KAIPARA DISTRICT COUNCIL

Kaipara District Council

Asset Management Plan 2018

Water Supply

October 2017

Status: Draft

Kaipara te Oranganui

KAIPARA DISTRICT

Two Oceans Two Harbours

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1 Executive summary

1.1 Introduction

Kaipara District Council (KDC/Council) operates five community Water Supply schemes for Dargaville and Baylys, Glinks Gully, Ruawai, Maungaturoto and Mangawhai. There are raw water supplies for agricultural purposes on the Kaihu (Dargaville) and Maungaturoto bulk watermains.

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 focus of the Water Supply system is to protect public health by providing potable water to the communities with reliable service and to distribute water for agricultural purposes.

The purpose of this Asset Management Plan (AMP) is to summarise Council's strategic and long term management approach for the provision and maintenance of Water Supply assets.

The AMP provides discussion of the key elements affecting management of Council's Water Supply 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 potable water supplies requires all those connected to the systems to take a degree of responsibility by ensuring the Water Supply is not wasted.

Kaipara is fortunate in having a number of long established water sources that provide high quality water. As our water sources are not considered secure, and that we already chlorinate all our public water supplies, there is no high risk of any material changes that would be required to our Water Supply schemes as a result of the Havelock North Drinking Water Inquiry: Stage 2.

In dry conditions, when demand is high, alternative supply points with poorer raw water quality are used which puts pressure on the treatment system. Seasonal peaks are experienced in Mangawhai and Glinks Gully during the Christmas period. In some dry periods, water carting has been necessary to augment the supply for these areas.

In the past KDC had to enforce restrictions (in Dargaville) on water use to ensure sufficient water is available for potable use and to protect public health. Given the prospect of a dry season in the future and with a better understanding of how the Water Supply system works, Council has received a revised water take consent at Rotu (raw water source at Dargaville) and also for Cattlemount (raw water source for Maungaturoto). These measures are expected to be sufficient at this stage to provide for the current demand at these communities.

1.2 The challenges

The systems are relatively stable in their operation at this time and with very limited requirements for providing for growth and LOS increases. In particular water quality is compliant with current requirements. However, focus will be required on the following aspects over the next 10 years:

Condition assessment – Pressure pipes are difficult to assess in relation to condition and remaining life. The techniques that can be used tend to be expensive an only justified for critical pipes. A sampling and assessment strategy is required to determine how best to advance this aspect.

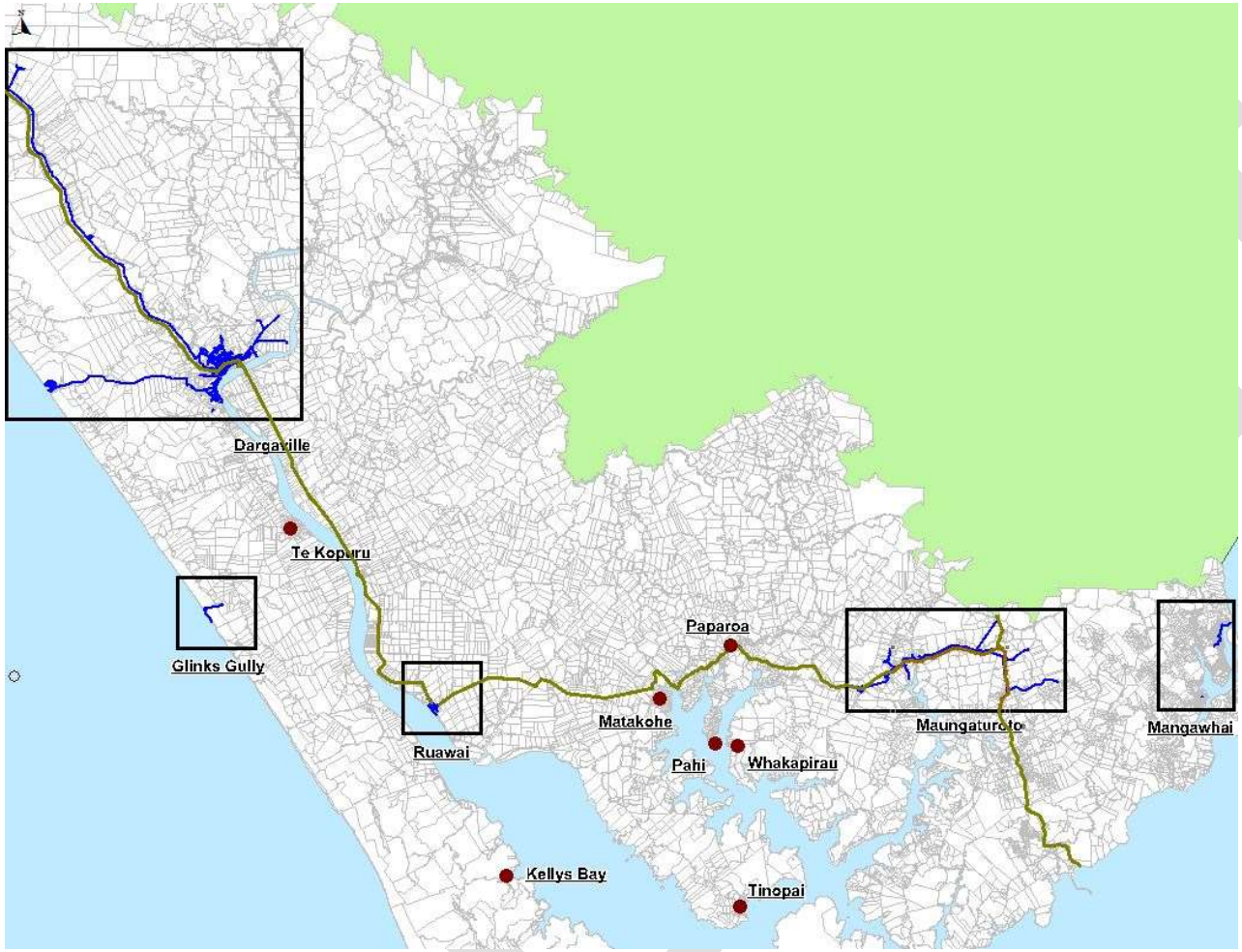
Leakage Management – Overall the systems are considered to be relatively high leakage. Some of this will be addressed as pipelines are renewed. For the rest it is a balancing act between the cost of finding and repairing the leaks and the benefits that are achieved by doing so. The more likely driver is the need to generate more capacity by reducing leakage and this will mostly apply to the Dargaville system.

Renewals – A significant portion of the pipework is nearing the end of its useful working life; as predicted by its current age and expected life. However, this is not a particularly accurate prediction tool and consideration must be given to optimising the renewal programme to minimise expenditure while managing risk and the LOS that can be delivered.

1.3 The assets

The location of each of the Water Supply schemes within Kaipara district is illustrated in the figure below. Dargaville has three water sources namely Waiparataniwha, Rotu and Waiatua Dam.

Figure 1-1: Location of WS schemes



In 2016 the district assets were valued at $62 million comprising 15 water source points with above ground assets consisting of 5 water treatment plants, 7 pump stations and 17 storage reservoirs. Below ground assets comprise 148.8 km of reticulation, 3,583 connections and 3,763 points which include, among others; valves, hydrants and meters. This marks a drop from the 2013 evaluation of $68 million.

Table 1-1: Water Supply asset overview summary

Community	Water source point	Water Treatment plant	Pump station	Storage	Reticulation (km)	Connection	Points (Fire hydrants, vallves, meters)
Dargaville/Baylys	5	1	4	3	125	2,782	3,115
Maungaturoto	4	1	3	4	13	447	496
Ruawai	2	1	0	1	6.5	251	129
Glinks Gully	3	1	0	4	1.4	85	9
Mangawhai	1	1	0	5	2.9	18	14
Water Supply total assets	**15**	**5**	**7**	**17**	**148.8**	**3,583**	**3,763**

Table 1-2: Summary of Water Supply asset valuations (2016)

Component	Replacement costs	Depreciated replacement cost	Annual depreciation
Dargaville/Baylys	$43,605,530	$15,739,325	$673,690
Maungaturoto	$14,061,602	$7,797,617	$232,966
Ruawai	$3,255,844	$1,595,069	$73,788
Glinks Gully	$534,823	$338,856	$8,680
Mangawhai	$597,837	449,680	$10,280
Water Supply total	**$62,055,636**	**$25,920,547**	**$999,404**

2 Strategic context

2.1 Purpose

The purpose of this AMP is to outline and to summarise in one place, Council's strategic and management long term approach for the provision and maintenance of its water 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 is 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 water. One such responsibility is the duty under the Health Act 1956 to improve, promote, and protect public health within the districts. This implies that, in the case of the provision of potable water, councils have the obligation to identify where such a service is required and to either provide it directly themselves or to maintain an overview of the supply if it is provided by others.

This AMP outlines and summarises Council's strategic and management long term approach for the provision and maintenance of potable water supplies to properties throughout the district (excluding those that service single premises that have their own rainwater tanks or bores) whether they be provided by public or private means. For reference, a list of defined acronyms used throughout this AMP is provided at the back of this document as Appendix E.

2.2 Service description and scope

Council operates five community Water Supply schemes for Dargaville and Baylys, Maungaturoto, Ruawai, Glinks Gully and Mangawhai in order to provide the communities a constant, adequate and sustainable potable Water Supply. Council owns and maintains the whole Water Supply network which covers:

- Collection of raw water;
- Treatment of raw water to produce suitable quality and quantities of drinking water; and
- Distribution of treated water to the point of supply to the customer including the water meter, to consistently meet specific flow, pressure and quality standards. This includes water required for emergency firefighting services.

A snapshot of the number of connections for each of Council's Water Supply schemes is provided in Table 2-1 below.

Table 2-1: Connections per Council Water Supply scheme

Water Supply scheme	Number of connections
Dargaville/Baylys	2,782
Maungaturoto	410 (Township) 37 (Railway)
Ruawai	251
Glinks Gully	85
Mangawhai	18

Council undertakes the following with assistance from their Maintenance Contractor, and other service providers as required:

- Asset management (AM);
- Customer services;
- Treatment plant operation and maintenance;
- Network operations and maintenance;
- Capital and refurbishment programme;
- Water billing; and
- Consent monitoring and compliance.

The scope of this AMP is to determine Water Supply standards, LOS and funding levels to maintain sustainable and affordable water supplies for Council's five existing Water Supply schemes. The AMP should be used to drive and manage the Water Supply business throughout the year, and this will require progressive updating to reflect the constantly changing situation.

By providing ready accessible potable water supplies, Council is working to improve, promote and protect public health within the district. Clean, safe water is essential for communities and local economic development. The water supplies also provide water for firefighting capability in established urban Water Supply areas that provides communities with a level of protection against fire.

2.3 Assumptions

Council has made a number of assumptions in preparing the 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 2017 New Zealand dollar values (GST exclusive) and no allowance has been made for inflation. Asset valuations are in 2016 dollar values.	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 there will be no major changes in legislation or policy.	The risk of major change is high due to the changing nature of the Government and politics. If significant changes occur it is likely to have a significant impact on the required expenditure. Council has not mitigated the effect of this.

2.4 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 Water Supply will significantly change from the LTP 2015/2025 i.e. Council's mission is to ensure that the district's Water Supply is collected, treated and disposed of in a cost-effective, sustainable and environmentally friendly manner.

Figure 2-1: Vision statement

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 Water Supply priorities and how those assets may be managed. This information, along with community consultation and discussion with other interested parties, contributes to the development of the community outcomes identified in the LTP. These outcomes have a direct influence on the management of the various Water Supply schemes.

The community outcomes that the Water Supply activity contributes to most are unchanged from the LTP 2015/2025.

- To provide a constant, adequate, sustainable and high quality Water Supply to Kaipara's reticulated areas;
- Clean, safe water is essential for communities and local economic development; and
- Public water supplies ensure communities receive water at the cost of production.

2.5 Stakeholders and consultation

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

2.5.1 *External*

- The Kaipara District community, including residents and ratepayers;
- Residential and commercial water consumers;
- Government agencies (e.g. Department of Health, Ministry for the Environment (MfE), Audit New Zealand);
- New Zealand Fire Service;
- Local Iwi;
- Northland Regional Council;

- Service Contractor;
- Northland District Health Board; and
- Visitors to the district.

Internal

- Mayor and Councillors;
- Asset Manager and Asset Management staff;
- Financial Services 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 needs. Council's knowledge of customer expectations and preferences is based on:

- Feedback from public surveys;
- Public meetings;
- Feedback from Elected Members;
- Analysis of customer service requests and complaints; and
- Consultation via the Annual Plan and LTP process.

2.6 Legislative framework and linkages

The Water Supply AMP is related to a range of national and local legislation, regulatory and policy documents as listed in through Table 2-3 below. The legislation and guidelines below are listed by their original title for simplicity, however all Amendment Acts shall be considered in conjunction with the original Act, these have not been detailed in this document. For the latest Act information refer to http://www.legislation.govt.nz/.

Table 2-3: Relevant Legislation

Acts
The Health Act 1956
The Health (Drinking Water) Amendment Act 2007 (an amendment of the Health Act 1956)
The Local Government Act 2002, especially: • Part 7; • Schedule 10; • The requirement to consider all options and to assess the benefits and costs of each option; and • The consultation requirements.
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 at Work Act 2015
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 2-4: Relevant regulatory requirements

National policies, regulation, standards and strategies
Drinking Water Standards for New Zealand 2005(08) (DWSNZ)
The Government's Sustainable Development Action Plan
National Policy Statement on Urban Development Capacity 2016
The National Environmental Standard Sources of Human Drinking Water

National policies, regulation, standards and strategies
Code of Practice for Urban Sub-division
The New Zealand Fire Service Fire Fighting Water Supplies Code of Practice: SNZ PAS 4509:2008
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 2-5: Relevant Council planning and policy documents

Local policies, regulations, standards and strategies
Council District Plan
Northland Regional Plan
Council Engineering Standards and Policies 2011
Council Procurement Strategy and Policy Documents March 2012
Fonterra Water Supply Agreement 2009 (Maungaturoto)

Table 2-6: Relevant Council Bylaws

Council Bylaws
Water Supply Bylaw 2009

It is important to highlight the following recent national water policy updates:

The Health (Drinking Water) Amendment Act 2007 (HDWAA) came into effect 01 July 2008. This means that compliance with the Drinking Water Standards for New Zealand (DWSNZ 2005) (DWSNZ) is a legal requirement for Council. These standards have been revised and Council intends to comply with the newer standards – DWSNZ 2005 (revised 2008) (DWSNZ 2005(08)).

The preparation and implementation of this AMP and associated long term financial strategies is a means for Council to comply with these requirements.

Local Government Act 2002:

As per the LGA 2002:

3. 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.
4. 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, funding and financial policies.
- Prepare an LTP (formerly the Long Term Council Community Plan or LTCCP), at least every three years, which must identify:
    - Activities and assets;
    - How the asset management (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.

With respect to the Significance and Engagement Policy, 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 issues, proposals, decisions or other matters 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 adaptation of a Long Term Financial Strategy, prudent asset management, and formal accounting for the "loss of service potential" of assets. In essence however, the intent of these requirements is still relevant as embodied in Audit New Zealand's expectations for AMPs through its requirement for councils to conduct an "assessment of water and wastewater services within its district".

The new legislation also puts a stronger emphasis than ever before on strategic planning (s121) that will describe:

- 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)).

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

- Permits councils to strike a rate or charge for any activity they choose to get involved in (s16).

Resource Management Act 1991 (RMA) sets out the framework for freshwater management. Freshwater is managed by regional councils who are responsible for the water bodies within their boundaries through implementation of the RMA.

The Health (Drinking Water) Amendment Act 2007 amended the Health Act 1956, requiring all water suppliers with the duty to ensure their water is safe to drink. The amended Act introduced a statutory requirement that all drinking water suppliers providing drinking water to over 500 people must develop and implement a Water Safety Plan (WSP) to guide the safe management of their supply. The quality assurance is complemented by the DWSNZ**,** which specifies the maximum acceptable concentrations of harmful contaminants in the water.[1]

National Policy Statement for Freshwater Management 2011

- Reflects central government's policy and directions to local government regarding the management of the nation's freshwater resources. The freshwater objectives seek to safeguard the life-supporting capacity, ecosystem processes and indigenous species, including their associated ecosystems of fresh water. This is to be achieved quantitatively through the sustainable management of taking, damming or diverting fresh water, and qualitatively through the sustainable management of the use and development of land and the discharge of contaminants.

Northland Regional Council (NRC) regulates the water takes in the Kaipara district. 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

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 Water Supply) to function to the fullest possible extent during and after an emergency and to have plans for such functioning (business continuity plans).

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 contract documents, as-built of public utilities and services such as: roads, drainage, sewerage and stormwater, Water Supply, flood control, power generated and supply, refuse disposal and public transport.

National Environmental Standards (NES)

The RMA promotes the sustainable use of resources. The main method that the Act uses to control the use of resources including the discharge of effluent to the environment is through the Regional Water and Soil Plan at regional level and District Plans at district level. This has resulted in varying standards for each region and district.

One method of ensuring that environmental standards are applied consistently across the country is provided in sections 43 and 44 of the RMA. These sections allow the Minister for the Environment to promote regulations called National Environmental Standards (NES). When an NES is enacted it means that each regional, city or district council must enforce the same standard. In some circumstances councils can impose stricter standards.

NES not only protect people and the environment, they also secure a consistent approach and decision making process throughout the whole country. They create a level playing field.

The following standards are in force as regulations:

- 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 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.

This AMP has considered the impact of those relevant NES that are known to be in force at the time of the current update. Future AMP updates will need to consider future Standards as the MfE develops these as it is likely that they will influence how Council manages the communities' Water Supply.

Links with other documents

This AMP is a key component in Council's strategic planning function. Among other things, 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.

2.7 Demand management

2.7.1 *Introduction to water demand management*

The objective of water demand management is to provide a framework and action plan for Council to continuously improve efficient use of water and water demand management across its water supplies, often targeting the highest demands/water loss first, to achieve a level of water demand management that is consistent with good performance in New Zealand.

Demand management strategies provide alternatives to the creation of new assets in order to meet demand and look at ways of modifying customer demands in order 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 2-7 below.

Table 2-7: Examples of WS demand management strategies

Demand component	Water Supply examples
Operation	• Optimise treatment processes; and • Leak detection to reduce non-revenue water loss (i.e. pressure management).
Incentives	• Rain water harvesting; and • Volumetric tariff encourages reduced water consumption.
Education	• Public education on alternative water source and water conservation; and • Encourage use of water efficient appliances
Demand substitution	• Water reuse for non-potable use, e.g. toilet systems and gardening

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

- Growth is consistent with the low percentages forecast; and
- No major changes to industrial usage.

If the growth significantly exceeds than expected then there is a risk that the 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.

Water demand management options can be categorised into two key areas, measures and instruments.

- **Measures** – 'what to do' to achieve a reduction in water use (e.g. conversion of inefficient showers to efficient star-rated showerheads);
- **Instruments** – 'how to do it' (how to ensure that the chosen 'measures' are put into place or taken up), which include the following types;
- **Economic** – incentives such as rebates and retrofits for efficient fixtures and fittings or cost-reflective pricing which makes customers consider how they can reduce their water use to reduce their water bills;
- **Economic** – uneconomic public water supplies are returned to private ownership or converted to a non-potable water source;
- **Regulatory** – the use of local development consent conditions to ensure all new properties sold achieve a specified level of water efficiency and minimum water efficiency performance standards at a national level that require all products sold to achieve a specified level of water efficiency; and

- **Communicative** – education and advertising/marketing to promote a water efficiency consciousness and promote behavioural changes.

In addition, the Water Services Association of Australia (WSAA) recommends identification of "foundation options" as they have often been critical elements to the success of a demand management programme. It may be difficult to analyse the costs and attribute savings to these options, however they should be considered in the full programme.

Foundation options include:

- An effective ongoing education and public awareness campaign that ensures the community understand how they use water and how they may be able to save water;
- A customer advisory service which assists in communicating to the public how to save water and participate in water efficiency programmes;
- The use of regular billing cycles including customer feedback on bills to advise how the customer is tracking with respect to previous billing cycles and typical household water consumption;
- Effective user pays cost-reflective pricing including consideration of inclining block water and wastewater tariffs and peak, drought and scarcity pricing; and
- Basic system management including systematic replacement of customer water meters and calibration of bulk water meters to ensure a high level of water accounting accuracy.

WSAA recommends designing both structural and behavioural changes into a demand management programme and using more than one instrument. A combination of at least two instruments is generally most effective. For example, an economic incentive for an indoor retrofit, plus communicative and educative material about water saving tips around the home, have the potential to tap into both structural and behavioural conservation.

Similarly, whenever considering changing a single measure such as a washing machine, at least two instruments are recommended to maximise effectiveness. For example, an economic incentive and communication/education that recognises both structural and behavioural changes can take place (e.g. a more efficient machine and the participant being informed that they can save both water and energy if they wait to use a full load when washing clothes, which will save them money).

2.7.2 *Council's approach to demand management*

Council has historically undertaken water demand management planning. By doing so, and planning for its use of water to be efficient, Council will be contributing to LOS that relate to the "sustainable economy" and "strong communities" community outcomes (s1.5).

The recent climatic conditions affecting Dargaville in particular are highlighting the need for more appropriate proactive demand management strategies to be developed and implemented.

In addition to commencing water demand management planning, the LOS for the water activity will also be expanded, for example creating performance measures for residential water consumption and water loss will enable Council to compare its performance on these measures with other water supplies in New Zealand. The AMP signals Council's intention to undertake this work and develop a proposed staged approach for improving water demand management in the district.

The first step is to review the Dargaville Drought Management Plan and incorporate a staged water restriction methodology adopted in the region. A community education communication plan also needs to be developed and implemented.

The following sections provide an analysis of factors affecting demand including population growth, social and technology changes and environmental considerations. The impact of these trends is examined and demand management strategies are recommended as a technique to modify demand without compromising customer expectations.

2.7.3 *Population growth*

The Long Term Plan 2015/2025 (LTP 2015) assumptions use a 2006 Census data as the base for the population projections with the intention of using the new 2013 Census base when this became available. Statistics New Zealand (SNZ) issued revised population projections on 22 February 2017, using an estimated resident population at 2013 as the new base.

The LTP 2015 assumptions used the high growth scenario with population projections of:

- 20,000 in 2016 - already exceeded by the 2013 base of 20,500;
- 21,400 in 2026 - a figure now expected to be exceeded three years earlier in 2023 by even the updated low growth scenario of 22,600; and
- 22,000 in 2031 – a figure now expected to be exceeded three years earlier in 2028 by even the updated low growth scenario of 22,800.

These higher projections reflect stronger than expected growth up to the 2013 Census and estimated between 2013 and 2016 with the economic recovery and strong migration. In moving to the latest 2017 projections data, a decision needs to be taken on whether to continue to use the high growth scenario or to use lower growth options. The annual average population increases under the three scenarios are:

- High – population increase of 8,300 over 30 years = 276 persons per annum;
- Medium – population increase of 4700 over 30 years = 157 persons per annum; and
- Low – population increase of 1,200 over 30 years = 40 persons per annum.

For comparison, the SNZ Subnational population estimates going back to 1996 show that despite slower growth in the 10 years up to 2006, the district grew by an average 315 persons per annum in the 10 years from 2006 to 2016. Even the recently updated SNZ high growth scenario of 276 persons per annum is below the average of 315 persons per annum seen from 2006 to 2016. If one assumes some moderation of the 2006/2016 highs due to the cyclic nature of economic development and growth, then use of the updated high growth scenario is reasonable. This is supported by the increasing influence of Auckland over time, particularly in the southern part of the district, which should see sustained population growth over time.

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 2018/2028 is presented in Table 2-8 below.

Table 2-8: Annual rating unit growth forecasts 2018/2028

Annual % change in rating units					
Area	**Rating Units (LTP) 2017/2018**	**Years 1-5 2018/2019 to 2022/2023**	**Years 6-10 2023/2024 to 2027/2028**	**Rating Units by Year 5 2022/2023**	**Rating Units by Year 10 2027/2028**
Dargaville and Baylys	2,518	0.32%	0.31%	2,558	2,599
Glinks Gully	85	0%	0%	85	85
Kaiwaka	334	1.95%	1.95%	368	405
Maungaturoto	351	0.20%	0.20%	354	357
Te Kopuru	252	0%	0%	251	250
Mangawhai	2,249	1.15%	1.20%	2,381	2,526
District (including all other areas)	14,658	1.01%	1.01%	15,414	16,208

While the above growth predictions are relatively low or even static, the district experiences growth in other ways, such as the increasing number of visitors that move into 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, Pahi, Tinopai, Baylys Beach and Kai Iwi Lakes.

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.

2.7.4 *Growth and demand trends*

Future demand for Water Supply services is driven by:

- Extent and location of urban growth;
- Changing environmental expectations;
- Community expectations;
- Industrial/commercial demand; and
- Legislation.

There is no growth-driven capital projects of significance for Water Supply over the coming years. The focus is on ensuring security of supply by sustainable water use and adequately maintaining and renewing infrastructure. 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.

Projections for growth in demand for Water Supply services must take into account new developments and existing residents in areas not yet serviced. Additionally, community expectations vary geographically and over time. Council can track the future demand for future Water Supply services through community consultation via the LTP and Annual Plan processes.

2.7.5 *Increase in demand for Water Supply services*

As development occurs and communities expand, the need for Water Supply services may increase, to provide certainty in supply (of potable water) and to manage risk (firefighting protection). The demand for such services is generally governed by the communities need and ability to pay. Two communities in particular may require additional Water Supply servicing in the future.

Mangawhai – this community continues to grow steadily but is largely un-serviced in relation to Water Supply. As many of the houses are used as holiday accommodation this can result in water shortages over summer and there is no reticulated fire capacity. However, there is no discernible community demand for the introduction of a community Water Supply and none is provided for in the long term planning at this time.

Kaiwaka – The cost of home ownership in Auckland is driving people to look at locations outside Auckland that either provide for an extended commute of for lower cost retirement within range of city amenities and family ties. This is already influencing growth in Warkworth and Wellsford. It is expected that this will start to influence Kaiwaka but this is not specifically provided for at this stage. Kaiwaka currently has no community Water Supply and this is not a significant barrier to growth occurring given the viability of tank supplies and the availability of tanker top-ups from Wellsford or Maungaturoto.

2.7.6 *NPS on Urban Development Capacity 2016*

The NPS requires all councils to provide for growth to occur in their areas such that a lack of 'development infrastructure' (which includes water services) is not an impediment to that growth.

There are no communities in Kaipara larger than 30,000 population of experiencing high rates of growth and so compliance only with requirements PA1-4 is required. Broadly these can be summarised as:

- For expected growth in period from now to 3 years the land and development infrastructure has to be feasible, zoned and serviced (or able to be serviced if it is developer responsibility);
- For medium term growth (3-10 years) the land does not need to be serviced but plans to service must be included in the LTP; and
- For long term growth (10-30 years) the land does not need to be serviced but provision to do so needs to be included in the Infrastructure Strategy.

In practical terms it is difficult for Council to predict when a particular developer might decide to proceed and what the staging of that development might be. In the absence of a specific proposal it is not cost-effective for Council to pro-actively install capacity for developments that 'might' proceed.

The approach adopted by Council is therefore to engage with the development community and seek a co-ordinated approach that will provide for the development on a 'just in time' basis and with confidence that any works required are financially feasible for both the developer and Council.

2.7.7 *Operational efficiencies*

The cost of operating and maintaining public Water Supply systems and maintaining compliance with ever increasing and demanding water quality standards, needs to be considered in the overall assessment of the schemes viability to continue as a public Water Supply, and as a financial demand on the ratepayers contributing to the ongoing operability of the system.

For schemes serving larger populations, the costs are shared across a larger population base and the system is more than likely cost-effective, with a greater emphasis on health and safety, through the provision of a healthy potable Water Supply, in sufficient quantities to provide the appropriate levels of fire safety.

For schemes serving smaller populations, or a segment of a community, the costs per ratepayer may be disproportionally larger, as the same quality standards need to be provided. An example could be the Mangawhai system where a small portion of the population (18 connections) is serviced by the system. The supply was upgraded in December 2016 and now meets the Drinking Water Standards for New Zealand 2005 (Revised 2008).

2.7.8 *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 Water Supply services. Whilst the DWSNZ drive and monitor potable water quality compliance, developments in water treatment processes and technology potentially offset the cost of increased quality compliance requirement. As such there is a need to monitor the technology aspect of Water Supply treatment, to potentially identify opportunities that may be developed and implemented to reduce the cost of treating water.

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

2.7.9 *Economic trends*

New Zealand is currently experiencing a significant growth in 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 and property sales.

Extension of the Northern Motorway to Warkworth may see more commuters prepared to settle in Mangawhai or Kaiwaka. Certainly, Mangawhai is very affordable compared to Orewa and is attracting a share of the retirees.

2.7.10 *Legislative change*

Legislative change can significantly affect Council's ability to meet minimum LOS, and may require improvements to infrastructure assets. Changes in the NRC Proposed Plan for Northland, environmental standards and the RMA 1991, may affect water take requirements.

In addition, changes in legislation can influence the ease at which new consents are obtained or existing consents are renewed. Experience demonstrates that consent conditions are becoming more stringent with increased monitoring requirements being commonplace and the likelihood of better management and possible reduced volumes in water take consents.

The Ministry for the Environment (MfE) is promoting a series of NES that can be enforced as regulations under the RMA. One such standard is the proposed standard for Ecological Flows and Water Levels, the objective of which is to facilitate the sustainable management of New Zealand's water resource. It intends to promote consistency in the way decisions are made to ensure sufficient variability and quantity of water flowing in rivers, groundwater systems, lakes, and wetlands.

2.7.11 *Customer expectations*

Our customers are becoming more aware of the cost and implications of providing and maintaining potable water supplies. Whilst seen as a necessity, the increased costs of providing a reticulated potable water system can be prohibitive. Community expectations such as in Mangawhai are clear that an extensive public Water Supply system to service the community is not required, and as such are unlikely to be willing to pay for a scheme to be implemented. The motivation behind such

sentiment could be attributed to the funding issues associated with the Mangawhai wastewater system or seen as a means to stifle development in the area. Regardless, such sentiment indicates that in this particular area, rainwater tanks will remain the preferred source of water for many years to come. It is our intention to monitor areas where potable Water Supply schemes are not available and to consult with the respective communities to gauge the future level of interest in the installation of potable Water Supply schemes.

2.7.12 *Environmental considerations*

The taking of water for subsequent treatment and use in a potable Water Supply scheme has until recently not been subject to much resistance. These days, with increasing demands for river and groundwater sources, unless well managed, the demand for that water may be greater than the ability of the source to supply. Recognising this, changes to the way in which river and groundwater takes are managed and the volume of water available to be taken, are likely to be more stringently controlled, with strict consent conditions around monitoring and reporting.

2.7.13 *Changes in weather pattern*

The MfE advises that climate scientists estimate that Northland's temperature could be up to 3°C warmer over the next 70-100 years. 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 many New Zealanders remember as particularly long, hot and dry, was only about 0.9°C above New Zealand's average for the 1990s. Northland could be up to 10% drier with more varied rainfall patterns and flooding could become up to four times as frequent by 2070.

The effects of this on Water Supply are that high intensity rainfalls create an increased flooding frequency and may contribute to poorer raw water quality and increased treatment requirements and costs.

The impact of long term changes in weather patterns on the existing systems have not been built into this AMP given the lack of detailed information available.

Certainly, Dargaville in particular has experienced two dry years in a row with 2012 river levels of the source water dropping to 20 year lows. In 2014 the base flows appeared lower than the previous year indicating the catchment was still suffering the effects from the previous dry year. These compounding effects require consideration in developing appropriate mitigation strategies.

Inclusion of possible risks imposed by global warming to the Water Supply assets will need to be included as appropriate as the AMP is developed in the future.

2.7.14 *Summary*

Table 2-9 below shows a summary of how the above demands will impact on the management of Water Supply assets.

Table 2-9: Summary of demands affecting the Water Supply assets

Demands	Impact on Water Supply assets
Population growth	Potential future new systems or extensions to existing system to provide the desired levels of water volume / protection may have a large impact if the community has the appetite to contribute towards funding the scheme.
Technical change	Alternative water treatment practices may have little impact, and may result in more cost-effective options.
Economic trends	In times of recession growth and development will slow, impacting on potential development contributions and new connections to fund new schemes.
Legislative changes	Unknown Impact. NES may result in stricter monitoring and reduced water take volumes.
Customer expectations	Unknown Impact. The communities willingness to pay for new schemes, scheme extensions and higher quality water may impact on the extent and quality of water provided.
Environmental considerations	Potentially high impact with stricter controls around the volume of water available to be sourced from ground / river supplies
Climate change	Possibly an increasingly important impact with potential reduced security of supply and contamination of supply. As weather changes are likely to be gradual, in terms of medium term asset management planning timeframes, these affects are raised here only and will need to be reviewed in the development of mitigation measures included in Drought Management Plans and as the AMPs are developed in future.

2.7.15 *Impact of trends on infrastructure assets*

The main impact of the above trends is the potential future restrictions on river and groundwater sources, the volumes of water able to be extracted, and the additional costs to source additional supplies to meet demand.

2.8 Environmental management

An important aspect of the Water Supply activity is ensuring the responsible management of water takes, whether from surface waters (such as streams, rivers or dams) or from groundwater. While the extraction and supply of water for domestic and stock drinking water needs is essential to the social and economic well-being of the community, there is an important need to protect the natural environment and function of the water resource.

The key objective, as identified in the Proposed Region Plan for Northland is to:

Manage the use, development, and protection of Northland's natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while:

1) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably

foreseeable needs of future generations, and

2) safeguarding the life-supporting capacity of air, water, soil, and ecosystems, and

3) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

It is recognised in the Regional Plan that these potential adverse effects are dependent on the size of the resource, the significance of the aquatic habitats it supports, other existing authorised users and the existing quality of the water resources. For example, larger rivers are better buffered from potentially adverse flow related habitat and water quality effects than are smaller rivers.

Where the existing water source is inadequate to meet demand, alternative water sources such as dams and reservoirs may have to be developed. More effective ways of utilising existing water sources will need to be considered, including strategies to harvest water at high river flows for use during periods of high demand and low availability. Avoiding wastage will also be an important consideration.

The controls for surface water and groundwater use are provided under Section 14 of the RMA 1991 and through the Regional Plan. The RMA requires resource consents for all activities relating to water (other than taking water for an individual's reasonable domestic or stock drinking water needs). Other resource consents may also be required for the installation and operation of Water Supply infrastructure (e.g. pipelines across rivers and streams). Council holds a number of resource consents for its water take activities. A summary of current water take consents held by Council is presented in Appendix D.

