STORMWATER

Asset Management Plan

July 2021

Contents

Table of Figures

Table of Tables

Executive Summary

Chapter 1: Introduction

The Assets and Services Department of Marlborough District Council (MDC) provides a stormwater drainage service to residences and businesses of Marlborough. The stormwater infrastructure is a reticulated network of pipes, channels, pump stations and associated apparatus required to drain rainwater from residential, commercial and industrial properties and surrounding land. The service is predominantly focused on the urban areas where the density of buildings and urban infrastructure disrupt both the natural flow paths and the soakage of surface water into the land.

This activity contributes to the Community Outcomes of:

- **Living –** providing a clean and safe living environment by removing stormwater runoff
- **Environment** — by providing urban drainage networks that effectively manage flood risk and the potential for surface contamination to enter aquatic environments
- **Economy** — by providing a safeguard against stormwater flooding of residential, commercial and industrial properties.

Stormwater drainage is integral to and reliant upon the flow and channel conditions of the receiving water courses. The Council's Rivers and Land Drainage Department manages the main rivers and creeks that receive the stormwater discharges. This department also maintains over 180 km of stopbanks on the main Wairau River that protect around 20,000 ha of fertile land, and manages a further 320 km of rivers and stream channels, along with floodway reserve land and erosion control works.

Closely coordinated management between the two departments is essential to achieve effective and efficient drainage of surface waters. The relationship between the departments has long been an informal arrangement. Recently there has been significant progress to formalise planning and operational management. The Blenheim Stormwater Strategy and the subsequent implementation arm — the Stormwater Action Group — are proving to be very effective mechanisms for coordinating the management of a complex relationship. The strategy is a detailed analysis of the stormwater issues for the town and a fundamental framework for infrastructure planning.

This stormwater asset management plan has been developed in close cooperation with staff from the Rivers and Land Drainage Department and their assistance is gratefully acknowledged.

Components of the Introduction:

1.1 Purpose — what the asset management plan seeks to achieve.

1.2 Strategic Context — how stormwater asset management fits into the wider Council vision, goals and objectives.

1.3 Asset Management in Relation to the Planning Process — a summary of other planning processes within the Council.

1.4 Stormwater Assets Included in the Plan — a short summary of the stormwater assets managed by the Council.

1.5 AM Plan Stakeholders — the main stakeholders and interested parties in the stormwater activity.

1.6 Organisational Structure — how the stormwater function is managed within the Council structure.

1.7 Negative Effects — the consequences of not providing or not delivering a satisfactory stormwater service.

1.8 The Plan Framework — a short description of the main elements of the asset management plan.

1.9 Asset Management Planning Maturity — a discussion on the developmental status of stormwater asset management planning.

1.1 Purpose

The purpose of the asset management plan (AMP) is to document the assets and management processes undertaken by the Council regarding its stormwater infrastructure and services in order to:

- demonstrate to the stakeholders the sustainable operation and responsible management of stormwater infrastructure
- describe service delivery achievements against the defined community outcomes
- define the strategy for asset development and maintenance into the future
- outline the medium-term (10+ years) financial planning profile by reference to the life cycle of the stormwater assets
- describe the strategies employed to manage the risks associated with delivery of the service
- provide support for the Council's Long Term Plan and meet the requirements of the Local Government Act 2002.

An asset management plan describes the current standard of service, the future expectations of stakeholders and any assumptions about the changing environment in which the service operates. Subsequent asset expenditure decisions are explained within the context of the sustainable funding constraints of all Council activities.

The Council acknowledges asset management planning as a tool to deliver effective, efficient and sustained service to the community. The 2021 Stormwater Asset Management Plan updates the asset management plan of 2018 which was preceded by plans in 2014, 2008, 2005, 2003, 2000 and 1997.

The management of stormwater assets is subject to continual improvement. Previous asset management plans are reviewed to ensure the improvement issues are addressed and emerging issues and options are incorporated into updates.

The asset management plan contains essential information to meet the requirements of Schedule 10 of the Local Government Act 2002. The asset management plans are coordinated with the Long Term Plan planning process, and the details of the stormwater activity within the plan are used to inform Council choices and decisions.

The draft plan is presented to the Assets & Services Committee for scrutiny and approval before it is presented to Council for ratification.

As a minimum the plan seeks to satisfy the requirements of a basic asset management plan as defined by the Auditor General.

1. Define the service level.
2. Define the timeframe (life cycle).
3. Describe the asset (physical, financial).
4. Include financial information (10 years +).
5. Recognise decline in service potential.
6. State assumptions and confidence levels.
7. Outline an improvement programme.
8. Be prepared by qualified persons.

9. Be a firm commitment of the governing body.

10. Be reviewed regularly.

The plan has also been developed in accordance with the guidelines published by the New Zealand National Asset Management Support Group (NAMS) and in collaboration with, and with contributions from, many departments throughout the Council.

Other legislation pertaining to the plan is summarised in chapter 2.

1.2 Strategic Context

1.2.1 Council Vision and Mission

Marlborough District Council has an overarching vision and mission.

Our Vision

Marlborough is a globally-connected district of smart, progressive, high-value enterprises, known for our economic efficiency, quality lifestyle and wellbeing, caring community, desirable location and healthy natural environment.

Our Mission

We invest in Marlborough's future, our people, quality lifestyle and outstanding natural environment.

The Council's vision and mission are implemented through a number of community outcome statements which describe the sort of community Marlborough could become as a result of actions taken now and into the future.

The vision, mission and community outcomes are reviewed and updated from time to time to ensure they are clear and fit for purpose. Amendments are consulted on and published in the Long Term Plan, with the latest amendments made in 2021.

1.2.2 30 Year Infrastructure Strategy

A 2014 amendment to the Local Government Act requires local authorities to produce an infrastructure strategy to look at challenges over a 30 year planning horizon and to ensure the infrastructure strategy is aligned with the Council's financial strategy. This asset management plan complements and contributes to the Marlborough Infrastructure Strategy 2021.

The strategy looks at Council owned infrastructure related to water supply, wastewater, stormwater, roading and flood management. These activities are widely regarded as key services and critical to the functioning of the region. The strategy considers the major factors influencing the delivery of these service areas over the next 30 years. Community facilities have also been included in the strategy as they have an important role in the functioning of the community. As many of the infrastructural assets have a design life in excess of 80 years it is essential to plan for the medium to long term.

There are five main themes running through the infrastructure strategy.

Resilience — building and maintaining assets that are resistant to natural events such as earthquakes and storms and also adaptable to climate change, rising sea levels, changing patterns of use and future demand for the services.

Levels of Service — assets that can respond to changes in demand from customers in terms of the quality and quantity of the services provided and external influences on local government services such as changes in national and international policy and legislation.

Affordability — the costs of owning and operating the infrastructure assets need to be affordable in the future, bearing in mind changes in population demographics, economic prosperity and changing work patterns.

Renewals — within the 30 years of the strategy many of the built assets will have reached the end of their useful life. It is important to plan for their replacement to avoid a deterioration of services and to ensure works are undertaken in a timely and efficient manner.

Growth & Demographics — the 2018 census confirmed several emerging trends. There is a decline in natural population growth as the age profile throughout the country gets older. Future population growth will be reliant on inward migration, which in turn is heavily dependent on economic prosperity. There will be an increasingly elderly population which may make different demands on services and have a different ability to pay. The general trend to rural depopulation is likely to continue and be apparent in many small settlements and provincial towns.

These key themes provide a context to the asset management plan and are apparent throughout the plan.

Specific stormwater asset management challenges identified in the Infrastructure Strategy are:

- the effects of urban growth and climate change on stormwater volumes
- the need to improve the quality of stormwater discharges
- continued development of a targeted and efficient renewals programme for up to $9.2M of stormwater network over the next 30 years.

1.2.3 Functional Environments

The Council operates in a number of distinct environments that shape the services it provides and the management of the assets required to deliver the services.

Legislative and Regulatory Environment — Stormwater services must be delivered in compliance with legislation for land drainage, flood control and environmental protection. The purpose is to provide safe and sanitary living conditions whilst protecting the natural environment from contaminated urban drainage. The main regulation of stormwater services is through the Building Act 2004, the Resource Management Act 1991 and the Local Government Act 2002. Health and safety and financial control legislation is also influential.

Commercial Environment — Local authorities' funding and spending mechanisms are important considerations for the delivery of community services. Councils have a moral responsibility to their ratepayers for financial prudence and are scrutinised and regulated by central government. A number of funding sources are available to Council including general rates, targeted rates, development levies, volumetric charges, loans, enterprise income, grants and charges. The allocation of costs must reflect due consideration of customer affordability and also be equitable and fairly distributed between business and domestic users.

Economic Environment — Council must consider its strategic approach to economic development — the amount and type of businesses to encourage to expand and/or move to the region along with the subsequent development of service industries and related commerce. Land must be identified and zoned for development accordingly. The prosperity of the area will contribute to population growth and urban development. The management of surface water drainage can be a significant cost or restraint to land availability. For this reason, the determination of development zones and the apportionment of costs is an important Council function.

Social Environment — Social responsibility requires fair and equitable business practices across the whole community; balancing the benefits and impacts of its service provision across socio-demographic groups. Stormwater services must be delivered fairly to urban communities of dwellings, businesses, utilities and community facilities.

