045**	**4,280**	**4,317**	**4,478**	**4,674**	**4,921**
Surplus (deficit) of operating funding	**735**	**479**	**796**	**961**	**1,155**	**632**	**854**	**1,208**	**1,362**	**1,578**	**1,737**

Wastewater Maungaturoto

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	496	543	577	543	572	583	597	587	601	618	633
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**496**	**543**	**577**	**543**	**572**	**583**	**597**	**587**	**601**	**618**	**633**
Application of operating funding											
Contractors costs	2	1	1	2	2	2	2	2	2	2	2
Professional services	37	58	57	20	14	14	15	15	15	16	16
Repairs and maintenance	118	118	121	124	127	131	134	138	142	146	151
Other operating costs	40	29	29	30	30	31	32	32	33	34	35
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	87	104	105	96	96	99	102	105	108	111	114
Finance costs	73	68	62	60	58	56	52	48	45	42	38
Total applications of operating funding	**357**	**378**	**377**	**331**	**328**	**332**	**336**	**339**	**345**	**350**	**356**
Surplus (deficit) of operating funding	**140**	**165**	**200**	**212**	**245**	**251**	**261**	**248**	**256**	**267**	**277**

Wastewater Te Kopuru

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	110	133	136	151	153	158	163	162	166	171	174
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**110**	**133**	**136**	**151**	**153**	**158**	**163**	**162**	**166**	**171**	**174**
Application of operating funding											
Contractors costs	1	1	1	1	1	1	1	1	1	1	1
Professional services	16	15	9	10	2	2	2	2	2	2	2
Repairs and maintenance	31	44	45	46	47	49	50	51	53	55	56
Other operating costs	12	8	9	9	10	10	10	10	10	11	11
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	27	34	33	34	32	33	34	35	36	37	38
Finance costs	3	3	3	3	3	3	3	3	3	3	3
Total applications of operating funding	**89**	**104**	**99**	**104**	**95**	**97**	**100**	**102**	**105**	**108**	**111**
Surplus (deficit) of operating funding	**21**	**29**	**38**	**47**	**57**	**60**	**63**	**60**	**62**	**63**	**62**

Capital works forecasts

Wastewater Dargaville

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	2027-2028 $'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-67	728	-218	-212	-227	-242	-233	-222	-143	-135	-120
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-67**	**728**	**-218**	**-212**	**-227**	**-242**	**-233**	**-222**	**-143**	**-135**	**-120**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	465	529	391	513	259	6	6	6	6	6
Capital Expenditure - Renewal	499	776	338	294	429	440	749	769	908	871	960
Increase (decrease) in reserves	-44	35	-1,506	-1,349	-450	-166	-192	-189	-315	-265	-339
Total applications of capital funding	**455**	**1,276**	**-639**	**-664**	**493**	**533**	**563**	**586**	**599**	**613**	**627**
Surplus (deficit) of capital funding	**-522**	**-548**	**421**	**453**	**-720**	**-775**	**-796**	**-808**	**-742**	**-748**	**-747**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Glinks Gully

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-5	-5	-6	-2	-7	-7	-8	-7	-8	-9	-9
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-5**	**-5**	**-6**	**-2**	**-7**	**-7**	**-8**	**-7**	**-8**	**-9**	**-9**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - Renewal	0	0	0	10	0	0	8	0	0	0	0
Increase (decrease) in reserves	2	3	4	0	6	7	-1	7	7	7	7
Total applications of capital funding	**2**	**3**	**4**	**10**	**6**	**7**	**7**	**7**	**7**	**7**	**7**
Surplus (deficit) of capital funding	**-7**	**-8**	**-10**	**-12**	**-13**	**-14**	**-14**	**-14**	**-15**	**-16**	**-16**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Kaiwaka

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-20	97	104	-19	-32	-34	9	-25	-27	-29	-21
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-20**	**97**	**104**	**-19**	**-32**	**-34**	**9**	**-25**	**-27**	**-29**	**-21**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	43	3	13	13	3	3	48	3	3	3	3
Capital Expenditure - Renewal	0	150	154	0	0	11	17	46	15	18	0
Increase (decrease) in reserves	-25	4	5	37	46	37	34	8	40	39	58
Total applications of capital funding	**17**	**157**	**172**	**50**	**49**	**51**	**99**	**57**	**58**	**60**	**61**
Surplus (deficit) of capital funding	**-38**	**-60**	**-67**	**-69**	**-81**	**-85**	**-90**	**-82**	**-86**	**-89**	**-83**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Mangawhai

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	350	1,885	1,909	2,436	2,413	2,409	2,409	2,409	2,409	2,409	2,235
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-559	-799	-848	-762	-840	-180	-236	-107	422	217	-566
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-209**	**1,086**	**1,061**	**1,674**	**1,574**	**2,229**	**2,174**	**2,303**	**2,831**	**2,626**	**1,670**
Applications of capital funding											
Capital Expenditure - Growth	521	1,915	1,553	1,772	1,815	2,463	2,524	480	2,272	2,790	2,868
Capital Expenditure - LoS	19	275	333	0	0	0	0	145	741	609	0
Capital Expenditure - Renewal	0	45	46	47	48	49	293	301	308	317	326
Increase (decrease) in reserves	-14	-670	-75	816	866	349	211	2,585	871	487	212
Total applications of capital funding	**526**	**1,565**	**1,857**	**2,635**	**2,729**	**2,861**	**3,028**	**3,510**	**4,193**	**4,204**	**3,406**
Surplus (deficit) of capital funding	**-735**	**-479**	**-796**	**-961**	**-1,155**	**-632**	**-854**	**-1,208**	**-1,362**	**-1,578**	**-1,737**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Maungaturoto

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-62	-88	-91	-93	-99	-99	-103	-86	-90	-97	-101
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-62**	**-88**	**-91**	**-93**	**-99**	**-99**	**-103**	**-86**	**-90**	**-97**	**-101**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	33	3	8	3	35	36	3	3	3	3	3
Capital Expenditure - Renewal	20	70	96	42	11	33	56	19	36	61	0
Increase (decrease) in reserves	25	4	5	75	100	83	98	141	128	107	172
Total applications of capital funding	**78**	**77**	**109**	**119**	**146**	**152**	**157**	**162**	**166**	**171**	**175**
Surplus (deficit) of capital funding	**-140**	**-165**	**-200**	**-212**	**-245**	**-251**	**-261**	**-248**	**-256**	**-267**	**-277**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Te Kopuru