On the other hand, the water treatment process can also impact on the environment as a result of backwash water discharge. The control of discharge of contaminants to the environment (land, air and water) is also controlled under Section 70 of the RMA and through the Regional Plan. The current list of backwash discharge consents held by Council is provided in Appendix D.

2.9 Proposed LOS and performance measures

LOS are attributes that Council expects of its assets to deliver the required services to stakeholders. A key objective of an AMP is to match LOS provided by the Water Supply activity with agreed expectations of customers and their willingness to pay for that LOS.

The LOS provide the basis for the lifecycle management strategies and works programmes identified in the AMP. With water 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 and implementation 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 Requirements** 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 the LOS and needs of stakeholders.

The LOS for Water Supply have been developed to contribute to the achievement of the stated Community Outcomes that were developed in consultation with the community (s1.4) 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.

The LOS included in this AMP are the LOS prepared, consulted on and adopted as part of the LTP 2012/2022 consultation process. Table 2-10 below details the LOS and associated performance measures for the water activity. These now include non-financial performance measures rules 2013 in accordance with s261B of the LGA which came into force on 30 July 2014.

The LTP performance measures are reported on through the annual reporting process. Council's current actual performance will be reported in the Annual Report 2014/2015.

The Asset Management Improvement Plan (AMIP) includes an action for Council to review its Water Supply LOS to identify if there is further opportunity for improved efficiencies and/or best practice that can be incorporated into the service framework. Currently the LOS reported in Table 2-12 are customer focused and those that are included in the LTP. An extension of the LOS and performance measures to include the more technical measures associated with the management of the activity has commenced with the inclusion of the non-financial performance measures. The following Service and Performance Measures are the same as the targets for 2016/2017 and there is no change intended over the term of the LTP commencing in 2018.

Table 2-10: LOS and performance measures

Measuring performance				
What we measure	**LTP Year 1 Target 2018/2019**	**LTP Year 2 Target 2019/2020**	**LTP Year 3 Target 2020/2021**	**LTP Years 4-10 Target 2021/2028**
Compliance with Part 5 of the drinking-water standards (protozoa compliance criteria) for the five drinking water schemes.	Dargaville, Maungaturoto, Ruawai, Glinks Gully and Mangawhai			
The percentage of real water loss from our networked reticulation system (average for total network of all schemes).Real water loss is calculated by subtracting the meter readings and 'other components' from the total water supplied to the networked reticulation system.	≤30%	≤29%	≤28%	≤27%
Median response time for attendance for urgent call-outs; from the time the local authority receives notification to the time that service personnel reach the site.	≤2 hours	≤2 hours	≤2 hours	≤2 hours
Median response time for resolution of urgent call-outs; from the time the local authority receives notification to the time that service personnel confirm resolution of the fault or interruption.	≤48 hours	≤48 hours	≤48 hours	≤48 hours
Median response time for attendance for non-urgent call-outs; from the time the local authority receives notification to the time that service personnel reach the site.	≤3 hours	≤3 hours	≤3 hours	≤3 hours
Median response time for resolution of non-urgent call-outs; from the time the local authority receives notification to the time that service personnel confirm resolution of the fault or interruption.	≤3 days	≤3 days	≤3 days	≤3 days
Total number of complaints about drinking water quality, e.g. clarity, odour, taste, pressure or flow and continuity of supply. Expressed per 1,000 water connections.	≤40	≤39	≤38	≤37
Water take consents: 100% compliance with Northland Regional Council water take consents The average consumption of drinking water per day per resident within Kaipara district. Average calculated by the billed metered consumption (m3) x 1000 divided by the no of connections x 365 x 2.5 (occupancy rate).	Dargaville – 275 Maungaturoto – 340 Ruawai – 130 Glinks Gully – 52 Mangawhai – 230			

2.10 Key issues

Key matters requiring attention for the Water Supply activity are summarised in Table below. These matters are further addressed in s3.1 (Asset Details) and s6.2 (Improvement Plan) of this AMP. Key matters requiring attention for the Water Supply service are summarised in the table below.

Table 2-11 Key Issues Overall

Issue	Location and status
New Zealand Drinking Water Standard (DWSNZ) 2005(08) compliance	All – Dargaville and Baylys, Maungaturoto, Ruawai, Glinks Gully, Mangawhai Status – SCADA implemented for Dargaville, Maungaturoto and Ruawai WTPs.
Updated Water Safety Plan (WSP) for each of the five Water Supply schemes	All – Dargaville and Baylys, Maungaturoto, Ruawai, Glinks Gully, Mangawhai Status – Revised WSPs to be prepared for all the Water Supply schemes. The process has begun and the Mangawhai WTP Catchment Risk Analysis is complete.
Waiparataniwha water take resource *consent issued 2014*	Dargaville Status: Complete, expires 2048
Dargaville Water Treatment Plant backwash discharge disposal *consent issued 2014*	Dargaville Status: There has been high aluminium discharge and there are current tests to use an alternative coagulant which has yielded preliminary positive results, consent expires in 2048
Maungaturoto raw water take resource consents *issued 2014*	Maungaturoto Status – A revised water take consent was granted by NRC to accommodate increase in consumption by Fonterra.
Maungaturoto Water Supply requires an optimisation strategy	Maungaturoto Status – SCADA has been implemented at all the raw water takes and also at Fonterra and WTP. Control through SCADA and real-time flow information has enabled operators to use the water scheme more efficiently.
Magflow installation for Council's treated water supplies	All – Dargaville and Baylys, Maungaturoto, Ruawai, Glinks Gully, Mangawhai. Status – Magflow has been installed at Dargaville, Maungaturoto, Ruawai.
Security of supply/Water source strategy - Waiatua Dam to Rotu pipeline	Dargaville Status – Drought Management Plan has been updated and shared with NRC incorporating revised Rotu water take consent. Budget allowed for the construction in LTP 2018/2028.

Issue	Location and status
Dargaville Drought Management Plan review	Dargaville Status – complete
Ruawai reticulation booster pumps meeting New Zealand Fire Standards compliance upgrades to be completed 2014.	Ruawai Status - Complete
Telemetry control system upgrade commenced 2014	All – Dargaville and Baylys, Maungaturoto, Ruawai, Glinks Gully, Mangawhai. Status – SCADA has been implemented at Dargaville, Maungaturoto and Ruawai.
Asset Information Inventory - accuracy, completeness Response - completed 2014 Criticality - definition Response - completed 2013 Condition - Response - commenced 2014 Performance Response - water models completed 2013, Water balance completed 2014 Lives - Response - commenced 2014 Lack of maintenance history - Response - Included as part of renegotiated maintenance contract	All – Dargaville and Baylys, Maungaturoto, Ruawai, Glinks Gully, Mangawhai. Status – process complete, information gathering ongoing.

Table 2-12: Remedial action identified in AMIP - Dargaville

Issue	Remedial action identified in AMIP	
	Improvement action	Forecast completion date
The main water source from Waiparataniwha Stream is prone to drought, hence the risk of supply for the Dargaville raw Water Supply pipeline.	Undertake a Water Source Strategy and investigate Dargaville's available water sources to understand what realistic and viable options exist, likely costs and potential issues for each option. Response - Review commenced in 2014.	December 2015 Completed Council has prepared an updated Drought Management Plan to reflect the variation approved by the NRC on Rotu water take
	Dargaville Alternative Water Supply - Investigation and Report Response – Review commenced in 2014.	
	Water Supply Modelling – Dargaville - review model, update and identify “at risk“ areas due to lack of capacity / pressure.	June 2020
There are a number of raw water connections between the Waiparataniwha Stream and Dargaville treatment plant. The raw water is not suitable for potable purposes.	Communicate with property owners so they are regularly made aware of the potential health risks associated with raw water use. This communication has commenced for Dargaville.	June 2016 (Completed) Council has informed billing team of the water accounts on the raw water main and the health risk message will be sent to identified customers as part of their water bill. Council has prepared a Water Supply Agreement with residents which is being signed and returned.
Knowledge of the firefighting capability of the Dargaville network.	Carry out an assessment of firefighting capability of the Dargaville/Baylys network.	June 2019

Table 2-13: Remedial action identified in AMIP - Maungaturoto

Issue	Remedial action identified in AMIP	
	Improvement action	Forecast completion date
The main water source (Cattlemount/Boar Hill) is prone to drought.	Develop a Drought Management Plan.	Completed
	Understand, what emergency response planning has been undertaken and what the Emergency Response Plans contain.	Completed (2017. Draft currently under review).

Issue	Remedial action identified in AMIP	
	Improvement action	Forecast completion date
Potential water quality issues with the Piroa Water Supply because of the relative location of the quarry to the Piroa water take.	Communicate with property owners so they are continuously made aware of the potential health risks associated with raw water use, specifically at Maungaturoto.	June 2016 Six-monthly letter is sent to raw water users. Council has prepared a Water Supply Agreement with residents which is being signed and returned.
The Maungaturoto WTP capacity is unknown.	Assess the capacity of treated water storage at Maungaturoto to meet peak daily demand, including both the current situation and projected growth scenarios.	June 2021
	Water Supply Modelling – Maungaturoto, Ruawai - develop models, identify “at risk” areas due to lack of capacity / pressure.	Completed
The raw water main from the Maungaturoto water sources is a single water main and Water Supply is at risk in times of significant failure of the water main.	Understand, for all schemes, what emergency response planning has been undertaken and what the emergency response plans contain (if they exist).	Completed – Drought Management Plan prepared - Emergency Response Plan draft under review.
Draft consent conditions issued March 2014.	Identify Consent required improvements and timing - develop programme.	Renewal of backwash consent is under process. Operational changes proposed and testing of alternative coagulant yielding lower level residual aluminium completed at Dargaville to be done at Maungaturoto.
Fonterra prefer taking water from the Baldrock Dam supply as the quality of water is better and easier to treat for production. The use of	Review the optimal utilisation of all three Maungaturoto Water Supply sources to identify Council’s two preferred water sources. Upgrade monitoring/telemetry requirements at these sites aligning with consent conditions.	Completed – SCADA installed

Issue	Remedial action identified in AMIP	
	Improvement action	Forecast completion date
water from Baldrock Dam is subject to a supply agreement between Council and the dam owners and allows a fixed volume 270,000 m^3 per year supply for an annual fee. KDC is required to monitor water use as exceeding this amount will breach contract.	Source and review the Maungaturoto, Baldrock Dam water use agreement and confirm if it is being implemented properly. Response – A review was undertaken in 2014 and presented to Fonterra for agreement.	Completed – Agreement with Fonterra has been reviewed and sent for comments to Fonterra. Completed and signed by Fonterra.
The Maungaturoto raw water pipeline is known to over-pressurise when Fonterra stops using the Baldrock Dam water source, causing overflows at the other Council-owned takes and causing the mixing of water from different catchments.	Backflow prevention – how well is this defined and managed. Review current practise and identify improvement programme.	Completed – Non-return valve has been installed at Cattlemount.
	Identify Consent required improvements and timing - develop programme.	Completed – Revised Cattlemount water take consent received and all raw water takes are now controlled and monitored through SCADA.

Table 2-14: Remedial action identified in AMIP - Ruawai

Issue	Remedial action identified in AMIP	
	Improvement action	Forecast completion date
During scheduled borehole pump maintenance in September 2012, the casing in Borehole 3 was found collapsed rendering the borehole unusable.	Borehole 2 pump has been upgraded to offset the loss of supply from Borehole 3.	Completed
	Undertake routine, five-yearly, inspections of groundwater Ruawai bores condition (next due 2017/18)	June 2018
Water in the Ruawai bores can be high in iron and manganese. Historically, there have been complaints, however after the installation of filters, there have not been recent complaints.	Review the Ruawai borehole management plan with specific focus on the futures of boreholes 4 and 5.	June 2019
	WSP - Update for Ruawai.	Completed – To be updated by June 2018
	In 2010, groundwater investigations were undertaken to support the installation of Borehole 5 as a new groundwater bore to replace Borehole 1. Concerns around the increasing electrical conductivity levels (indicating saltwater intrusion) at Borehole 5 put the plans on hold and Borehole 1 has since been renewed for ongoing use.	Completed
Ruawai WTP Treated Water reservoir leaks and in poor condition.	Replace reservoir	June 2018

Table 2-15: Remedial action identified in AMIP – Glinks Gully

Issue	Remedial action identified in AMIP	
	Improvement action	Forecast completion date
The presence of backflow prevention devices on the Glinks Gully consumers is unknown and requires understanding.	Investigate what backflow prevention exists for Glinks Gully residents that use water tanks.	June 2018

Table 2-16: Remedial action identified in AMIP - Mangawhai

Issue	Remedial action identified in AMIP	
	Improvement action	**Forecast completion date**
The water take consent (#8032) prescribes seasonal water use limits for winter and summer. The take allowance decreases from 125m^3/day during summer to 90m^3/day in winter. It is reported that this changeover can cause Water Supply issues when Easter falls in late April.	Undertake a study to better understand the impact of the non-resident holiday homemakers and visitors have on the district.	Dec 2019. Currently the option is for residents to rely on water carters during the dry peak season and a reminder to residents is on the Council website.
Peak demand issues during the peak summer season resulting in supply augmentation by water carters.	There is no immediate possibility to increase supply as Council is limited by the available consented water from the bore. Improve reaction time for water carters.	
The high summer population at the Mangawhai camp ground may impact on the Water Supply classification under the DWSNZ 2005(08) and treatment upgrades are likely to be required to comply.	Investigate and understand what will be required at the Mangawhai scheme for it to be compliant with NZDWS 2005(08). New treatment plant commissioned in December 2016.	Liaison with Northland District Health Board underway for pre-inspection for compliance with DWS. Target for compliance July 2017. Completed 2016.
	Undertake routine, five-yearly, inspections of groundwater bores for Mangawhai (next due 2016/2017)	March 2018
	Water Safety Plan – to be developed for Mangawhai	March 2018

3 The assets

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

- Asset Details – summary of Council's five Water Supply schemes and related assets;
- Critical Assets – summary of Council's critical assets for Water Supply and how these will be managed; and
- Asset Values – summary of the Water Supply asset valuation.

3.1 Asset details

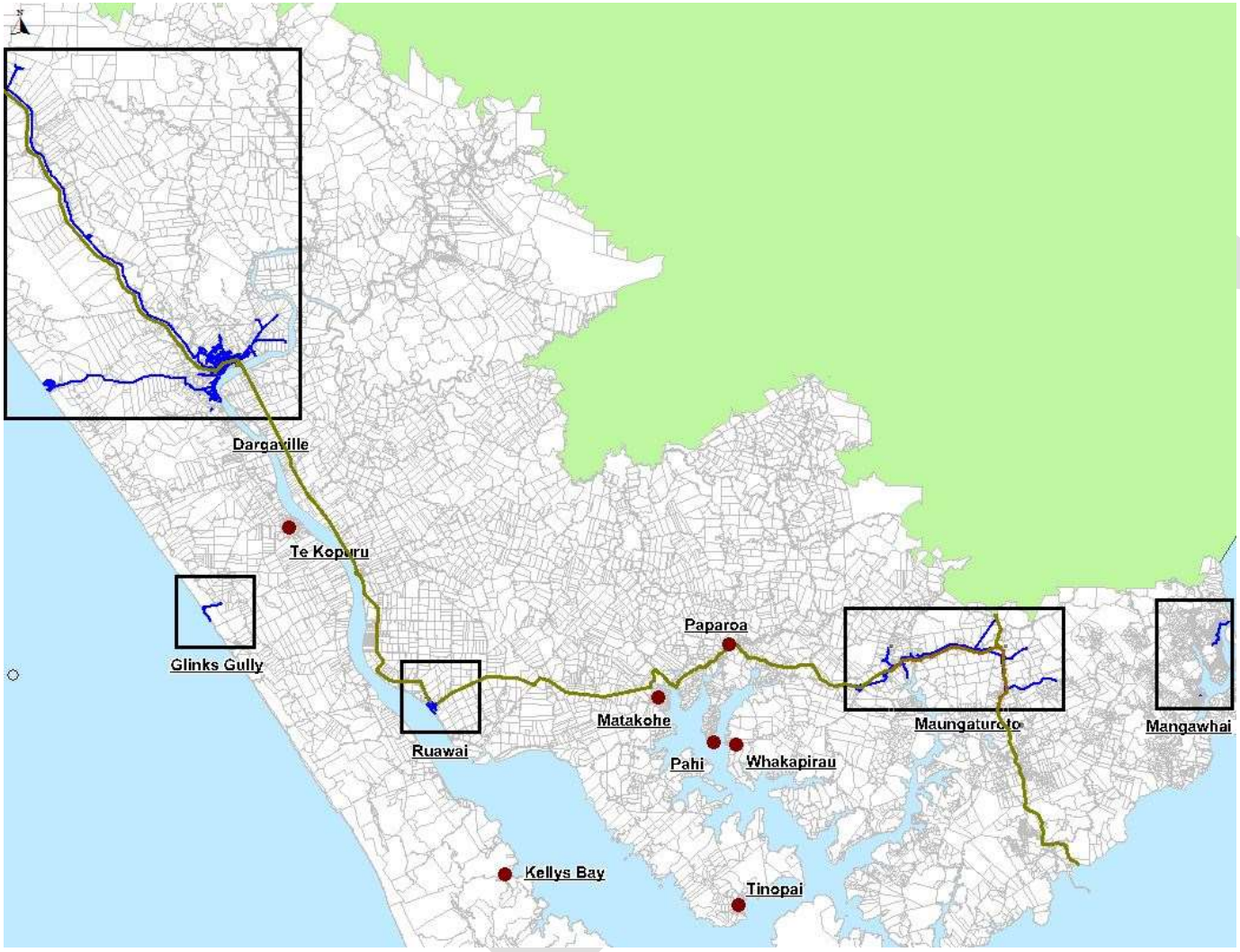
3.1.1 Overview

Council operates five community-based Water Supply schemes, which are each separately funded per community. These five Water Supply schemes are:

- Dargaville/Baylys;
- Maungaturoto;
- Ruawai;
- Glinks Gully; and
- Mangawhai

The location of each of these communities within Kaipara district is illustrated in the figure below.

Figure 3-1: Location of communities with WS schemes



An overview of the Water Supply assets in the district is provided in the table below. Asset details for these schemes are described below in Section 3.2 to 3.6.

Table 3-1: Asset overview summary

(Based on information used in 2016 valuation by MWH)

Scheme	Water source point	Water Treatment plant	Pump stations	Storage	Reticulation (KM)	Connections	Points	Valves	Meters
Dargaville/Baylys	5	1	4	3	136	2,782	375	639	2864
Maungaturoto	4	1	3	4	13	447	66	101	477
Ruawai	2	1	0	1	6.5	251	38	52	248
Glinks Gully	3	1	0	4	1.4	85	1	8	87
Mangawhai	1	1	0	5	2.9	18	2	17	27
Total	15	5	7	13	159.8	3583	483	817	3703

The asset valuation totals for the district is summarised in Tables 3.10 to 3.13 below. See Section 3.1.8 for discussion of the asset valuations.

3.1.2 *Asset condition*

The condition of pressure mains is difficult to assess and a combination of a limited planned and opportunistic assessment for those assets exposed during repair is used. Treatment plants and other above ground assets have elevated criticalities and structured inspection programmes are undertaken. As an example, larger diameter bulk watermains passing under buildings or with a breakage history would be prioritised for condition assessment. For example, the Dargaville watermain passing under the Dargaville High School will be tested in 2017/2018.

It is desirable to gather more information on the condition of pipe assets but this requires the development of a structured approach that reflects the outcome desired, the priority of the pipe for assessment and the selection of an appropriate technology to determine the condition. Translation of this to Likelihood of Failure is a further challenge. This is an ongoing development.

3.1.3 *Asset performance*

The current performance of our water assets has been mixed as evidenced by the following metrics included in the Annual Report 2016/2017.

Water quality

Bacteria compliance was achieved for all schemes. Protozoa compliance was achieved for all schemes except Maungaturoto which had issues with the continuous monitoring of its UV system and was resolved in 2017.

Water losses

Water losses in all major schemes was greater than the target level. While significant individual leaks impacted on several of the results and have subsequently been located and repaired the targets and the actual results are still considered to be quite high.

Table 3-2: Water losses

Scheme	Target	Actual
Dargaville	25%	27%
Maungaturoto	30%	41%
Ruawai	30%	41%
Mangawhai	30%	35%

3.1.4 *Asset capacity*

The Water Supply system has enough capacity in the treatment system for the design population at Dargaville, Maungaturoto, Ruawai, Glinks Gully and Mangawhai. The current problems are in the water source for Dargaville especially during dry conditions when water restrictions are invoked in accordance with the approved Drought Management Plan. For the coastal areas of Glinks Gully, Baylys and Mangawhai, the increase in demand during peak holiday periods have put pressure in the supply system resulting in Glinks Gully and Baylys getting supplementary carted water. For Baylys, the reservoir needs upgrading to meet the peak demand over holiday periods.

3.2 Dargaville and Baylys

3.2.1 *Overview*

The Dargaville/Baylys Water Supply system services about 4,683 people. There are in total 2,782 connections including those from the raw water lines, Baylys and Awakino are in the scheme. The primary raw Water Supply is sourced from the Waiparataniwha Stream at the southern end of the Kaihu forest. Water is

collected via three coarse screen filter intakes built in the stream. An additional take is located on the Kaihu River at Rotu and is used to boost Water Supply in dry periods. Under the current consent any volume of water abstracted from the Rotu take must be supplemented by an equal amount discharged from the Waiatua Dam. Figure 3-2 shows a map of the scheme.

Figure 3-2: Dargaville/Baylys asset map

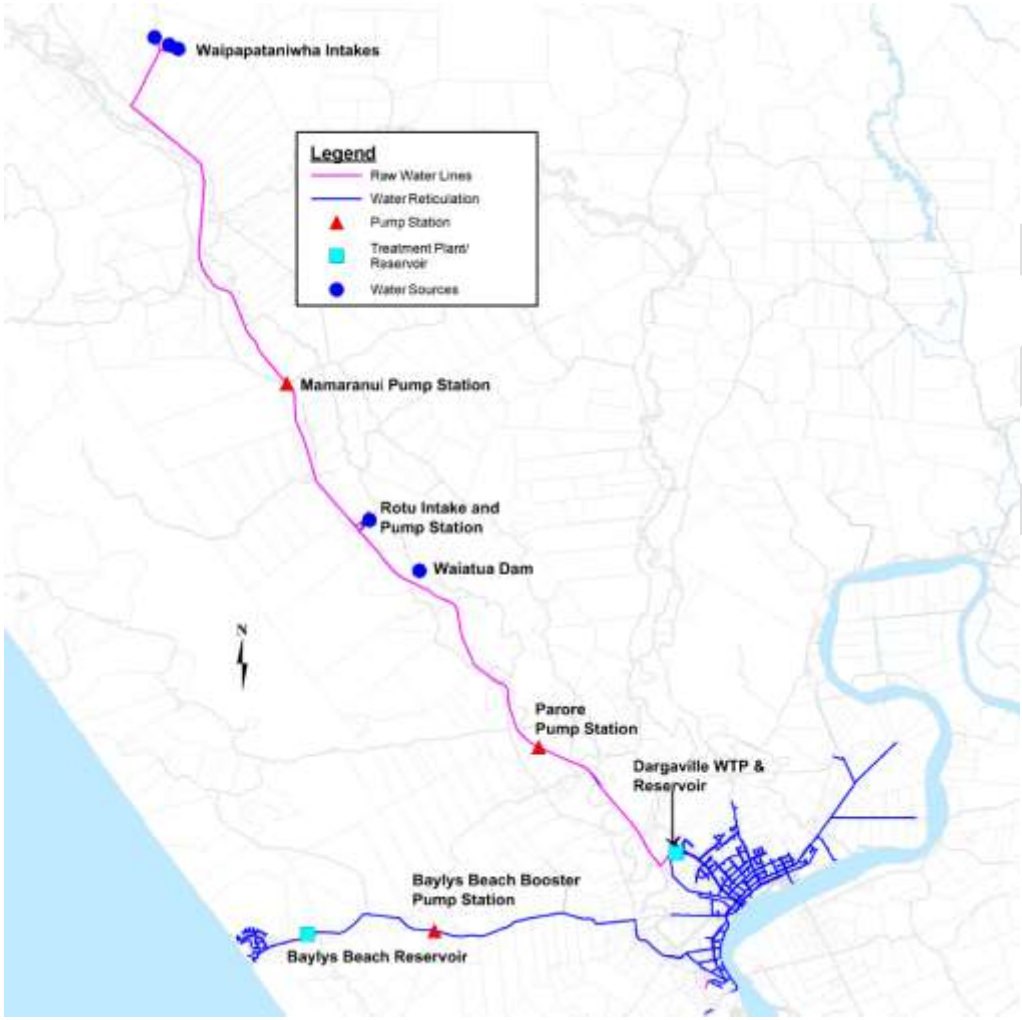
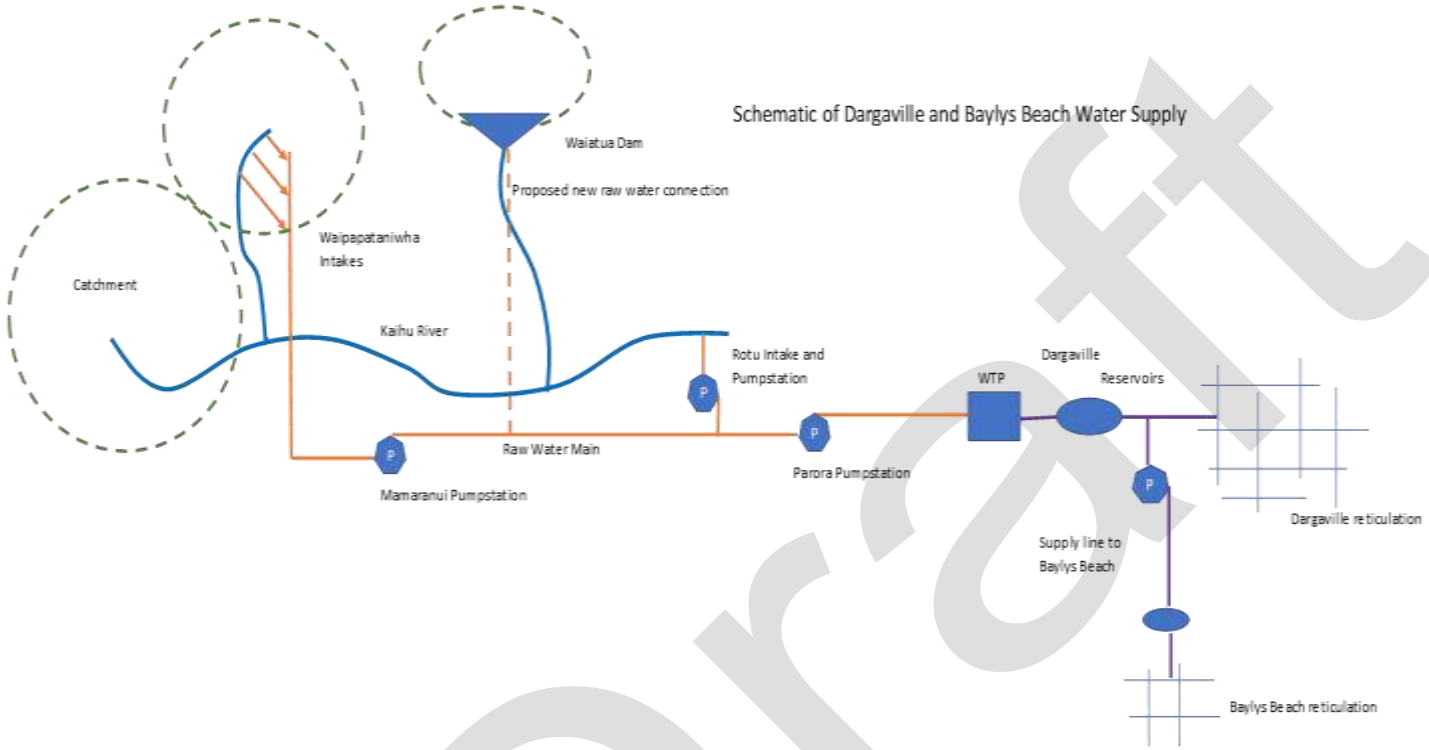


Figure 3-3: Schematic of Dargaville WS



Water is pumped from these intakes to the Dargaville Water Treatment Plant (WTP), located on Hokianga Road, where it is treated to a potable standard prior to distribution to individual consumers in Dargaville and Baylys. Silver Fern Farms is a key commercial water consumer in this network and operates a meat processing factory. A photograph of the WTP showing the clarifier is included as Figure 3-4.

Figure 3-4: Dargaville/Baylys WTP clarifier

Council has worked with the Ministry of Health to upgrade the Dargaville WTP to meet the DWSNZ 2005(08), which was required to be completed by June 2014. Council has installed a UV plant and also SCADA to control the plant remotely and record data continuously. The plant is compliant with the Drinking Water Standards New Zealand 2005 (Revised 2008) DWSNZ 2005(08)

Two booster stations are incorporated into the distribution network to ensure adequate levels of pressure and volume are provided. The Baylys (Seaview Road) pump station boosts water pressure from the Dargaville WTP for distribution to the Baylys community. The Hokianga Road booster station ensures an acceptable pressure is provided to the customers at the upper section of Hokianga Road.

The Dargaville reticulation system operates on a dual feed with a 250mm pipe connection to the network to the east of the WTP and a 300mm pipe connecting to the network to the southwest (and downhill) of the plant. The Baylys Water Supply network is fed from Dargaville via 8.2km of 100mm diameter asbestos cement pipeline. 4.5km of the pipeline was replaced by a same size PE pipe in the 2016/2017 financial year with the remainder planned to be replaced in the 2017/2018 financial year. Storage for Baylys is provided by a 225m^3 reinforced concrete reservoir located behind Seaview Road, provides two days storage under normal demand excluding holiday periods.

Table 3-3: Dargaville/Baylys Asset Summary

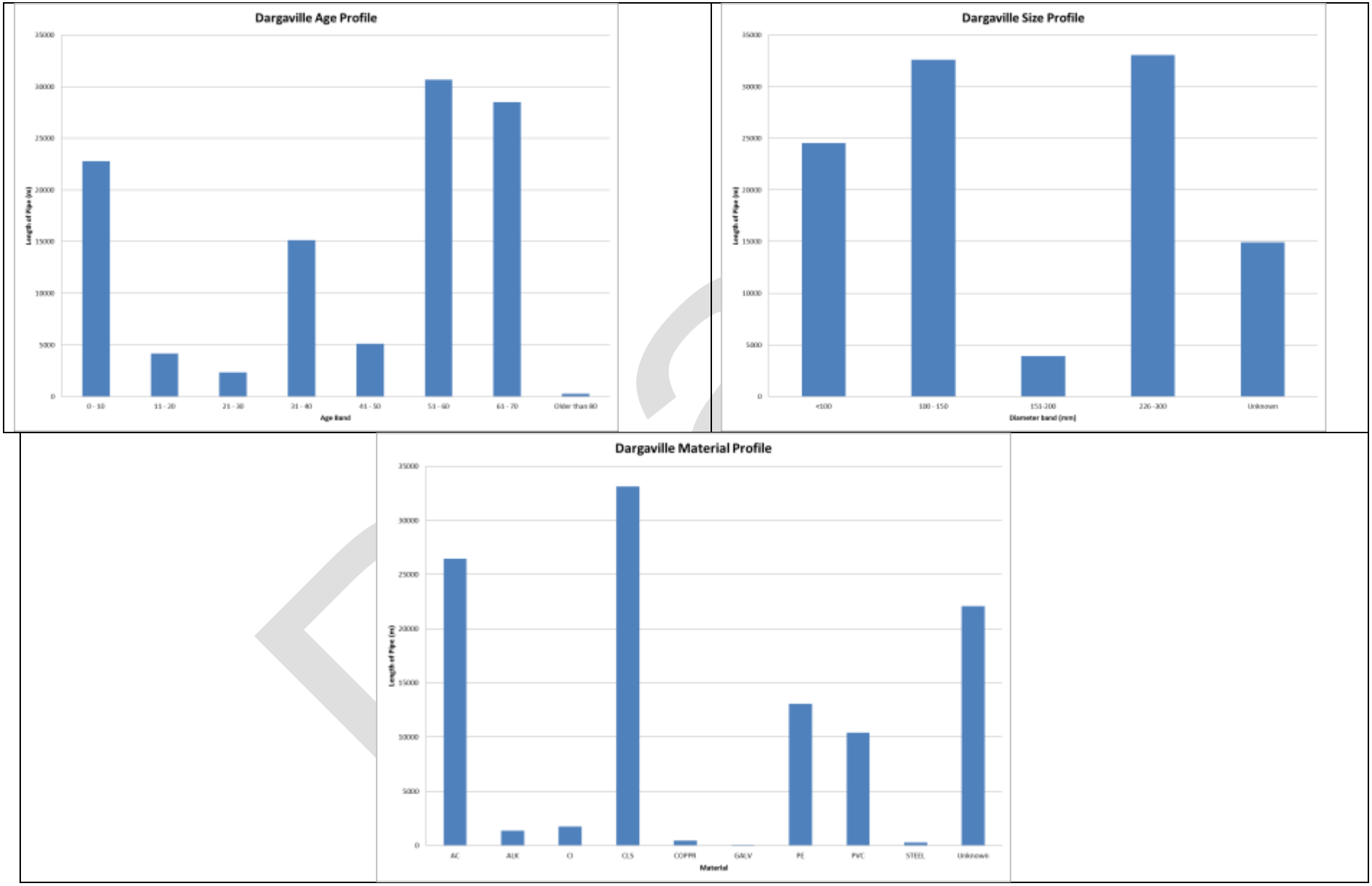
Type	Description		
Sources	Waiparataniwha bores x3 Allowed take : Not to exceed an average of 4,465m^3/day as calculated each calendar month	Rotu Allowed take: 7,200m^3/day	Waiatua Dam Allowed take: 7,200m^3/day
	• Three coarse screen filter intakes on the Waiparataniwha Stream supply raw water to the Dargaville WTP via a 25km concrete lined steel pipeline; • Additional intakes on the Kaihu River at Rotu to boost water take in dry periods with water from the Waiatua Dam supplementing the Kaihu River to allow continued take from Rotu during low flows; • Two raw water booster pumps; and • There are 22 bridges which the raw water pipeline crosses from the intake to the WTP. The bridge crossings are considered critical as they would take longer to repair in the event of a pipe failure.		
Pump stations	Raw Water x2 Parore Booster, Mamaranui Booster Treated Water x2 Baylys Booster, Hokianga Road Booster		
Water Treatment	Compliant with DWSNZ 2005 (2008). WINZ Grading Coagulation, Pre pH correction ,Polyelectrolyte dosing, Clarifier, Rapid sand filter, Post pH correction, Chlorine disinfection		
Storage	Dargaville WTP Storage Reservoirs x2 3,400m^3 and 2,270m^3 Baylys Storage Reservoir 225m^3		

Type	Description
Reticulation	Water mains Dargaville 0 – 50mm 22.8km 51 – 100mm 27.5km 101 – 150mm 7.9km 151 – 200mm 5.1km 201 – 250mm 4.4km 251 – 300mm 3.7km Baylys 0 – 50mm 3.1km 51 – 100mm 11.3km 101 – 150mm 1km
Other assets	Fire hydrants 367, valves 603, water meters 2,145

Asset profile – Dargaville

Dargaville has a total of approximately 108km of predominantly Concrete Lined Steel and Asbestos Cement pipes. The sizes range from less than 100mm to 300mm diameter and 54% are older than 50 years old. Unknown diameters constitute 14% of this total while unknown materials comprise 20%. See graphs on Figure 3-5 below.