Natural Environment — Environmental sustainability is becoming a pressing imperative. Councils are expected to set high standards of environmental stewardship. Policies and strategies must be adopted to protect the environment from the negative effects of urban drainage, and stormwater services need to comply with those standards.

Cultural Environment — Council has to pay due consideration to the cultural sensitivity and heritage of the community. People from European, Maori, Pacifica and other cultures can have significantly different relationships to the environment. Stormwater discharges to natural receiving waters must be considered from a cultural as well as an environmental perspective.

Within the context of these environments a number of Levels of Service have been established;

- Provide an overall level of service that meets or exceeds residents' expectations.
- Minimise the environmental risks of stormwater discharges.
- Provide a reliable stormwater service.
- Provide a service that is timely and responsive to customer needs.
- Provide a stormwater service that is sustainable.

The method of developing and establishing the Levels of Service is described in Chapter 2.

1.2.4 The Blenheim Stormwater Strategy

During the 1990s it became increasingly apparent there were key issues developing around the management of stormwater in Blenheim. A review of the history of stormwater management in Blenheim revealed a number of themes.

- There was a very close inter-dependency between stormwater infrastructure and the rivers and drainage channels that drain the Lower Wairau plain.
- The town had experienced considerable urban growth and more growth could be expected.
- There was a growing requirement to demonstrate responsible environmental stewardship.
- A legacy of existing discharge consents had evolved over time under a number of jurisdictions.
- There was a lack of consistency between the conditions of the consents.
- There was a need to clarify the level of service delivered now and in the future.

A scoping report was prepared in 2007 to outline how a coordinated stormwater strategy could be developed for Blenheim. The strategy identified several key drivers:

- complying with regulatory requirements
- achieving improved water quality
  protecting the receiving environment
- coping with increased stormwater run-off from urban development
- providing a strategic framework for all key stakeholders.

Following a series of development workshops a comprehensive strategy was developed and adopted by Council in May 2012. The strategy includes eight overarching goals.

Integrated Management

Goal 1 — To provide an integrated approach to the management of stormwater in Blenheim.

Goal 2 — To support the implementation of the strategy with a comprehensive monitoring and enforcement programme.

Asset Management and Flooding

Goal 3 — To ensure the stormwater network provides an appropriate response during flooding events so that people and property are protected to accepted standards.

Goal 4 — To provide guidance on effective and efficient management of MDC's stormwater assets.

Receiving Environment

Goal 5 — To maintain or enhance the environmental performance of the stormwater system and the quality of receiving environments.

Stakeholder Engagement & Education

Goal 6 — To engage with key stakeholders and educate the wider community on the importance of integrated stormwater management.

Planning and Regulation

Goal 7 — To ensure the planning and regulatory framework remains responsive to integrated stormwater management.

Goal 8 — To gain a comprehensive discharge consent for Blenheim's stormwater network for a 35 year term.

Whilst the strategy was developed specifically for Blenheim the process of its development and many of its outcomes will be readily transferable to the other reticulated settlements.

The Springlands Stormwater Management Area Plan (SMAP) was adopted in September 2020. This plan supports the discharge consent for the Springlands catchment which was awarded in September 2020. This consent is for a 10 year period. The new SMAP to be developed will be in the Kinross area.

1.2.5 Levels of Service

From these environments the levels of service and subsequent performance measures were established to provide an overall level of service that meets or exceeds the residents expectations.

- Provide a reliable stormwater service such that habitable floors of all properties within the urban stormwater areas will not experience flooding from storms that, on average, will occur once in 50 years or less
- Provide a reliable stormwater service such that properties within urban stormwater areas will not experience flooding water from storms that, on average, will occur once in 10 years or less.

1.3 Asset Management in Relation to the Planning Process

The role of the stormwater asset management plan in Council planning is shown in Figure 1-1. The asset management plan provides a link between the strategic objectives of the Council, long term planning, and the day to day functioning of the operational activities.

Asset management is a continuous process because operational circumstances change minute by minute. Data is collected to inform short, medium and long term operational and maintenance decisions. The data is also analysed to identify where system improvements are required. The upgrade options are evaluated and presented to Council for consideration and approval. The asset management plan collates the available data and current decisions into a single document.

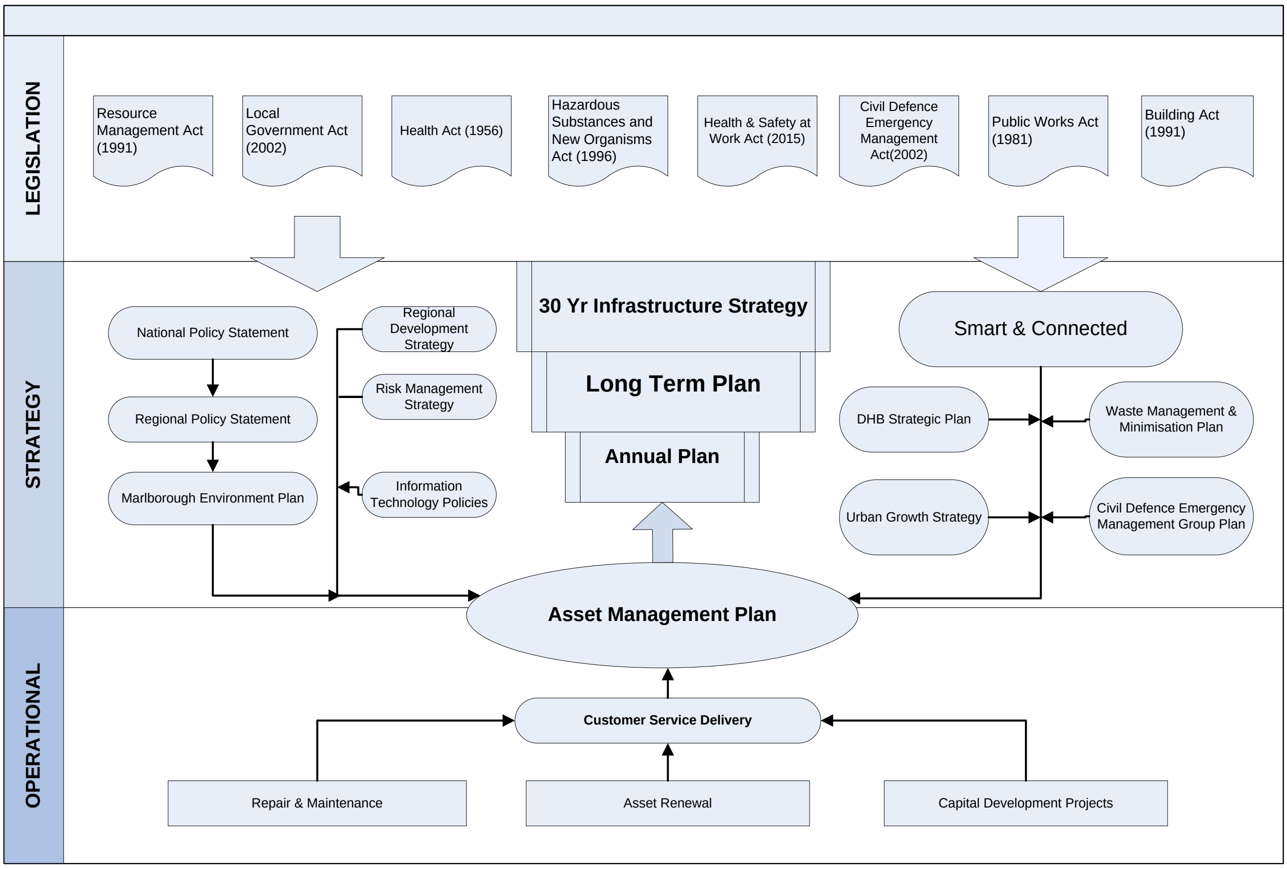
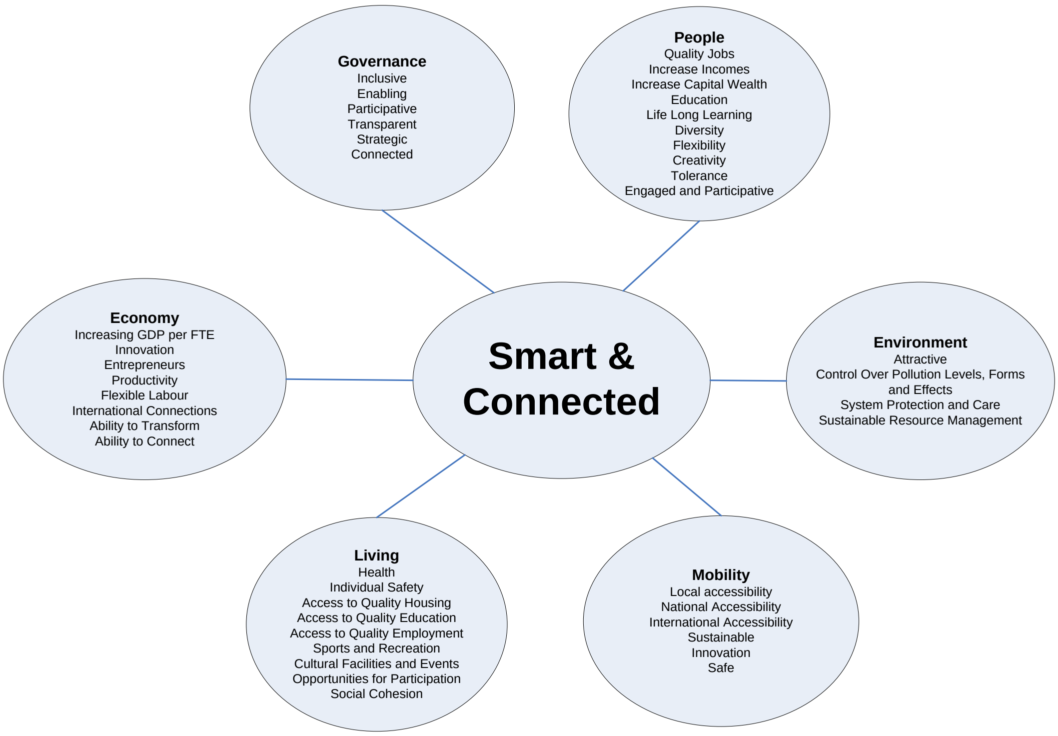


Figure 1-1 The role of asset management plans in the planning process

1.3.1 Other Planning Documents

Smart and Connected Strategy — The Council has adopted a regional ‘Smart and Connected’ Strategy to promote the economic development of the region and this is now integrated across Council activities. The strategy emphasises an integrated approach that maximises the skills and resources of the region and how they interrelate with the national and international context.