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-6	-4	6	5	-6	-7	-7	-2	-2	-2	0
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-6**	**-4**	**6**	**5**	**-6**	**-7**	**-7**	**-2**	**-2**	**-2**	**0**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	3	13	13	3	3	3	3	3	3	3
Capital Expenditure - Renewal	0	0	0	21	0	16	39	0	0	24	0
Increase (decrease) in reserves	15	23	31	19	49	34	13	55	57	34	59
Total applications of capital funding	**15**	**25**	**44**	**53**	**51**	**53**	**56**	**58**	**60**	**61**	**63**
Surplus (deficit) of capital funding	**-21**	**-29**	**-38**	**-47**	**-57**	**-60**	**-63**	**-60**	**-62**	**-63**	**-62**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Appendix B: Resource consent register

Consent No	Details	Status	Expiry Date	Conditions / limits applied	Monitoring required	Reporting required
3666	Dargaville WWTP Discharge Consent	Current	2048	Y	Y	Y
7231	Glinks Gully WWTP Discharge Consent	Current	2024	Y	Y	Y
1116	Kaiwaka WWTP Discharge Consent	Current	2022	Y	Y	Y
1115	Maungaturoto WWTP Discharge Consent	Current	2032	Y	Y	Y
5087	Maungaturoto Railway Discharge Consent	Current	2025	Y	N	Y
1102	Te Kopuru Discharge Consent	Current	2044	Y	Y	Y
1383	Maungaturoto Backwash Discharge Consent	Current	Being reviewed	N	Y	N

Appendix C: Historical LOS

Performance measures	2009 AMP – 2009 target	2009/10 AR - Actual	2010/11 AP - Target	2010/11 AR - Actual	2011/12 AP - Target	2011/12 AR - Actual	2012/22 LTP – 2016/2022 Target
Customer LOS							
Percentage of customers satisfied with wastewater (NRB).	40%	45%	41%	41%	41%	?	60%
Commencement of containment and clean-p of notified spills.	2 hours	2 hours	2 hours	90%	2 hours	?	-
Percentage of beaches and rivers available for swimming and shellfish gathering during summer monitoring period.	80%	95%	80%	96%	80%	?	-
Percentage of urgent request (emergency overflows) responded to within 1 day (Councils Help Desk).	90%	100%	90%	100%	90%	?	-
Number of requests for service regarding odours.	-	-	-	-	-	-	32
Number of requests for service regarding blockages.	-	-	-	-	-	-	95
Technical LOS							
Continuity of the wastewater service to KDC's customers that meets community expectations.	Less than two wastewater reticulation incidents per km of public drain reported in any 12 month period.	-	-	-	-	-	-

Performance measures	2009 AMP – 2009 target	2009/10 AR - Actual	2010/11 AP - Target	2010/11 AR - Actual	2011/12 AP - Target	2011/12 AR - Actual	2012/22 LTP – 2016/2022 Target
Restore private property disturbed by wastewater service activities to a standard at least as good as before the work was carried out.	No unresolved complaints. 80% of contracts performed without justifiable complaints.	-	-	-	-	-	-
Zero wastewater overflows into habitable buildings due to faults in the public wastewater system.	Zero overflows into habitable buildings any 12 month period.	-	-	-	-	-	-
Zero dry weather overflows in any 12 month period.	Zero overflows in any 12 month period.	-	-	-	-	-	-
KDC takes all practicable steps to ensure that no avoidable harm is suffered by any person because of any action, or any failure to act, by a worker ('Worker' as defined in HASIE Act).	All contractors to KDC are registered as Health and Safety compliant.	-	-	-	-	-	-
No abatement notices issued for any Council operated wastewater treatment facility in the district.	Zero abatement notices in any 12 month period.	-	-	-	-	-	-
All wastewater spills investigated and any necessary disinfection works completed within 24 hours of the spill occurring.	90% compliance.	-	-	-	-	-	-
Develop an emergency management plan for all wastewater schemes.	Emergency management plan developed in 2009/2010 financial year.	-	-	-	-	-	-
Compliance with outfall waste consent conditions.	-	-	-	-	-	-	90%

Performance measures	2009 AMP – 2009 target	2009/10 AR - Actual	2010/11 AP - Target	2010/11 AR - Actual	2011/12 AP - Target	2011/12 AR - Actual	2012/22 LTP – 2016/2022 Target
The annual number of events where wastewater is discharged from Council's reticulation into rivers and streams.	-	-	-	-	-	-	5

Appendix D: List of acronyms

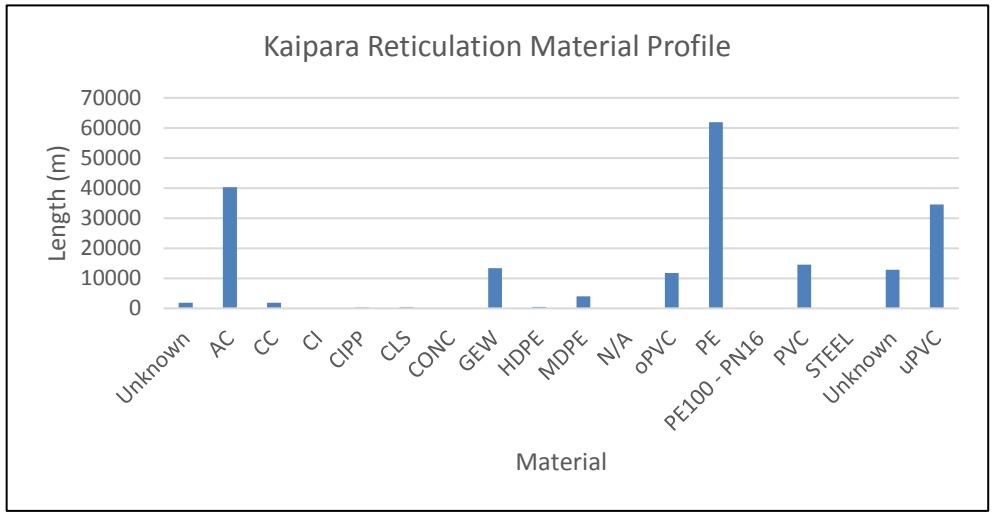
The following lists key acronyms and abbreviations used in this document:

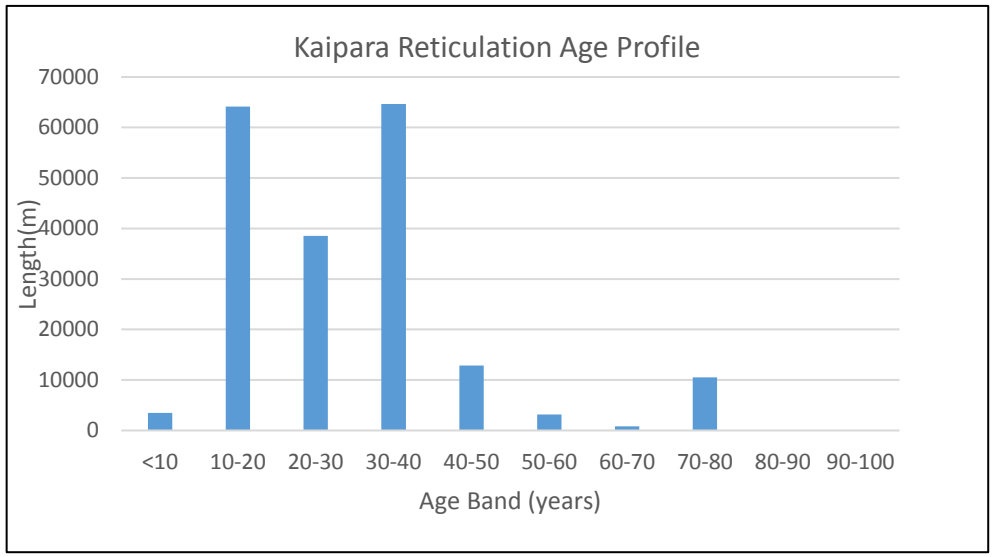
Term	Definition
AC	Asbestos concrete (pipe type)
AM	Asset Management
AMIP	Asset Management Improvement Plan
AMP	Asset Management Plan
AMS	Asset Management Systems
BERL	Business and Economic Research Limited
CAPEX	Capital expenditure
CCTV	Closed Circuit Television
CDEM	Civil Defence Emergency Management
CMA	Costal Marine Area
CON	Concrete (pipe type)
CORST	Corrugated steel (pipe type)
Council/KDC	Kaipara District Council
CPP	Competitive Pricing Procedures
DP	District Plan
EW	Earthenware (pipe type)
GIS	Geographical Information System
IPCC	Intergovernmental Panel on Climate Change
IIMM	International Infrastructure Management Manual
KDC/Council	Kaipara District Council
KITE	Kaipara Information Technology Environment

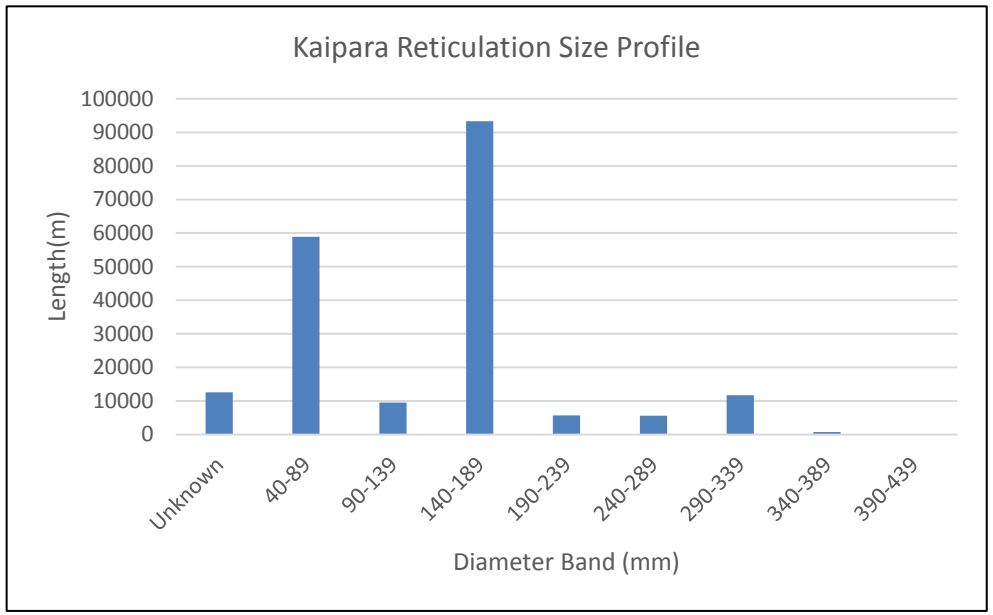
Term	Definition
LGA	Local Government Act 2002
LIM	Land Information Memoranda
LOF	Likelihood of Failure
LOS	Level of Service
LTP	Long Term Plan
MCWWS	Mangawhai Community Wastewater Scheme
MfE	Minister for the Environment
NRC	Northland Regional Council
OPEX	Operational expenditure
PIM	Project Information Memoranda
PVC	Polyvinylchloride (pipe type)
RCRRJ	Reinforced concrete rubber ring joint (pipe type)
RMA	Resource Management Act 1991
UPVC	Unplasticised polyvinylchloride (pipe type)
URP	Usual Resident Population
WIG	Water Infrastructure Group
WSSA	Water and Sanitary Services Assessment
WWTP	Wastewater Treatment Plant