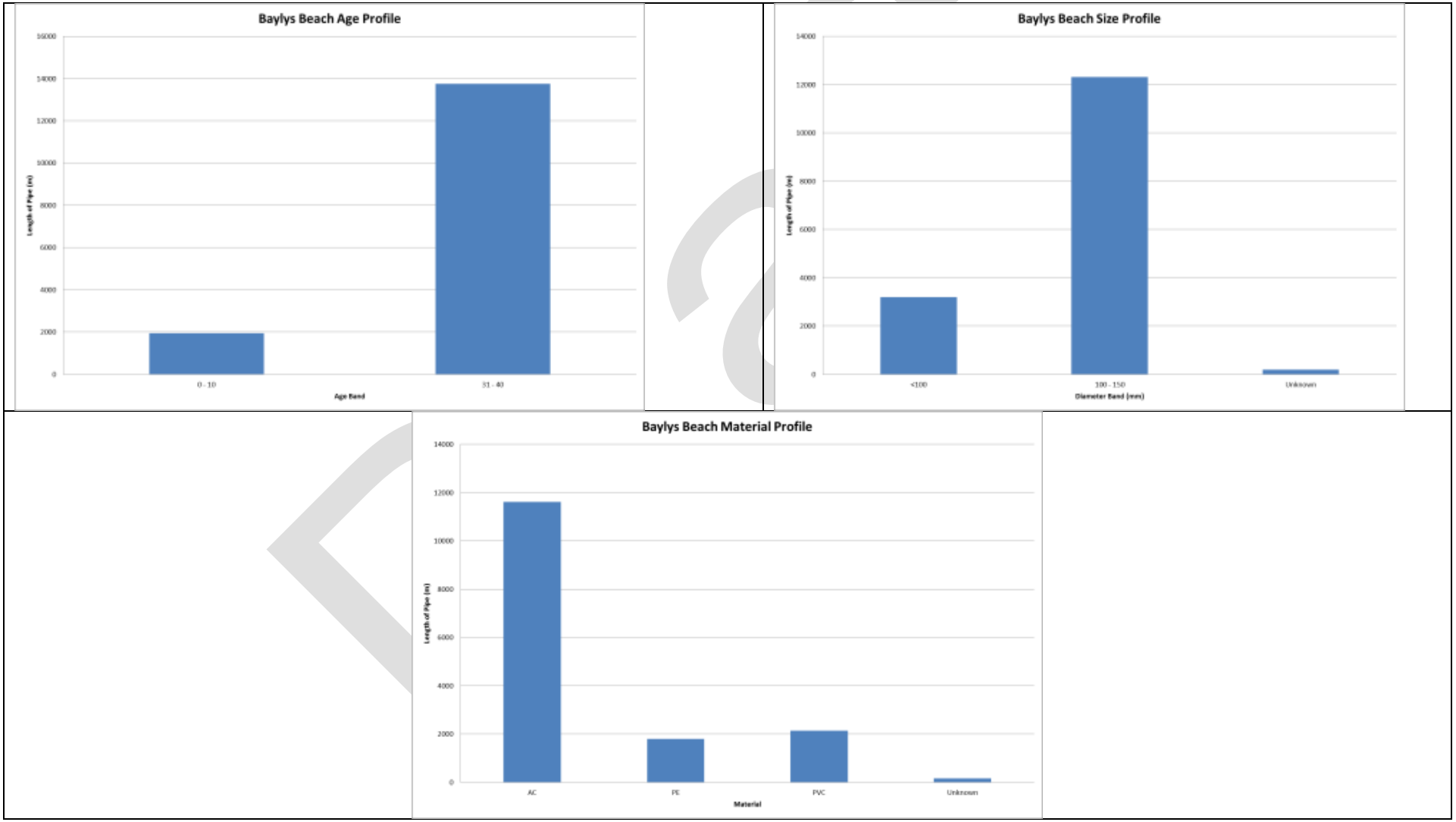
Figure 3-5: Asset profile graph Dargaville



Asset profile – Baylys

Baylys has a total of approximately 15.75km of predominantly Asbestos Cement pipes. The sizes range from less than 100mm to 150mm diameter and 87% are older than 30 years old. Unknown diameters constitute 1% of this total while unknown materials comprise less than 1%. See graphs on Figure 3-6 below.

Figure 3-6: Asset profile graph Baylys



3.2.2 *Asset information*

Headworks

- A condition assessment of all headwork assets is required undertaken within 2018/2019 with the results feeding into a proactive renewal strategy;
- To date, Council only monitors the volume of water taken at the Rotu source however the new Waiparataniwha resource consent requires additional metering was installed at Waiparatanihwa to comply with increasing environmental standards;
- All connections from the raw water line have a backflow installed and Council includes a note on their billing account reminding consumers of the public health risks associated with non-potable water. It is unknown what backflow prevention exists for treated water users. An AMPI has been added for Council to undertake an audit of all current major consumers to check if appropriate backflow protection is in place;
- BECA undertook a safety review of the Waiatua Dam in October 2008, which concluded there were no critical deficiencies that would render the dam an immediate risk. However, several minor improvements were suggested during the review. The AMIP (s6) includes for Council to produce a Dam Safety Review Plan that sets out a long term inspection schedule for the Waiatua Dam;
- Council undertook intrusive sampling to assess the condition of the raw Water Supply line in November 2008. Results indicated the pipe was in relatively good condition and that it would probably not need replacing in its entirety within the next 30 years. Specific sections of this pipeline were highlighted as may be needing additional work within this time including:
    - Sections of raw water pipe that crosses the Kaihu River on pipe bridges and exposed to accelerated degradation and harsh weather;
    - Sections of raw water pipe that run close to the surface (possibly in a bund) which are at risk of damage from stock or grading of stock races; and
    - Where the raw water pipe is close to or under the State Highway where it is subject to increased loads and stresses.
- The raw water line is subject to an annual inspection by the Maintenance Contractor and the 2014 condition assessment project focused on critical aspects of the raw water pipeline and treated water pipeline to Baylys , including pipe bridges, air and scour values; and
- The updated WSP will confirm any risks to public health from the source. The previous Duffill Watts and King (DWK) report prepared in 2008 identified risks of pipeline failure, contamination of Water Supply from farm land. Iwi have also raised concerns due to recreational use up stream of the Rotu intake.

Treatment

- In 2004, Duffill Watts Limited (differs from DWK), completed a desktop study into the future capacity requirements and the design capacity for the Dargaville WTP. The study found that the sand filter capacity to be sufficient to cater for future growth, and was unclear on what future capacity the clarifier was able to provide for. The AMIP programmes for an investigation to gain an accurate measure of the clarifier flow capacity to determine the WTPs ability to meet future demands;
- The Dargaville WTP now complies with the NZDWS 2005. The installation of a UV plant in 2014 has enabled compliance with NZDWS 2005; and
- The Dargaville WSP was prepared in 2014. The document was based on the earlier DWK report. This report identified issues of the clarifiers being exposed to the open air, shortfalls in water quality and a lack of qualification of the operators.

Storage and distribution

- The most recent water balance undertaken in June 2015 by Thomas Civil and Environmental Consultants Ltd indicated non-revenue water at 27.6%; and
- Sampling of the Baylys Water Supply line in November 2008 indicated that the line was in poor condition and at risk of failure at some point between 2010 and 2014. Renewal of this main is now proceeding.

Resource consents associated with any of these Water Supply assets are included in Appendix D.

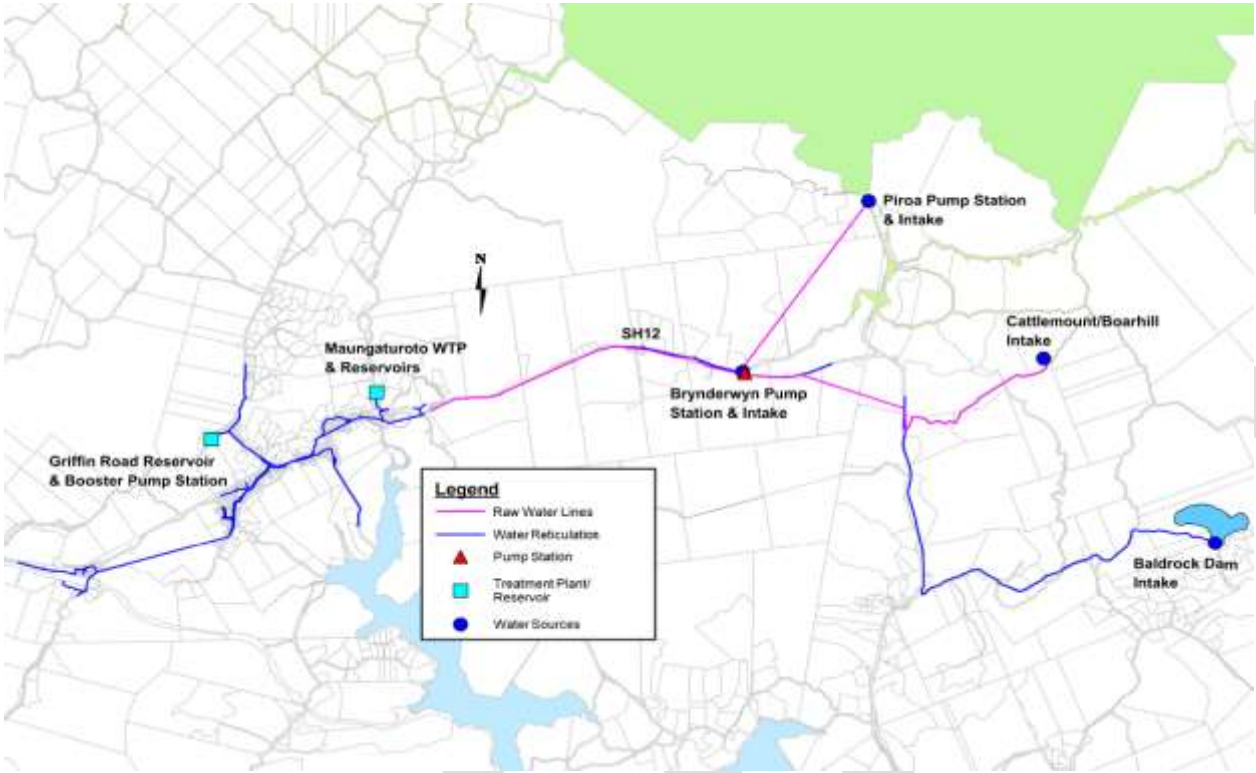
3.3 Maungaturoto

3.3.1 Overview

The Maungaturoto Water Supply system services approximately 895 people. There are in total 447 connections including 410 from the Maungaturoto Township and 37 from the Railway Village.

The primary raw water source is sourced from the Brynderwyn Ranges catchment area, collected by three gravity intakes at Cattlemount and Boar Hill. A secondary intake is located on the Piroa stream. In 2010 the Baldrock dam pump station was completed. This enabled a further water source to be available to Council via a water use agreement with the private dam owner. An overview of the Maungaturoto Water Supply system is provided below and shown in Figure 3-7.

Figure 3-7: Maungaturoto asset map



There are a number of takes from the raw water line, the most significant of which supplies the Fonterra factory in Maungaturoto with an average take of approximately 1,500m^3/day. Council manages the water use of Fonterra through a Water Supply Agreement, with a 25 year contract term and expires in 2034. Under this agreement, Fonterra is classified as a bulk water consumer. The raw water from these connections is not potable and is unable to be used for domestic purposes. Fonterra manages its own onsite treatment to treat raw water for production purposes.

Approximately 8km of 200mm pipeline transfers the raw water to the Maungaturoto WTP. The basic plant was constructed in 1979, while the clarifiers, dosing and control equipment were added in 1997. The plant was upgraded in July 2011 with new filters, an upgrade to the clarifier to increase the capacity, new dosing, switchboard and controls and the addition of UV reactors. The upgraded Maungaturoto WTP is expected to be compliant with the DWSNZ 2005(08) after implementing various upgrades. Council is in the process of collecting monitoring data to support compliance with DWS. A photograph of the WTP and treated water reservoir is shown below as Figure 3-8.

Figure 3-8: Maungaturoto WTP

The Maungaturoto community is serviced by approximately 13km of pipeline, fed by a single 150mm diameter watermain. Council operates one booster station in Maungaturoto at Griffin Road.

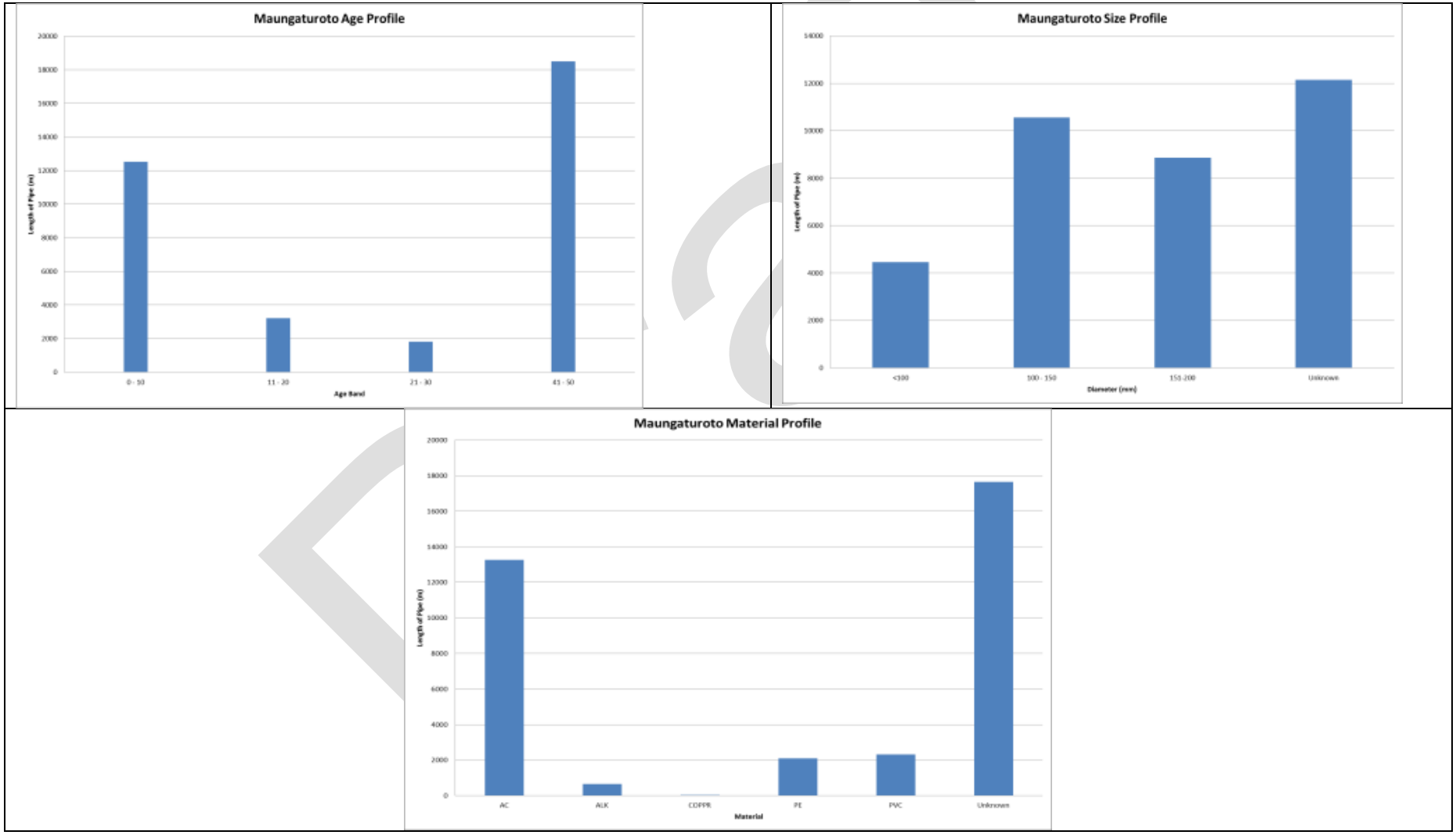
Table 3-4: Maungaturoto asset summary

Type	Description		
Sources	Cattlemount/Boar Hill Allowed take: 1,650 m^3/day	Piroa to boost water take in dry periods Allowed take: 1,000 m^3/day	Brooklands(Baldrock) Dam (privately owned) Allowed take: 270,000 m^3/year
	• Raw water is pumped from the Piroa Stream and then gravity fed until it joins with the pipeline from the Brynderwyn Ranges, near the old/abandoned Brynderwyn Intake; and • Supplementary supply from Brooklands Dam (privately owned) (Are there any seismic issues with the dam? Does the agreement demonstrate that the private owner is maintaining/managing it adequately?) during drought conditions is possible.		
Pump stations	Raw Water x2 Piroa Pump Treated Water x1 Griffin Road Booster		
Water treatment	Coagulation, Polyelectrolyte dosing, Clarifier, Pressure sand filters, UV disinfection, Post pH correction		
Storage	Maungaturoto WTP Raw Water Storage Reservoirs x1 920m^3 Maungaturoto Storage Reservoirs x3 690m^3 total		
Reticulation	Water mains 0 – 50mm 2.6km 51 – 100mm 6.0km 101 – 150mm 3.5km 151 – 200mm 1.8km		
Other assets	Fire hydrants 56, valves 72, water meters 368		

Asset profile – Maungaturoto

Maungaturoto has a total of approximately 35km of predominantly Asbestos Cement pipes. The sizes range from less than 100mm to 200mm diameter and 37% are older than 40 years old. Unknown diameters constitute 34% of this total while unknown materials comprise 49.5%. See graphs on Figure 3-9 below.

Figure 3-9: Asset profile M'roto



3.3.2 *Asset information*

Based on the available and known information, the scheme assets are in moderate condition. Council is committed to maintaining its asset register with up-to-date performance and condition data to help inform future valuations with system based knowledge (that can back up individuals knowledge). For example, the hydraulic modelling of the Maungaturoto network has identified asset performance information that can be entered into the Council database (AssetFinda), and the AMIP includes for recording maintenance information in AssetFinda at the asset component level.

Headworks

- Council has installed magflows and SCADA to monitor the volume of water taken at all raw water sources. The resource consent for the Cattlemount raw water take has been revised in view of increased water demand at Fonterra in the year 2015;
- Council has done condition assessment of the Maungaturoto raw water line in order to have accurate condition information of the Maungaturoto raw Water Supply line. Sections of this line have been renewed over the past four years and this information has been captured in Council's asset system. Renewal will continue in the 2016/2017 financial year and over the next ten years; and
- NRC has raised concerns regarding potential back flow of water from the Brooklands Dam system through the Cattlemount balance tank/reservoir. Council has installed a non-return valve at Cattlemount as part of the resource consent to satisfy NRC's concerns;
- NRC was keen to see the intakes able to be closed to prevent the overflow through the reservoir/ balance tank when demand is less than the intakes supply. It was argued that the intakes could not be valved at the balance tank/reservoir as this could over pressure either the tank and or the pipelines. It was suggested that once the condition assessment is undertaken consideration could be given to enabling the connections to be isolated when necessary as part of the renewal of that part of the system in the future;
- The project to install 25 testable backflow preventers on the raw watermain to Maungaturoto by Broadspectrum to protect the raw water from contamination is complete; and
- Pipe testing of the raw water line in November 2008 indicated a failure may be expected between 2017 and 2029 (Opus AC08-78). Council will continue to monitor the condition of this asset and build in renewals, as required.

Treatment

- The Maungaturoto WTP was upgraded in July 2011 to meet the requirements of the DWSNZ 2005(08) and increase the WTP's capacity for future growth after receiving funding from the Ministry of Health; and
- The Maungaturoto WSP will be updated in the last quarter of the current financial year and early in the next financial year to reflect the upgraded WTP. The water quality monitoring plan will be updated to reflect DWSNZ 2005(08) requirements.

Storage and distribution

- It was reported in the June 2011 AMP that the Maungaturoto scheme was estimated to experience a network loss of treated water of approximately 60%. A hydraulic model of the Maungaturoto network completed in 2013 gives an indication of what losses there are and response recommendations; and
- A water balance study was prepared in January 2014 by Thomas Civil and Environmental Consultants Ltd and the results of this indicated that while the Maungaturoto scheme was too small to accurately develop an Infrastructure Leakage Index the indicative value of 4.6 is only marginally above the 4 which is considered acceptable as an economic level of leakage. This report also indicated that non-revenue water was 32.6%. Recommendations in light of the report are in the AMIPs.

Resource consents associated with any of these Water Supply assets are included in Appendix D.

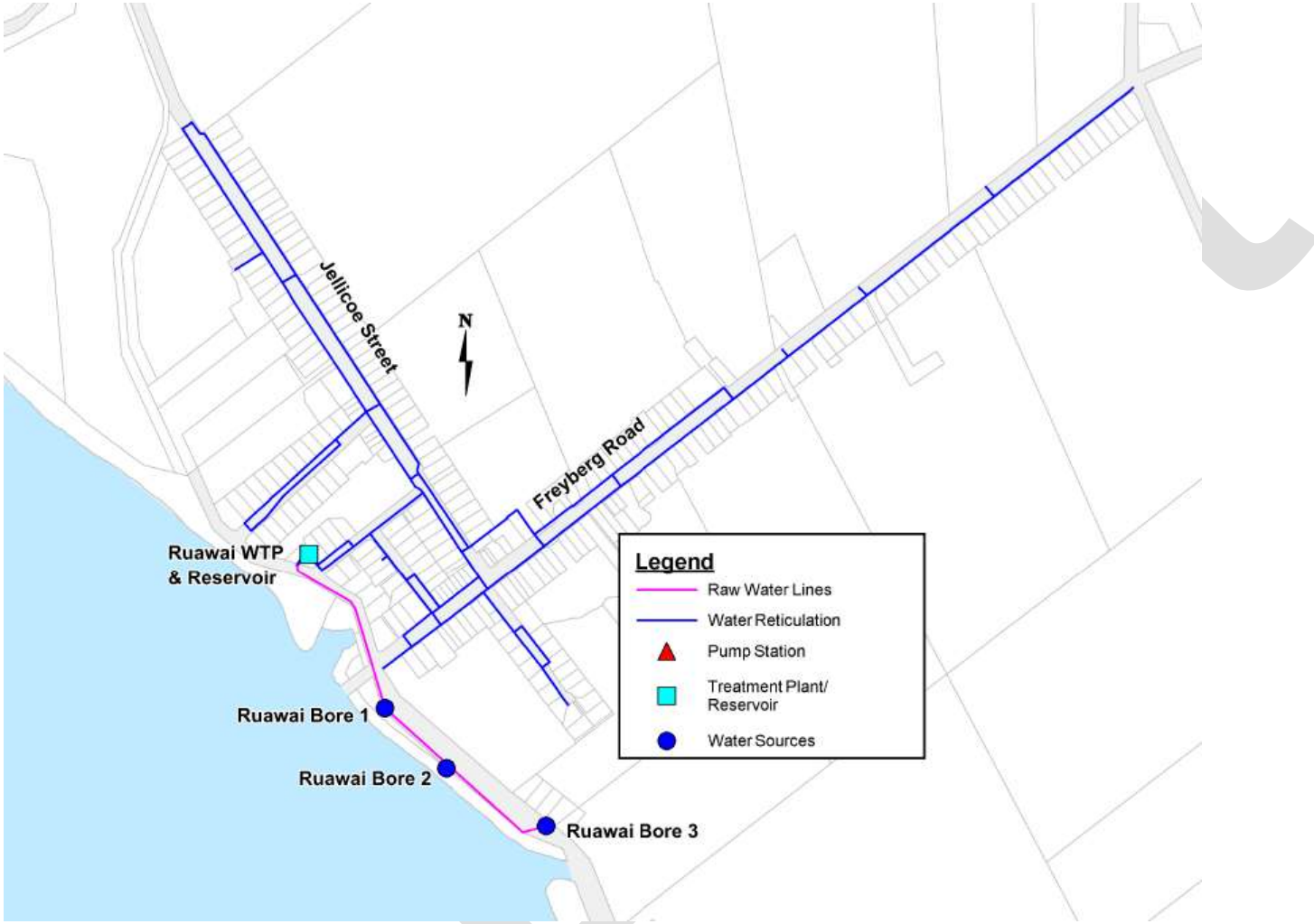
3.4 Ruawai

3.4.1 Overview

The Ruawai Water Supply system services approximately 500 people. There are in total 251 connections to the scheme.

Raw water is drawn from two bores of varying depths located beside the Wairoa River on Stopbank Road and Westlake Street. Figure 3-10 below shows the network map of the Ruawai Water Supply scheme.

Figure 3-10: Ruawai asset map



The original Ruawai WTP was constructed in 1970. Filters, aerators, pumps and electrical equipment at the plant were renewed in 1995. The plant was upgraded again in November 2011 to work towards meeting the DWSNZ 2005(08) and risks identified in the Ruawai PHRMP (April 2008).

Ruawai has a 350m^3 treated water reservoir located at the Ruawai WTP which was constructed in 1970. It is designed to ensure a three day constant supply of water to the residents of Ruawai before refilling. A photograph of the WTP and treated water reservoir is shown in Figure 3-11 below.

Figure 3-11: Ruawai WTP

Ruawai is serviced by approximately 6.5km of pipeline network, which is fed by a single 150mm diameter pipeline from the WTP. The 150mm dia supply pipe has been undergoing renewal since 2014 which will be completed in 2018. The reticulation network was constructed in 1996. Treated water is boosted from the WTP reservoir to the consumers via one of two pumps, operating in a duty/standby mechanism. Table 3-5 below summarises the key assets for the Ruawai Water Supply scheme.

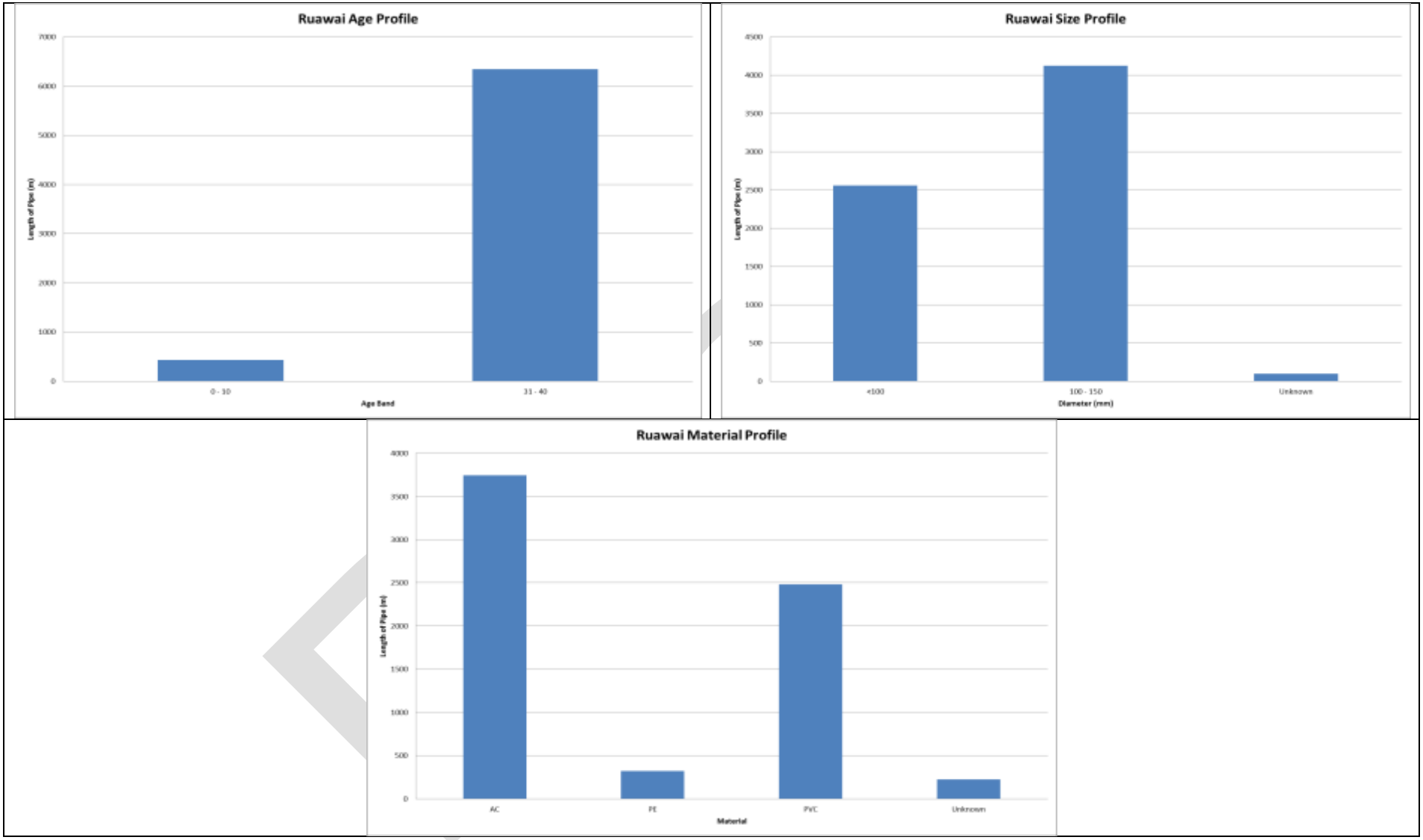
Table 3-5: Ruawai asset summary

Type	Description
Sources	Northern Wairoa River x2 active bores • Five bores on the banks of the Northern Wairoa River (two of which are actively used); and • Borehole 3 was abandoned and sealed in September 2012 following the collapse of the borehole lining. Allowed take: 450 m^3/day, 73,000 m^3/year
Pump stations	Raw Water The 2 bores have 1 pump in each bore, one with Variable Speed Drive. Treated Water WTP contains two booster pumps to boost pressure in the network.
Water treatment	Oxidation using chlorine, Aeration and filtration, Cartridge filtration Chlorination
Storage	WTP Storage Reservoir 350m^3
Reticulation	Water mains 0 – 50mm 2.2km 51 – 100mm 1.3km 101 – 150mm 3.5km
Other assets	Fire hydrants 32, valves 49, water meters 48

Asset profile - Ruawai

Ruawai has a total of approximately 6.7km of predominantly Asbestos Cement pipes. The sizes range from less than 100mm to 150mm diameter and 94% are older than 30 years old. Unknown diameters constitute only 1% of this total while unknown materials comprise 49.5%. See graphs on Figure 3-12 below.

Figure 3-12: Asset profile Ruawai



3.4.2 *Asset information*

Based on the available and known information, the scheme assets are in moderate condition (with Borehole 3 being abandoned). Council is committed to maintaining its asset register with up-to-date performance and condition data to help inform future valuations with system based knowledge (that can back up individuals knowledge). For example, the hydraulic modelling of the Ruawai network identified asset performance information that was able to be entered into the Council database (AssetFinda), and identify the upgrade for the pumps to address low flow during firefighting draw off.

Headworks

- Borehole 1 was refurbished and pump upgraded in August 2011. Borehole 2 was refurbished and pump upgraded in September 2012. After the refurbishments, both Boreholes 1 and 2 are considered to be in good condition. During the September 2012 inspection, the casing of Borehole 3 was found to have collapsed, which rendered the borehole unusable, and consequently Borehole 3 has been abandoned. Based on the discovery of the collapsed casing in Borehole 3, Council has included an Asset Management Improvement Plan (AMIP) action to undertake five yearly borehole inspections for the Ruawai scheme, with the next inspection scheduled for 2016/2017; and
- A new SCADA system has been successfully implemented at Ruawai WTP through which control of raw water from bores and operations of the WTP is controlled remotely.

Treatment

- The Ruawai WTP was upgraded in November 2011 to meet DWSNZ 2005(08), and therefore no immediate condition issues are reported. The plant is compliant, under s10 of the Drinking Water Standards. Council will continue to monitor the performance and condition of the WTP through routine operations and maintenance and scheduled condition assessments; and
- The Ruawai WSP will be updated in 2018 to reflect DWSNZ 2005(08) requirements and the newly implemented SCADA installation.

Storage and distribution

- The June 2011 AMP reports the condition of the Ruawai storage reservoir was assessed in October 2008 by Duffill Watts Limited and reported to be structurally sound and expected to last ‘many years’. In 2014, Opus performed a district wide study of above ground assets and reported that the treated water reservoir required immediate attention. Replacement of the reservoir will be included in the 2019 capital works. Council has included an action in the AMIP to undertake a structural inspection of all Water Supply storage facilities to assess condition. This is part of the assessment project that commenced in 2014.

It was reported in the June 2011 AMP that the Ruawai scheme was estimated to experience a network loss of treated water of approximately 32%. The hydraulic model of the Ruawai network includes an indication of what losses there are and response recommendations.

A water balance study was prepared in January 2014 by Thomas Civil and Environmental Consultants Ltd and the results of this indicated that while the Ruawai scheme was too small to accurately develop an Infrastructure Leakage Index the indicative value of 2.7 is acceptable as an economic level of leakage. This report also indicated that non-revenue water was 32.9%. Recommendations in light of the report are in the improvement plans.

Resource consents associated with any of these assets are included in Appendix D.

3.5 Glinks Gully

3.5.1 Overview

The Glinks Gully Water Supply system gets raw water from three groundwater springs located inland from the community and supplies treated water to approximately 72 people. Historically Glinks Gully had a secondary water source from a stream adjacent to the Glinks Gully community; however this is no longer in use due to the potential for contamination from an adjacent landfill.

The raw water is gravity-fed to the Glinks Gully WTP where it is received in a raw water reservoir fitted with a lime column to raise the pH. The treatment process consists of pressure sand filtration, four cartridge filters (two x 5 micron and two x 1 micron), two UV sterilisers (as of November 2008), pulse dosing pH correction and chlorine disinfection. Treated water storage is provided by four x 23m^3 concrete reservoirs. The Water Supply reticulation network comprises approximately 1.4km of alkathene water main servicing up to 85 connections including a camp ground.