The strategy has been built on a framework of six Community Outcomes — Governance, Environment, People, Economy, Mobility and Learning, as shown in **Error! Reference source not found.**. The outcomes of most significance to the water supply are: environment (sustainable resource management), economy (productivity), and living (health). The contribution of the water supply activity is discussed in more detail in section 2.2 of this plan (community outcomes).



The 30 Year Infrastructure Strategy — This strategy is an important document for medium to long term planning and describes the future management of stormwater in relation to the other major council infrastructure.

The Long Term Plan — The Long Term Plan (LTP) is a requirement of the Local Government Act 2002. The LTP is the primary medium term planning document for local government and contains key information on the activities, assets, levels of service and financial details of all Council services. The plan covers a ten year period and is updated every three years. It contains detailed information for the first three years and outline information for a further seven years. Asset management plans provide additional detailed information on the main Council activities that feature in the LTP.

Annual Plan — Each year the LTP is reviewed and updated. Updates are publicly consulted on through the Annual Plan. Progress on infrastructure projects, performance against levels of service and financial matters are reported through the **Annual Report**.

Resource Management Plans — The proposed Marlborough Environment Plan includes the Council's environmental objectives, policies and rules, and these have a major influence on stormwater management. The provisions relate to overarching issues such as land use, and discharges to freshwater and the marine environment.

Bylaws — Council has powers to develop local enforceable bylaws. The Council's Trade Waste Bylaw is predominantly concerned with the protection of the wastewater system but also provides the Council with some powers to protect the stormwater system.

Urban Growth Strategy — The Council has a well-established urban growth strategy[1] which was developed from 2011–13 following thorough consultation and analysis of future growth patterns. The Assets & Services (A&S) Department was fully involved in the evolution of the strategy to ensure urban growth pockets could be adequately serviced.

The A&S Department works with developers from the outset to form an agreed service plan to ensure new infrastructure is designed and installed to meet the long term growth projections.

[1] Growing Marlborough – A Strategy For The Future (March 2013)

Council coordinates the collection of development levies to ensure developers are reimbursed for installing additional capacity to meet future demand.

1.4 Stormwater Assets included in the Plan

The stormwater assets covered by this plan are the reticulation systems and three terminal pump stations shown in Table 1-1. and also shown in the maps – The Council also participates in the annual National Performance Review undertaken by Water NZ. Over fifty councils regularly submit data for the annual reviews covering over 90% of the population of New Zealand. The data is categorised into large, medium and small participants (some water service providers are not councils). The report covers the three water services and provides an opportunity for councils to compare their performance on a large number of financial and non-financial performance indicators. Inevitably there is some difficulty in 'normalising' data across numerous agencies but the report still provides a good comparative guide on the performance of the Council's water supply activity within a national context.

Stormwater specific performance measures are shown Appendix 2 – Levels of Service 2021-2031

Appendix 1. There are a number of short lengths of reticulation pipework in the smaller settlements around the Marlborough Sounds (Anakiwa, Okiwi Bay, Sounds) as a result of adopted reticulation from individual subdivisions.

In total the Blenheim system has 12 pump stations at the termination of the stormwater reticulation that lift the water into the land drainage system. 10 of the pump stations are owned and operated by the Rivers and Land Drainage Department. The operation of these stations is integral to the functioning of the upstream stormwater system. Close coordination between the two departments is critical to the effective operation of these systems and a good example of the inter-dependency of the two systems.

Area	Length mains (km)	Pump Station	Replacement Value ($M)
Anakiwa	0.8		$ 0.50
Blenheim	134.0	2	$ 97.15
Grovetown	0.7		$ 0.57
Havelock	2.5		$ 1.83
Okiwi	0.8		$ 0.61
Picton	29.5	1	$ 24.60
Renwick	5.5		$ 4.54
Riverlands	6.8		$ 5.49
Seddon	0.9		$ 0.63
Sounds	0.3		$ 0.26
Spring Creek	3.6		$ 2.84
St Andrews	0.3		$ 0.36
TOTAL	185.8		$ 139.37

Table 1-1 Stormwater assets

The stormwater assets can have different functions depending on the geomorphology and rainfall regime in different areas. In some cases the assets are designed to detain the flow of water, slow down the concentration and avoid accumulation of flood water downstream. In other areas it is important to facilitate the flow of stormwater to discharge it to the receiving channels as quickly as possible. These factors are discussed in "Procedures for Reviewing Blenheim Stormwater Capacity And Providing For New Areas (Draft)" (Williman, 2014).

The relationship between ground slope, rainfall and the capacity of the receiving channels has a consequence for the levels of service objectives. The secondary flow paths may be detaining the flow and creating areas of temporary flooding or facilitating rapid, high flows. Three slope categories were recognised for the Blenheim stormwater drainage catchment ranging from the foothills of the Wither Hills to the very flat lands on the valley bottom. The infrastructure has different purposes and functions in each of the areas. It is useful to communicate this to customers in order to manage expectations. A similar analysis of the steep catchments around Picton and Havelock will have a different outcome and the strategic management plan will be adapted accordingly.

Some performance measures adopted by the Council have been difficult to measure, and there was no defined interpretation of the method of measurement. Detailed methodologies have subsequently been documented for each measure to ensure repeatable consistency and accuracy. Recommendations by the OAG to improve the control environment, including the data collection and storage mechanisms, have been actioned.

The AMIS is partially integrated with the customer request management system. There is a capability to trace service requests to subsequent work orders. The system allows response time monitoring, symptom and fault analysis, interruption and restoration monitoring, and cost recording.

The Council also participates in the annual National Performance Review undertaken by Water NZ. Over fifty councils regularly submit data for the annual reviews covering over 90% of the population of New Zealand. The data is categorised into large, medium and small participants (some water service providers are not councils). The report covers the three water services and provides an opportunity for councils to compare their performance on a large number of financial and non-financial performance indicators. Inevitably there is some difficulty in 'normalising' data across numerous agencies but the report still provides a good comparative guide on the performance of the Council's water supply activity within a national context.

1.5 AM Plan Stakeholders

This plan is an important reference for current and future Councillors and community decision makers. It provides information on the Council's stewardship of the three water assets on behalf of the community, including the performance and capacity of the assets, and future demands related to the assets.

The plan is also a primary reference document for managers and engineers within the Assets & Services Department, and operators of the stormwater supply services. It provides a systematic approach to maintaining, upgrading and operating the stormwater assets in order to meet the Council's objectives. It will be a source of information for the Council's corporate planners (particularly during the development of long term plans) as well as for Finance, Building Control and Resource Consents staff.

Marlborough is a unitary authority and, as such, is responsible for environmental monitoring and the management of both freshwater and coastal water quality. Stormwater discharges can have a major impact on the quality of local waterways and these are monitored by the Regulatory Department.

The interests of other stakeholders are discussed in section 2.3, and include iwi, the Marlborough CDEM group and operators of engineering lifeline utilities, as well as businesses, community groups and recreational users.

Environmental and recreational groups have a significant interest in the performance of the stormwater networks.

1.6 Organisational Structure

The Assets & Services Department is responsible for the Council's water supply services. The capital programme is managed by the Planning and Development Engineer and the day-to-day running of the system by the Operations and Maintenance Engineer. The structure of the department is shown in **Error! Reference source not found.**. The department has its own Finance and Information Manager to supervise the budget and liaise with the Corporate Finance Department.