Appendix E: Asset profiles

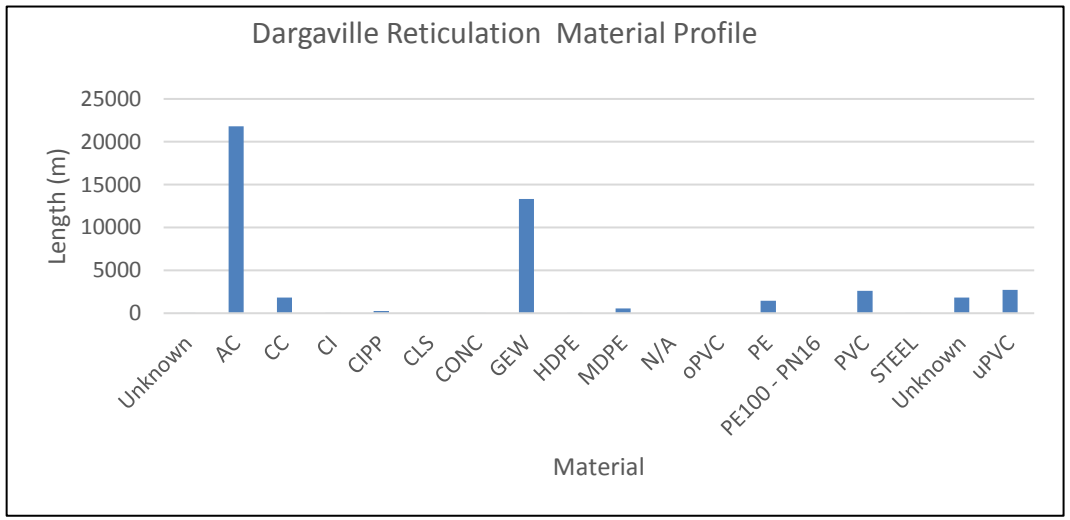
Asset profiles – All schemes

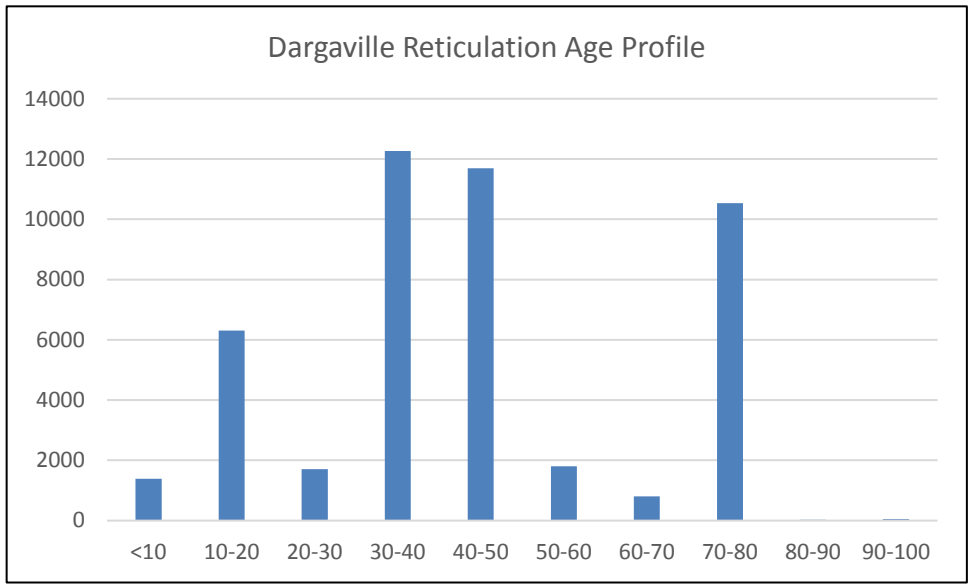






Asset profiles – Dargaville




Dargaville Reticulation Age Profile
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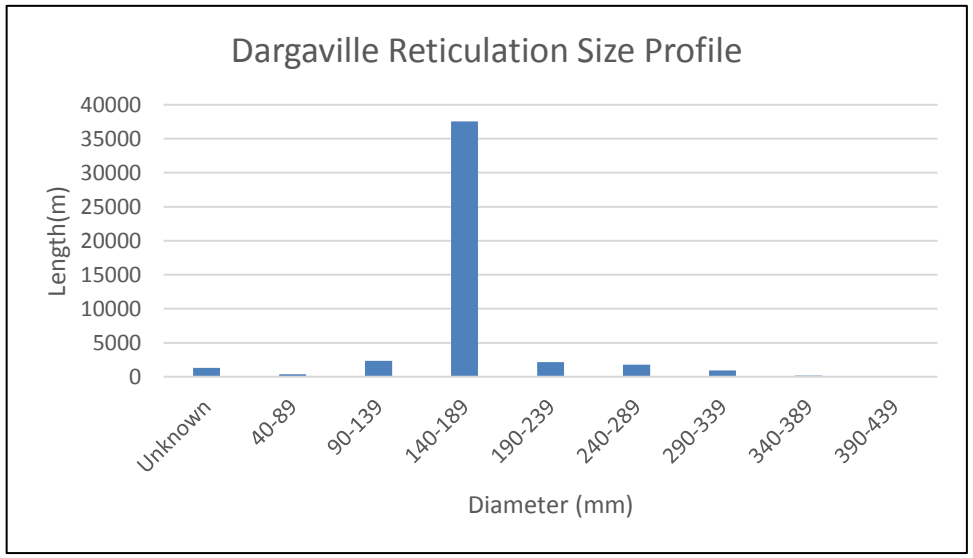
12000
10000
8000
6000
4000
2000
0
<10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100