An overview of the Glinks Gully Water Supply system is provided below and shown in Figure 3-13.

Figure 3-13: Ginks Gully asset map

Table 3-6: Glinks Gully asset summary

Type	Description
Sources	Glinks Gully Stream Extraction/Gallery x3 near the intersection of Glinks and Redhill Roads Allowed take: 100 m^3/day
Pump stations	Raw Water No pumps – gravity-fed system Treated Water No pumps – gravity-fed system
Water treatment	Coarse screens, Multimedia sand filters, Micro filtration, UV disinfection, Chlorine dosing, Water acidity correction
Storage	Glinks Gully Concrete Storage Reservoirs x4 23m^3 each, 92m^3 total

Type	Description
Reticulation	Water mains 0 – 50mm 0.9km 51 – 100mm 0.5km
Other assets	Fire hydrants 1, valves 8

3.5.2 *Asset information*

Based on the available and known information, the scheme assets are in moderate condition. Council is committed to maintaining its asset register with up-to-date performance and condition data to help inform future valuations with system-based knowledge (that can back up individuals knowledge). For example, the AMIP includes recording maintenance information in AssetFinda at the asset component level.

Headworks

- While the water quality from the upstream source is good, the size of the raw water main transporting this water to the Glinks Gully WTP limits extraction capacity. As a result, in peak periods, water must be supplemented by tank supply. The AMIP includes an action for Council to undertake a cost/benefit analysis of using tankers to supply water to Glinks Gully during peak demand to understand what is the most efficient and effective option for Council.

Treatment

- Drafting of the Glinks Gully WSP is scheduled to be undertaken in Council's renewals programme. This will identify health risks to Water Supply, develop ways of addressing these risks and ensure contingency plans are in place to protect the public, should an adverse event occur.

Storage and distribution

- The June 2011 AMP reports the reticulation pipeline to be relatively new and considered to be in good condition. Given that Glinks Gully is a coastal settlement, metal fittings were eliminated from the network to reduce the chance for corrosion and increased maintenance requirements; and
- It is unknown what backflow prevention exists, if any, within the reticulation scheme. An investigation to understand what backflow prevention is present is included in the AMIP and the 2012/2013 renewals programme.

Resource consents associated with any of these assets are included in Appendix D.

3.6 Mangawhai

Mangawhai has a small Water Supply scheme with 18 connections. The scheme primarily provides potable water source to the Mangawhai Heads Camp Ground,

Wood Street shops, public toilets and for community housing. The Mangawhai community has previously indicated that it did not want a public water scheme which Council accepted at the time. A new treatment plant was commissioned on 23 December 2016 utilising the existing bore in order to meet the Drinking Water Standards for New Zealand 2005 (Revised 2008).

Mangawhai's water is drawn from a bore and pumped through a cartridge filtration system, Ultra-Violet (UV) disinfection, pH correction and chlorination before storage in two 135m^3 reservoirs. Council now has allocated specific funds for operations and maintenance of the Mangawhai system.

An overview of the Mangawhai Water Supply system is provided below and shown in Figure 3.14.

Figure 3-14: Mangawhai asset map

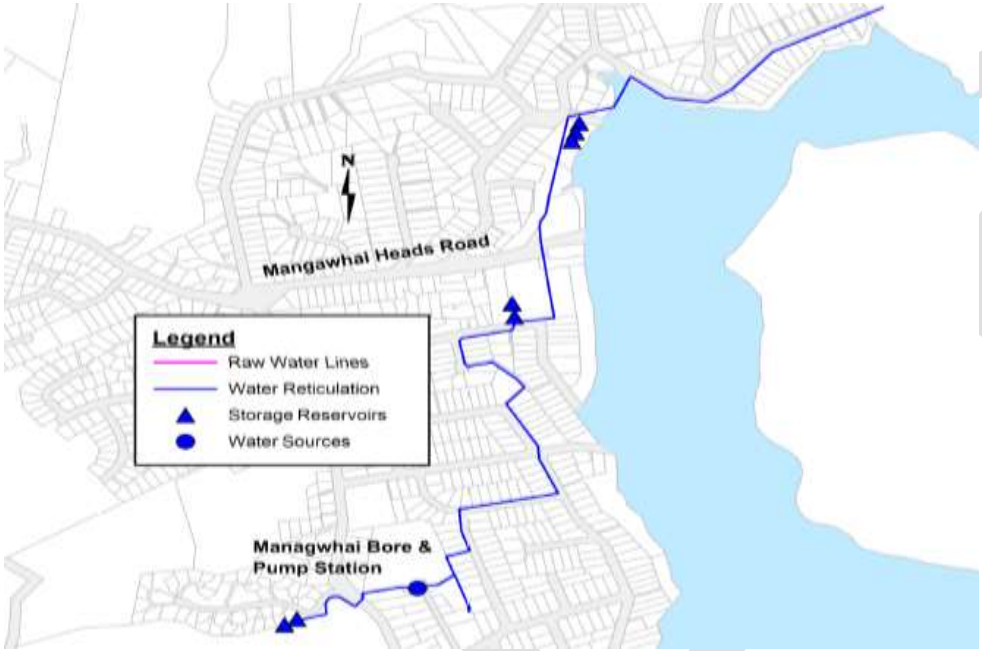


Figure 3-15: Mangawhai WTP

Table 3-7: Mangawhai asset summary

Type	Description
Sources	Bore located near the dead end road, Fagan Place Allowed take: 125m^3/day in summer, 90m^3/day in winter
Pump stations	No stand-alone pump station; the raw water bore includes a pump.
Water treatment	Cartridge Filtration, UV Disinfection, pH Correction and Chlorination
Storage	Two timber distribution reservoirs with capacity 135m^3. Northern Mangawhai camp ground – 3 tanks with a total storage of 73m^3 Southern Mangawhai camp ground at Olsen Avenue – 2 concrete tanks with a total storage of 20m^3
Reticulation	Water mains 0 – 50mm 1.1km 51 – 100mm 2.4km
Other assets	Fire hydrants 2, valves 10, water meters 2

3.6.1 *Asset information*

Based on the available and known information, the scheme assets are in moderate condition. Council is committed to maintaining its asset register with up-to-date performance and condition data to help inform future valuations with system based knowledge (that can back up individuals' knowledge). For example, the AMIP includes the requirement for recording maintenance information in AssetFinda at the asset component level.

Headworks

- The water take is from a single bore that was deemed too shallow to secure when attempted in 2012 (less than 10m depth). In order to comply with the DWSNZ 2005(08), the level of treatment was therefore increased in December 2016 to account for the unsecure bore conditions;
- Council shares the bore aquifer with six other private water users. One of the Mangawhai water take consent conditions is that our abstraction should not cause groundwater inaccessibility or unavailability from the bores of the other six users. If this happens, Council must provide the users with an alternative supply of water at similar quantity and quality within 24 hours; and
- The AMIP includes an action for Council to undertake five yearly inspections of the Mangawhai bores. The most recent inspection was undertaken in 2011/2012 and there was a pump replacement in 2016; the next inspection is in 2018/2019. Currently the boreheads are inspected for watertightness regularly during plant visits by operators.

Treatment

- The water treatment at Mangawhai was upgraded in December 2016 to incorporate a cartridge filtration, UV disinfection, pH correction and chlorination. This upgrade was on the AMIP to make the WTP at Mangawhai compliant with the DWSNZ 2005(08).
- No WSP exists for Mangawhai, however a Catchment Risk Analysis was completed. The Mangawhai WSP is scheduled to be undertaken after in 2018 in Council's renewals programme and will identify health risks to Water Supply, develop ways of reducing these risks and ensure contingency plans are in place to protect the public, should an adverse event occur.

Storage and distribution

- Council has completed renewal of a section of pipeline from the north past the southern Mangawhai camp ground and this has been entered into the AssetFinda database system.

Resource consents associated with any of these assets are included in Appendix D.

3.7 Critical assets

Critical assets have been defined as being assets with a high consequence of failure[2]. They are often found as part of a network, in which, for example, their failure would compromise the performance of the entire network.

In March 2016, the Water Services Team developed a criticality framework with respect to consequence of failure with the help of a Consultant. It is anticipated that actions would be put into place to reduce the consequences of failure to High (Major) e.g. by duplication or elimination of an asset, or it is accepted that the very high cost of lowering the consequence is not justifiable given the very low likelihood of occurrence associated with the particular hazard. In the latter case some consideration would be given to contingency planning but the nature and scale of the potential occurrence is likely to be difficult to predict and require the implementation of emergency management procedures at the time.

Criticality classes - management approach

Table 3-8 shows the lower three of five categories of criticality derived from the criticality framework. The High (Extreme) category would be managed in the Council's Risk Matrix and Council would not tolerate a situation where the consequence was considered to be Extreme and the Likelihood any higher than Rare.

[2] National Asset Management Steering Group, Association of Local Government Engineering NZ Inc. (2006) 3rd edition (Version 3.0), *International Infrastructure Management Manual*, National Asset Management Steering Group, Association of Local Government Engineering NZ Inc. (INGENIUM)

In order to reduce the consequence to High (Major), a cost benefit analysis will have to be carried out to see if the (high) cost duplication or elimination of an asset would be justifiable when compared to the acceptance of the risk considering that the likelihood of occurrence is low. Contingency planning can be implemented as well as emergency management approaches because the nature and scale of the occurrence is unpredictable.

Table 3-8: Criticality classes – management approach

Consideration		Insignificant / Minor	Moderate	High (Major)
1	Primary description	Assets with low consequence of failure and largely managed reactively by contractor without direct Council input (other than Call Centre referral).	Assets with tolerable consequence of failure but not on a reoccurring basis. Response will typically require additional resources and generate widespread and/or lengthy disruption.	Assets that ideally do not fail and are managed pro-actively to prevent this. If failure does occur it is a major event requiring significant resourcing and management input.
2	Consequences of failure	Limited in both extent and time (typically less than 3-4 hours maximum) and covered by adopted LOS targets. Extent of disruption also likely to be limited. Some customers may be unaware of situation.	Impact on customers (key and residential) is more significant in relation to extent and/or duration. May generate impacts on health, safety, damage and environment. Contingency servicing may be required and some management of demand.	Major impact on residential and/or key customers. Services are disrupted for lengthy period and inconvenient alternatives put in place. Significant and/or lasting adverse impacts occur in any, or several, of service delivery, health, safety, damage, environment.
3	Impact during remediation	Some alternative servicing may be required for some customers in extra-ordinary circumstances. Otherwise customers expected to cope with loss of service. Some discomfort and inconvenience for some affected customers.	Likely to require demand management and provision of alternative servicing for duration. Discomfort and inconvenience for large group of customers. Individual evacuations may be required.	Significant demand management required. Alternative servicing barely adequate. Widespread evacuations may be required.

Consideration		Insignificant / Minor	Moderate	High (Major)
4	Maintenance response	Routine maintenance response typically within capacity and authorisation of maintenance contractor.	The response to the incident will require resources beyond the normal capacity of the contractor such as multiple tankers or sucker trucks, additional manpower or specialist skills, additional equipment such as generators etcetera brought in. Urgency with obtaining equipment not held in stock. Note that it is still anticipated that the contractor would have contingency plans in place to undertake the lower end of this escalation as part of their 'normal' response and without the involvement, or approval, of Council management.	Contractor fully committed to response and additional resourcing utilised. 'Fix at any cost' approach may be required in relation to obtaining required equipment and materials. Overall response is managed by Council management in consultation with the contractor and any external resources engaged. It is not anticipated that the Declaration of a Local Emergency would be required in these circumstances but this could occur in unusual circumstances.
5	Escalation and communication	Largely dealt with at normal operational level. Call Centre would be advised. Council Water Services management advised in monthly reporting and on an informal/courtesy basis.	Escalation to management of Water Services for input into solution. Senior management and Mayor/local Councillor advised of situation and remedial measures underway. Communication staff briefed as required. Some 'public service' announcements required and co-operation of community sought.	Major event for Council. Primary focus of Council activity until resolved. Communication staff updated regularly and managing media and Mayor/Councillor enquiries. Regular briefing of senior management and CE. Potential to escalate to emergency management status if required to manage impacts or acquire resources.

Consideration		Insignificant / Minor	Moderate	High (Major)
6	Planned maintenance and inspections regime	Prescribed maintenance undertaken as required for specific electro/mechanical equipment. Maintenance of other assets likely to be irregular and budget constrained. Standby equipment routinely checked for serviceability where this provides full, or substantially, the same capacity as duty equipment. Service alternated to manage wear on duty/standby configurations. Many readily accessible assets are subject to regular inspections even though they have a relatively low criticality. The inspection is relatively low cost, typically undertaken as part of a circuit and serves to minimise the likelihood of minor issues leading to failure, and associated costs, or a situation arising that would reflect adversely on Council if noted by the public but not 'Called in' e,g, graffiti. Such inspections reduce the likelihood of avoidable failures but might not be justifiable if subjected to strict cost/benefit analysis.	Valves and controls exercised routinely to check operability. Equipment that is easily accessible (not requiring excavation) is subject to regular inspections; includes electrical, mechanical and hydraulic equipment that does not have an installed or easily implemented bypass. In some circumstances consideration should be given to exposing assets (e.g. in pits and chambers) to allow regular inspections to be undertaken.	As for Moderate plus prescribed maintenance linked to contractual reporting and KPIs. Consideration given to duplication of equipment to ensure ongoing functionality even in event of asset failure (some loss of capacity may be acceptable).

Consideration		Insignificant / Minor	Moderate	High (Major)
7	Contingency planning and Critical Spares	Generic contingency planning appropriate for wide group of assets and circumstances. Notwithstanding availability of stand-by equipment the time required for sourcing replacement should be assessed and this may require holding of Critical Spares if time running without back-up is considered to be unacceptable.	Planning would reflect the upper end of generic contingency planning. Consideration would be given to the more significant impacts of asset failure and the nature of the resources required to manage the situation and affect a recovery. This may result in the holding of increased inventory and more robust assessment of the compatibility of existing spares versus the installed assets.	Specific contingency planning for identified hazards arising from failure of specific asset. Assumptions (e.g. availability of repair or replacement equipment) checked on a regular basis. Critical spares held and periodically checked for condition and serviceability.
8	Asset Information and location	Attributes of asset may be incomplete or not verified. Updating occurs when opportunity arises. Location generally plotted from as-builts or 'best fit'. Servicing and repair may require some time to locate asset.	All attributes of asset are known and verified. Specific repair spares and equipment identified. Location of asset will be generally known with consideration given to how difficult it would be to find if required. Connectivity of valves and lines known and verified by testing.	All attributes of asset are known and verified. Specific repair spares and equipment identified. Location of asset will be known and piloted if required to ensure rapid ability to respond. Connectivity of valves and lines known and verified by testing.
9	Performance monitoring	Monitoring by exception i.e. if issue/complaint arises an investigation is undertaken.	Some form of regular inspection/measurement should be in place to detect any decline in performance that would indicate imminent failure.	Regular monitoring of performance as appropriate. Likely to be SCADA connected. Targets and response limits defined using approaches such as Hazard Analysis Critical Control Point (HACCP).

Consideration		Insignificant / Minor	Moderate	High (Major)
10	Condition monitoring	Assets are inspected as the opportunity arises either from asset modification (e.g. adding a connection) or repair of asset failure.	Periodic inspections are undertaken on the asset, or very similar assets, to determine if deterioration is occurring. Industry knowledge about the likely decline of similar assets may be utilised if it can be established they are in comparable situations. Any asset failure is carefully investigated to determine if asset deterioration was the primary driver.	Techniques are identified that allow the condition of the specific asset to be monitored in relation to likely failure modes. Inspections are scheduled and likely to become more frequent as the asset ages or as deterioration is noted. Analysis is undertaken using the measured deterioration to predict likely asset life.
11	Renewal Planning	These assets are operated on a 'Fix When Fail' basis. Renewal is only considered when there is clear evidence that the failure was generated by the deterioration of the condition of the asset and that this is likely to extend beyond the point of failure to the extent that renewal of the entire asset can be justified rather than a localised repair/renewal. Renewal would also require consideration of the cost benefit of repair versus renewal and whether acceptable LOS have been breached. Multiple failures over several years may be an acceptable outcome albeit this would result in the pipe being closely monitored	The key characteristic is that the impacts are considered to be tolerable but not on a regular basis. A single asset failure considered to be directly attributable to condition deterioration, and considered to be indicative of overall asset condition, would trigger a response to minimise the likelihood of a repeat occurrence within the short to medium term.	These are assets for which failure Is considered to be unacceptable and to be avoided if it is practical and possible to do so. In the absence of actual failure records for the specific asset it will be necessary to assemble as much information as is relevant to the renewal decision. This will include information on failure of other assets considered to be similar, general industry knowledge, specific testing undertaken on the asset and a rigorous review of the consequences and likelihood of failure. It is unlikely that age by itself will be sufficient unless this is all that is available

Consideration		Insignificant / Minor	Moderate	High (Major)
		and included in potential renewal within the near term.		and there is consensus that failure is not an option.
12	Prioritisation	In the event that budget provisions are constrained these are the assets that would be given the lowest priority for investigations, preventative maintenance and renewals. If resources are constrained these are the projects that should be deferred. Care should however be exercised to ensure that any increasing maintenance costs arising do not exceed the cost associated with renewal. There is also the risk that Council will be perceived to be running its assets down by not progressing routine renewals in response to failures and it is therefore still desirable to be able to maintain an ongoing programme of renewals of assets that have obviously deteriorated to the point where this is required.	These sit between the Low and High Criticality projects. They would have status above the Low but would be subservient to the High.	These are the highest priority projects to progress both in terms of funding the necessary works in the operational or CAPEX budgets but also in terms of ensuring that works actually progress during the intended planning period. In the event that any asset is identified as having Extreme (High) consequences of failure then a remedial plan to reduce that consequence would have the highest consequence unless it is considered that the associated likelihood of occurrence does not justify such an investment.

Applying this framework, the Water Services Team with the help of a consultant has identified key assets in the network which are presented below.

Table 3-9: Key assets in network

Asset group	Specific asset group	Criticality
Raw water source	Glinks Gully :	Low
Raw water source	Maungaturoto – Alternate (not Cattlemount) supplies	Low
Raw water transmission and storage	Glinks Gully :	Low
Raw water transmission and storage	Mangawhai :	Low
Raw water transmission and storage	Maungaturoto : Individual transmission from smaller (non-Cattlemount) sources	Low
Raw water transmission and storage	Ruawai :	Low
Treated water storage	Glinks Gully :	Low
Bulk treated water transmission	Glinks gully :	Low
Bulk treated water transmission	Mangawhai :	Low
Bulk treated water transmission	Maungaturoto :	Low
Bulk treated water transmission	Ruawai :	Low
Boost pumping	Dargaville: Hokianga Road system	Low for Hokianga Road
Boost pumping	Maungaturoto :	Low
Boost pumping	Ruawai :	Low
Reticulation	Baylys :	Low
Reticulation	Dargaville : < 200mm	Low :
Reticulation	Glinks Gully :	Low
Reticulation	Maungaturoto :	Low
Reticulation	Ruawai :	Low
Major customers	Silver Fern Farms Abattoir takes 25% of Dargaville supply and is at opposite end of town to the WTP. Ring-mains largely provide some redundancy through the western/central parts of Dargaville although there may be a loss of pressure at the abattoir if a failure occurred in these areas.	Low
Business and community customers	CBD -	Low
Business and community customers	Daycare Centres -	Low
Business and community customers	Schools -	Low
Raw water source	Mangawhai :	Moderate
Raw water source	Maungaturoto : Cattlemount supply	Moderate

Asset group	Specific asset group	Criticality
Raw water source	Ruawai :	Moderate
Raw water transmission and storage	Maungaturoto : Cattlemount and combined system	Moderate
Treated water storage	Dargaville :	Moderate for Dargaville
Treated water storage	Mangawhai :	Moderate
Treated water storage	Maungaturoto : 2 at end of system	Moderate
Bulk treated water transmission	Dargaville / Baylys :	Moderate
Boost pumping	Baylys : Until standby pump installed	Moderate
Reticulation	Dargaville : ≥ 200mm	Moderate
Reticulation	Mangawhai : In response to summer peak usage period	Moderate during summer peak
Business and community customers	Commercial / Industrial	Moderate
Raw water source	Dargaville / Baylys :	High (Major)
Treatment	Dargaville / Baylys :	High (Major)
Treatment	Glinks Gully :	High (Major)
Treatment	Mangawhai :	High (Major)
Treatment	Maungaturoto :	High (Major)
Treatment	Ruawai :	High (Major)
Treated water storage	Baylys :	High (Major)
Treated water storage	Maungaturoto : 1 x treated water reservoir at WTP	High (Major)
Treated water storage	Ruawai	High (Major)
Pipes running under buildings	There is a major pipeline that appears to be running under Dargaville High School buildings.	High (Major)
Major customers	Maungaturoto Dairy Factory takes raw water from 7km system upstream of township. Believed to have approximately 1 day of storage onsite.	High (Major)
Business and community customers	Hospital / clinics –.	High (Major)
SCADA		High (Major)
Back flow prevention	Currently going through an upgrade programme.	High (Extreme)
Treatment	All plants - Equipment whose failure could lead to production of water not complying with Priority 1 Determinants of DWSNZ 2005 (Revised 2008)	High (Extreme)

Asset group	Specific asset group	Criticality
Treated water storage	All reservoirs - Equipment whose failure could lead to the contamination of treated water to the extent of not complying with Priority 1 Determinants of DWSNZ 2005 (Revised 2008)	High (Extreme)

3.8 Asset values

3.8.1 *Overview*

The valuation was based on substantially complete asset registers, appropriate replacement costs and useful lives, providing a relative degree of confidence in the valuation data

Asset values for each of Council's five Water Supply schemes are presented in this section in terms of current replacement value and depreciated replacement value. Depreciated replacement value is the current replacement cost less allowance for physical deterioration and optimisation for obsolescence and relevant surplus capacity.

Depreciation

Depreciation of assets must be charged over their useful life.

- *Depreciated Replacement Cost* is the current replacement cost less allowance for physical deterioration and optimisation for obsolescence and relevant surplus capacity. The *Depreciated Replacement Cost* has been calculated as:

$$\frac{\text{Remaining useful life}}{\text{Total useful life}} \times \text{replacement cost}$$

- *Depreciation* is a measure of the consumption of the economic benefits embodied in an asset. It distributes the cost or value of an asset over its estimated useful life. Straight-line depreciation is used in this valuation;
- *Total Depreciation to Date* is the total amount of the asset's economic benefits consumed since the asset was constructed or installed;
- The *Annual Depreciation* is the amount the asset depreciates in a year. It is defined as the replacement cost minus the residual value divided by the estimated total useful life for the asset; and
- The *Minimum Remaining Useful Life* is applied to assets which are older than their useful life. It recognises that although an asset is older than its useful life it may still be in service and therefore have some value. Where an asset is older than its standard useful life, the minimum remaining useful life is added to the standard useful life and used in the calculation of the depreciated replacement value.

3.8.2 *Scheme valuations*

The following tables present 2016 valuation information covering:

- Pipes;
- Points (valves, hydrants etcetera) not included in the lines; and
- Treatment plants.

The implied average life is determined by dividing the renewal cost by the annual depreciation. This is purely an average across the entire asset group and there will be new assets and old assets contained within the group.

Table 3-10: Summary - Water Supply pipes

Description	Replacement cost	Annual depreciation	Implied average life	Scheme /total
Baylys Beach	$3,043,065	$48,849	62	7%
Dargaville	$29,732,115	$398,286	75	66%
Glinks Gully	$284,323	$3,554	80	1%
Mangawhai	$423,892	$5,647	75	1%
Maungaturoto	$10,378,141	$148,726	70	23%
Ruawai	$1,477,349	$22,396	66	3%
Total 2016	**$45,338,885**	**$627,459**	72	100%

Table 3-11: Summary - Water Supply points

Description	Replacement cost	Annual depreciation	Implied average life	Scheme /total
Baylys	$446,813	$9,227	48	7%
Dargaville	$4,622,140	$92,189	50	71%
Glinks Gully	$119,024	$2,208	54	2%
Mangawhai	$51,968	$952	55	1%
Maungaturoto	$835,161	$16,780	50	13%
Ruawai	$429,744	$8,036	53	7%
Total 2016	**$6,504,849**	**$129,392**	50	100%

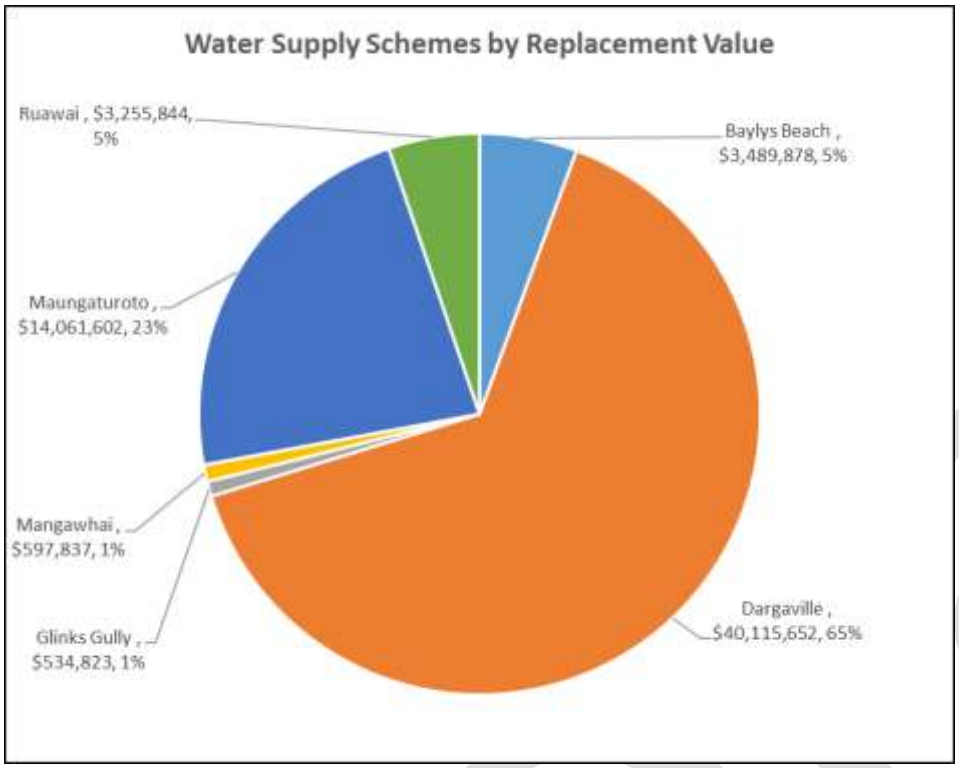
Table 3-12: Summary - Water Supply plant

Description	Replacement cost	Annual depreciation	Implied average life	Scheme/total
Baylys (Dargaville)				0%
Dargaville (incl Baylys) supply and treatment	$5,761,397	$125,138	46	56%
Glinks supply and treatment	$131,476	$2,919	45	1%
Mangawhai Water	$121,977	$3,681	33	1%
Maungaturoto supply and treatment	$2,848,301	$67,459	42	28%
Ruawai supply and treatment	$1,348,752	$43,356	31	13%
	$10,211,903	**$242,552**	42	100%

Table 3-13: Replacement costs and Annual Depreciation of all schemes

Description	Replacement cost	Annual depreciation	Implied average life	Scheme/total
Baylys	$3,489,878	$58,076	60	6%
Dargaville	$40,115,652	$615,613	65	65%
Glinks Gully	$534,823	$8,680	62	1%
Mangawhai	$597,837	$10,280	58	1%
Maungaturoto	$14,061,602	$232,966	60	23%
Ruawai	$3,255,844	$73,788	44	5%
Total 2016	**$62,055,637**	**$999,403**	62	100%

Figure 3-16: WS schemes by replacement value



3.8.3 *Basis of valuation*

Figure 3-17: Water Supply Pipe Unit Rates

Water Supply Lines : Unit Rates by Pipe Diameter

Diameter (mm)	2016 Unit Rates $/m (including overhead)
20	$74.19
25	$89.94
32	$89.94
40	$89.94
50	$101.17
60	$101.17
63	$101.17
65	$101.17
75	$157.39
80	$157.39
100	$220.00
125	$220.00
150	$258.56
180	$393.46
200	$393.46
250	$528.36
300	$595.81

2016 Useful Life Assumptions

Pipe material	Base Life	Minimum Remaining Useful Life
AC	60	5
ALK	80	5
CI	60	5
CLS	80	5
COPPR	40	5
GALV	60	5
HDPE	80	5
MDPE	80	5
PE	80	5
PVC	80	5
STEEL	80	5
Unknown	60	5
UPVC	80	5

Note that the life of 60 years for AC only applies to pipes ≥ 100mm diameter. It is increased from the previous valuation.

Figure 3-18: Water Supply Points Valuation Data

Valuation of Points

Water Supply valve diameter (mm)	2016 Unit Rates $/ea (including
11	$292.10
15	$292.10
20	$292.10
25	$292.10
32	$302.78
40	$337.01
50	$586.50
75	$819.10
80	$819.10
100	$921.07
150	$1,575.81
180	$2,230.52
200	$2,885.23
250	$4,812.84
300	$6,204.67

Asset Type	2016 Unit Rates $/ea (including overhead)
Connection	$958.59
Fire Hydrant	$2,079.72
Junction Box	$1,461.42
Manhole	$3,372.52
Meter	$303.53
Mix Chamber	$3,372.52
Rodding Eye	$2,248.34
Valve	Table by dia

2016 Useful Life Assumptions

Asset Types	2016 Useful Life Assumption	Minimum Remaining Useful Life
Connection	70	5
Fire Hydrant	70	5
Junction Box	70	5
Manhole	70	5
Meter	20	5
Mix Chamber	70	5
Valve	60	5

Table 3-14: Water Supply Plant useful lives

Plant Useful Lives

Adopted Asset Type	Adopted Base Life for 2016 Valuation	Adopted Minimum Useful Life
Booster pump station	25	2
Bores	20	2
Building and civil 25yrs	25	2
Building and civil 60yrs	60	5
Building and civil 80yrs	80	5
Building and civil m2 50yrs	50	5
Building and civil m2 80yrs	80	5
Contact tank	25	2
Control	20	2
Dosing equipment	25	2
Earthworks	Non depreciable	Non depreciable
Electrical	20	2
Equipment	25	2
Filtration and aerator	40	2
Filtration and clarification	50	2
Flow meters and logging	20	2
Headworks	20	2
Intakes 50yrs	50	5
Intakes 80yrs	80	5
Mechanical	25	2
Mixing tank	60	5
Pipework lump sum	60	5
Pumps	25	2
Reservoir	80	5
Resource consent 10yrs	10	2
Resource consent 12yrs	12	2
Resource consent 34 yrs	34	2
Resource consent 5yrs	5	2
Resource consent 6yrs	6	2
Sand trap	20	2
Tank	50	2
UV disinfection	25	2
Valves	25	2

4 Financial and lifecycle strategy and management

4.1 General lifecycle management plan

4.1.1 Introduction

This section identifies Council's strategy and programme for managing, maintaining and renewing assets within its water scheme. The programmes described within this section have been developed to achieve the LOS identified in Section 1.10 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. 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;
- Development strategies to address growth and demand;
- Disposal strategies for when the asset is no longer required; and
- Work programmes and the associated financial forecasts, which are developed later for each scheme.

4.1.2 Design parameters

Design parameters for all new Council Water Supply assets are set out in Council's Engineering Standards 2011. In summary these requirements include the following:

- That full supply is available during a 20 year drought;
- Be adequate for firefighting purposes;

- Normal residential demand shall be taken as 300 litres per person per day;
- Peak flow shall be taken to be 2.5 times the average daily demand;
- Fire hydrant specifications;
- Service connection requirements, including compliance with the NZ Building Code requirements for backflow prevention;
- Requirements for pipe size, material and depth of construction; and
- Pipe installation, disinfection and testing requirements for new water assets.

4.1.3 *Work categories*

Council's lifecycle asset management strategies are divided into the following five work categories:

Asset operations: The active process 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 to 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:

- **Unplanned maintenance** – work carried out in response to reported problems or defects;
- **Preventative maintenance** – work additional to scheduled inspections and maintenance identified during inspections as essential to continued operation; and
- **Planned maintenance** – work carried out to a predetermined schedule, or programmed as a result of identified needs.

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: Creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capability or performance in response to changes in supply needs or customer expectations.

Development works falls into two separate categories:

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

Asset decommissioning / disposal: Any of the activities associated with the disposal of a decommissioned asset. 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 Water Supply through Contract 527 Water Supply and Wastewater Operations and Maintenance Services. 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 4-1.

Table 4-1: 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

4.1.4 *Contractual setting*

Council has an in-house team of engineers to oversee the operations and management including asset management of 3 Waters. Council tendered its 3 Waters O&M Contract in 2015/2016 and received a very good response. The new O&M Contractor commenced in July 2016 and a critical component of Asset Management (AM) has been added in the O&M Contract, capturing field repair data and cost in Council's AM tool, AssetFinda. 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 4-1 below.

Figure 4-1: 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 with 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 inspect reticulation when responding to an incident; and
- Collection of data from inspections and interventions for incorporation into Council's GIS system.

The inspections will be recorded in the AssetFinda for Council to review and act accordingly. Any key actions are discussed at monthly contract meetings between Council and the Operations contractor.

These monthly meetings are also supplemented with 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 meetings 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 year's Annual Plan or, in extreme cases, initiate a review within the current financial year to address critical infrastructure issues.

4.1.5 *Environmental compliance*

Council holds resource consents for all its Water Supply sources. A list of the consents is included in Appendix D. The compliance with these consents is monitored by NRC. Council works closely with NRC in monitoring the performance of Water Supply assets.

The day-to-day monitoring of performance of Water Supply systems is a requirement of the Operations Contract, which in turn is monitored by Council staff. Where resource consent non-compliance is observed, the non-compliances are reported to NRC with remedial actions. It is also reported in the Annual Report.

4.2 Maintenance and operating strategy and expenditure forecast

4.2.1 *Strategy*

Table 4-2 shows Council's 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 4-2: Maintenance and operating strategies

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 costs and risk of failure.
Unplanned maintenance – All assets, disaster	Council will maintain a suitable level of preparedness for prompt and effective response to civil emergencies and system failures by ensuring the availability of suitably trained and equipped staff and service delivery contractors. Council will 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 1 hour for system malfunction or rupture and 2 hours for all other unplanned priority works, apart from service restoration).	Medium No water to parts of schemes. Potential flooding of private property and damage to public roads and utilities.
Unplanned maintenance – Pump stations, treatment plants – 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 1 hour for all scheme areas).	Medium No water to parts of schemes. Flooding, low water pressure.
Unplanned maintenance – pipelines break	Sufficient spares to be stocked (by contractor) to address regular failures.	Responsiveness (Response time for unplanned priority works is1 hour for all scheme areas)	Medium No water to parts of schemes. Flooding, low pressure.
Planned inspections pump stations, treatment plant and 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. Council will modify the inspection programme as appropriate in response to unplanned maintenance trends.	Maintaining existing LOS.	Medium Potential lowering of water pressure.