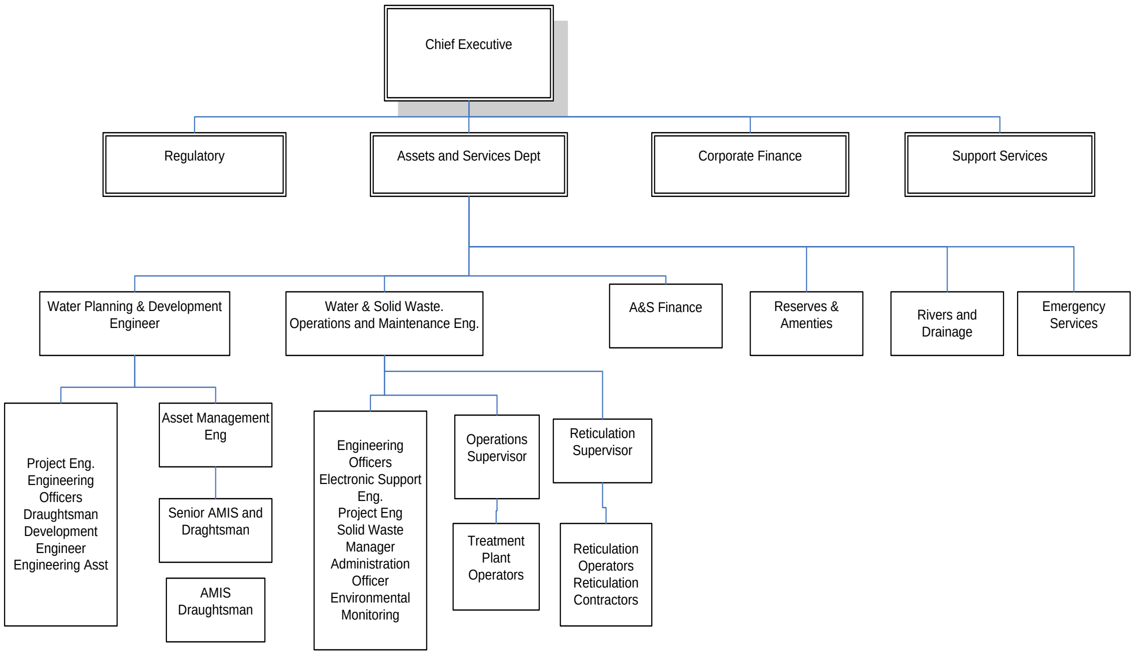


Figure 1-2 Organisational structure of stormwater management at Marlborough District Council

1.7 Negative Effects

The Local Government Act 2002 requires the identification of the negative effects associated with the provision of the service.

Table 1-2 Negative effects of stormwater services

Area of Impact	Negative Effects
The health of communities	Insanitary living conditions from flooded dwellings and property.
The safety of communities	Personal hazard from fast flowing or deep surface water. Restricted access to community facilities from flooded roads.
Minimising adverse environmental effects	Acute pollution events or long term degradation of natural receiving waters from urban run-off. Additional flows from urban drainage exacerbating downstream flow conditions.
Industrial and residential development	Damage to buildings, property, public infrastructure, vehicles etc from uncontrolled flood waters. Restricted building development opportunities due to inadequately drained land.
Commercial	Loss of productivity or sales as a result of flood water causing interruption to business activities.
Cultural sensitivity	Causing cultural offence from polluted stormwater discharges and environmental degradation.

1.8 The Plan Framework

In 2012 the asset management plan was substantially rewritten and updated in accordance with the guidance in the NAMS International Infrastructure Management Manual 2011. The 2021 plan incorporates many of the recommendations of the AECOM peer review of the 2018 plan. Advice and guidance from SOLGM and comments from Audit New Zealand are also reflected in this plan. The six chapters in the plan provide the following information.

- **Chapter 1 — Introduction**: background, strategic context, plan framework, and maturity of asset management planning.
- **Chapter 2 — Levels of Service**: customer research and expectations, strategic and corporate goals, legislative requirements, current levels of service, desired levels of service.
- **Chapter 3 — Future Demand**: demand drivers, demand forecasts, demand impacts on assets, demand management plan, asset programmes to meet demand.
- **Chapter 4 — Lifecycle Management Plan**: background data on water infrastructure, infrastructure risk management plan, routine operations and maintenance plan, renewal/replacement plan, creation/acquisition/augmentation plan, disposal plan.
- **Chapter 5 — Financial Summary**: financial statements and projections, funding strategy, valuation forecasts, key assumptions, data confidence, risks and assumptions.
- **Chapter 6 — Plan Improvement and Monitoring**: status of asset management practices, improvement programme progress, 2018–21 improvement programme, monitoring and review of procedures, performance measures.
- **Appendices**.

1.9 Asset Management Planning Maturity

The Council seeks to achieve a solid core standard of asset management. Intermediate and advanced asset management tools and techniques are deployed where they add demonstrable value to the decision making process. The maturity of asset management within Marlborough District Council is dependent upon a number factors — skills available, size, complexity and value of the infrastructure, criticality of the community facilities the infrastructure serves, experience and culture of staff, and risk management.

The Council recognises there is an element of diminishing returns between the effort required to collect and analyse data and the subsequent improvement in decision making. The wastewater infrastructure networks are relatively small and comprehensible systems. They are managed by an experienced engineering management team and skilled operators. Advanced asset management techniques are employed only where they will add significant value to the current decision making process or significantly improve future forecasting.

Core asset management is being developed to provide intelligence to operational managers and to 'future-proof' the existing knowledge base. Advanced techniques such as mathematical modelling, option identification and selection, cost-benefit and total benefit analysis, risk management techniques, and asset condition gradings are all regularly used within the current asset management implementation processes.

A team within the Assets and Services Department continues to collect data on asset condition, location and performance to support the asset managers. The quality of the data is systematically and continuously reviewed and improved.

As the treatment processes and the connectivity of the reticulation become more sophisticated, network modelling and other techniques provide insights into the complex behaviour and performance of the infrastructure. Dynamic mathematical models are being developed and deployed to model and predict future scenarios.

There is a current reliance on the knowledge and experience of a stable and highly skilled workforce. The depth and breadth of the skills base across the workforce mitigates many of the risks associated with reliance on individual staff members. However, high quality data and empirical analysis is required to optimise effective decisions and forward planning. There is an increasing demand for logical and robust processes to support and demonstrate effective management.

The Council's approach to asset management will select and deploy advance techniques where they will assist in resolving conflicting demands whilst maximising the skills and practical experience of the workforce.

Chapter 2: Levels of Service

The purpose of the Levels of Service chapter is to describe the type and extent of stormwater services the Council provides, the context and manner in which they are delivered, the current achievements, and challenges in meeting future expectations.

Components of the Levels of Service Chapter

2.1 Strategic Overview

The operating costs of the stormwater service account for around 2% of the Council's total activity expenditure. This proportion is predicted to remain relatively unchanged in the 2021–2024 planning period. Stormwater drainage has an important role in the overall provision of Council services. In common with both Emergency Management and Rivers & Land Drainage Dept. the service is seldom tested but has a high impact on urban residents. Figure 1-1 in Chapter 1 shows the relationship between the stormwater asset management plan and the Council's strategic objectives.

The Council has three strategic objectives related to stormwater;

There is a strong national direction to improve the quality of freshwater quality. Given this, there is some uncertainty about whether stormwater supply activities will remain as a local authority function in future. The Three Waters Reform which is currently being undertaken asks Local Authorities to decide whether they will "opt-in" to the reform and support the establishment of multi-regional water supply entity by December 2021. At this stage, Marlborough District Council has been in support of this process.

Separation of stormwater supply from local authority jurisdiction would allow consistent implementation of national objectives and priorities; professional and expert governance, consistent standards and the practices across the activity; the pooling of technical expertise for increasingly demanding engineering and operational standards. cost sharing across an increased user base and opportunities for alternative funding models.

2.2 Community Outcomes

Community outcomes are a keystone to public service provision in New Zealand. The Long Term Plan (LTP) is the vehicle by which the relationship between community well-being, community outcomes and the services provided by the Council are communicated to the community. The LTP is updated every three years whilst Annual Plans and Annual Reports are published annually in the interim periods.

This activity contributes to the community outcomes of:

- **Environment** by providing urban drainage networks that effectively manage flood risk and the potential for surface contamination to enter aquatic environments

- **People** and **Economy** by providing a safeguard against stormwater flooding of residential, commercial and industrial property.

The community outcomes have been established through consultation with the community and their elected representatives. The Council conducts an annual customer satisfaction survey of 600 residents. Plans and strategies are published and the public are invited to submit their comments.

Special consultative committees and working groups are established to gain public opinion on specific projects. The structured decision making process with the Murphy's Creek Stakeholder Group was a very successful exercise in reaching a consensus solution with a variety of stakeholders.

The Council also draws intelligence from the experience and research of a number of national and local agencies such as the Nelson Marlborough District Health Board, Ministry for the Environment, Ministry of Social Development, Statistics New Zealand, the New Zealand Transport Agency, Marlborough Research Centre and many others.

Performance measures for Council activities are reported each year in the Annual Report. In 2014 national non-financial performance measures for water were introduced by the Secretary for Local Government. These have become the primary methods of monitoring and evaluating progress towards the community outcomes and comparing councils throughout New Zealand.

2.3 Who Are Our Customers and Stakeholders

The expression 'customers' is a useful concept in that it infers a contractual relationship between the ratepayer purchasing goods and services from the Council. However the Council has a more complex role to play than a simple purveyor of services. For example, many of the services provided by the Council are required by central government through statute and are outside the usual customer/vendor relationship. It is more accurate for this section to consider all of the stakeholders.

Commercial properties and domestic households connected to the stormwater reticulation may be regarded as more traditional 'customers'. All properties within urban zones can expect to benefit from the stormwater drainage system with the costs met from general rates. Developers of the urban zones are required to make provision for stormwater drainage within the subdivision and pay a stormwater Development Contribution towards the Council owned infrastructure.