Dargaville Reticulation Size Profile
Length(m)
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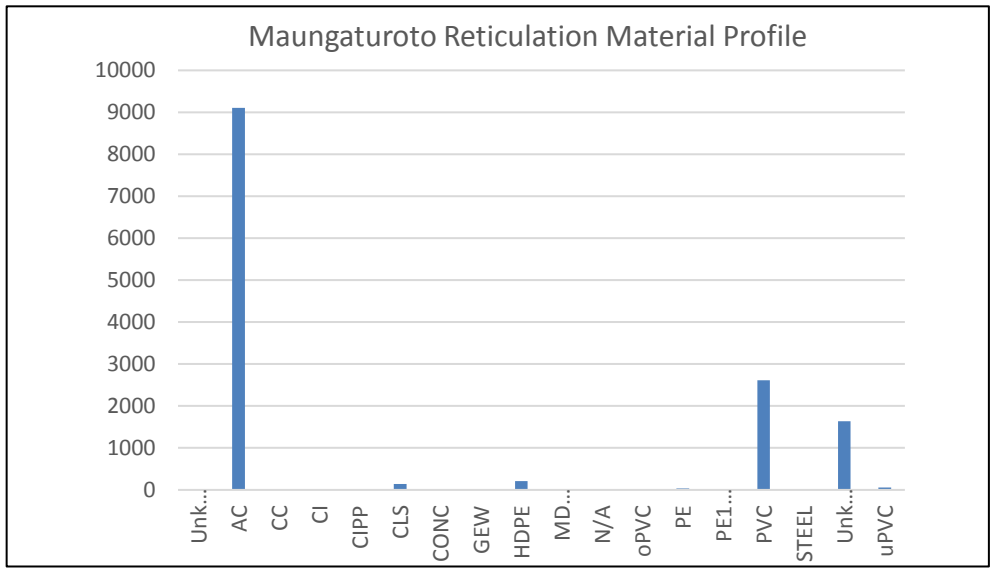
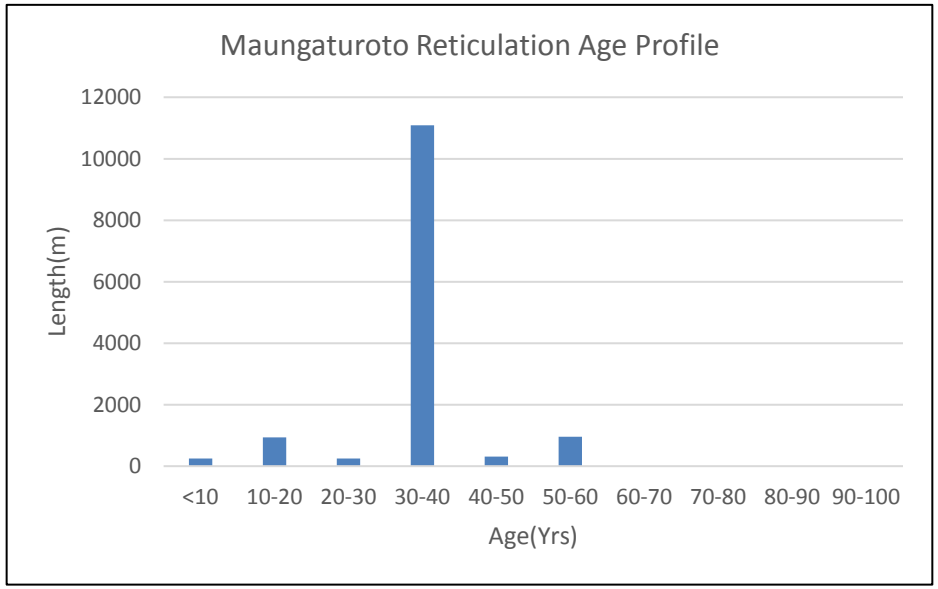
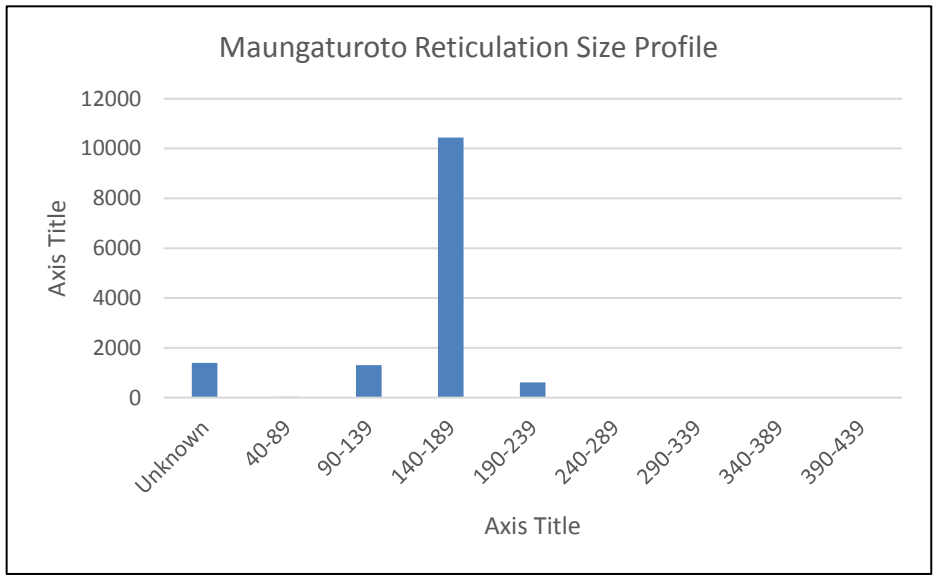
35000
30000
25000
20000
15000
10000
5000
0
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439
Diameter (mm)