Activity	Strategy	Service criteria	Impact
Planned inspections Monitoring equipment calibration	Council will undertake annual inspection of monitoring equipment.	Maintaining existing LOS.	Medium
Planned – preventative maintenance Pump stations, treatment plants, pipelines	Council will undertake a programme of planned asset maintenance to minimise the risk of critical equipment failure or where justified economically.	Maintaining existing LOS. Cost/affordability	Medium No water to parts of schemes. Flooding, low pressure.

4.2.2 *Operations and maintenance activities*

Current operation and maintenance activities undertaken across the Water Supply activity include:

- Normal routine maintenance to ensure that natural water sources are kept functioning;
- Maintaining the raw water pipelines which convey raw water to the local WTPs;
- Inspection of the raw water pipelines annually;
- Maintaining and operating the local WTPs;
- Maintaining and repairing the water storage reservoirs and pump systems;
- Repairing any broken pipes or other related equipment; and
- Recording faults and maintenance undertaken (a future improvement has been identified to begin recording maintenance history and costs at asset component level in AssetFinda).

4.2.3 *Expenditure forecast*

The 10 year forecast for operations and maintenance expenditure (comprising all five Council Water Supply schemes) are shown in Figures 4-3 to 4.7 below. The forecast expenditure information is based on the LTP 2015/2025 financial forecast and the AMIP, which provides a relative degree of confidence in the values reported.

The operational expenditure forecast covers:

- All control and operation activities, as described in Section 4.2.1;
- Actions resulting from improvement planning during preparation of this AMP (see the AMIP in Appendix B); and
- The maintenance expenditure forecast covers all planned and reactive maintenance activities, as described in Section 4.2.1.

Table 4-3: OPEX forecasts WS 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
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1,961	2,174	2,250	2,263	2,266	2,501	2,730	2,798	2,875	2,955	3,013
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	15	15	16	16	17	17	17	18	18	19	20
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	**1,977**	**2,189**	**2,266**	**2,279**	**2,282**	**2,518**	**2,747**	**2,816**	**2,894**	**2,974**	**3,033**
Application of operating funding											
Contractors costs	133	121	124	127	130	134	137	141	145	149	153
Professional services	89	120	105	108	22	22	23	23	24	25	26
Repairs and maintenance	309	383	394	403	413	424	435	447	460	474	489
Other operating costs	77	87	88	90	92	94	96	98	101	103	106
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	365	453	460	470	459	483	505	518	532	547	563
Finance costs	103	95	117	129	155	229	304	289	283	274	266
Total applications of operating funding	**1,076**	**1,260**	**1,288**	**1,328**	**1,271**	**1,386**	**1,500**	**1,517**	**1,545**	**1,572**	**1,603**
Surplus (deficit) of operating funding	**901**	**930**	**978**	**951**	**1,011**	**1,132**	**1,247**	**1,299**	**1,349**	**1,402**	**1,430**

Table 4-4: OPEX forecasts WS 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	66	73	81	86	90	93	96	98	101	104	104
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	**66**	**73**	**81**	**86**	**90**	**93**	**96**	**98**	**101**	**104**	**104**
Application of operating funding											
Contractors costs	5	11	12	12	13	13	13	14	14	14	15
Professional services	3	1	1	1	1	1	1	1	1	1	2
Repairs and maintenance	25	25	26	27	27	28	29	30	30	31	32
Other operating costs	4	2	4	5	5	5	5	5	5	5	5
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	13	16	17	18	18	19	19	20	20	21	22
Finance costs	6	5	5	5	5	5	4	4	4	3	3
Total applications of operating funding	**56**	**61**	**66**	**67**	**69**	**70**	**72**	**73**	**75**	**77**	**79**
Surplus (deficit) of operating funding	**10**	**12**	**15**	**18**	**21**	**22**	**24**	**25**	**26**	**27**	**26**

Table 4-5: OPEX forecasts WS Mangawhai

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	83	104	109	103	109	112	115	118	122	126	130
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	**83**	**104**	**109**	**103**	**109**	**112**	**115**	**118**	**122**	**126**	**130**
Application of operating funding											
Contractors costs	8	29	30	31	31	32	33	34	35	36	37
Professional services	14	10	10	2	2	2	2	2	2	2	2
Repairs and maintenance	25	25	26	26	27	28	28	29	30	31	32
Other operating costs	10	5	5	5	5	6	6	6	6	6	6
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	19	26	27	25	25	26	27	27	28	29	30
Finance costs	1	1	1	1	1	1	1	1	1	1	1
Total applications of operating funding	**78**	**96**	**98**	**89**	**92**	**94**	**97**	**99**	**102**	**105**	**109**
Surplus (deficit) of operating funding	**6**	**8**	**11**	**14**	**17**	**18**	**18**	**19**	**20**	**20**	**21**

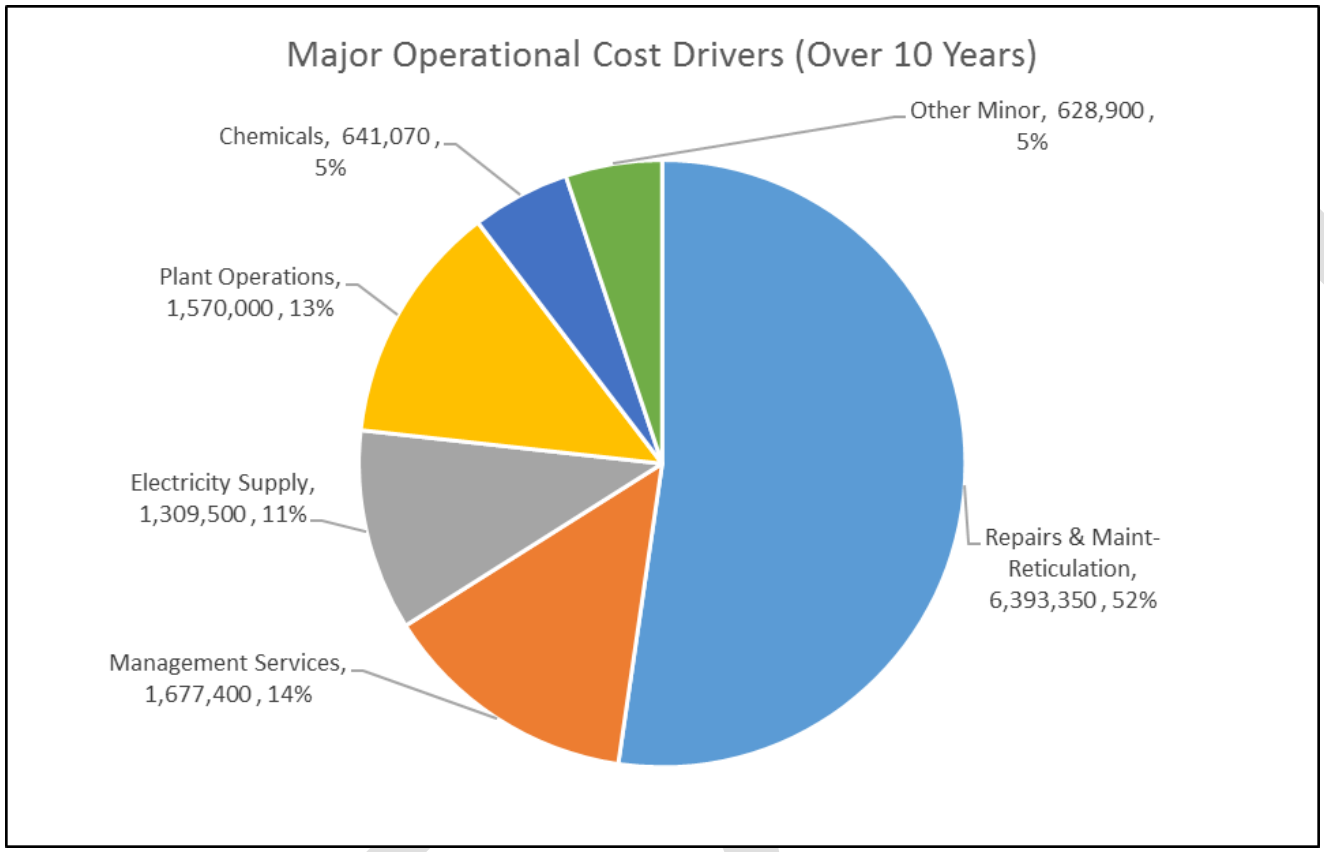
Table 4-6: OPEX forecasts WS Maungaturoto

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	722	508	565	625	688	705	705	711	731	752	761
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	316	324	331	339	347	356	365	375	385	396
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	**722**	**824**	**889**	**956**	**1,027**	**1,052**	**1,061**	**1,076**	**1,106**	**1,137**	**1,157**
Application of operating funding											
Contractors costs	47	44	45	46	47	49	50	51	53	54	56
Professional services	40	90	93	95	97	100	102	105	108	111	115
Repairs and maintenance	135	143	147	150	154	158	162	167	171	177	182
Other operating costs	58	62	64	65	66	68	69	71	73	74	76
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	145	185	190	194	199	204	209	215	221	227	234
Finance costs	76	71	65	61	59	55	50	44	40	35	29
Total applications of operating funding	**500**	**595**	**602**	**612**	**622**	**632**	**643**	**653**	**666**	**678**	**692**
Surplus (deficit) of operating funding	**222**	**230**	**287**	**344**	**405**	**420**	**418**	**423**	**440**	**458**	**465**

Table 4-7: OPEX forecasts WS Ruawai

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	264	314	329	346	359	368	378	387	399	410	419
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	**264**	**314**	**329**	**346**	**359**	**368**	**378**	**387**	**399**	**410**	**419**
Application of operating funding											
Contractors costs	33	31	32	33	34	34	35	36	37	39	40
Professional services	35	35	36	27	28	29	29	30	31	32	33
Repairs and maintenance	63	71	73	75	77	79	81	83	85	88	91
Other operating costs	13	11	12	12	12	12	13	13	13	14	14
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	58	69	71	69	71	73	75	77	79	81	84
Finance costs	12	12	15	28	30	30	30	28	28	27	26
Total applications of operating funding	**214**	**229**	**238**	**244**	**251**	**257**	**263**	**268**	**274**	**280**	**288**
Surplus (deficit) of operating funding	**50**	**86**	**91**	**102**	**107**	**111**	**115**	**120**	**125**	**130**	**131**

Figure 4-2: Major OPEX cost drivers



GRAPHS TO BE UPDATED TO REFLECT FINANCIALS

Figure 4-3: WS OPEX large supplies

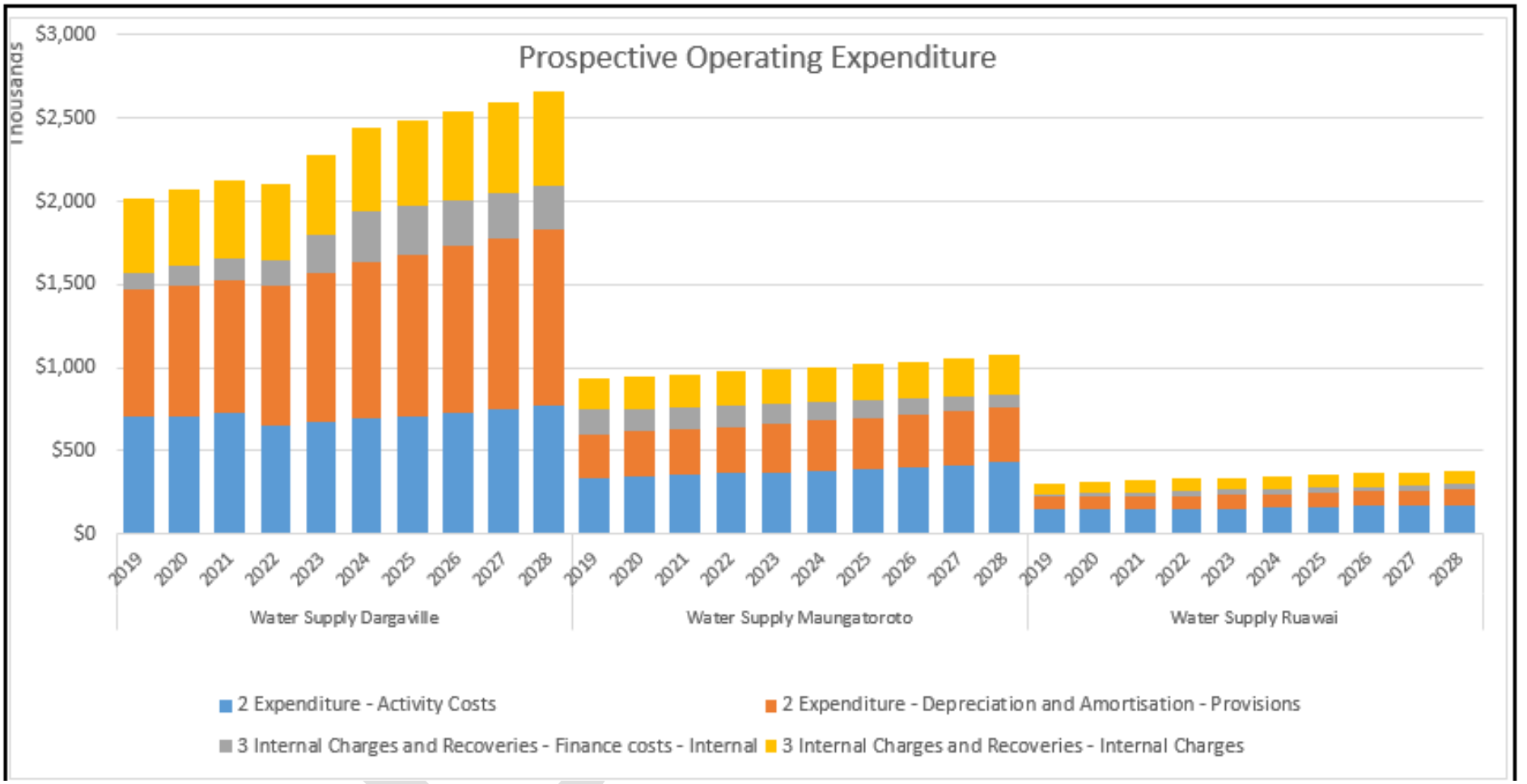
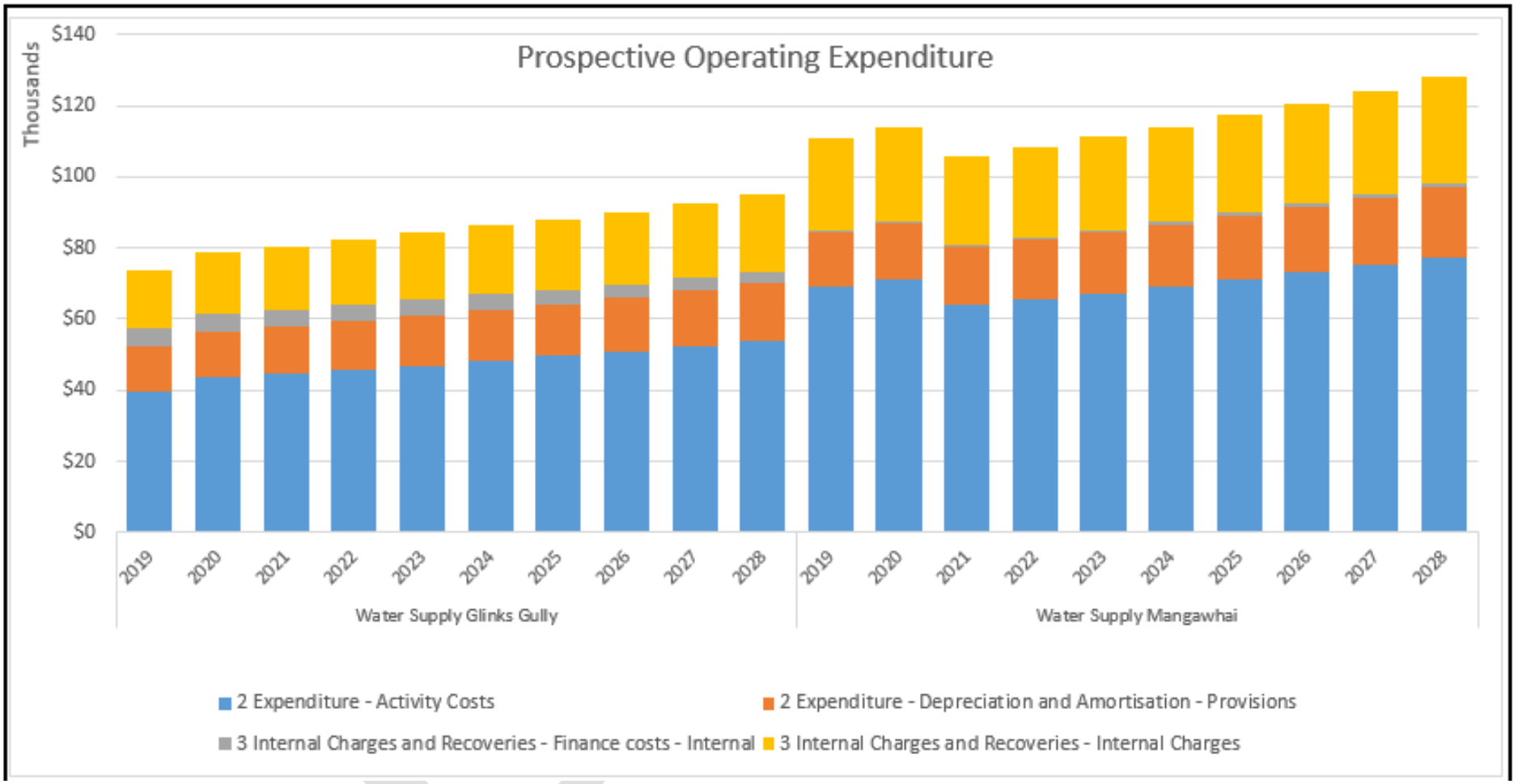


Figure 4-4: WS OPEX small supplies



4.3 Capital expenditure forecasts

4.3.1 Renewals strategy and expenditure forecast

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 reviewed its renewal strategy during 2012/2013 and is moving towards a "just in time" approach; to rehabilitate or replace assets when justified by condition and where there is a significant reduction in performance.

The current state of our asset data, as discussed in Section 3.1.2, affects Council's ability to accurately forecast necessary renewals. 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 lives, further modified through local knowledge and experience gained from the maintenance contract staff and local resources on asset performance. Council's risk management and criticality assessment procedures are currently being reviewed, the outcome of which may affect Council's renewal strategy. 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.
- **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.

4.3.2 *Application of age based renewals forecasting*

As discussed above the starting point for renewals planning is the AM Information system combined with the asset valuation. Collectively these databases contain the extent and attributes of the asset, the date the asset was installed, the expected life for that type of asset and the expected renewal cost for that asset (in current equivalent materials).

From this information a future forecast of renewals expenditure can be calculated.

Pipelines

The forecast shows a significant level of overdue renewals required in Dargaville and then period renewals over the next 10 years. This largely relates to the AC pipe in the network with an expected life of 60 years.

For the other systems that are somewhat newer there are defined spikes in the future for Maungaturoto and Ruawai systems with the former falling into the 10 year plan.

While the Dargaville 'overdues' are past their theoretical life expectancy the backlog is not apparent in actual performance of the assets; particularly in relation to main breaks. If $4.3million was made available tomorrow it is not immediately apparent which mains would be renewed with this funding. This is not altogether

surprising as the prediction of asset life is not a precise science. Even if the 'average life' could be accurately predicted there would still be a significant scatter of earlier and later failures occurring around this point.

The prediction of a 60 year life for AC pipes is prudent and supported by widespread views within the industry. It is therefore prudent for Council to manage its finances on the basis that this expenditure could be required in the relatively near future. The actual renewal works should however only be undertaken if justified by risk (in relation to critical mains) and considerations such as LOS and cost/benefit for low criticality mains. The analysis provides for the overdue renewal to occur by predicting that these works would be undertaken over the next 15 years at a uniform rate. This will almost certainly be wrong in relation to the timing and profile but there is no more accurate way of determining when they will actually occur.

Figure 4-5: Predicted Dargaville pipeline renewals from valuation data

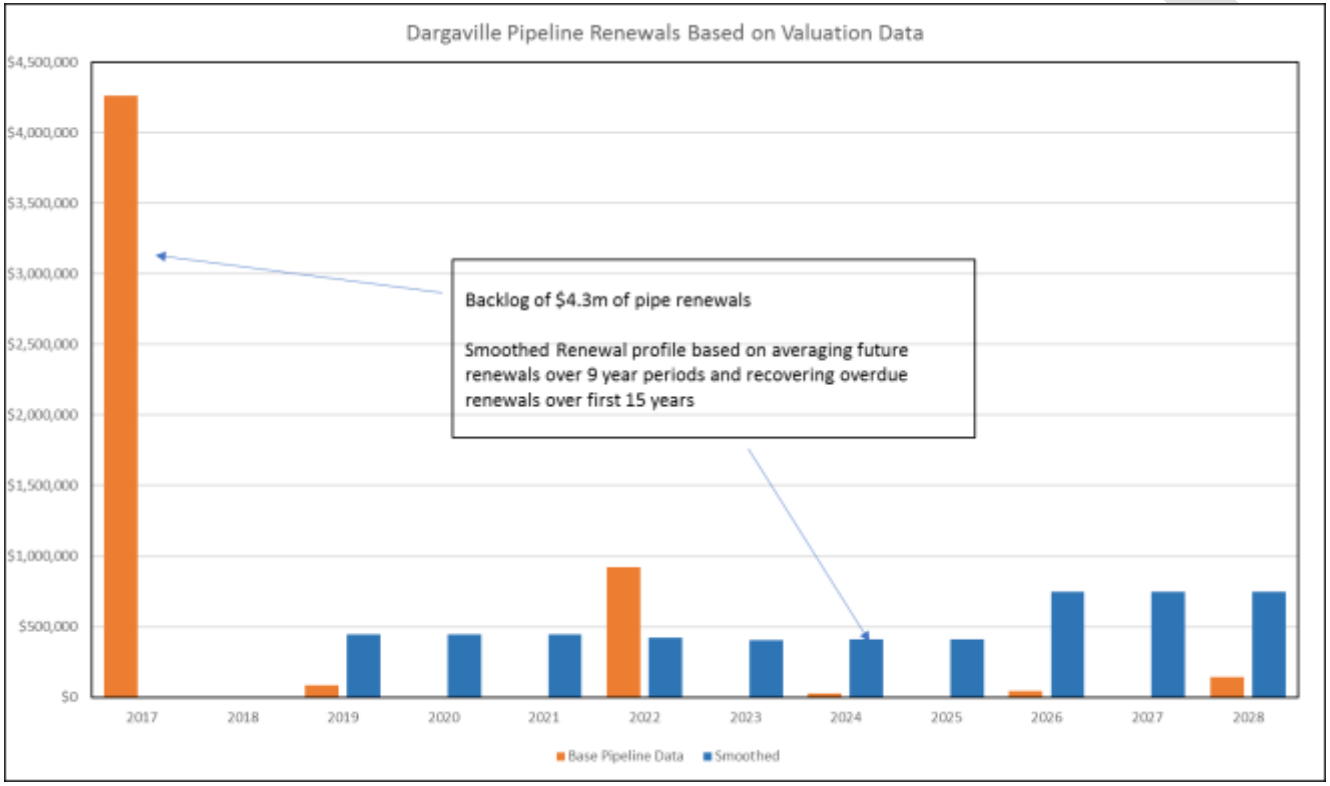
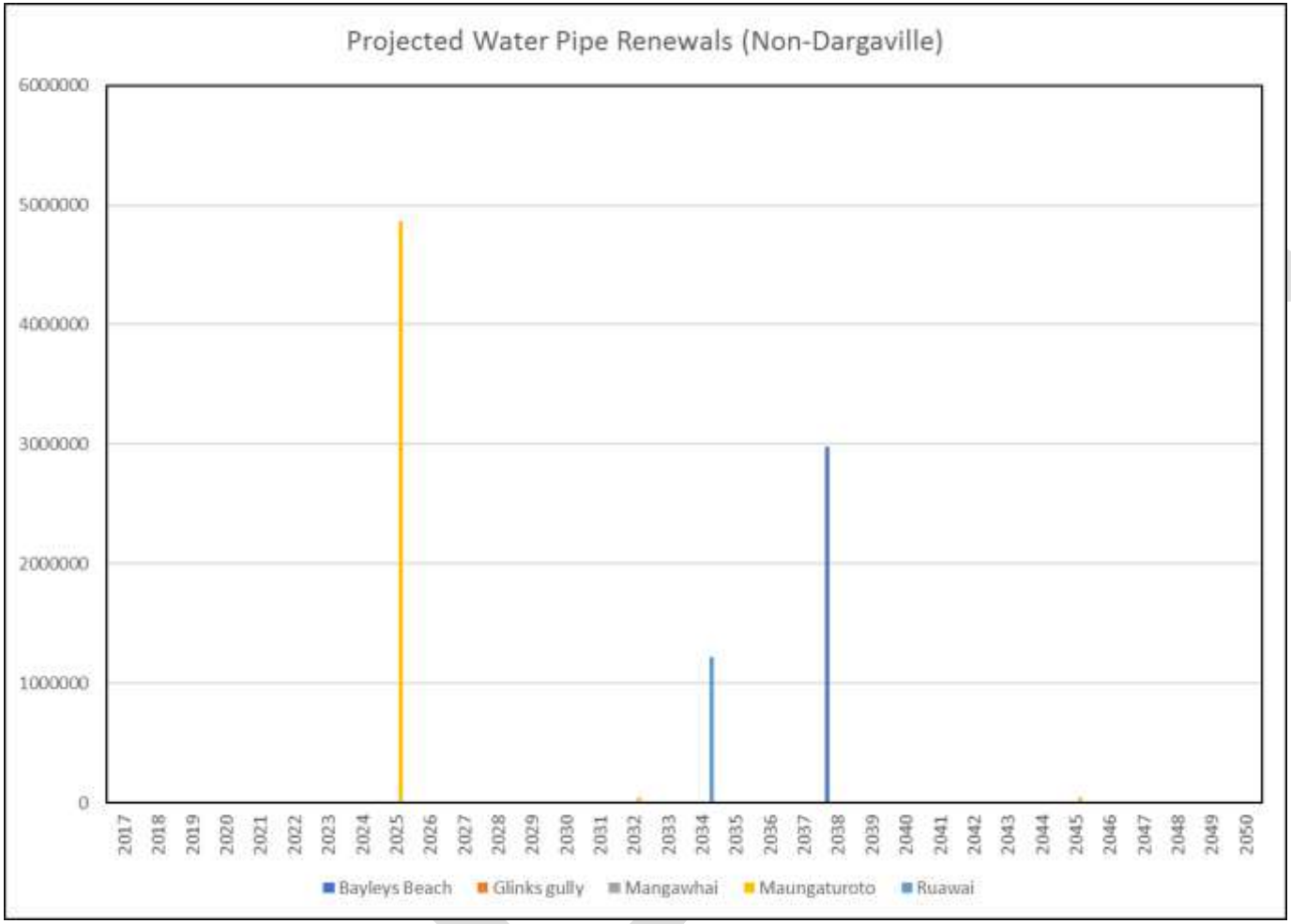


Figure 4-6: Predicted non-Dargaville pipeline renewals from valuation data



Plant renewals (treatment plant and reservoirs, pump stations)

A similar approach was applied to Water Supply plant i.e. using installation date, predicted lives and renewal cost from the valuation database.

While buildings and reservoirs tend to have quite long lives this group of assets also includes pumps, switchboards and treatment processes that are typically allocated quite short lives e.g. 15 years, in the valuation database. This is typical across the industry for such assets but any extension of the lives of these assets beyond the expected life expectancy quickly shows up as “overdue renewals’.

The analysis shows over $2million of overdue renewals and, as with the pipelines, there is not this amount of work showing up as needing to be undertaken at this time. The list of overdue renewals is included in the table below. As with the pipelines the overdue renewals are predicted to be undertaken over the next 15 years.

The analysis of renewals gathered the predicted future renewals into five year blocks and these are distributed uniformly over the five years when assembling the overall renewal prediction.

Figure 4-7: WS predicted plant renewals

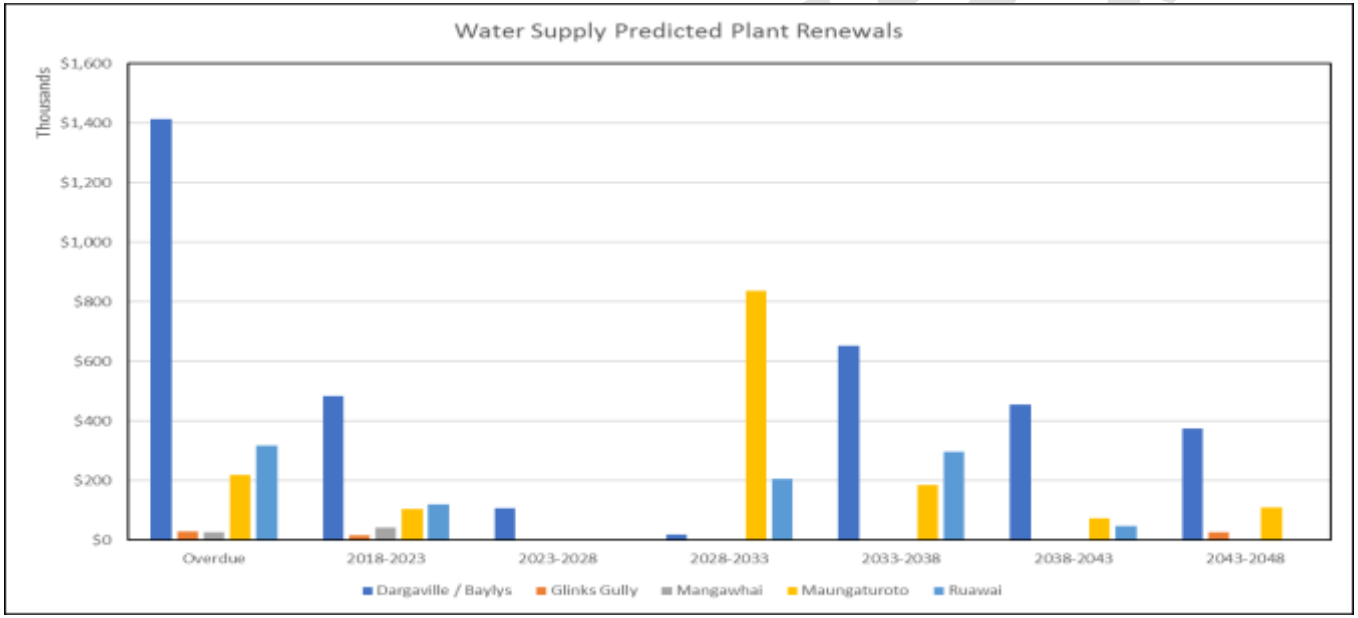


Table 4-8: Overdue WS plant renewals

Kaipara District Council - Overdue Water Supply Plant Renewals

System Name	Asset Group	Asset Type	Predicted Renewal	Replacement Value (2016)
Ruawai supply and tmt	Treatment plant	Bores	2010	$121,411
Ruawai supply and tmt	Treatment plant	Sand trap	2010	$12,141
Ruawai supply and tmt	Treatment plant	Filter/Aerator	2010	$144,479
Ruawai supply and tmt	Treatment plant	Electrical	2015	$19,268
Ruawai supply and tmt	Resource Consent	Water Take	2001	$20,640
				$317,938
Dargaville supply and treatment	Resource Consent	Waipapataniwha	2000	$41,001
Dargaville supply and treatment	Ahikiwi	Pumps	2013	$50,942
Dargaville supply and treatment	Ahikiwi	Electrical	2008	$8,260
Dargaville supply and treatment	Ahikiwi	Control	2008	$1,377
Dargaville supply and treatment	Resource Consent	Ahikiwi	2000	$20,652
Dargaville supply and treatment	Mamaranui	Pumps	2015	$52,318
Dargaville supply and treatment	Mamaranui	Electrical	2010	$13,768
Dargaville supply and treatment	Mamaranui	Control	2010	$28,913
Dargaville supply and treatment	Parore	Electrical	2008	$8,260
Dargaville supply and treatment	Parore	Control	2008	$1,275
Dargaville supply and treatment	Resource Consent	Rotu	2011	$20,665
Dargaville supply and treatment	Treatment plant	Filtration/Clarification	2012	$922,452
Dargaville supply and treatment	Treatment plant	Electrical	2016	$68,840
Dargaville supply and treatment	Hokianga Rd	Air Valves	2001	$128,854
Dargaville supply and treatment	Baylys Beach	Building	2003	$6,678
Dargaville supply and treatment	Baylys Beach	Booster Pump Station (complete)	2003	$30,353
Dargaville supply and treatment	Baylys Beach	Chlorine booster	2003	$7,572
				$1,412,179
Glinks supply and treatment	Resource Consent	Resource consent - water take	2002	$6,884
Glinks supply and treatment	Treatment plant	Headworks	1986	$11,015
Glinks supply and treatment	Treatment plant	Electrical	2016	$11,703
				$29,602
Mangawhai Water	Resource Consent	Water Take	2002	$6,884
Mangawhai Water	Treatment plant	150 mm Bore & 1.5kW Pump	2017	$10,901
Mangawhai Water	Treatment plant	Electrical	2017	$6,884
				$24,670
Maungaturoto supply and tmt	Resource Consent	Filter Discharge	2000	$6,884
Maungaturoto supply and tmt	Supply and Treatment	Pumps and Electrical	2005	$28,104
Maungaturoto supply and tmt	Supply and Treatment	Data logging and flow meter	2000	$12,748
Maungaturoto supply and tmt	Supply and Treatment	Valves	2005	$68,827
Maungaturoto supply and tmt	Treatment plant	Electrical	2017	$19,122
Maungaturoto supply and tmt	Supply and Treatment	Resource Consent	2001	$13,768
Maungaturoto supply and tmt	Treatment plant	Control	2017	$38,244
Maungaturoto supply and tmt	Supply and Treatment	Resource Consent	2001	$13,768
Maungaturoto supply and tmt	Supply and Treatment	Resource Consent	2001	$13,768
Maungaturoto supply and tmt	Supply and Treatment	Pumps and Electrical	2005	$3,442
				$218,676
				$2,003,065

Assembly of overall forecast and comparison to proposed

A renewal profile was generated from the asset valuation data which included the backlog of renewals as discussed above.