Most central government legislation of drainage matters is devolved to local authorities to enforce. The legislative framework is outlined in Section 2.5.

Industries and businesses are heavily reliant on stormwater drainage to protect both their buildings and the productive areas surrounding them.

Many members of the public, iwi and environmental groups such as Forest & Bird, Guardians of the Sounds, Kaipupu Point Inland Island, and the Grovetown Lagoon Working Group, have a strong interest in the quality of waterways. Recreational users (swimming, angling, boating, shell-fishing, etc) also have an obvious interest in water quality.

Businesses within the commercial sector may represent a significant threat to stormwater quality. It is common for businesses to have a hardstanding area that drains to the stormwater system. The land can be used for processing, material storage, vehicle parking or loading. Accidental spillage, leakage or overflows of hazardous materials may flow across the impermeable surfaces into the stormwater system. It is part of the Council's duty to protect the receiving environment from potential pollutants being conveyed through its stormwater infrastructure. Council may need to regulate activities within businesses' properties in order to control sources of potential contaminants.

Iwi have a special cultural relationship with the environment which is an important element to consider in the abstraction and distribution of water, and construction of related infrastructure.

Customers and stakeholders will be engaged in the development of Stormwater Management Action Plans (SMAP) across the region.

2.4 What Our Customers Want

The levels of service and the subsequent performance measures are derived from these fundamental objectives of stormwater drainage:

- safeguard the community from urban flood hazards
- minimise damage to urban property from floodwater
- facilitate commercial and residential development
- protect the aquatic environment through the management of the quality of urban stormwater discharges
- provide the service at an efficient and equitable cost.

In practice there is a tension between the provision of the first four objectives and the perceived value, and hence the willingness to pay for the service. Some of the standards included in the stormwater levels of service are prescribed by legislation and have little room for negotiation; others recognise the limitations of delivering the desired goals within financial restraints. The levels of service that are currently used have, therefore, been derived through consultation with the customer base to best reflect the realities of the situation.

The levels of service are included in the LTP which is reviewed at three yearly intervals and the levels of service and related performance indicators are published in the Annual Reports. Major changes to the levels of service are normally dealt with through the LTP adoption process. However the Annual Plan process can be used for modifications in the interim periods. Submissions from the public either in support or challenging any proposed changes to levels of service are formally received and carefully considered by the Council.

The Council also collaborates with a number of national and international organisations to help to determine the appropriate levels of service and performance indicators. The National Asset Management Support Group (NAMS Ltd) publishes guidance and hosts training courses on good practice in the development of levels of service. Water New Zealand and the Institute of Public Works Engineering New Zealand (IPWEA) assist in the promotion of best practice through published guidance, research, working groups and discussion papers.

Each year an independent consultant is employed by the Council to undertake a customer satisfaction survey. The telephone poll of 600 residents is selected from a statistically representative sample of the population across the region. The survey asks respondents to score each of the Council's activities and the results are analysed and compared with responses from previous years. This provides a subjective assessment of Council performance relative to recent history. Verbatim comments are also recorded and these provide a good source of information on the appropriateness of the levels of service and individual concerns.

The outcome of the customer satisfaction survey can be heavily influenced by recent events. This is particularly apparent for the stormwater drainage service which deals with infrequent events that have a high impact. If there has not been a major storm, opinions are likely to be neutral or high. However, if there has been a major storm the customer's direct experience or media coverage is likely to have a negative influence on the survey results. For instance, photographs of submerged roadways in the media are likely to suggest the system is not coping even though the roadway may have been designed as a secondary flow path for excess stormwater and is functioning as it should.

In August 2017 a Levels of Service Workshop was held to present councillors with information on the current levels of service, to discuss the options and seek their feedback. No major amendments were identified as a result of the workshop.

Marlborough District Council reviews its business processes from a ‘systems’ perspective. The foundation of the ‘systems thinking’ approach is to consider the performance of the business from the point of view of the customers. Once the customers’ experiences are thoroughly understood the business ‘systems’ can be analysed to ensure they are aligned with delivering the best outcome. It has been frequently demonstrated that many business processes are adept at delivering internal objectives that are not necessarily aligned with providing the best outcome to the customer.

In December 2014 a new asset management information system was introduced. The project ensured that customer service requests were linked to work orders so that there was clear linkage between reported problems and remedial actions. The database is able to provide both asset performance and customer service data.

2.4.1 National Benchmarking

Performance measures for Council activities are reported each year in the Annual Report. These have become a primary method of monitoring and evaluating progress towards the community outcomes and comparing councils throughout New Zealand. In 2013 Non-Financial Performance Measures were issued by the Secretary for Local Government in accordance with section 261B of the Local Government Act 2002. The rules to provide standard performance measures came into force on 30 July 2014 and were incorporated into the Council’s reporting process in 2016. Sub-part 3 of the rules prescribe 14 performance measurements for wastewater supply to be adopted by all local authorities throughout New Zealand.

Sub-part 3 of the rules prescribe eight performance measurements for stormwater drainage to be adopted by all local authorities in New Zealand. The measures have a similar intent to the previous performance indicators — measuring the number of properties flooded during storm events; the quality of stormwater discharges, the response time to flooding events and the number of customer complaints. The new benchmark measures are included in Section 2.6.

2.4.2 The Murphys Creek Case Study

The Council sought community involvement and acceptance throughout development of the Blenheim Stormwater Strategy and the early stages of its implementation. Public consultation and collaboration in decision making is an evolving process. Resolution of conflicting views on stormwater issues around Murphy’s Creek has been an exemplary exercise in this evolving process.

Murphy’s Creek is a spring fed creek that drains through a northern suburb of Blenheim and into the Taylor River just north of the town centre. The creek also receives drainage from the adjacent land through private drains and Council’s stormwater pipes. The surface water flows have increased over the years as a result of housing infill and a decrease in permeable surfaces for rainwater soakage. Flow characteristics in the creek are also influenced by weed growth in the watercourse.

Commercial development and rezoning of land in the headwaters of the catchment was the catalyst for a collaborative decision making process relating to Murphy’s Creek. A resource consent application was approved to permit the stormwater from a large retail park to be discharged into upper Murphy’s Creek. The pipe was installed in 2012 with additional capacity to allow for future urban development on the north-west periphery. The potential consequences of the additional flow from a large commercial site provoked considerable concern amongst the downstream residents.

Murphy’s Creek has high amenity value to local residents and particularly property owners adjacent to the watercourse. The spring fed creek is generally considered to be high quality water and is valued for its aesthetic and ecological value. Whilst this would appear to be self-evident there has been little supportive long term scientific data regarding the chemical and biological quality of the stream.

The Murphy's Creek stakeholders were well organised in their opposition to the upstream developments. Their concerns centred around an increased risk of flooding due to the additional flows and the potential damage to water quality and the ecosystem from the stormwater collected from a commercial/urban area.

Council has responded by helping to facilitate an investigation into the stakeholders' concerns. An independent facilitator was appointed to conduct a structured decision making process into the issues and options. Five stakeholder workshops were organised.

Detailed hydraulic modelling of the relationship between the flows in the creek and Taylor River have been undertaken. Flood levels along the course of the creek have been projected from the mathematical models for a range of different storm scenarios. A permanent water quality monitoring station has been established on the creek. The data has been supplemented by routine manual sampling. An analysis of 'first flush' rainwater run-off has also been undertaken to check the effects of surface water draining to the creek after a prolonged dry spell. The data is being made available to an independent consultant to analyse and report to the stakeholder group.

Ten alternative solutions to the stakeholders' concerns emerged from the workshops. Each option was evaluated by the stakeholder group on set criteria — stream bed, aesthetic value, water quality, bank stability, ecosystem health, mauri, economic impact, cost and recreation. At the end of the fifth workshop one solution predominated (Option G) with a reasonable consensus agreement between the stakeholders.

Councillors attended many of the workshops and a proposal was prepared for the Assets & Services Committee to consider.

It is likely this approach will be a model community consultative process for other Stormwater Management Areas in the Blenheim strategy, and subsequent strategies.

2.5 What We Have To Do — Legal Requirements

Local Government Act 2002 S.10 — *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 the 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.*

'Good quality' in the legislation is defined as efficient, effective and appropriate for present and anticipated future circumstances.

Note: The 2018 Local Government (Four Wellbeings) Amendment Bill proposes to amend section 10 of the Act by replacing section 10(1)(b) with: "(b) to promote the social, economic, environmental, and cultural well-being of communities, in the present and for the future."

Section 11A states local authorities are required to provide 'core services'. Network services are listed as a core service.

Section 125 requires the local authority to undertake an assessment of the water and sanitary services within their area.

Section 126 states the purpose of an assessment is to assess the "adequacy of water and other sanitary services available to communities…" in terms of the quality of the service currently available; the potential health risks from the absence or deficiency of the service; the current and estimated future demand; and the potential consequences of discharges of sewage and stormwater.

Resource Management Act 1991 — The purpose of this Act is to promote the sustainable management of natural and physical resources. Section 15(a) states no person is allowed to discharge water or contaminants into water unless it is expressly allowed to do so. This is the major piece of legislation that controls the quality and quantity of stormwater discharged into local waterways.