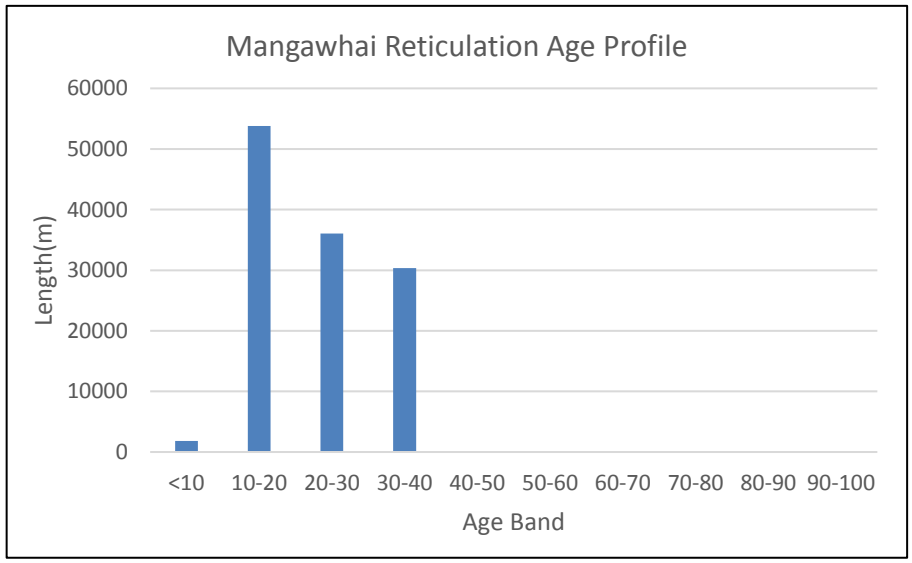
Asset profiles – Maungaturoto

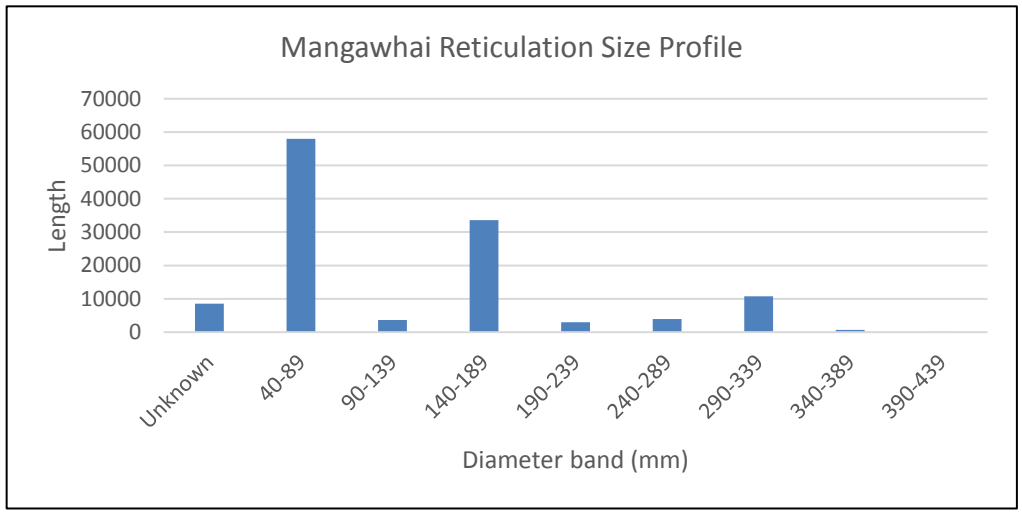






Asset profiles – Mangawhai




Mangawhai Reticulation Size Profile
Length
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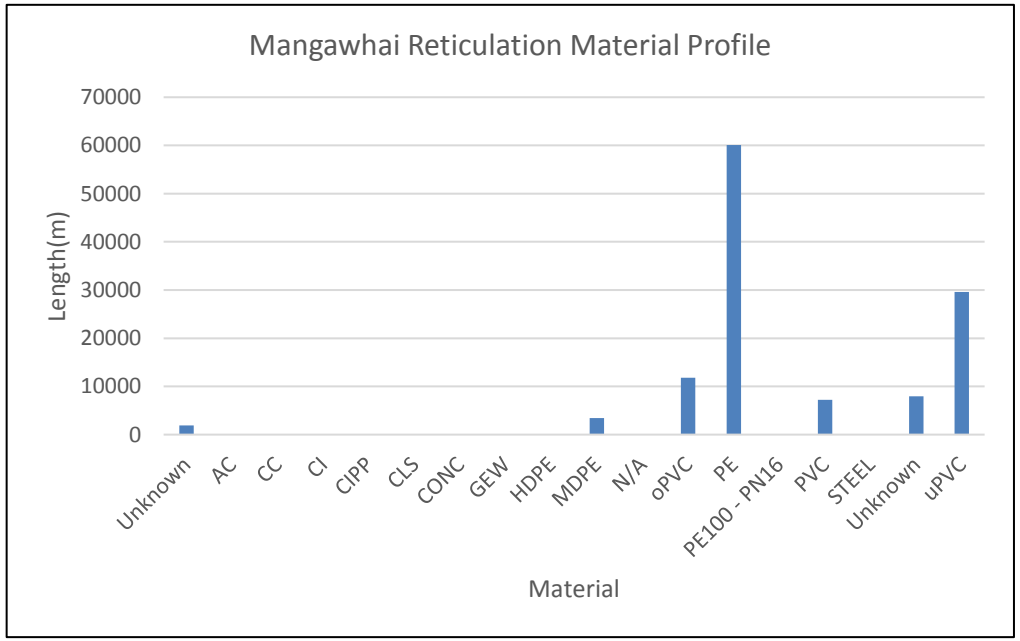
60000
50000
40000
30000
20000
10000
0
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439