This was then compared to the proposed renewal works included in the 10 year LTP.

The following outcomes are apparent:

- The proposed renewals of $19 million over 10 years are higher than the predicted renewals at $13 million over 10 years but the later are driven by actual demonstrated need; and
- The profile of the spending aligns quite well.

The approach adopted highlights the many assumptions that are implicit in the process and the difficultly of generating robust predictions of asset lives and when, and why, renewals will be required.

However the process makes appropriate use of the available information and highlights the connectively between the various sources of information.

Table 4-9a-e: Comparison of valuation based renewals and proposed renewals

Plant Renewals from Valuation

System	Overdue	2018-2023	2023-2028
Dargaville / Baylys	$ 1,412,179	$ 482,901	$ 107,651
Glinks Gully	$ 29,602	$ 14,457	
Mangawhai	$ 24,670	$ 42,065	
Maungaturoto	$ 218,676	$ 103,271	
Ruawai	$ 317,938	$ 118,836	

Plant Renewals from Valuation

System	Overdue	2018-2023	2023-2028								
Dargaville / Baylys	$ 1,412,179	$ 482,901	$ 107,651								
Overdue over 15 yrs		$ 94,145	$ 94,145	$ 94,145	$ 94,145	$ 94,145	$ 94,145	$ 94,145	$ 94,145	$ 94,145	$ 94,145
5 Yrly Spread		$ 96,580	$ 96,580	$ 96,580	$ 96,580	$ 96,580	$ 21,530	$ 21,530	$ 21,530	$ 21,530	$ 21,530
Glinks Gully	$ 29,602	$ 14,457									
Overdue over 15 yrs		$ 1,973	$ 1,973	$ 1,973	$ 1,973	$ 1,973	$ 1,973	$ 1,973	$ 1,973	$ 1,973	$ 1,973
5 Yrly Spread		$ 2,891	$ 2,891	$ 2,891	$ 2,891	$ 2,891					
Mangawhai	$ 24,670	$ 42,065									
Overdue over 15 yrs		$ 1,645	$ 1,645	$ 1,645	$ 1,645	$ 1,645	$ 1,645	$ 1,645	$ 1,645	$ 1,645	$ 1,645
5 Yrly Spread		$ 8,413	$ 8,413	$ 8,413	$ 8,413	$ 8,413					
Maungaturoto	$ 218,676	$ 103,271									
Overdue over 15 yrs		$ 14,578	$ 14,578	$ 14,578	$ 14,578	$ 14,578	$ 14,578	$ 14,578	$ 14,578	$ 14,578	$ 14,578
5 Yrly Spread		$ 20,654	$ 20,654	$ 20,654	$ 20,654	$ 20,654					
Ruawai	$ 317,938	$ 118,836									
Overdue over 15 yrs		$ 21,196	$ 21,196	$ 21,196	$ 21,196	$ 21,196	$ 21,196	$ 21,196	$ 21,196	$ 21,196	$ 21,196
5 Yrly Spread		$ 23,767	$ 23,767	$ 23,767	$ 23,767	$ 23,767					

Pipe Renewals from Valuation

Dargaville Watermains	$442,993	$446,325	$446,325	$423,505	$404,681	$410,977	$410,977	$747,515	$745,740	$748,520
Mgto Watermain						$1,622,570	$1,622,570	$1,622,570		
Glinks Gully, Mangawhai, Ruawai	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

$4,867,709 Spread over 3 years

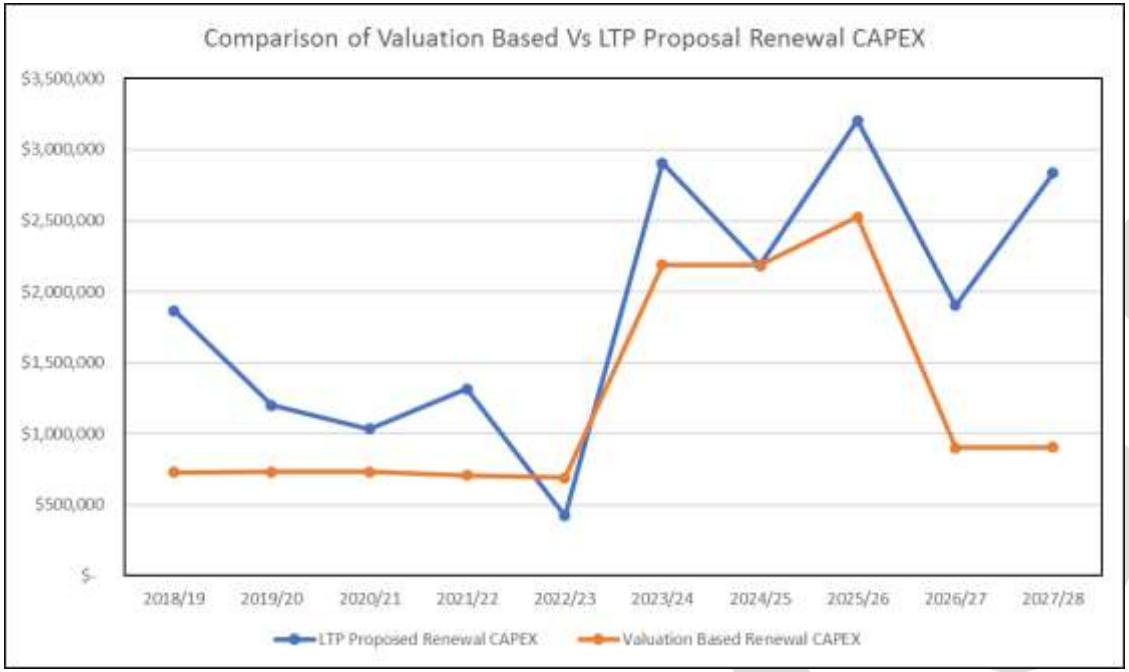
Includes recovery of $4.3m backlog over 15 years

Total Renewals (Plant & Pipe) from Valuation Approach (With Overdue Recovered over 15 Years)

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	
Dargaville / Baylys	$ 633,718	$ 637,051	$ 637,051	$ 614,230	$ 595,406	$ 526,652	$ 526,652	$ 863,190	$ 861,416	$ 864,196	
Glinks Gully	$ 4,865	$ 4,865	$ 4,865	$ 4,865	$ 4,865	$ 1,973	$ 1,973	$ 1,973	$ 1,973	$ 1,973	
Mangawhai	$ 10,058	$ 10,058	$ 10,058	$ 10,058	$ 10,058	$ 1,645	$ 1,645	$ 1,645	$ 1,645	$ 1,645	
Maungaturoto	$ 35,233	$ 35,233	$ 35,233	$ 35,233	$ 35,233	$1,637,148	$1,637,148	$1,637,148	$ 14,578	$ 14,578	
Ruawai	$ 44,963	$ 44,963	$ 44,963	$ 44,963	$ 44,963	$ 21,196	$ 21,196	$ 21,196	$ 21,196	$ 21,196	
TOTAL	$ 728,836	$ 732,169	$ 732,169	$ 709,349	$ 690,525	$2,188,614	$2,188,614	$2,525,152	$ 900,808	$ 903,588	$12,299,823

Proposed	$1,865,500	$1,200,000	$1,033,000	$1,316,325	$ 423,505	$2,905,000	$2,185,000	$3,205,000	$1,905,000	$2,835,000	$18,873,330
Diff (Proposed - Planning)	$1,136,664	$467,831	$300,831	$606,976	-$267,020	$716,386	-$3,614	$679,848	$1,004,192	$1,931,412	$6,573,507
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	

Figure 4-8: Comparison val based vs LPT prop CAPEX



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

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).

To date the development of Water Supply assets has largely been undertaken on a community by community basis. The reported growth figures (Section 2.7.3) indicate that all five community-based Water Supply schemes are not anticipating levels of growth over the next 10 years that will require a significant amount of new capital to be invested. Hence, the new asset funding over the next 10 years is focused on improving the level of services.

Growth

There is no significant growth related projects in the district. Mangawhai may have some growth but currently Council has no intention to provide reticulated water for future growth.

LOS

LOS-related projects are to maintain treatment plants and reticulation to comply with DWSNZ. However there will be no significant projects.

Table 4-10: CAPEX forecast WS 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	-62	485	146	391	1,303	1,281	-294	-321	-345	-370	-370
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-62**	**485**	**146**	**391**	**1,303**	**1,281**	**-294**	**-321**	**-345**	**-370**	**-370**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	197	5	5	5	1,482	1,517	6	6	6	6	6
Capital Expenditure - Renewal	741	1,410	1,119	1,336	479	466	2,156	2,087	2,260	2,321	2,511
Increase (decrease) in reserves	-98	0	0	0	353	430	-1,208	-1,115	-1,262	-1,296	-1,457
Total applications of capital funding	**839**	**1,415**	**1,124**	**1,342**	**2,314**	**2,413**	**953**	**978**	**1,004**	**1,031**	**1,060**
Surplus (deficit) of capital funding	**-901**	**-930**	**-978**	**-951**	**-1,011**	**-1,132**	**-1,247**	**-1,299**	**-1,349**	**-1,402**	**-1,430**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 4-11: CAPEX forecast WS 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
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	-4	-5	-5	-6	-6	-7	-8	-8	-9	-10	-8
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-4**	**-5**	**-5**	**-6**	**-6**	**-7**	**-8**	**-8**	**-9**	**-10**	**-8**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	2	2	2	2	2	2	2	2	2	2	2
Capital Expenditure - Renewal	0	0	0	0	8	8	0	0	0	0	0
Increase (decrease) in reserves	4	6	9	11	6	6	14	15	15	16	16
Total applications of capital funding	**6**	**8**	**10**	**13**	**15**	**16**	**16**	**16**	**17**	**17**	**18**
Surplus (deficit) of capital funding	**-10**	**-12**	**-15**	**-18**	**-21**	**-22**	**-24**	**-25**	**-26**	**-27**	**-26**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 4-12: CAPEX forecast WS Mangawhai

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	1	1	1	1	1	1	1	1	1	1	0
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	2	2	2	2	2	2	2	2	2	2	2
Capital Expenditure - Renewal	0	0	0	10	21	0	11	14	0	12	0
Increase (decrease) in reserves	5	8	11	3	-5	17	6	4	19	7	20
Total applications of capital funding	**7**	**9**	**12**	**15**	**18**	**19**	**19**	**20**	**20**	**21**	**22**
Surplus (deficit) of capital funding	**-6**	**-8**	**-11**	**-14**	**-17**	**-18**	**-18**	**-19**	**-20**	**-20**	**-21**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

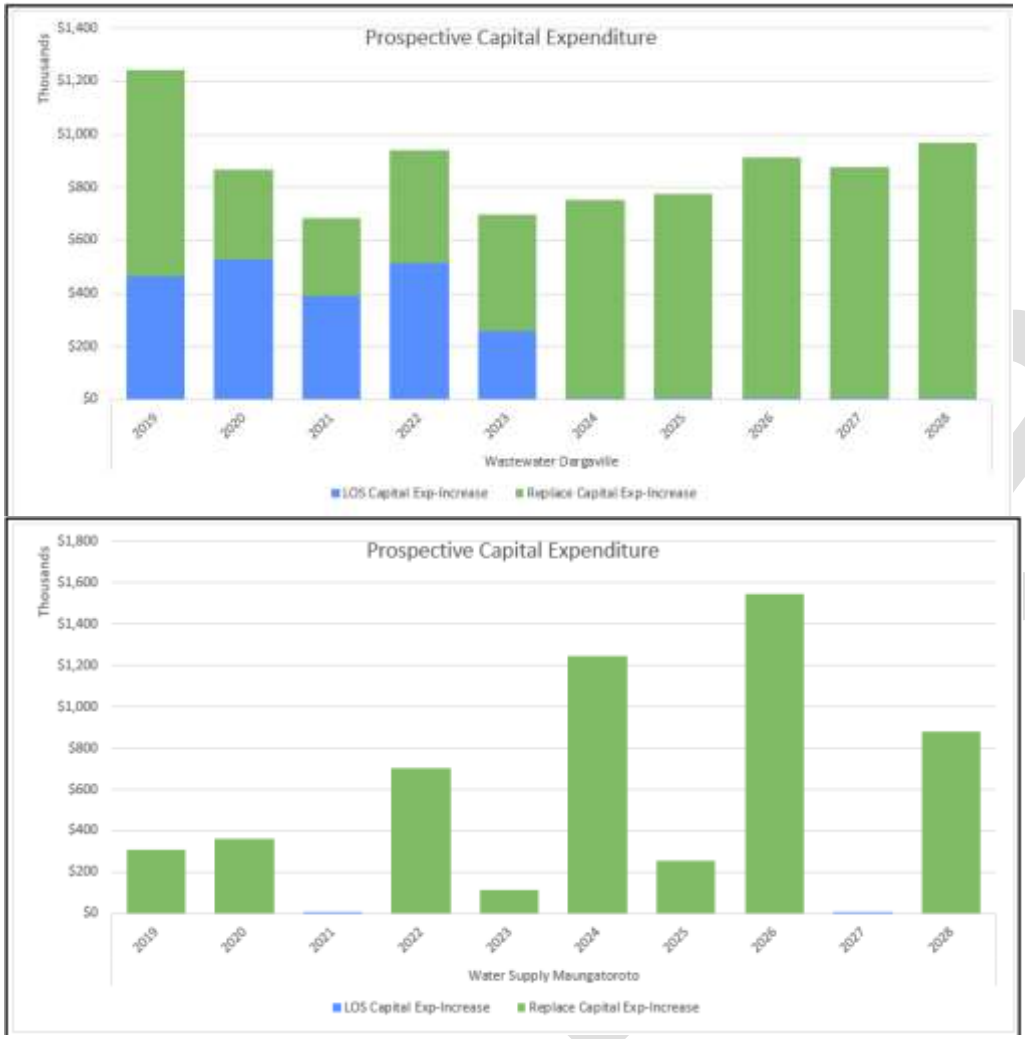
Table 4-13: CAPEX forecast WS Maungaturoto

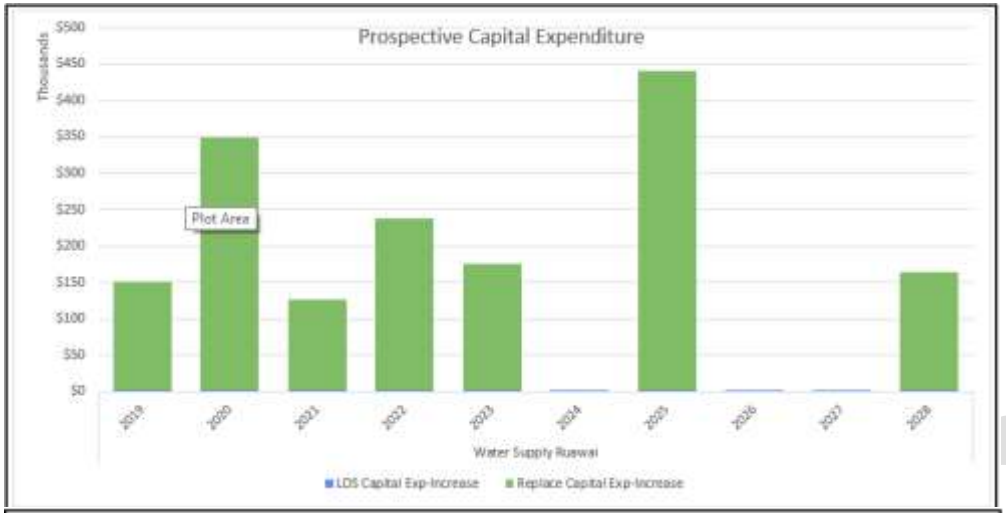
For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	214	251	0	489	0	868	0	1,080	0	614
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	59	-95	-104	-112	-120	-128	-118	-116	-125	-134	-132
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**59**	**119**	**147**	**-112**	**368**	**-128**	**750**	**-116**	**955**	**-134**	**482**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	193	3	3	3	3	3	3	3	4	4	4
Capital Expenditure - Renewal	0	306	359	0	698	114	1,240	253	1,542	0	877
Increase (decrease) in reserves	88	39	72	229	73	175	-76	51	-151	320	67
Total applications of capital funding	**281**	**348**	**434**	**233**	**774**	**292**	**1,167**	**307**	**1,395**	**324**	**947**
Surplus (deficit) of capital funding	**-222**	**-230**	**-287**	**-344**	**-405**	**-420**	**-418**	**-423**	**-440**	**-458**	**-465**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

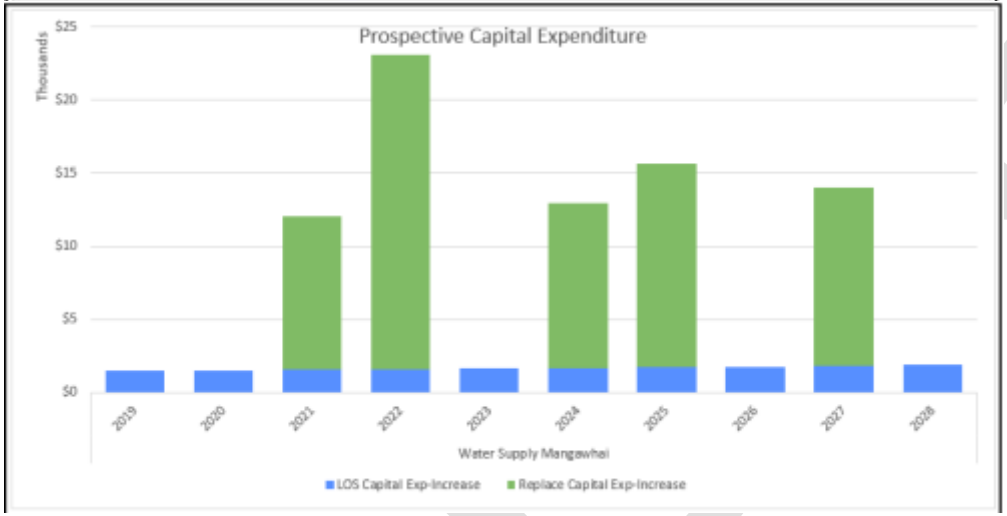
Table 4-14: CAPEX forecast WS Ruawai

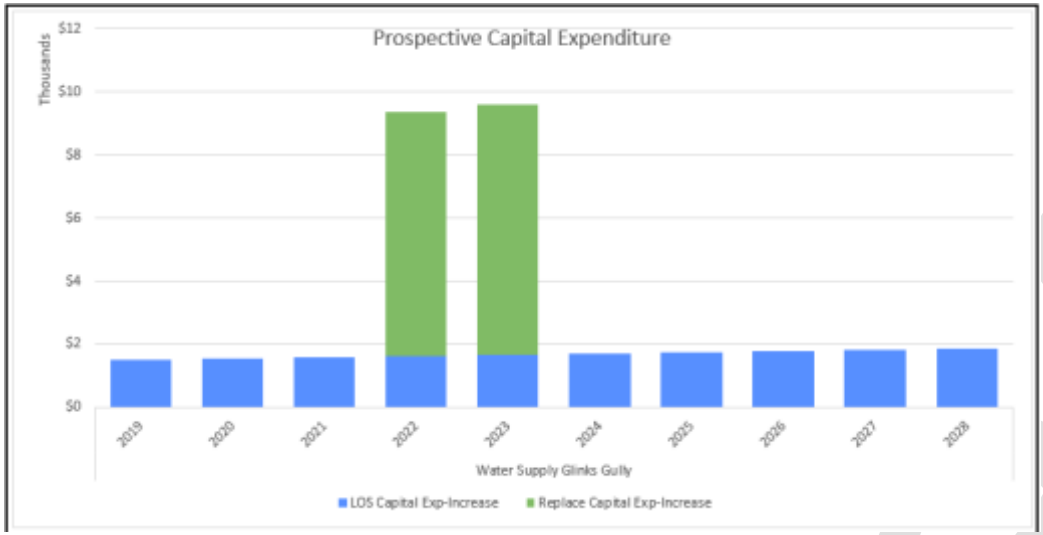
For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	2027-2028 $'000
Capital funding											
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	-9	66	258	24	-25	-27	-29	-31	-33	-36	-35
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-9**	**66**	**258**	**24**	**-25**	**-27**	**-29**	**-31**	**-33**	**-36**	**-35**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	2	2	2	2	2	2	2	2	2	2	2
Capital Expenditure - Renewal	40	150	347	125	236	175	0	439	0	0	163
Increase (decrease) in reserves	0	0	0	0	-156	-92	85	-352	89	92	-68
Total applications of capital funding	**42**	**152**	**349**	**126**	**82**	**84**	**86**	**89**	**91**	**94**	**97**
Surplus (deficit) of capital funding	**-50**	**-86**	**-91**	**-102**	**-107**	**-111**	**-115**	**-120**	**-125**	**-130**	**-131**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Figure 4-9: Total WS graphs




Prospective Capital Expenditure
Thousands
$500
$450
$400
$350
$300
$250
$200
$150
$100
$50
$0
Plot Area
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Water Supply Ruawai
LOS Capital Exp-Increase
Replace Capital Exp-Increase


Prospective Capital Expenditure
Thousands
$25
$20
$15
$10
$5
$0
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Water Supply Mangawhai
LOS Capital Exp-Increase
Replace Capital Exp-Increase



4.4 Asset decommissioning and/or disposal strategy and financial forecast

Council does not have formal strategy documents relating to asset disposals. When disposal of an asset needs to be considered, Council will address this case-by-case.

There are no areas of operation that Council plans to abandon therefore asset disposal 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
- removed and sold.

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

4.5 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 and 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.

Table 4-15 below shows a summary of the service potential for each of the five Water Supply schemes. Cumulative depreciation from 2018/2019 through 2027/2028 is plotted against cumulative renewals and a service potential is calculated as the sum of these two factors. The figures are based on the depreciation values reported in the 2016 valuations (effective 01 July 2016) and assume completion of the programmes within the costs and timeframes shown.

Previously, Kaipara district rates have not included a component for depreciation, meaning users of the asset were not contributing to the asset's upkeep or replacement costs. As outlined in the LTP 2012/22, Council will fund renewals during years 1 to 2 where the level of renewals is less than depreciation in order to assist with affordability for ratepayers. After year 4, Council will progressively move towards a position whereby rates will fund depreciation by the end of the 10 year period. By funding the depreciation, a reserve is set up that can be used to fund the renewal expenditure when it is required.

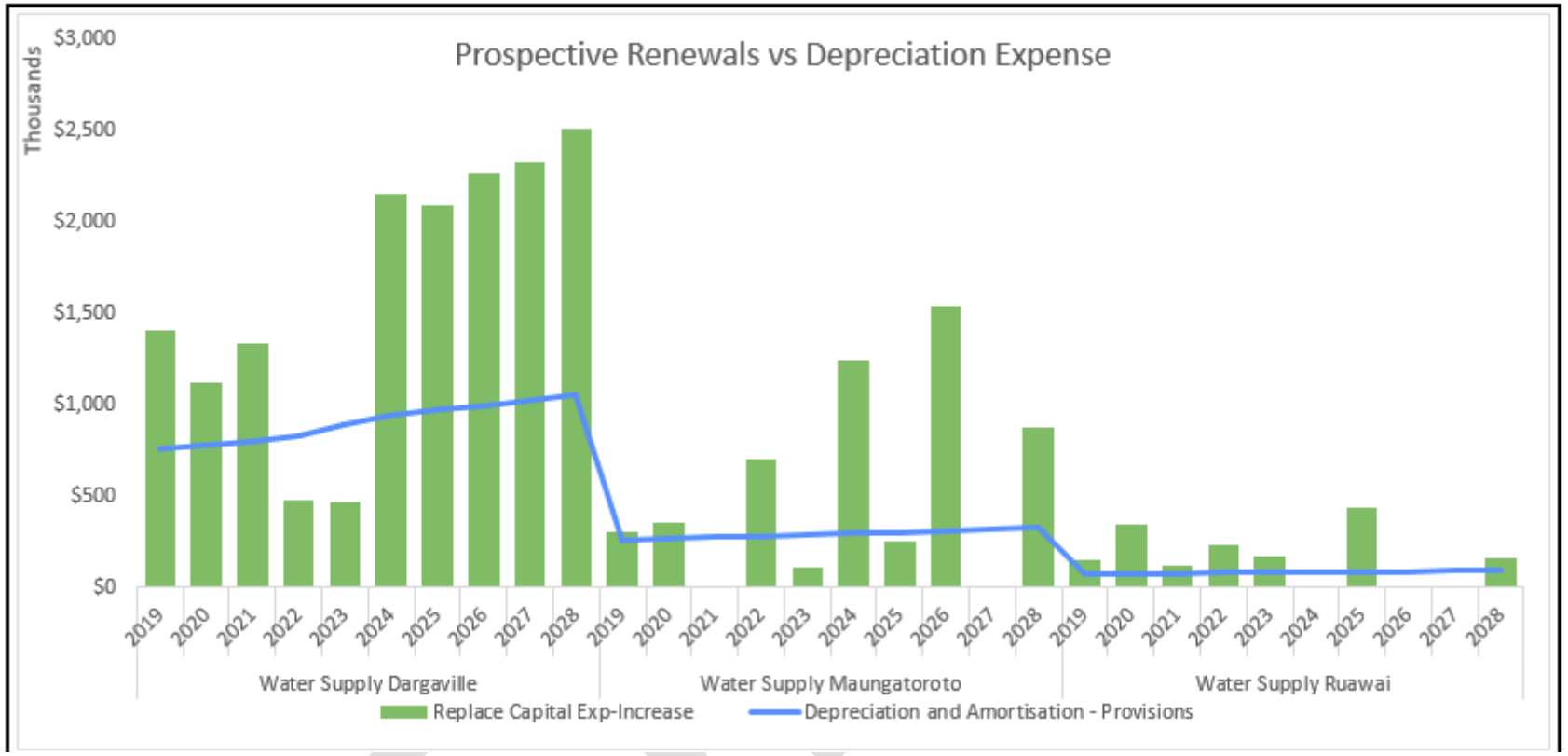
Table 4-15: Comparison of renewals and depreciation

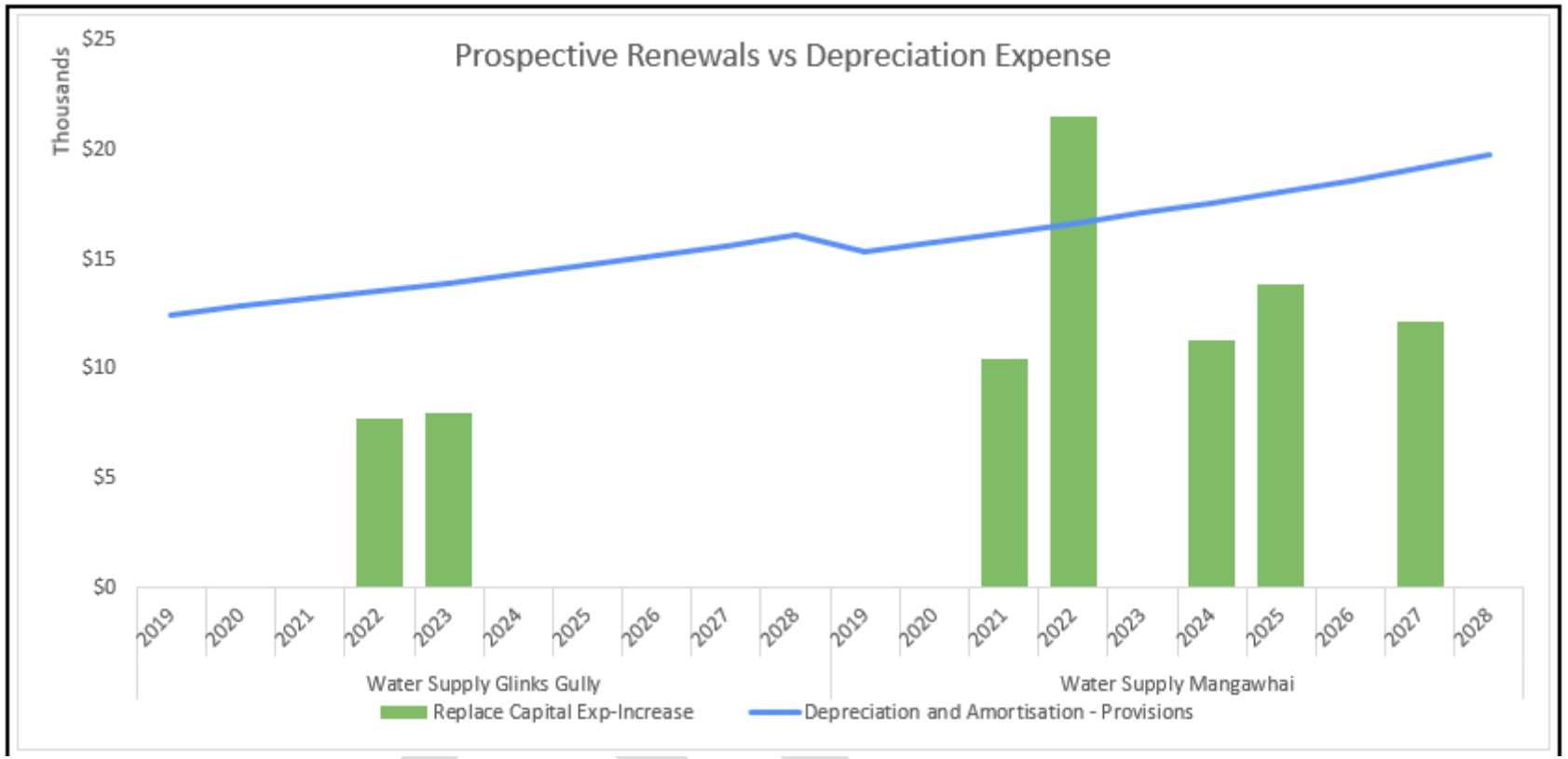
Comparison of Renewal CAPEX with Annual Depreciation (per 2016 Valuation)

Scheme & Depreciation		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Dargaville/Baylys		1,409,500	850,000	1,033,000	446,325	423,505	1,805,000	1,805,000	1,905,000	1,905,000	2,005,000
Annual	$673,690	209%	126%	153%	66%	63%	268%	268%	283%	283%	298%
Cumulative Renewals		1,409,500	2,259,500	3,292,500	3,738,825	4,162,330	5,967,330	7,772,330	9,677,330	11,582,330	13,587,330
Cumulative Depreciation		673,690	1,347,379	2,021,069	2,694,758	3,368,448	4,042,137	4,715,827	5,389,516	6,063,206	6,736,896
Cumulative Comparison		209%	168%	163%	139%	124%	148%	165%	180%	191%	202%
Maungaturoto		306,000	350,000	0	650,000	0	1,100,000	0	1,300,000	0	700,000
	$232,966	131%	150%	0%	279%	0%	472%	0%	558%	0%	300%
Cumulative Renewals		306,000	656,000	656,000	1,306,000	1,306,000	2,406,000	2,406,000	3,706,000	3,706,000	4,406,000
Cumulative Depreciation		232,966	465,931	698,897	931,862	1,164,828	1,397,794	1,630,759	1,863,725	2,096,690	2,329,656
Cumulative Comparison		131%	141%	94%	140%	112%	172%	148%	199%	177%	189%
Mangawhai		0	0	0	0	0	0	0	0	0	0
	$10,280	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cumulative Renewals		0	0	0	0	0	0	0	0	0	0
Cumulative Depreciation		10,280	20,560	30,840	41,121	51,401	61,681	71,961	82,241	92,521	102,802
Cumulative Comparison		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ruawai		150,000	0	0	220,000	0	0	380,000	0	0	130,000
	$73,788	203%	0%	0%	298%	0%	0%	515%	0%	0%	176%
Cumulative Renewals		150,000	150,000	150,000	370,000	370,000	370,000	750,000	750,000	750,000	880,000
Cumulative Depreciation		73,788	147,575	221,363	295,151	368,939	442,726	516,514	590,302	664,089	737,877
Cumulative Comparison		203%	102%	68%	125%	100%	84%	145%	127%	113%	119%
Glinks Gully		0	0	0	0	0	0	0	0	0	0
	$8,680	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cumulative Renewals		0	0	0	0	0	0	0	0	0	0
Cumulative Depreciation		8,680	17,361	26,041	34,721	43,401	52,082	60,762	69,442	78,122	86,803
Cumulative Comparison		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total		1,865,500	1,200,000	1,033,000	1,316,325	423,505	2,905,000	2,185,000	3,205,000	1,905,000	2,835,000
	$999,403	187%	120%	103%	132%	42%	291%	219%	321%	191%	284%
Cumulative Renewals		1,865,500	3,065,500	4,098,500	5,414,825	5,838,330	8,743,330	10,928,330	14,133,330	16,038,330	18,873,330
Cumulative Depreciation		999,403	1,998,807	2,998,210	3,997,613	4,997,016	5,996,420	6,995,823	7,995,226	8,994,630	9,994,033
Cumulative Comparison		187%	153%	137%	135%	117%	146%	156%	177%	178%	189%

p

Figure 4-10: Comparison of renewals and depreciation (yearly and cumulative)

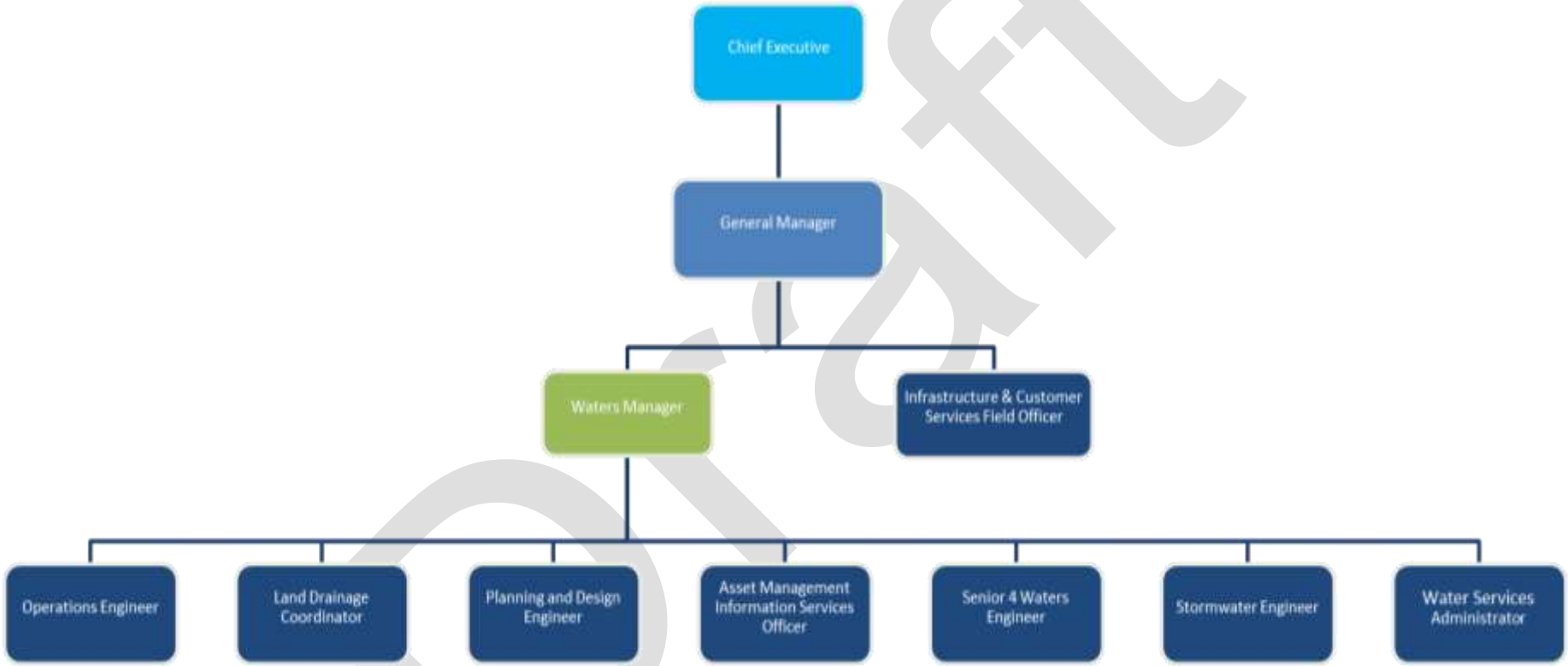



Prospective Renewals vs Depreciation Expense
Thousands
$25
$20
$15
$10
$5
$0
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Water Supply Glinks Gully
Water Supply Mangawhai
Replace Capital Exp-Increase
Depreciation and Amortisation - Provisions

5 Service management

5.1 Organisation

Figure 5-1: KDC organisational structure



5.2 Asset management systems and processes

5.2.1 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 5-1 to manage the Water Supply business:

Table 5-1: 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. Asset information from AssetFinda is exported to MapInfo.
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.
IntraMaps	Enquiring and viewing asset information	Web-based GIS viewer enabling viewing and enquiry of assets.
NCS	Accounting Customer service tracking	Council accounting and financial systems are based on NCS software and GAAP Guidelines. To record customer enquiries and to register and track tasks allocated to the Maintenance contractor for follow-up investigation and resolution within appropriate timeframes.
Advanced information	Telemetry	The performance of the treatment plants and Water Supply pumping stations is monitored via the advanced information telemetry system.
SCADA	Telemetry	Newly installed SCADA at various water and wastewater assets helps in daily operations of WTPs and pump stations and also helps in meeting resource consent requirements.