National Policy Statement for Freshwater Management 2020 (NPSFM) — The NPSFM requires councils to set water quality limits for water bodies which (at least) meet the national objectives related to ecosystem health and human health for recreation. All regional (and unitary) councils need to fully implement the objectives and policies in the NPSFM as promptly as is reasonable, and no later than December 2025.

That means water quality objectives will be set for freshwater management units within the region which must reflect tangata whenua roles and interests. Under Policy A2, every regional council is:

- to specify targets and implement methods (either or both regulatory and non-regulatory) in a way that considers the sources of relevant contaminants recorded under Policy CC1 (accounting for freshwater takes and contaminants)
- to assist the improvement of water quality in the freshwater management units, and
- to meet those targets within a defined timeframe.

National Policy Statement on Urban Development Capacity 2020 (NPS-UDC) - The NPS-UDC specifically requires provision to be made for urban development in an area.

Objective A2: Urban environments that have sufficient opportunities for the development of housing and business land to meet demand, and which provide choices that will meet the needs of people and communities and future generations for a range of dwelling types and locations, working environments and places to locate businesses.

Policy PA1: Local authorities shall ensure that at any one time there is sufficient housing and business land development capacity according to the table below:

Short term (the next 3 years)	Development capacity must be feasible, zoned and serviced with development infrastructure.
Medium term (3 to 10 years)	Development capacity must be feasible, zoned and either: • serviced with development infrastructure, or • the funding for the development infrastructure required to service that development capacity must be identified in a Long Term Plan required under the Local Government Act 2002.
Long-term (10 to 30 years)	Development capacity must be feasible, identified in relevant plans and strategies, and the development infrastructure required to service it must be identified in the relevant Infrastructure Strategy required under the Local Government Act 2002.

Table 2-1 Policy objectives of the National Policy Statement on Urban Development

The Health and Safety at Work Act 2015 provides the legislation for the occupational health and safety of staff employed in stormwater management.

Civil Defence Emergency Management Act 2002 & Amendment 2016 – Section 60 requires lifeline utilities to prepare to function to the greatest possible capability during an emergency. The design and operation of the stormwater system is encompassed within the requirements of the Act.

Other Acts

The Health and Safety at Work Act 2015 provides the legislation for the occupational health and safety of staff employed in stormwater management.

The Building Act 2004 requires new houses and habitable buildings to be designed with a floor level above the 50 year Average Return Interval (ARI) event. It also requires that a 10 year ARI storm event shall not cause nuisance to other properties. This applies only to the building of new houses, but there is an implicit indication that these are appropriate standards for older properties too.

2.6 What We Currently Provide

Currently the Council has four levels of services pertaining to stormwater drainage. Achievement against these standards is judged through eight ‘performance indicators’ which are reported in the LTP/Annual Report. The levels of service and reported performance are outlined here.

LEVEL OF SERVICE: Customer Satisfaction — Provide an overall level of service that meets or exceeds residents’ expectations.

Performance Indicator — Residents’ satisfaction survey.

Indicator	Baseline	2018-19	2019-20
Resident satisfaction with this service as measured by survey, where 10 = “service delivered extremely well”.	6.6	6.7	6.6

The residents’ satisfaction survey is conducted each year. A telephone poll of approximately 600 residents is undertaken around June/July. Participants are asked to rate the Council’s performance in providing the service. The measure is subjective and can be heavily affected by recent storm activity or publicity on a particular topic. However as a general indicator of public opinion it is an important reference. The survey scores achieved between 2008 and 2017 are shown in **Error! Reference source not found.**.

The telephone survey was introduced to the customer in the following way — “The Council provides a stormwater drainage system to manage storm water runoff in urban catchments, predominantly in Blenheim and Picton, and smaller networks in Renwick, Havelock, Spring Creek, Riverlands and Cloudy Bay Business Park”. Residents were then asked: “on a scale of 1 to 9 where 1 = not at all well, 5 = neutral and 9 = extremely well, how well do you think the Council performs in providing this service?” The responses are illustrated in

Figure 2-1.

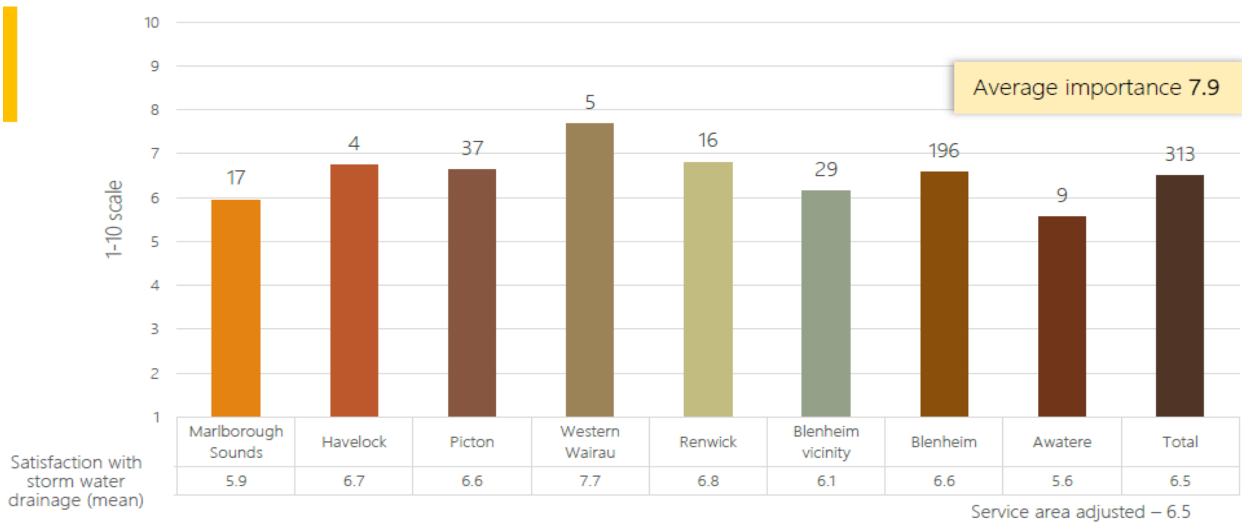


Figure 2-1 Customer satisfaction survey results 2020

Careful interpretation of the survey result is required to attain an accurate understanding of the service performance. For example there is very little stormwater infrastructure in the Marlborough Sounds area so it is difficult to know on what experience the participants of the survey from the Sounds based their judgment. Flood and landslip damage is inflicted on many roads in the Sounds as a result of the storms in November 2016. Road drainage in the Sounds is not stormwater infrastructure. However, with caution the data can continue to give useful feedback on the service.

The report based on the 2020 survey concluded: "*Overall, satisfaction with urban stormwater drainage was on par with the historical tracking average (6.5); 72% of residents were satisfied with this service in 2020.*"

The impromptu comments are an interesting insight into customer perception. Although subjective they can provide a valuable source of information. For this reason they are carefully scrutinised and considered in future planning.

Storm water drainage system unprompted comments (coded categories)				
	Positive	*Count*	*Negative*	*Count*
Urban storm water drainage	Good / well-maintained	12	Poor maintenance	6
	No problems	5	Drains blocked / need cleaning	5
	Not much flooding	4	Flooding still occurring	4
	Improvements needed	4	Other negative	1

Table 2-2 Summary of impromptu comments from customer satisfaction survey 2020

Table 2-2 shows a summary of the impromptu comments from the 2020 survey. No persistent problems or trends were identified. Flooding in streets, which are designed to act as a storage facility during intense rainfall, will often occur. The lack of notification or requests for service around damage to property and/or habitable floor levels suggests that this comment is around flooding within the road reserve.

LEVEL OF SERVICE: Discharge Compliance — Minimise the environmental risks of stormwater discharges.

Performance Indicator:

Key Performance Indicators	Baseline	2018-19	2019-20
Compliance with the territorial authority's resource consents for discharge from its stormwater system, measured by the number of: (a) abatement notices (b) infringement notices (c) enforcement orders, and (d) convictions, received by the territorial authority in relation those resource consents.	Nil	Nil	Nil

The types of discharge that can cause deterioration to the aquatic environment can range from serious chemical or oil spillages to soil sediment from de-watering excavation works and other point-source pollution events. There are also more chronic effects such as metals (zinc, iron and lead) dissolving into rainwater from metal roofs, and accumulated road grime such as oils, greases, rubber, copper (from brake pads) and bitumen.

Drainage from the roads and many private properties are directly connected to the stormwater reticulation. It can be very difficult to control contamination from these sources. Road inlets have grating and sumps to trap the gross materials washed from the road surface.

Council is providing the method of conveyance to discharge into the environment and therefore has a responsibility for the quality of the discharge. Marlborough Roads is generally responsible for the maintenance of the road sumps, ensuring debris is removed from the gratings and sumps are sucked out at routine intervals.

This indicator was adopted by Council the with the national performance indicators in 2015.

A number of tactics can be deployed to protect the environment. 'Source control' of activities at the originating site to prevent contaminants entering the system is generally the most cost-effective. Council also identifies high risk sites. These are typically industrial and commercial sites and are recognised either through the planning process or through the trade waste monitoring programme. Site owners are advised of the risks and their responsibilities. Engineering solutions are sought to mitigate the risks such as fitting canopies over high risk areas to avoid rainwater wash-off of contaminated material, fitting bunds around surface water sumps or fitting interceptors onto stormwater drains. Owners are encouraged to produce management plans to develop good practices and deal with accidental spillage.