Diameter band (mm)


Mangawhai Reticulation Material Profile
Length(m)
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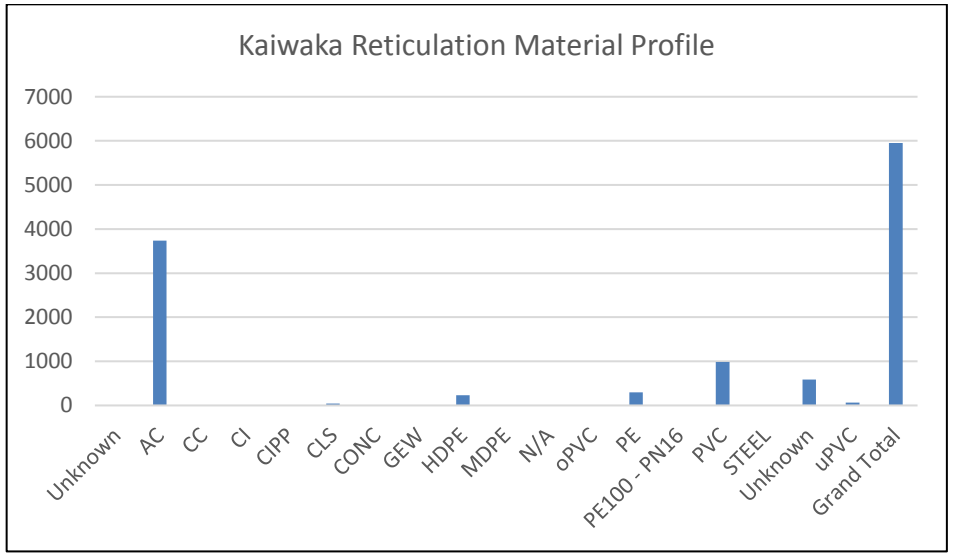
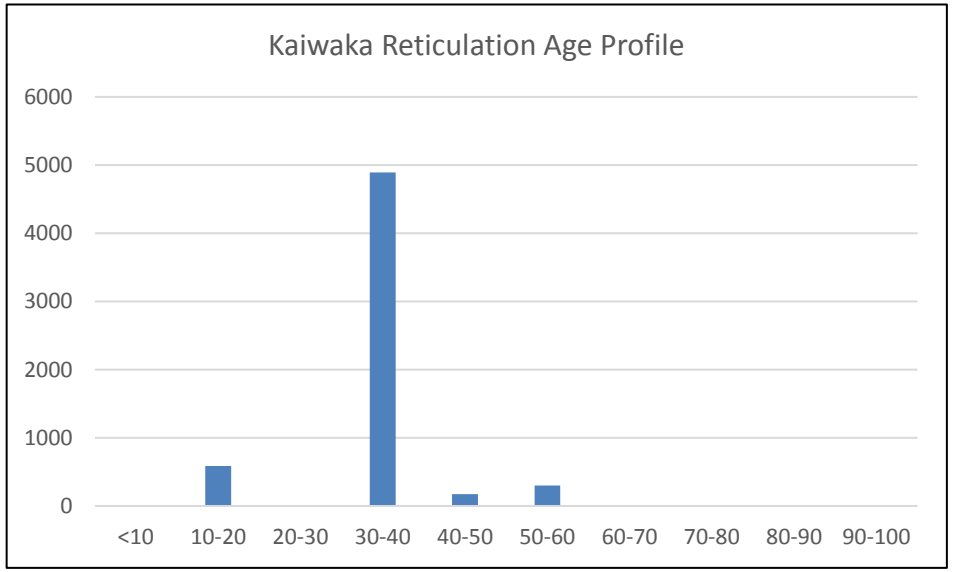
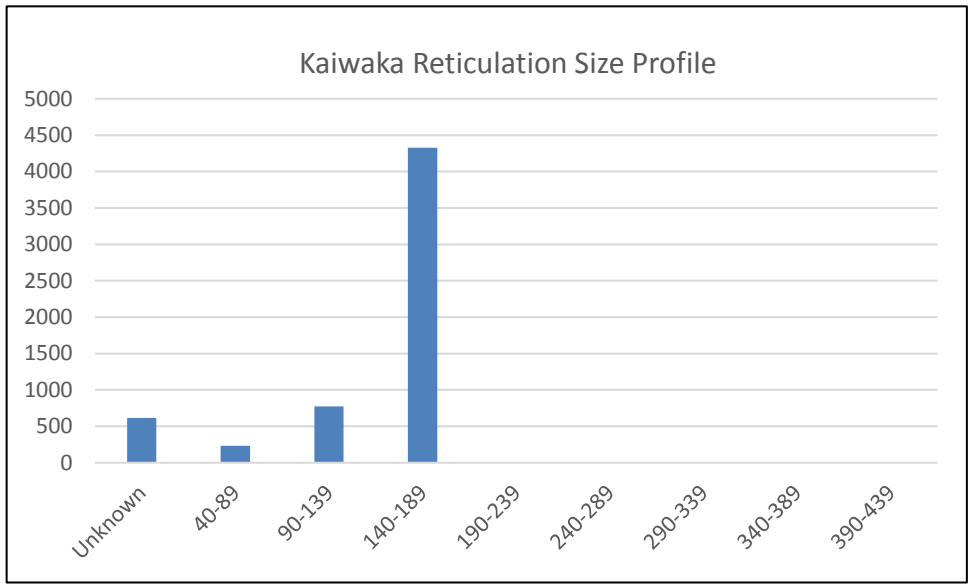
60000
50000
40000
30000
20000
10000
0
Unknown
AC
CC
CI
CIPP
CLS
CONC
GEW
HDPE
MDPE
N/A
oPVC
PE
PE100 - PN16
PVC
STEEL
Unknown
uPVC
Material