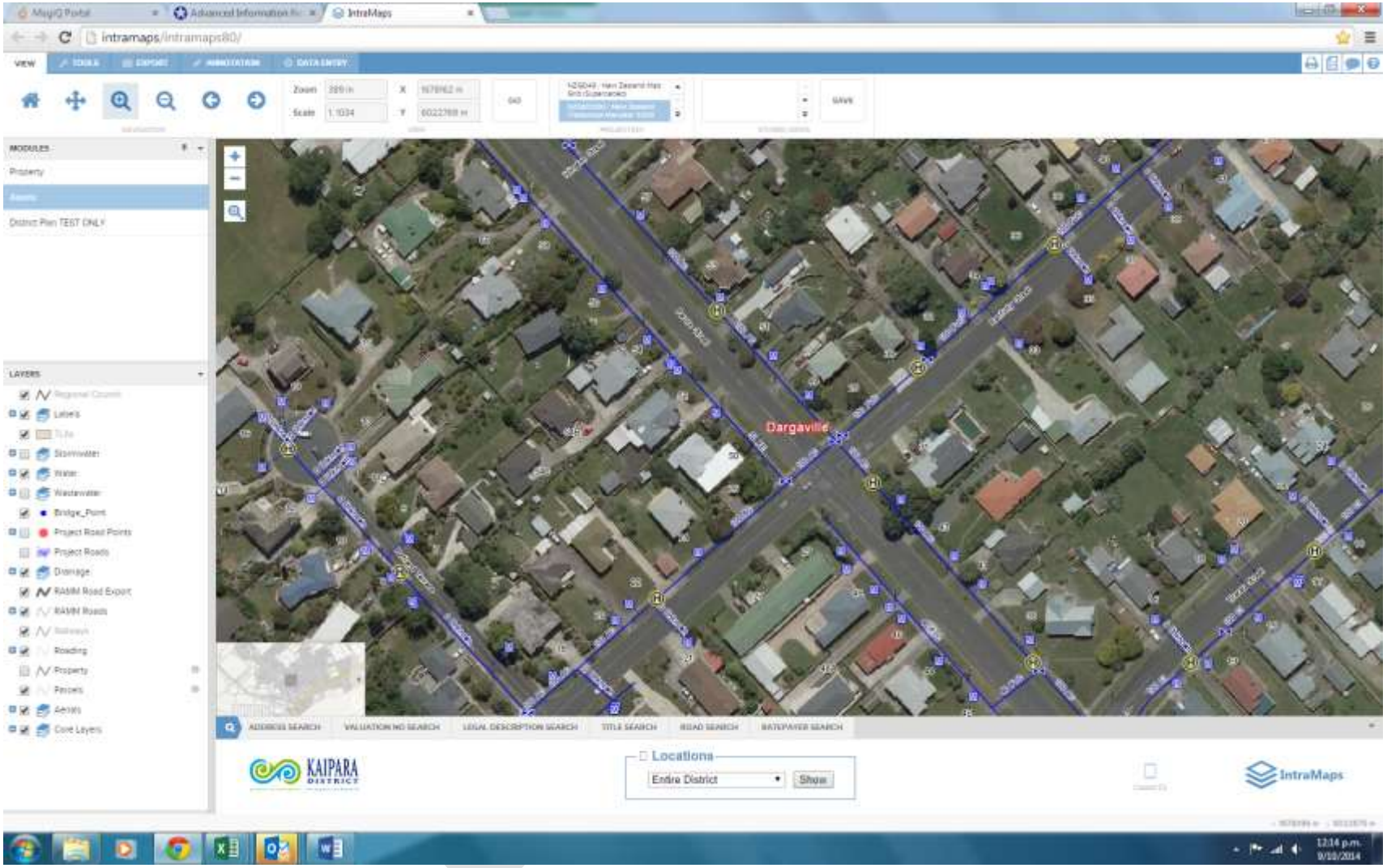
5.2.2 *IntraMaps*

The MapInfo GIS system is the core GIS 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 screen shot of the IntraMaps GIS web viewer is shown in Figure 5-2 below:

Figure 5-2: IntraMaps screenshot



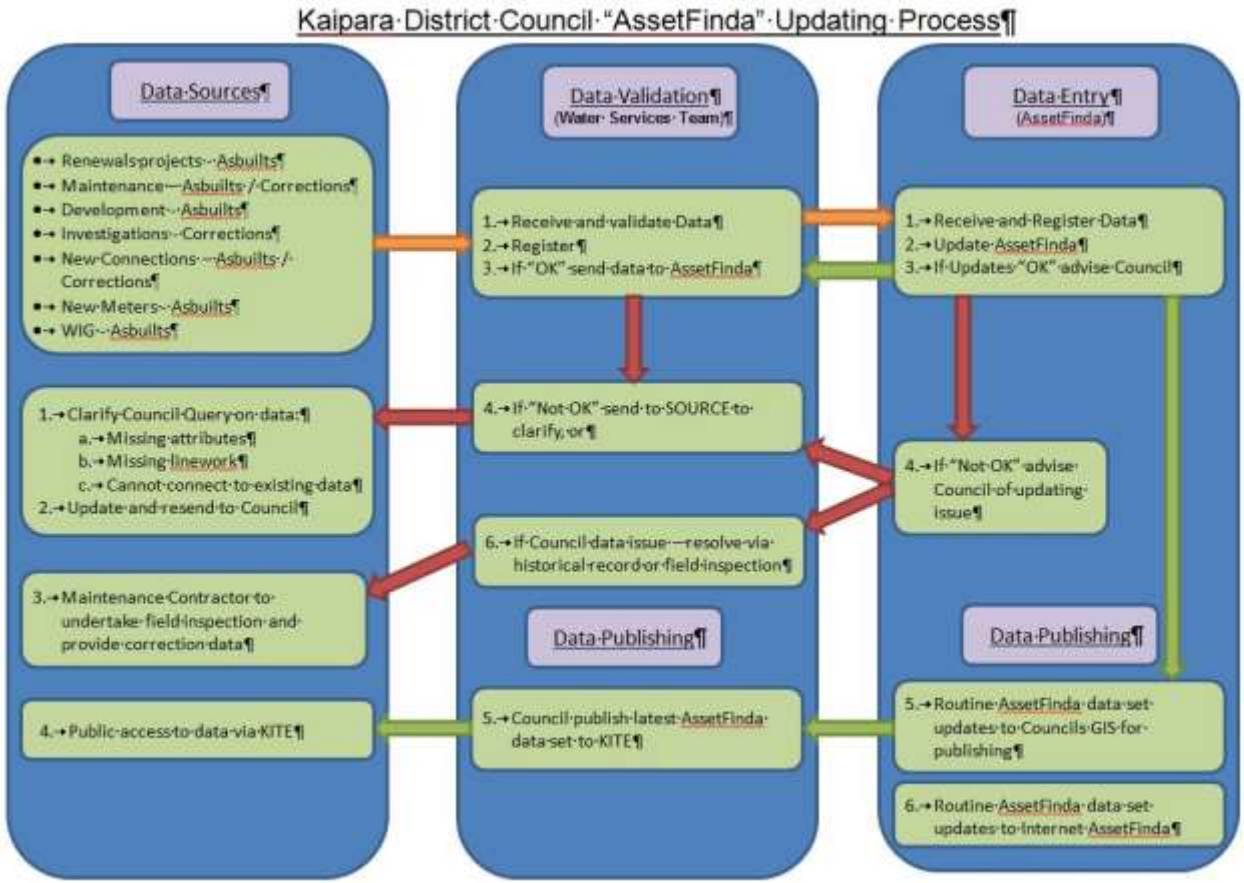
The representation of the assets within this system is believed to be reasonably comprehensive, although gaps and inaccuracies in the data are known to exist. A data improvement task has been identified and included in the AMIP to investigate and resolve the known anomalies where possible.

Improvements to data quality and identification / resolution of data anomalies will be resolved primarily through the maintenance contract and projects, when 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 5-3 below.

Figure 5-3: Data maintenance process



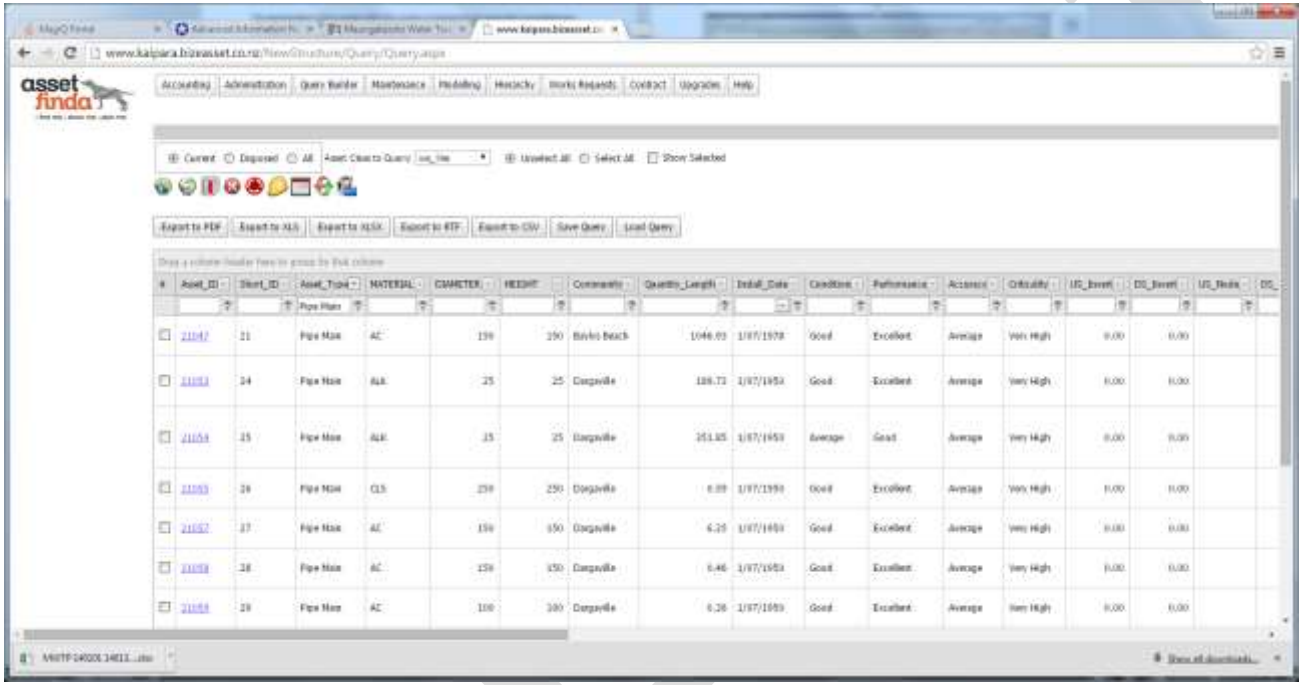
5.2.3 *AssetFinda*

The AssetFinda system is a MapInfo-based tool used to record asset related information. This currently includes basic assed 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 be web-enabled. The system is externally hosted and maintained.

A screenshot of the AssetFinda system is included in Figure 5-4 below:

Figure 5-4: AssetFinda screenshot



The system has the ability to:

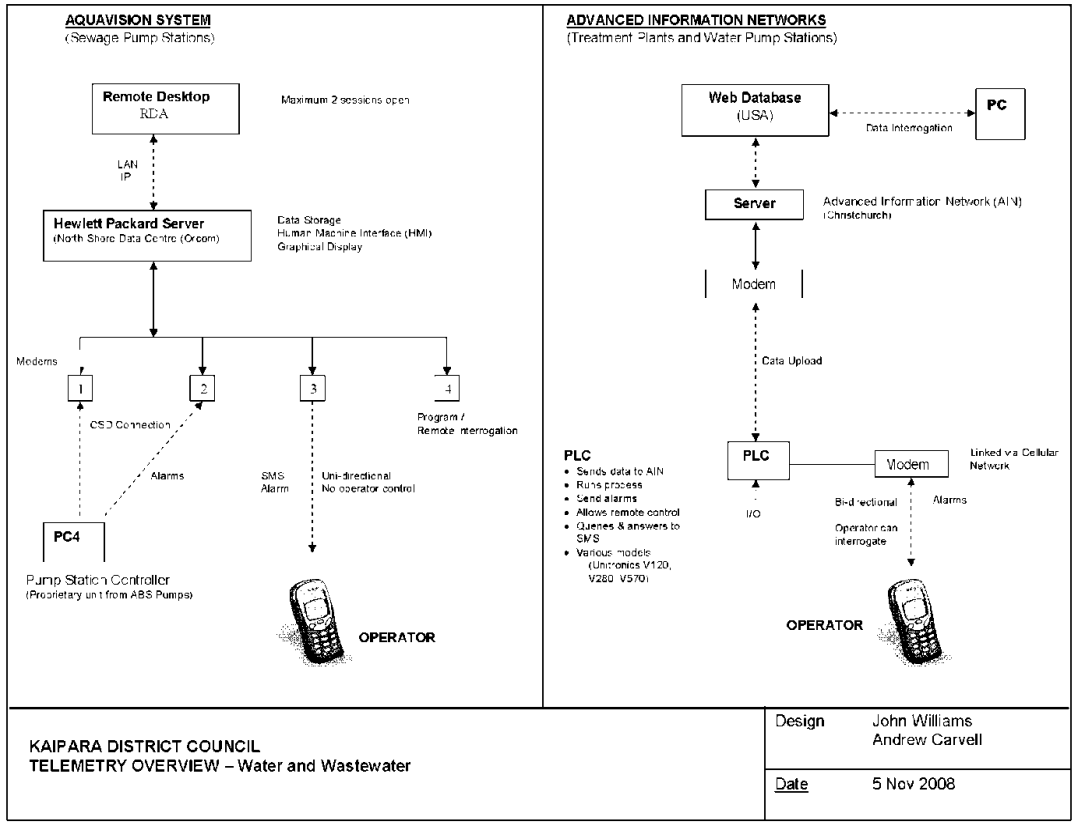
- undertake asset valuations and depreciation calculations for the Water Supply, wastewater and stormwater assets, however, this functionality has yet to be implemented on Council's data; and
- record various maintenance activities against the asset; this critical AM activity is proposed to start from 01 July 2016 when the new O&M Contract starts.

The O & M Contractor collects data related to breaks, repairs and renewals from the field uploads it in AssetFinda to be used for monitoring the decline in asset serviceability and determination of timing for asset renewal.

5.2.4 *Telemetry*

Council operates a GSM telemetry system that monitors various characteristics (flows, levels, pH, and turbidity) via daily email and SMS texts to operators' mobile phones. An overview of this system is provided in Figure 5-5 below.

Figure 5-5: Aquavision telemetry system overview



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

The previous telemetry system was managed by an external consultant separate to the maintenance contractor which created ownership and responsibility issues.

The system also had reached the end of its economic life with numerous components not being supported.

5.3 Potential negative effects

The potential significant negative effects on the community of undertaking the Water Supply activity are detailed in

Table 5-2 below. This AMP describes Council's water 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 AM planning activities including: Asset development work, monitoring and testing, demand management initiatives and public education, including water conservation programmes.

Table 5-2: Potential SNE

Activity	Effect on community well-being	Current controls
Malfunction of water assets	• Social - Can cause disruption to supply. This can pose a public health risk and is frustrating to the local community. • Economic - If the businesses rely on a Water Supply and has no built in storage, then loss of water is a major inconvenience.	• Council relies on the operation and maintenance contractor responding quickly to any malfunction.
Water sources	• Social - Water is abstracted from surface water and groundwater sources. The removal of water from the natural environment results in the water being unavailable for other uses such as irrigation or recreational. • Economic - Water is abstracted from surface water and groundwater sources. The removal of water from the natural environment results in the water being unavailable for other uses such as irrigation or recreational. • Environmental - Water abstracted from surface water, may add strain on a river system which is already very low.	• Council has Drought Management Plans in place to guide water management during times of drought. • Investigating new water sources and educating the public on water usage. • Resource consents are and will be in place, and Council takes all practicable steps to keep parameters with the limits.

Activity	Effect on community well-being	Current controls
The cost of providing the services	• Economic - The cost of providing services is resulting in increases in rates.	• Council uses competitive tendering processes to achieve best value for money for works it undertakes.
Spillage of chemicals stored at water treatment plants	• Social - The ratepayer expects Council to handle all chemicals in the correct manner. • Economic - Businesses which rely on nearby watercourses may not be able to operate until any chemical spill is resolved. • Environmental - Northland region is an environmentally sensitive area, any chemical spill will have a notable effect on the environment.	• Appropriately trained staff and contractors. All chemicals are stored in the correct prescribed manner.
Climate change effects on Water Supply activity reduced rainfall, extreme rainfall events and increased temperature	• Social - Reduced security of supply (depending on water source). • Environmental - Contamination of Water Supply.	

5.4 Risk management (including health and safety)

Council's Risk Management Policy and Framework has been recently updated and the latest version dated December 2012 was approved and supported by the Commissioners and the Executive Team.

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

Council is familiar with the risks associated with each Water Supply scheme, however it has not previously formalised a risk management strategy. Council propose to generate such a strategy during the 2012/2013 financial year to systematically identify, assess and manage asset risks. The risk management strategy should hold a pivotal role in the prioritisation of asset funding.

A Council-wide approach to risk management would be valuable, to allow comparison of risk across different asset types. This would allow risks that impact on the Water Supply network to be compared against those impacting wastewater and roading assets for example. It would then be possible to balance all of

Council's risks in a way that optimises expenditure and minimises Council's total risk exposure.

Council uses risk registers and action plans to monitor and control specific key risks. An example of the risk register template is included as Appendix B.

Table 5-3 identifies Council high and extreme risks, together with potential impact, current controls and an action plan to mitigate, minimise or manage the risk.

Table 5-3: WS high risks

Description		Potential impact	Current controls	Action Plan
Asset group	Risk			
Events				
Reticulation	Earthquake causes extensive damage to reticulation.	Loss of stored, treated water due to large diameter pipe failure.	Nil	Fit emergency shut off valves to reservoirs.
Dargaville water sources	Drought causes insufficient water at intakes.	Water restrictions to loss of supply.	Waiatua Dam Rotu Intake	Apply to vary consent to draw water at lower levels from Rotu. Investigate alternative, more secure source.
Dargaville raw water pipeline	Flooding causes erosion or debris build-up at inlets.	Damage to intakes or pumping facilities rendering them inoperative.	Routine inspections	Undertake inspections immediately after event.
	Flooding causes extensive damage at multiple bridge crossings.	Long term loss of water, very high cost to repair in reactive manner.	Nil	Budgeted for replacement and renewal of river crossings with alternative like inverted syphons.
Glinks Gully raw water pipeline	Landslide damages raw water pipeline.	Loss of Water Supply to scheme for long period, high cost of reactive repairs.	Secondary intake	Investigate alternative route for pipeline.
Treatment and booster stations	External power failure causes shutdown of plant.	Reduction in plant/station output, temporary loss of supply.	Stored water	Provide alternative power supply (generator and external plug etcetera) at key locations.

Description		Potential impact	Current controls	Action Plan
Asset group	Risk			
Infrastructure				
Dargaville raw water pipeline	Pipe failure over significant length of pipe.	Loss of Water Supply to scheme for long period, high cost of reactive repairs.	Annual inspection of pipeline.	Continue investing in renewals. Investigate alternative, more secure source, provide extra cover to pipe where insufficient.
	Damage from external influences (farmers, stock etcetera) or singular pipe bridge failure.	Localised pipe failure, causes loss for supply for short period.		
Maungaturoto headworks	Failure of Cattlemount intakes.	Loss of supply.	Can use Baldrock Dam supply.	Renewal of infrastructure in poor condition.
Dargaville headworks	Embankment failure at Waiatua Dam.	Loss of security of supply, environmental and financial impacts.	Five yearly inspection programme.	Monitor pore water pressures in the embankment, ensure drawdown of water levels is possible.
All reticulation	Damage caused by contractors (related or unrelated).	Premature failure of assets results in unplanned maintenance and renewal costs.		Register for contractors working in area.
All reticulation	Poor quality of construction reduces life of network.	Increased renewal expenditure and lack of funding.	Designs are checked for compliance with Council's Engineering Quality Standards.	Assess cost and benefits of Quality Audit and acceptance testing of new assets prior to final acceptance.
All reservoirs	Leakage or failure due to deterioration.	Excessive water loss, loss of pressure or supply.	Periodic inspections.	Monitor water loss levels, proactive restorative maintenance.
Operational	Operator sustains injury onsite, not able to call for help.	Serious injury occurs but no-one aware of issue to respond.	Contractor Health and Safety Plan.	Assess need to develop radio check in procedures.

Description		Potential impact	Current controls	Action Plan
Asset group	Risk			
Product				
Water sources	Contamination of source water from land use activities.	Degrading of water quality, increased treatment requirements, illness possible.		Investigate alternative, more secure source.
Raw or treated water	Malicious contamination of Water Supply.	Numerous cases of serious illness, medium term loss of supply.	Locked gates to treatment plant, only access by authorised personnel.	Review security of potential contamination points, improve where possible.
Treated water	Contamination resulting from repair or incorrect commissioning of new works,	Localised illness,	Operator procedures and training,	Assess costs and benefits of audit and enforcement of procedures,
Treatment chemicals	Accidental release of chemicals (especially chlorine).	Environmental effects and health issues for operators and residents.	Some consents in place.	Assess chemical storage and handling procedures.
Resource consents	Unable to retain resource consent to extract water at current levels. Discharge consent required for Maungaturoto WTP.	Loss of security of supply, reduced water quality from use of alternative sources, water restrictions. Environmental effects and possible legal action from NRC.		Investigate alternative, more secure source.

5.5 Potential alternative methods of service delivery

The geographic location of Kaipara district could lend itself to shared water services with neighbouring Councils including Whangarei District Council (WDC) and Far North District Council (FNDC), or even Council Controlled Organisations such as Watercare Services Ltd in Auckland.

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.

Although this set-up may present cost-saving opportunities for council, the process of amalgamating services regionally between multiple councils may take some time, and will likely require central government intervention to progress.

It has been decided to have shared services between the District Councils and the Northland Regional Council for GIS services in the first instance, with further shared services being considered in other areas in the future.

5.6 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".*

6 Continuous improvement

6.1 Overview

The AMPs have been developed as a tool to help Council manage their assets, deliver LOS and identify the expenditure and funding requirements of the activity.

Continuous improvements are necessary to ensure Council achieves 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 Water Supply AMP.

6.2 AMIP

The Water Supply AMIP is attached in Appendix A Each improvement has been categorised by AM area (LOS, Data, Operations etcetera), a priority level given with forecasted completion date. Responsibility has been assigned for each improvement, along with a proposed budget allowance, identified as capital or operational expenditure.

Timing for completion of the activities may vary depending on Council priorities. This may result in re-prioritisation of activities from year to year.

The key improvements to be achieved in the next three years to facilitate achievement of core asset management activities and delivery of the Water Supply service are:

- Understanding of required work to achieve DWSNZ 2005(08) compliance at all treatment plants.
- Review and update the WSPs for all five Water Supply schemes;
- Undertake a formal condition assessment of Water Supply assets (in alignment with wastewater and stormwater services) and feed into the renewals programme;
- Undertake hydraulic modelling of the Dargaville, Maungaturoto and Ruawai Water Supply networks to identify information gaps and potential performance issues; and
- Review of data management procedures and including development of system for recording maintenance and costs at asset component level in the asset register.

6.3 AM practices

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 Water Supply business. Details of each system and its capabilities are included in Section 5.2 (AM systems and processes).

It is recognised that the condition and performance data relating to the Water Supply assets is being refined. 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 Water Supply assets.

The improvement of Council's data collection and entry processes has been identified as a current 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. Council has initiated a data cleaning exercise and it is expected that we will have more robust asset data in the coming years.

Council has moved towards making use of 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. Council through its new O&M Contract that started on 01 July 2016 captures all work orders (works done) and associated costs to an asset. This will help enable Council in developing a more informed replacement programme.

The data improvement actions included in the AMIP are listed in Table 6-1

Table 6-1: AMIP data improvement actions

Improvement action	Forecast completion date
Review the asset register to ensure all known assets are properly recorded.	Ongoing Council has developed and agreed vested assets process to capture all assets.
Complete the data cleansing project to reduce the number of unknown asset attributes.	Ongoing Council engaged a consultant to help identify data gaps and propose suggestions on bridging those identified gaps. Data cleansing exercise is ongoing and with the help of O&M contractor, it is expected to be progressed with field verification.
Record the maintenance history with each works order at asset component level in AssetFinda.	Ongoing This aspect has been covered in the new O&M Contract that started 01 July 2016.
Investigate what backflow prevention exists for Glinks Gully residents that use water tanks.	June 2018

Table 6-2: Overall data management plan

Improvement programme 2018/2028	
Year 1 – 2018/2019 Planned improvement / change	• Develop a central database and Geographic Information Systems (GIS) mapping for condition assessment information and generate a renewal programme • Replace the manual system for consents, compliance and monitoring with a central management software system • Continue the data cleansing project to improve our knowledge of our assets, including asset life to help with renewal planning • An ecological study of the Kaihu River to assess the possibility of varying the water take consent. • Water loss management by ensuring the contractor adheres to reactive timeframes for leak requests, and is proactive in leak detection and effective meter reading. • Review and update water safety plans for all five Water Supply schemes using the latest requirements from Northland District Health Board (NDHB). • Continue with condition assessments of Water Supply assets in alignment with wastewater and stormwater services, and feed into the renewals programme. • Develop hydraulic computer models for Dargaville, Maungaturoto and Ruawai reticulation networks, predicting pressures and flows to confirm network capacity and manage growth • Review data management procedures and include development of a system for recording maintenance and costs at asset component level in our asset register.
Year 2 – 2019/2020 Planned improvement / change	• Continue developing a central database and Geographic Information Systems (GIS) mapping for condition assessment information and generate a renewal programme • Continue developing a central database and Geographic Information Systems (GIS) mapping for condition assessment information and generate a renewal programme • Review and update the water safety plans for all five Water Supply schemes using the latest requirements from NDHB. • Continue with the condition assessments of Water Supply assets in alignment with wastewater and stormwater services, and feed into the renewals programme.

Improvement programme 2018/2028	
	• Continue developing hydraulic computer models for Dargaville, Maungaturoto and Ruawai reticulation networks, predicting pressures and flows to confirm network capacity and manage growth • Review data management procedures and include development of system for recording maintenance and costs at asset component level in the asset register • Water loss management by ensuring the contractor adheres to reactive timeframes for leak requests, and is proactive in leak detection and effective meter reading.
Year 3 – 2020/2021 Planned improvement / change	• Continue developing a central database and Geographic Information Systems (GIS) mapping for condition assessment information and generate a renewal programme • Continue developing a central database and Geographic Information Systems (GIS) mapping for condition assessment information and generate a renewal programme • Review and update the water safety plans for all five Water Supply schemes using the latest requirements from NDHB. • Continue with condition assessments of Water Supply assets in alignment with wastewater and stormwater services, and feed into the renewals programme; • Continue developing hydraulic computer models for Dargaville, Maungaturoto and Ruawai reticulation networks, predicting pressures and flows to confirm network capacity and manage growth • Water loss management by ensuring the contractor adheres to reactive timeframes for leak requests, and is proactive in leak detection and effective meter reading.
Years 4-10 – 2021/2028 Planned improvement / change	• Review and update the water safety plans for all five Water Supply schemes using the latest requirements from NDHB. • Continue with condition assessments of Water Supply assets in alignment with wastewater and stormwater services, and feed into the renewals programme. • Water loss management by ensuring the contractor adheres to reactive timeframes for leak requests, and is proactive in leak detection and effective meter reading.

Appendix A: Continuous improvement

Asset Management Improvement Programme (AMIP)

Executive summary

Continuous improvements are necessary as Kaipara District Council (KDC/Council) continues to achieve the appropriate (and desired) level of activity management practice; delivering services in the most sustainable way which meeting the community's needs.

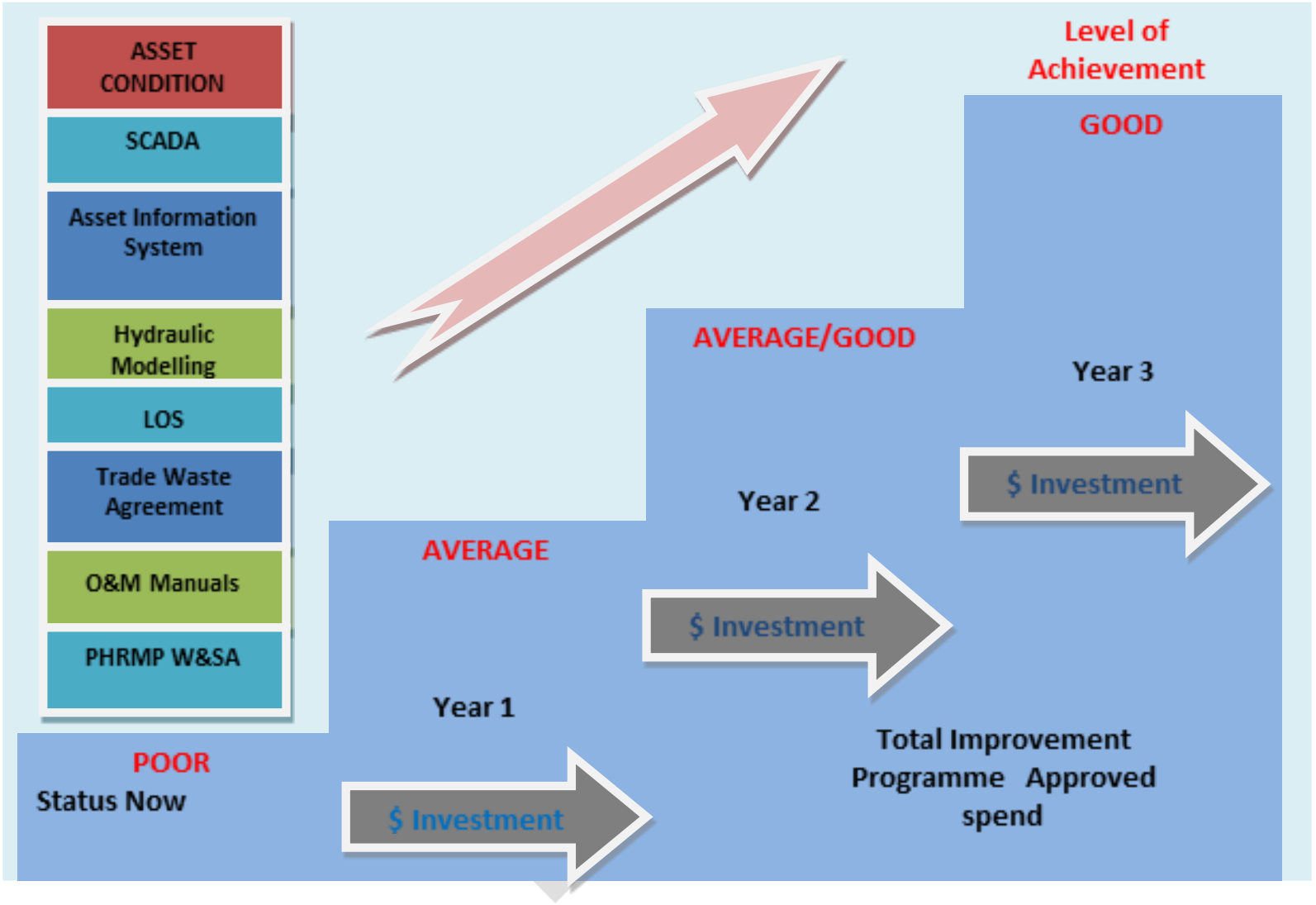
The AMIP has been developed, identifying the highest priority activities to undertake in next 1-3 years to improve level of AM practice in 3 Waters as follow:

- Condition Assessment;
- SCADA System;
- Asset Information System (AIMS);
- Hydraulic Modelling;
- Level of Service (LOS);
- Trade Waste Agreements;
- O&M Manual;
- Public Health Risk Management Plan (PHRM); and
- Water and Sanitary Assessment (W&SA).