Strategies are evolving to manage the more chronic and dispersed sources of contamination. Major new subdivisions are required to provide treatment swales using special plantings and substrate material which is designed to remove much of the road film from water before it enters the reticulation.

Assets & Services Department staff are notified of customer complaints and are able to respond immediately on a 24/7 basis. Pollution clear-up kits are readily available to the response crew. Temporary bunds can be deployed to contain surface contaminants and absorbent pads are used to soak up spillages. There is close cooperation between Assets & Services staff and the Environmental Protection Officers to respond to pollution incidents and to search for the source of the pollution.

LEVEL OF SERVICE: System Adequacy — Provide a reliable stormwater service.

Performance Indicator

Key Performance Indicators	Baseline	2018-19	2019-20
The number of flooding events that occur in a territorial authority district.	Actual number to be reported	0	0
For each flooding event, the number of habitable floors affected, expressed per 1000 properties connected to the territorial authority's stormwater system.	3	0	0

This national performance measure was first introduced in 2015/16. A "flooding event" is defined as an event in which the Assets and Services Incident Management Team is stood up to respond to the event.

Accurate recording during an emergency event can be difficult. There is a high volume of activity, urgent works are being undertaken to mitigate damage, and personnel are extremely busy working in arduous circumstances. It is not always obvious if rising flood waters entered 'habitable floors' or if there was a lesser outcome. For reporting purposes the worst is assumed unless there is evidence to the contrary.

LEVEL OF SERVICE: Response Times – provide a service that is timely and responsive to current needs.

Performance Indicator

Key Performance Indicators	Baseline	2018-19	2019-20
The median response time (in hours) to attend a flooding event, measured from the time that the territorial authority receives notification to the time that service personnel reach the site.	1 hour	0	0

Infrastructure cannot be economically installed to cope with all possible rainfall events. The system is designed to meet criteria that are acceptable to customers in terms of frequency and consequences. The most uncommon, intense storm events that cause very high flows of stormwater will cause some localised flooding. A combination of planning legislation, building regulations and stormwater management is designed to minimise the impact on habitable property. However once a flooding event occurs it is important that the Council responds to requests for assistance in a timely fashion.

A weather forecast of a severe storm will initiate the establishment of an Incident Management team within the Council's Assets & Services Department. The team receives all customer service requests. Calls are triaged. The severity of the problem and the likelihood and speed of deterioration is estimated. Responsibility is determined between roading, rivers, stormwater or private drainage issues. The work is prioritised and work orders are assigned to appropriate teams.

Customers have a range of expectations and tolerances, and determining priority can be problematic. Receiving good, clear feedback from the field during an emergency event can also be difficult as resources are inevitably stretched, with people working in difficult circumstances.

In many storm events the Council receives calls regarding customers' problems with the sewerage system. Toilets and domestic plumbing are slow to drain and can backup, sometimes alarmingly. This is due to stormwater ingress into the sewer pipes causing them to surcharge and preventing them from taking any further foul wastewater. This is a problem with the sewer reticulation and must be considered separately from the performance of the stormwater system.

A debriefing is held after each major event to identify any structural changes required to improve asset performance or operational matters to ensure the response times to customer requests are minimised.

2.7 What Our Customers Would Like — Future Challenges

The target performance indicators for 2021-2024 are shown in Appendix 2.

The Blenheim Stormwater Strategy provides an excellent framework for analysing needs and for planning and implementing future improvements. This has also been supported by insights from the Murphy's Creek structured decision making process.

The strategy identifies 85 possible actions which are derived from the strategic goals. The Blenheim area has been divided into Stormwater Management Area Plans (SMAPs) based on eight natural drainage basins within the Blenheim area. The SMAPs will assist management by focusing and prioritising potential actions into a practical implementation plan. The Council will progressively develop the plans in order to implement the strategy. It is likely that the same methodology will be adopted for the other urban areas.

The Blenheim Stormwater Strategy Action Plan is attached as Appendix 3 as it demonstrates the thorough content and detail of the Strategy.

The importance of community involvement in urban stormwater management decision making was highlighted in the Murphy's Creek case study. It included complex issues and potentially conflicting views from the various stakeholders. The process of gaining public approval can be time consuming but ultimately can be cost-effective as delays and challenges in the planning process add significant delays and costs to projects.

The programme of capital investment to meet the levels of service targets is shown in Financial Chapter **Error! Reference source not found.**.

The levels of service are likely to remain relatively unchanged in future.

2.7.1 Water Quality

The National Policy Statement for Freshwater Management 2020 (NPSFM) came in to force on 3 September 2020. It provides direction on how local authorities should carry out their responsibilities under the Resource Management Act 1991. In 2014 the framework for national objectives was established. As a minimum, two national objectives for compulsory values were set — ecosystem health and human health for recreation. In 2017 the further amendments included the target for 90% of rivers and lakes to be swimmable by 2040. The most recent update includes management of freshwater that "gives effect" to Te Mana o te Wai, improvement of degraded waterways and expansion of the national objectives framework.

There is a legacy of many different historical resource consents covering the discharges of stormwater throughout the region. The Blenheim Stormwater Strategy proposes a comprehensive review and renewal of the urban stormwater resource consents. The objective is to consolidate consents based on stormwater catchment areas. The conditions imposed by future consents can be anticipated. A succession of amendments to the NPSFM are setting more stringent targets for rivers and receiving waters. The Stormwater Action Group maintain close liaison with both the Council's Environmental Monitoring and Regulatory departments to inform future infrastructure plans.

It's possible that future consent applications will have consent conditions regarding the physical, chemical and biological quality of stormwater discharges to the receiving water. Alternatively target values may be set for the water quality of receiving streams as they pass through the urban environment.

Recent large subdivisions on the periphery of Blenheim have been required to fit stormwater treatment devices. A combination of stormwater detention, roadside swales with plantings and substrate designed to remove suspended particulate matter have been installed. Infiltration swales have been incorporated into the design of The Omaka Landings and Westwood Residential sub-divisions. The majority of stormwater from the Taylor Pass subdivision discharges into a wetland treatment pond.

There are a number of proprietary treatment filters which are being evaluated by staff. To date these have not been installed but are likely to be retrofitted to existing outfalls where the space available for natural filter designs is insufficient.

Resource consents for recent subdivisions increasingly require ongoing monitoring of stormwater, particularly the 'first-flush' of stormwater from the onset of rainfall. Contaminants are likely to accumulate on road surfaces and drainage infrastructure during prolonged dry weather. The first rainfall event may mobilise the particles and cause a sudden 'shock 'of contamination into the watercourses. The monitoring requirements will provide a base of information for future decision making.

There is evidence of a deterioration of water quality in the Taylor River as it passes through Blenheim. CCTV surveys of the sewer and stormwater network following the 2016 earthquakes has shown considerable pipe damage. Monitoring of the river and stormwater quality may show a causative effect and help to direct the future rehabilitation programme. CTTV survey evidence is being presented to the Department of the Prime Minister and Cabinet (DPMC) and Council's commercial insurers for funding assistance (as outlined in Chapter 5) to help meet the costs of repair and rehabilitation of the earthquake damaged reticulation..

In 2017 the Council's Environmental Science and Monitoring Department was successful in a bid for a grant from the Ministry for the Environment's Freshwater Improvement Fund (FIF.) The project is centred on the Taylor River, which is recognised for its cultural and amenity value, but also for its vulnerability to land use changes and contamination from leaking sewer and stormwater infrastructure through Blenheim.

In the spring of 2017 the Assets & Services Department initiated a weekly stormwater monitoring programme to sample eight stormwater outfalls along the Taylor River as it passes through Blenheim. The monitoring was coordinated with a wider survey undertaken by the Environmental Science and Monitoring Department for the FIF project. Additional samples are routinely taken from the stormwater network upstream of the outfall to check for bacterial contamination. There is some anecdotal evidence that ex-filtration from the sewer network, possibly as a result of earthquake damage, may be infiltrating the stormwater reticulation and discharging to the river. The monitoring programme will provide evidence and help to identify the possible sources of cross-contamination. This information will help the Assets & Services Department to target CCTV surveys of both sewer and stormwater networks. The Taylor River Freshwater Improvement Project has been funded for two years. It has wider environmental objectives but will provide base data for future rehabilitation and renewals planning.

Gap Analysis – continue to monitor water quality of stormwater outlets and receiving waters. Analyse route cause and identify remedial works.

Continue to monitor research and best practice of stormwater treatment and incorporate methods into new designs and consider retrofit treatment where required.

2.7.2 Flooding

The Building Act 2004's standard for avoiding flooding of buildings is a well-recognised standard and is likely to remain for new housing and to be a goal for existing property. The Act requires new houses and habitable buildings to be designed with a floor level that will not be flooded by a storm event with a 50 year Average Return Interval (ARI). It also requires that in a 10 year ARI event that nuisance to other properties is avoided. This applies only to the building of new houses, but there is an implicit indication that they are appropriate standards for older properties too.

The safe floor level requirement in a 50 year ARI event can be achieved by several methods:

- setting of minimum floor levels, and/or
- a pipe network to take some/all stormwater, and/or
- surface storage/ponding, and/or
- providing a secondary overflow path.