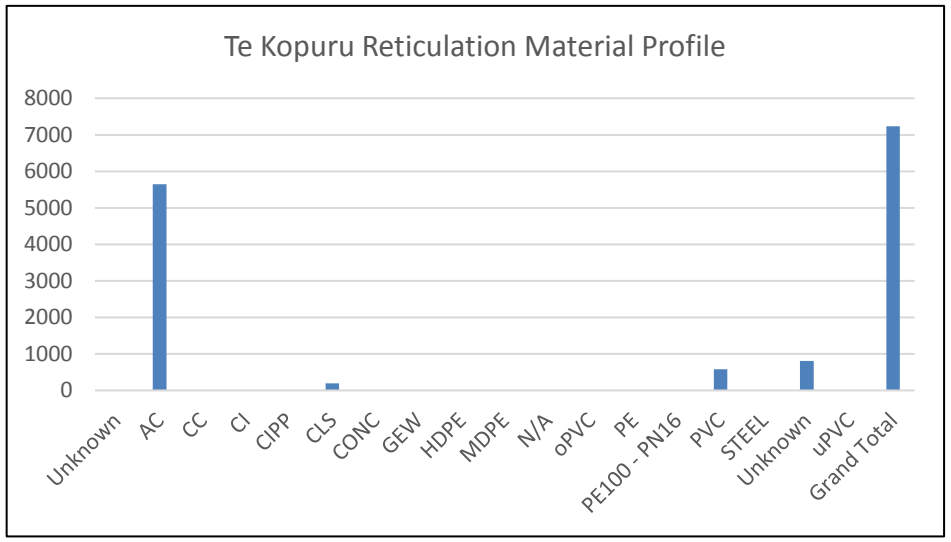
Asset profiles – Kaiwaka

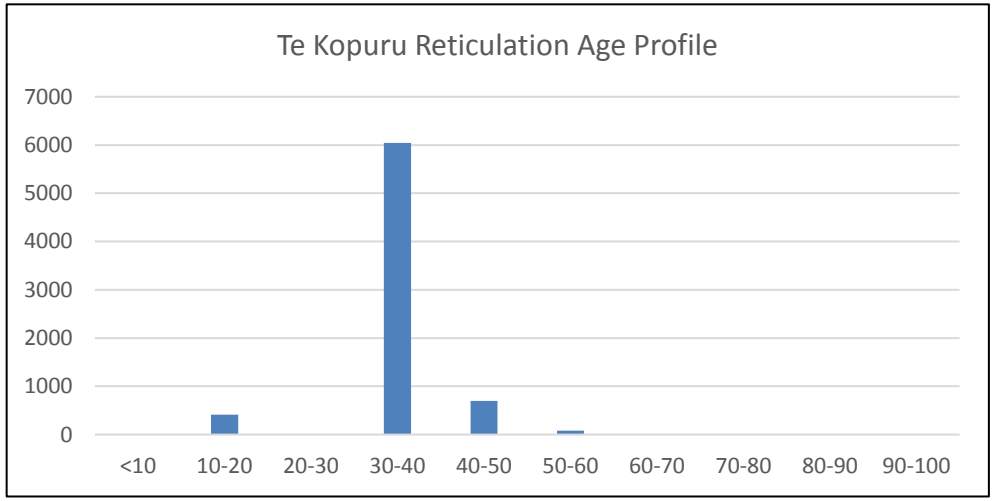


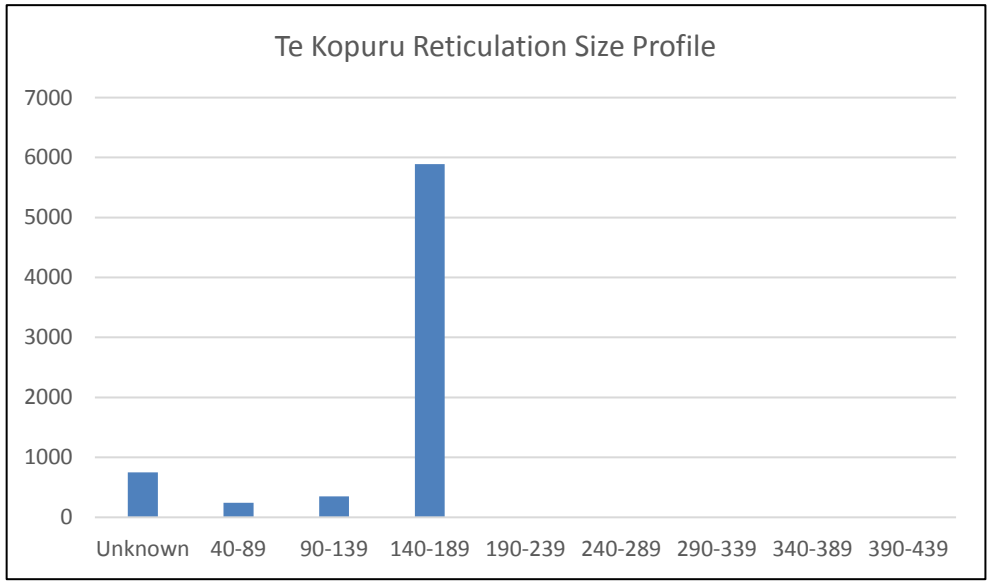




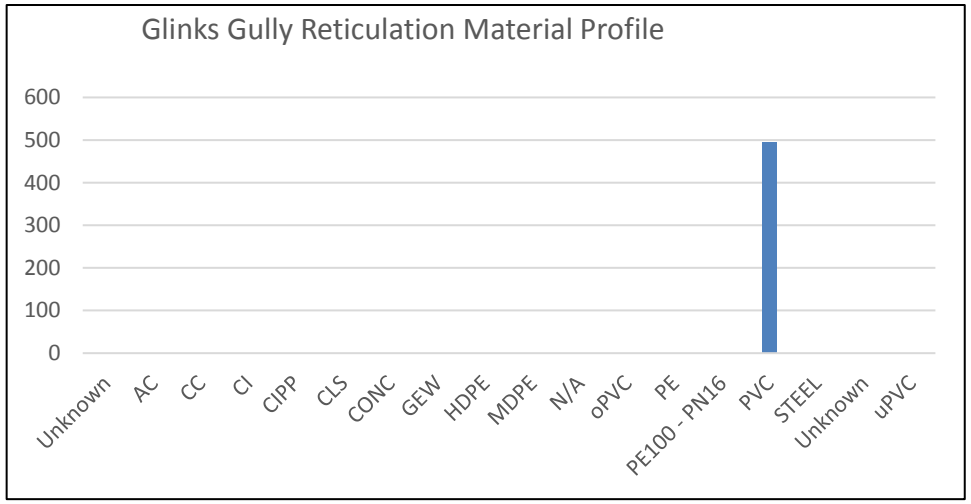
Asset profiles – Te Kopuru

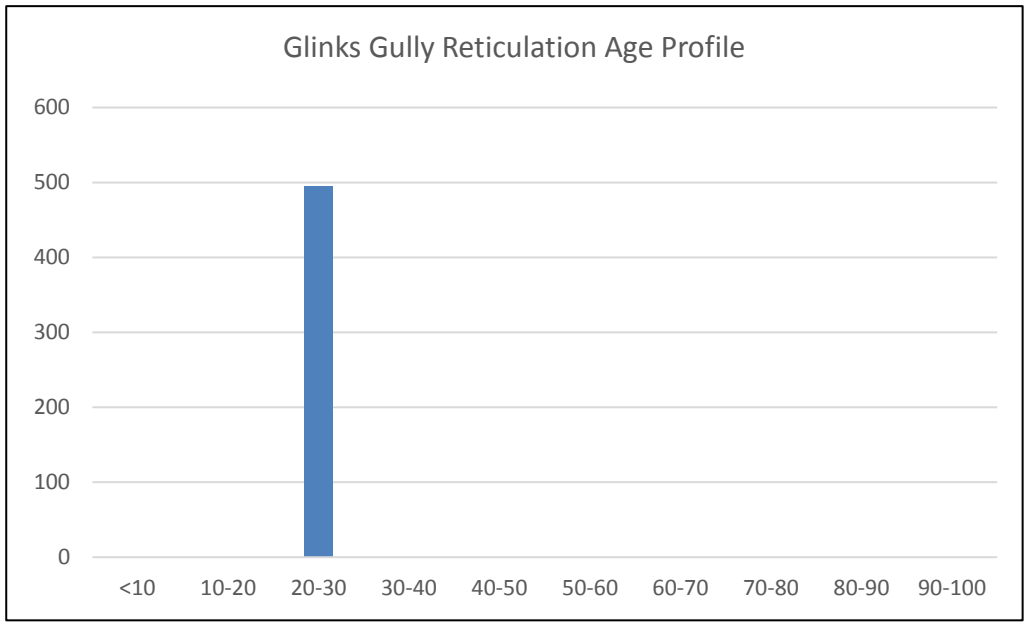


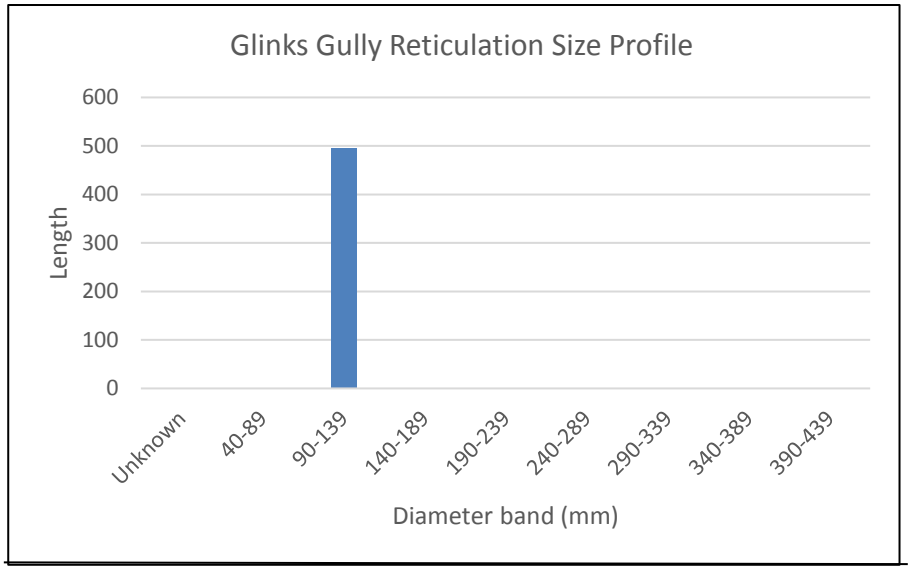

Te Kopuru Reticulation Age Profile
7000
6000
5000
4000
3000
2000
1000
0
<10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100


Te Kopuru Reticulation Size Profile
7000
6000
5000
4000
3000
2000
1000
0
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439

Asset profiles – Glinks Gully






Glinks Gully Reticulation Size Profile
600
500
400
300
200
100
0
Length
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439
Diameter band (mm)