An AMIP has been prepared to address the critical issues. It has to be acknowledged that, not all issues can be resolved with the available resources and a criticality criterion is applied to identify the most pressing that need attention.

A firm commitment is needed to deliver this program as it would elevate the present "Poor" status of the above activities to a "Good" status in three years' time as demonstrated in the diagram below.

AMIP of 3 Waters



AMIP programme summary

Item	Description	Total Budget (3 yrs)	Year 1 2018-19	Year 2 2019-20	Year 3 2020-21
1	Dargaville Capacity and Hydraulic Study	$60,000		$60,000	
2	Maungaturoto Capacity and Hydraulic Study	$60,000		$30,000	$30,000
3	Maungaturoto Piroa preparation for consent renewal and review of backwash discharge consent	$35,000	$35,000		
4	Ruawai Capacity and Hydraulic Study	$20,000	$10,000	$10,000	
5	Mangawhai Capacity and Hydraulic Study	$12,000	$6,000	$6,000	
6	WSPs Update	$15,000	$5,000	$5,000	$5,000
7	Condition assessment	$90,000	$30,000	$30,000	$30,000
8	Central database and geospatial framework for condition assessment information and generate renewal programmes from the system;	$75,000	$25,000	$25,000	$25,000
9	Dargaville Kaihu River Ecological Study and Consent Variation	$60,000	$60,000		
10	Central management system for consents, compliance and monitoring;	$30,000		$10,000	$20,000
11	Water Loss Management including repairs to Reservoirs - Ruawai	$100,000	$46,000	$27,000	$27,000
12	Asset Revaluation	$45,000	$45,000		
13	Glinks Gully Capacity Study	$2,000	$1,000	$1,000	
14	AMP and LOS Review	$50,000		$25,000	$25,000
	Other (unspecified)	$58,800	$5,000	$5,000	$48,800
	TOTAL	$712,800	$268,000	$234,000	$210,800

Appendix B: Risk register

Asset Description	Category	Community	Quantity	Consequence of Failure	Likelihood of Failure	Risk
Dargaville		Dargaville				
Waiparataniwha Intake	Source	Dargaville	3	Severe	Unlikely	Moderate
Rotu Intake	Source	Dargaville	1	Severe	Possible	Moderate
Raw Water Line	Raw Water Line	Dargaville	25Km	Major	Likely	High
Raw Water Booster Pumps	Booster Pumps Raw Water	Dargaville	2	Severe	Moderate	Low
Waiatua Dam	Source	Dargaville	1	Minor	Unlikely	Low
Treatment Plant	Plant	Dargaville	1	Catastrophic	Likely	High
Chemical Dosing Pumps	Plant	Dargaville	6	Minor	Possible	Low
Sand Filters	Plant	Dargaville	4	Minor	Possible	Low
Clarifier	Plant	Dargaville	2	Minor	Possible	Low
Post pH/Chlorine Disinfection	Plant	Dargaville	3	Minor	Possible	Low
Telemetry/ Electrical	Plant	Dargaville	1	Major	Likely	High
DWTP Reservoirs	Reservoir Treated Water	Dargaville	2	Severe	Likely	High
Baylys Reservoir	Reservoir Treated Water	Dargaville	1	Catastrophic	Moderate	High
Baylys Supply line	Treated Water Line	Dargaville	8Km	Major	Likely	High
Booster Pump stations treated water	Booster Pumps treated Water	Dargaville	one	Major	Moderate	High
(Reticulation > 50mm)	Reticulation	Dargaville	50Km	Minor	Possible	Low
Trunk Main	Trunk Main	Dargaville	2	Severe	Likely	High
Extend assessment to non-critical assets		Dargaville				
Maungaturoto		Maungaturoto				
Intake	Source	Maungaturoto	3	Minor	Possible	Low
Raw Water Line	Raw Water Line	Maungaturoto	10 Km	Major	Likely	High
Baldrock pump station/pipeline	Booster Pumps Raw Water	Maungaturoto	1	Minor	Possible	Low
Piroa pump station/pipeline	Booster Pumps Raw Water	Maungaturoto	3Km	Minor	Possible	Low
Raw water Reservoir	Reservoir Raw water	Maungaturoto	1	Major	Possible	High
Treated Water Reservoir	Reservoir Treated Water	Maungaturoto	3	Major	Possible	High
Reticulation	Reticulation	Maungaturoto	12Km	Minor	Possible	Low
Treatment Plant	Plant	Maungaturoto	1	Catastrophic	Likely	High
Clarifier	Plant	Maungaturoto	1	Minor	Possible	Low
Filters	Plant	Maungaturoto	3	Minor	Possible	Low
Chemical Dosing	Plant	Maungaturoto	6	Minor	Possible	Low
pH correction/ Chlorine Disinfection	Plant	Maungaturoto	2	Minor	Possible	Low
UV Disinfection	Plant	Maungaturoto	2	Minor	Possible	Low
Treated Water Reservoirs	Reservoir Treated Water	Maungaturoto	3	Minor	Possible	Low
Pumps (duty assist)	Plant	Maungaturoto	5	Minor	Possible	Low
Rising Main (Griffin Road)	Rising Main	Maungaturoto	1Km	Minor	Possible	Low
Trunk Main Plant to Griffin Road	Trunk Main	Maungaturoto	3Km	Severe	Likely	High
Trunk Main to Railway Village	Trunk Main	Maungaturoto	2Km	Major	Likely	High

Asset Description	Category	Community	Quantity	Consequence of Failure	Likelihood of Failure	Risk
Ruawai		Ruawai				
Bores	Source	Ruawai	2			
Rising Main	Rising Main	Ruawai	500m	Major	Likely	High
Raw water Reservoir	Reservoir Raw water	Ruawai	1			
Treatment Plant	Plant	Ruawai	1	Catastrophic	Likely	High
Chemical Dosing	Plant	Ruawai	6	Minor	Possible	Low
Filtration	Plant	Ruawai	3	Minor	Possible	Low
Cartridge Filtration	Plant	Ruawai	2	Minor	Possible	Low
Booster pump	booster Pumps treated Water	Ruawai	1	Severe	Likely	High
Reticulation	Reticulation	Ruawai	6.5Km	Minor	Possible	Low
Reservoirs	Reservoir Treated Water	Ruawai	1	Catastrophic	Possible	High
Glinks Gully (outside peak holiday period)		Glinks Gully				
Intakes	Source	Glinks Gully	3	Minor	Possible	Low
Raw Water Line	Raw Water Line	Glinks Gully	2Km	Minor	Possible	Low
Raw Water Reservoir	Reservoir Raw water	Glinks Gully	1	Major	Likely	High
Treatment Plant	Plant	Glinks Gully	1	Major	Likely	High
Filters	Plant	Glinks Gully	4	Minor	Possible	Low
UV Disinfection	Plant	Glinks Gully	2	Minor	Possible	Low
Dosing	Plant	Glinks Gully	2	Minor	Possible	Low
Reservoirs	Reservoir Treated Water	Glinks Gully	4	Minor	Possible	Low
Reticulation	Reticulation	Glinks Gully	1.4Km	Minor	Possible	Low
Mangawhai (outside peak holiday period)		Mangawhai				
Bores	Source	Mangawhai	1	Severe	Moderate	significant
Rising Main	Rising Main	Mangawhai	1Km	Severe	Moderate	significant
Reservoirs	Reservoir Treated Water	Mangawhai	2	Severe	Moderate	significant
Reticulation	Reticulation	Mangawhai	3Km	Severe	Moderate	significant
Booster pump	Booster Pumps treated Water	Mangawhai	1	Severe	Moderate	significant

Appendix C: Resource consent register

Kaipara District Council resource consent register – Water Supply

Consent number	Scheme	Details	Expiry date
8134	Dargaville/Baylys	Rotu water take	2033
8369	Dargaville/Baylys	Waiatua Dam	2033
30845	Dargaville/Baylys	Waiparataniwha water take	2048
4702	Dargaville/Baylys	Taharoa water take	2028
7582	Maungaturoto	Piroa Stream water take	2019
3815	Maungaturoto	Brynderwyn Stream water take	2001 relinquished consent as part of 2014 consent renewal process.
9888	Maungaturoto	Cattlemount Stream and Spring water take	2039
9888	Maungaturoto	Boar Hill Stream water take	2039
2187	Ruawai	Water take	2030
7944	Glinks Gully	Water take	2022
8032	Mangawhai	Camp ground water take	2025

Kaipara District Council resource consent register – backwash discharge

Consent number	Scheme	Details	Expiry Date
5107	Ruawai	To discharge backwash water from the WTP to an unnamed tributary of the Wairoa River.	30 June 2046
1383	Maungaturoto	Discharge of backwash from WTP. New consent application is on hold under Section 92 request. Final investigations and feedback underway March 2014.	Expired
36520	Dargaville/Baylys	Discharge of backwash from treatment plant into Kaihu River.	2048
No consent	Glinks Gully	To be applied for.	--

Appendix D: Historic LOS

Performance measures	Data source						
	2009/10 AP Target	2009/10 AR - Actual	2010/11 AP Target	2010/11 AR Actual	2011/12 AP Target	2011/12 AR Actual	2012/2022 LTP 2016/2022 Target
Customer LOS							
Percentage of customers satisfied with water (NRB)	80%	Not Achieved. 79% of those surveyed were satisfied with the Water Services provided.	80%	82%	80%	91%	82%
Compliance with NZ Drinking Water Standards (2000-2005)							
Dargaville Plant		Achieved.					
E coli	C	Not measured due to change in Ministry of Health reporting.	C	C	C	C	C
Chemical	-		C	C	C	C	C
Glinks Gully Plant		Achieved.					
E coli	C	Not measured due to change in Ministry of Health reporting.	C	C	C	C	C
Chemical	-		C	C	C	C	C
Ruawai Plant							
E coli	C	Achieved.	C	C	C	C	C
Chemical	C	Achieved.	C	C	C	C	C
Maungaturoto Plant		Achieved.					
E coli	C	Not measured due to change in Ministry of Health reporting.	C	C	C	C	C
Chemical	-		C	C	C	C	C
Mangawhai Heads Bore	C	Achieved.					
E Coli	-	Not measured due to change in Ministry of Health reporting.	C	C	C	C	C
Chemical			C	C	C	C	C

Performance measures	Data source						
	2009/10 AP Target	2009/10 AR - Actual	2010/11 AP Target	2010/11 AR Actual	2011/12 AP Target	2011/12 AR Actual	2012/2022 LTP 2016/2022 Target
Percentage of urgent request responded to within 1 day (Council Help Desk)	90%	Achieved. All urgent requests were responded to within 1 day.	90%	90%	90%	94%	-
Number of complaints per annum regarding water quality for Council-owned and controlled Water Supply.	-	-	-	-	-	-	<21 (New Measure)
Number of Requests for Service regarding water leaks for Council-owned and controlled Water Supply.							100-80 (New Measure)
Key: NRB - National Research Bureau N/C – Non- Compliant C - Compliant							
Technical LOS							
Water Quality – Drinking Water Standards Compliance: Routine water quality tests confirm safe potable water supplies	100% Compliance	-	-	-	-	-	-
Water Quality – Drinking Water Standards Compliance: No Abatement notices issued for any Council operated Water Supply	100% Compliance	-	-	-	-	-	-
Environmental Standards – Volume of water extracted: Compliance with resource consents	100% Compliance	-	-	-	-	-	-
Quantity – NZ Fire Service Code of Practice requirements – Percentage of fire hydrants tested provide flows in accordance with the Fire Service Code of Practice	100% compliance within the defined Water Supply areas	-	-	-	-	-	-
Efficiency – Notified partial shutdowns: Consumers notified of planned shutdown at least 48hrs in advance	100% compliance	-	-	-	-	-	-
Efficiency – Non-notified partial shutdowns: Number of households affected by shutdowns exceeding *2* hours duration	< 20 p.a.	-	-	-	-	-	-

Performance measures	Data source						
	2009/10 AP Target	2009/10 AR - Actual		2010/11 AP Target	2010/11 AR Actual	2011/12 AP Target	2011/12 AR Actual	2012/2022 LTP 2016/2022 Target
Efficiency – Non-notified partial shutdowns: Unplanned Water Supply interruptions greater than 4 hours, in any 12 month period.	Zero	-		-	-	-	-	-
Responsiveness – Speed of Response to service requests and system failures: Percentage of complaints and requests that were adequately responded to within the allowed period of time.	Urgent service requests within 2 hours on 90% of occasions Non-urgent within 5 working days on 95% of occasion.	-		-	-	-	-	-
Responsiveness – Speed of response to public enquires: Percentage of routine enquires adequately responded to within the allowed period.	Response to written/faxed enquires made within 5 working days on at least 95% of occasions. Response to telephone enquires made on the same working day on at least 95% of occasions.	-		-	-	-	-	-

Appendix E: List of acronyms and abbreviations

List of acronyms

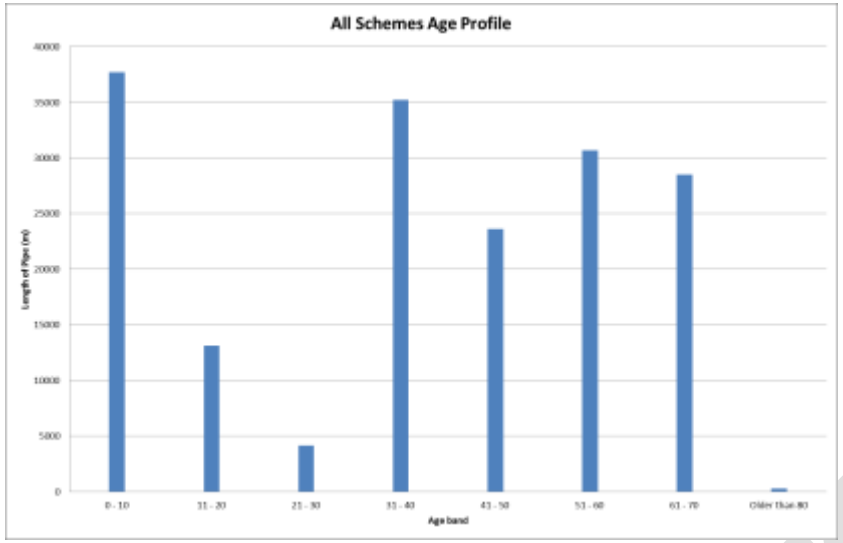
The following lists key acronyms and abbreviations used in this document:

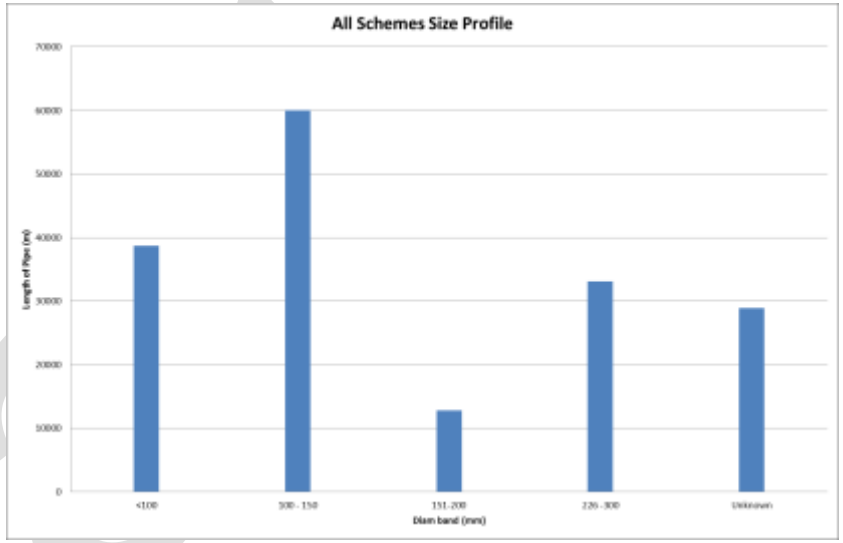
Term	Definition
AC	Asbestos concrete (pipe type)
AEP	Annual Exceedance Probability (e.g. 10% is once in 10 years)
AM	Asset Management
AMIP	Asset Management Improvement Plan
AMP	Asset Management Plan
AMS	Asset Management Systems
BERL	Business and Economic Research Limited
CAPEX	Capital expenditure
CDEM	Civil Defence Emergency Management
Council/KDC	Kaipara District Council
CPP	Competitive Pricing Procedures
DWSNZ	New Zealand Drinking Water Standards
FNDC	Far North District Council
GAAP	Generally Accepted Accounting Practices
GIS	Geographical Information System
IIMM	International Infrastructure Management Manual
IPCC	Intergovernmental Panel on Climate Change
KDC/Council	Kaipara District Council
LGA	Local Government Act 2002
LOS	Level of Service
LTP	Long Term Plan
MfE	Ministry for the Environment

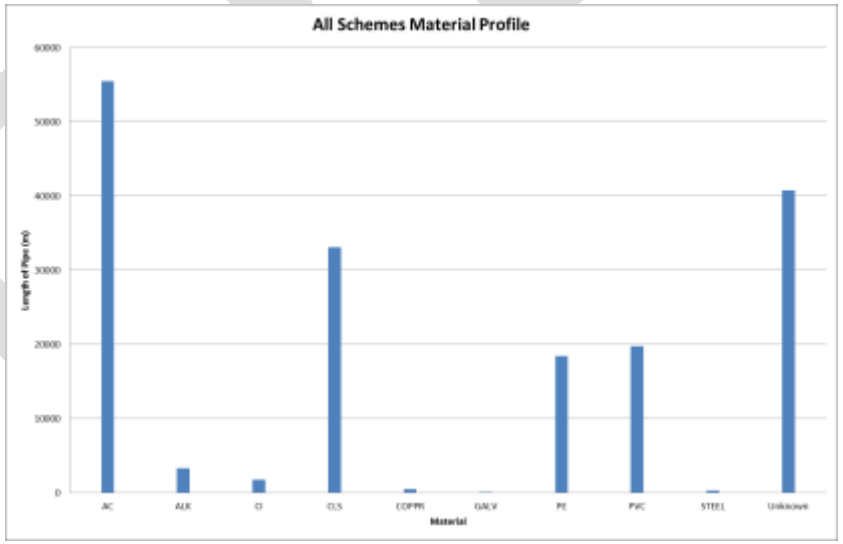
Term	Definition
NAMS	National Asset Management Steering Group
NCS	Napier Computer System
NES	National Environmental Standards
NRC	Northland Regional Council
O&M	Operations and Maintenance
ODRC	Optimised Depreciated Replacement Cost
OPEX	Operational expenditure
PHRMP	Public Health Risk Management Plan
RMA	Resource Management Act 1991
URP	Usual Resident Population
WDC	Whangarei District Council
WSAA	Water Services Association of Australia
WSP	Water Safety Plan
WTP	Water Treatment Plant

Appendix F: Asset profiles

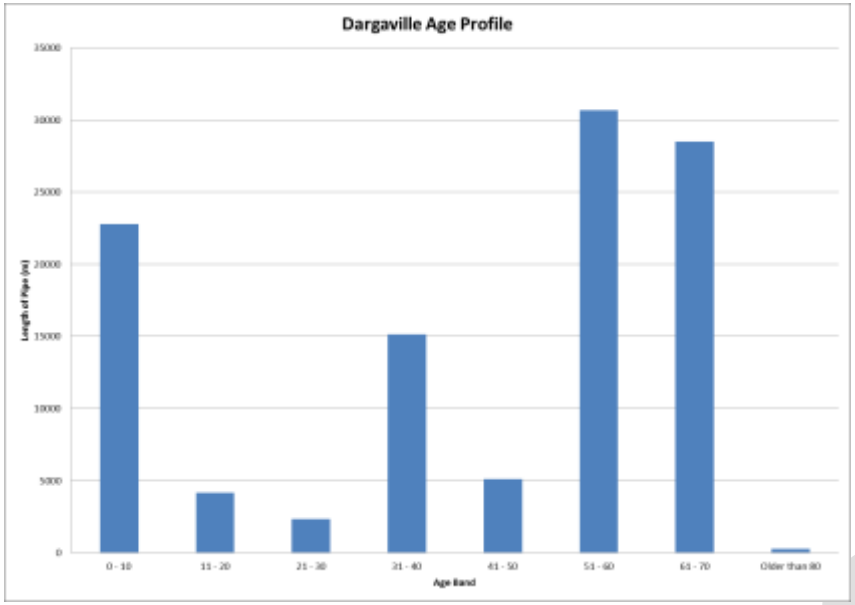
Asset profiles - all schemes

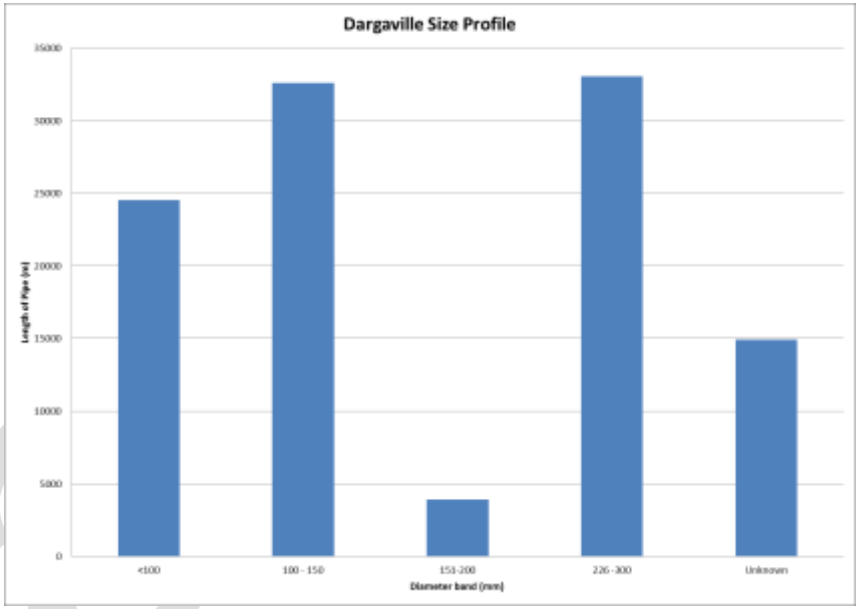


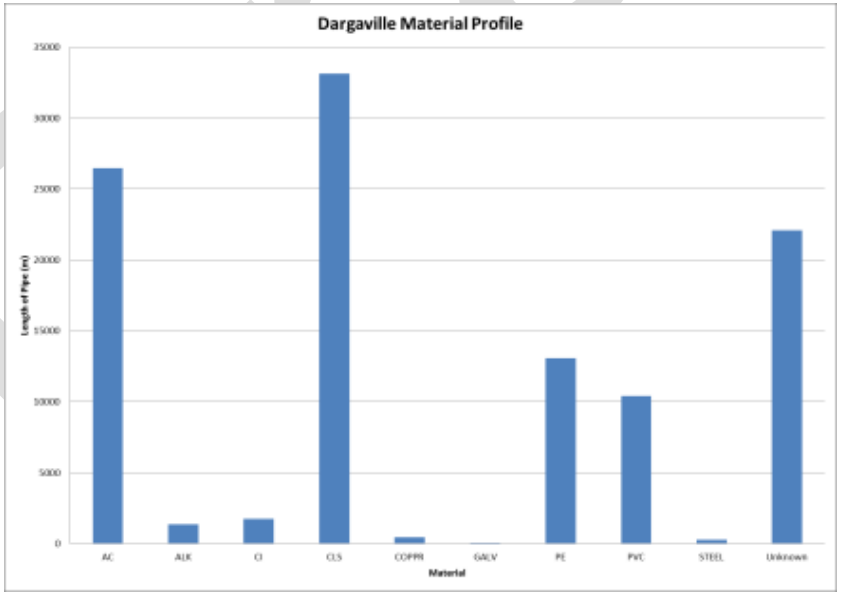




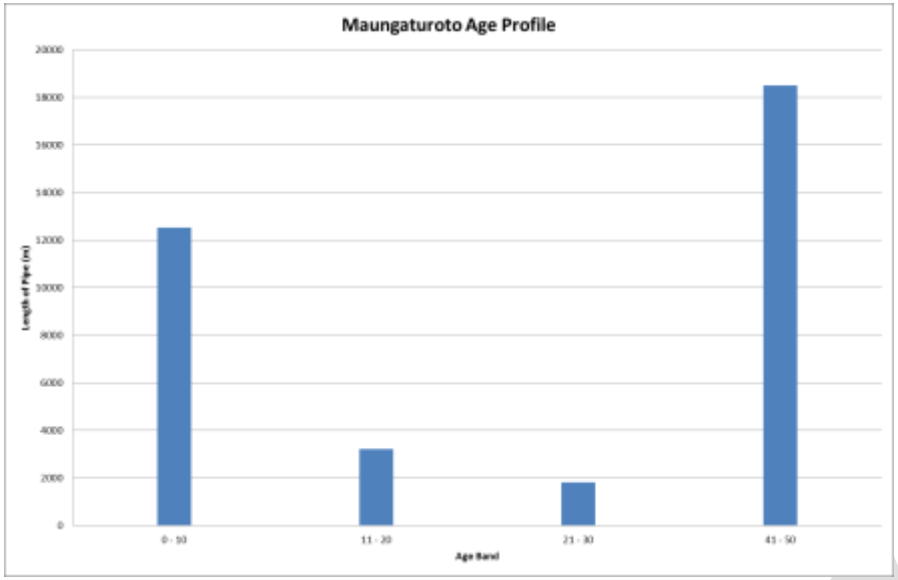
Asset profiles – Dargaville

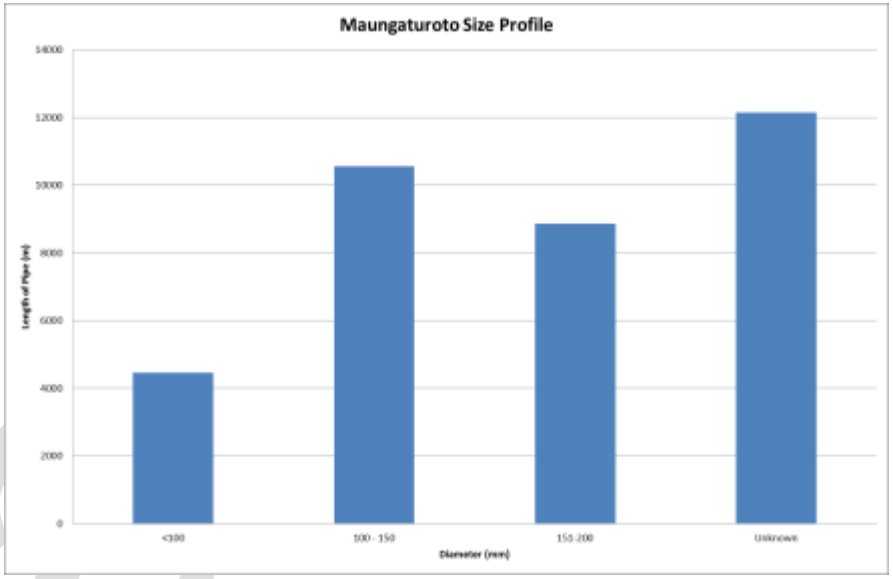


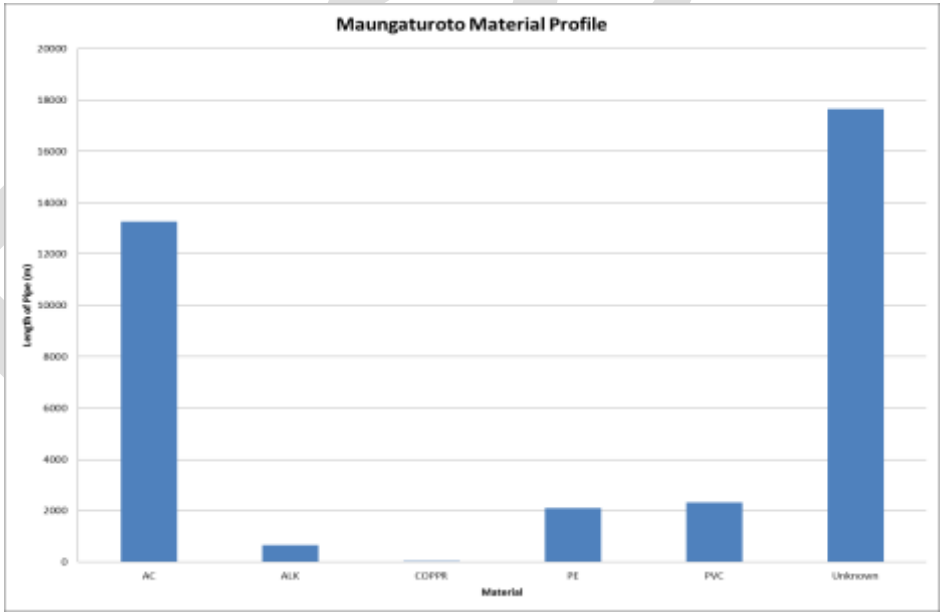




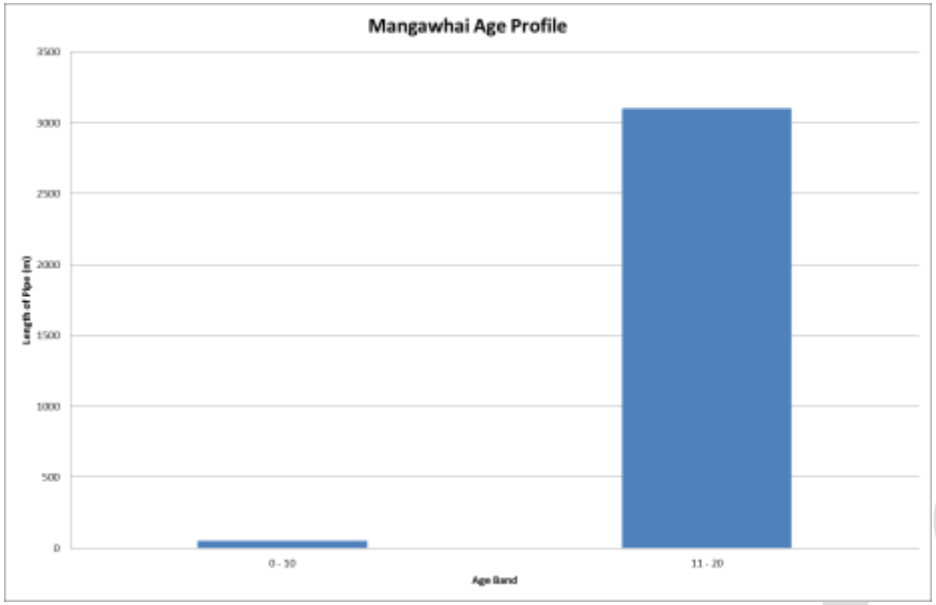
Asset profiles – Maungaturoto

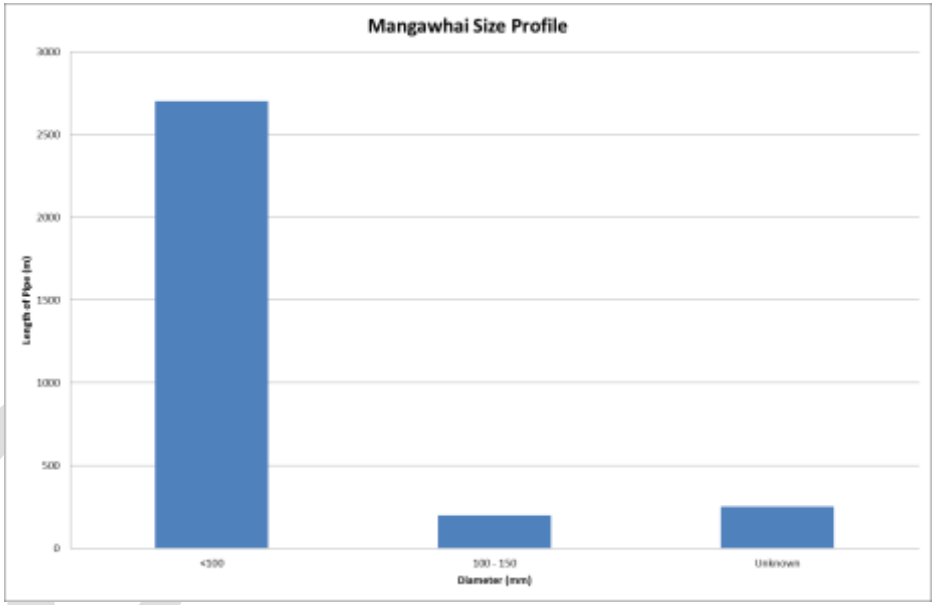


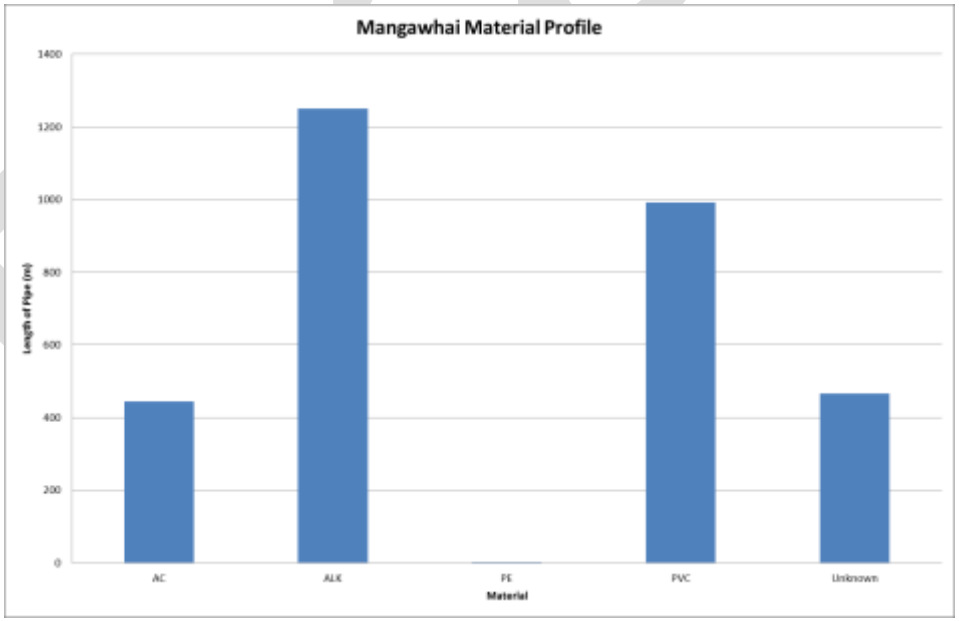




Asset profiles - Mangawhai







Asset profiles – Baylys