Often a pipe network is constructed to deal with a 5 year ARI storm event (Q_5), but can be less or sometimes more. Surface methods of secondary overflow or acceptable ponding storage are then required to cope with storm run-off in excess of a 5 year ARI event and up to a 50 year ARI event to ensure house floor levels are not flooded. To prevent nuisance to other properties in a 10 year ARI event requires such ponding storage to be limited to the road.

The challenge will be to ensure that surface drainage around houses built prior to 2004 can achieve a similar performance and that the standard can be maintained in the face of further urban growth and climate change.

A detailed mathematical model of the Redwood Street catchment in Blenheim has identified a number of upgrades to the stormwater pipe network and receiving drains that would improve the drainage capacity of the area and resolve long-standing issues in the South of the town. The stormwater work will be integrated with the Rivers and Land Drainage Department which is overseeing a series of improvements to the Town Branch Drain. An outline budget of $10 million has been approved for the project. The first phase has been to upgrade the Town Branch drain channel immediately east of Redwood Street. This was completed in the autumn of 2017 by the Rivers Department for around $750,000.

There is a trend towards increasing customer expectations and lower tolerance levels. Significant work has been undertaken both locally and nationally to understand the components of stormwater management through soakage, detention and conveyance and to maximise the effectiveness of each. Once a drainage area is thoroughly understood, the infrastructure is installed and the customers' expectations managed. To this end an important report[2] has been drafted based on the Blenheim system. The report examines the attributes of a stormwater system, the factors affecting surface water drainage, previous and current design criteria and includes a review of best practice from around the country. The report provides an excellent platform for future stormwater design.

Gap Analysis – Ensure new structures are designed with minimum floor levels and impacts on stormwater flows. Continue to implement the stormwater strategy.

Ensure designs accommodate climate change forecasts

2.7.3 Service Response Times

Customers will continue to require a speedy response to service requests. Evidence from the customers service request data base and from the customer satisfaction survey suggests the current performance achievement is adequate. The existing business model using directly employed service operatives can be supplemented at short notice by local contractors who are available to respond to emergency needs. This approach is working satisfactorily. The system is tested under duress during storm events.

The introduction of the 'Floodwatch' programme to the MDC website has been very popular. The site provides access to live information on the quantity of rainfall recorded at the network of MDC weather stations and the levels of the major rivers in the district. The information is of primary

[2] Procedures for Reviewing Blenheim Stormwater Capacity and Providing New Areas, MDC (August 2014).

benefit to the rural population but is also widely accessed by urban dwellers during storms. The site is readily available through the Council's 'Smart Maps' application on the website.

Gap analysis – no significant changes to this level of service however seek to improve site feed-back particularly during severe storms

2.7.4 Affordability

Affordability is perhaps the most important challenge to be faced in the achievement of the levels of service. As noted in Section 2.4 there is often a conflict between the desired, or imposed, levels of service and the ability of the community to pay for them.

The Council's Revenue and Financing Policy is reviewed every three years and the updated version is included in the Long Term Plan. The policy seeks to establish a fair and equitable distribution of costs between the individuals that pay and the beneficiaries of the Council's services.

Gap Analysis – ensure whole life costs including maintenance and depreciation costs of increasing infrastructure are included in initial design assessment and strategic overview.

Chapter 3: Future Demand

Components of the Future Demand Section	
3.1	Demand drivers — factors influencing the demand for stormwater services.
3.2	Demand Forecasts — how future demand has been evaluated.
3.3	Demand Impact on Assets — asset additions, augmentation and utilisation to meet demand.
3.4	Demand Management Plan — non-asset solutions to meet demand estimates.
3.5	Asset Programmes to Meet Demand — major demand driven programmes and costs.

3.1 Demand Drivers

Future demand for stormwater services is influenced by a number of factors that work together in combination.

Population growth — The forecast population projections for Marlborough indicate some population growth over the next 20 years. The 2020 population estimates from Statistic New Zealand indicate the Marlborough population is still growing at a rate of over 1% per year and is now 50,200 (estimate as at June 30, 2020)[3].

Maintain Levels of Service — There is an increasing trend for customers to demand increasingly higher standards of stormwater drainage and to be less tolerant of surface flooding.

Improved environmental standards — New Zealand is very aware of its 'clean/green' reputation and much of the economic strategy is based on this brand. There is increasing concern over the impact of human activities on the quality of waterways and the coastal environment. Central government provides direction through national policy statements which are implemented at a regional level through the Proposed Marlborough Environment Plan and consent conditions. Tighter regulation and more rigorous enforcement of existing controls can be expected in future. This is discussed in more detail in Chapter 2 (particularly section 2.7.1).

Legislation — The main legislative powers influencing wastewater services are outlined in Chapter 2. Changes in legislation may require additional drainage capacity or environmental protection upgrades.

Climate Change —Research and understanding around the implications of medium and long term climate change are improving. There has been a significant increase in extreme weather events and researchers predict this trend will continue. As severe storms become more frequent there will be more inflow/infiltration, and implications for the low lying treatment plants in Havelock and Blenheim from sea level rise.

Resilience — Having a robust and durable stormwater system in place is important, and this is recognised as an essential lifeline service in the National Emergency Management Agency (NEMA) Act. Meeting the demand for additional security against natural hazards would require further upgrades or extensions of the existing system.

[3] www.stats.govt.nz Estimated resident population at 30 June 2020

Technological developments have the potential to change many elements of infrastructure over the next 30 years, including the availability of treatment and water recycling options. Intelligent robotics will be increasingly used in underground inspections and works.

3.2 Demand Forecast

3.2.1 Marlborough Population Growth - BEING UPDATED FOLLOWING RECENT RELEASE OF STATS NZ DATA

Marlborough has had an increase in population by approximately 9% between the 2013 and 2018 Census. The graph below shows the increase from 43,416 in 2013 to 47,340 in 2018. This population increase is in line with medium to high projections rates produced by Statistics NZ and is driven primarily through net migration into the region.

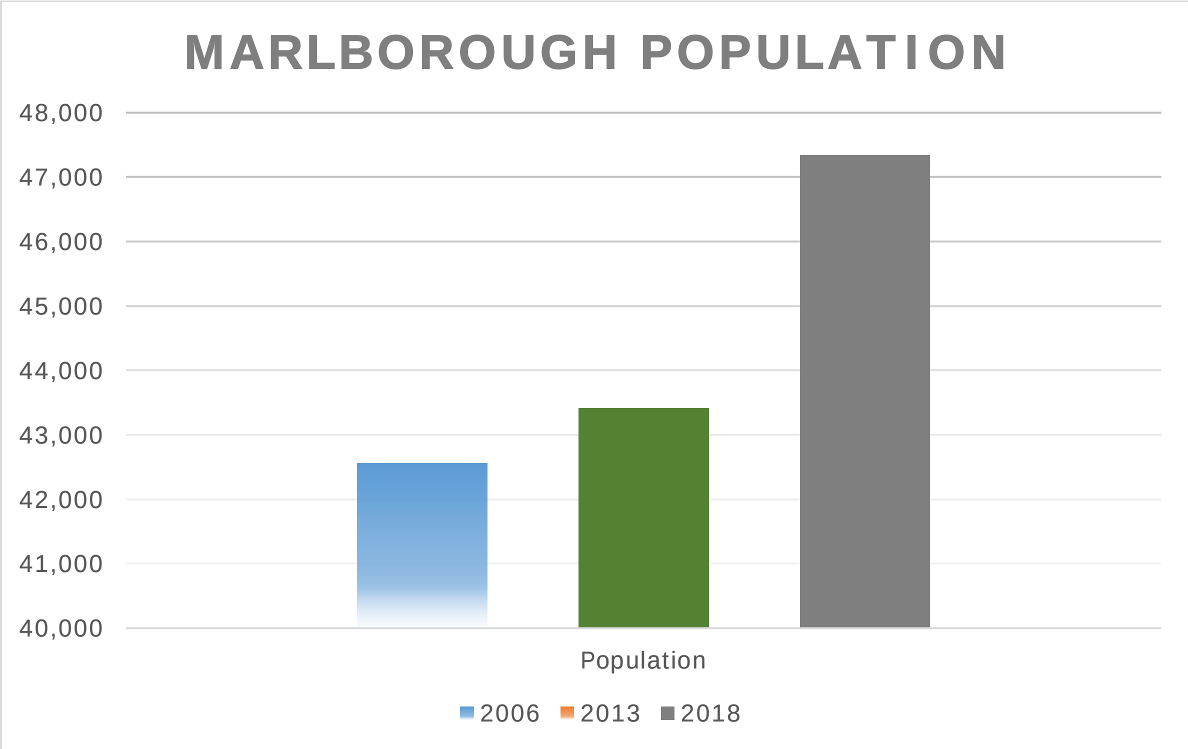


Figure 3-1 Marlborough Population 2006 – 2013 - 2018

The forecast population projections for Marlborough indicate some population growth over the next 20 years. The 2020 population estimates from Statistic New Zealand indicate the Marlborough population is still growing at a rate of over 1% per year and is now 50,200 (estimate as at June 30, 2020)[4]. More than 70% of this population live in Blenheim and approximately 16% in the Picton, Waikawa area.

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

[4] www.stats.govt.nz Estimated resident population at 30 June 2020

Figure 3-2 highlights the population projections by age groups.

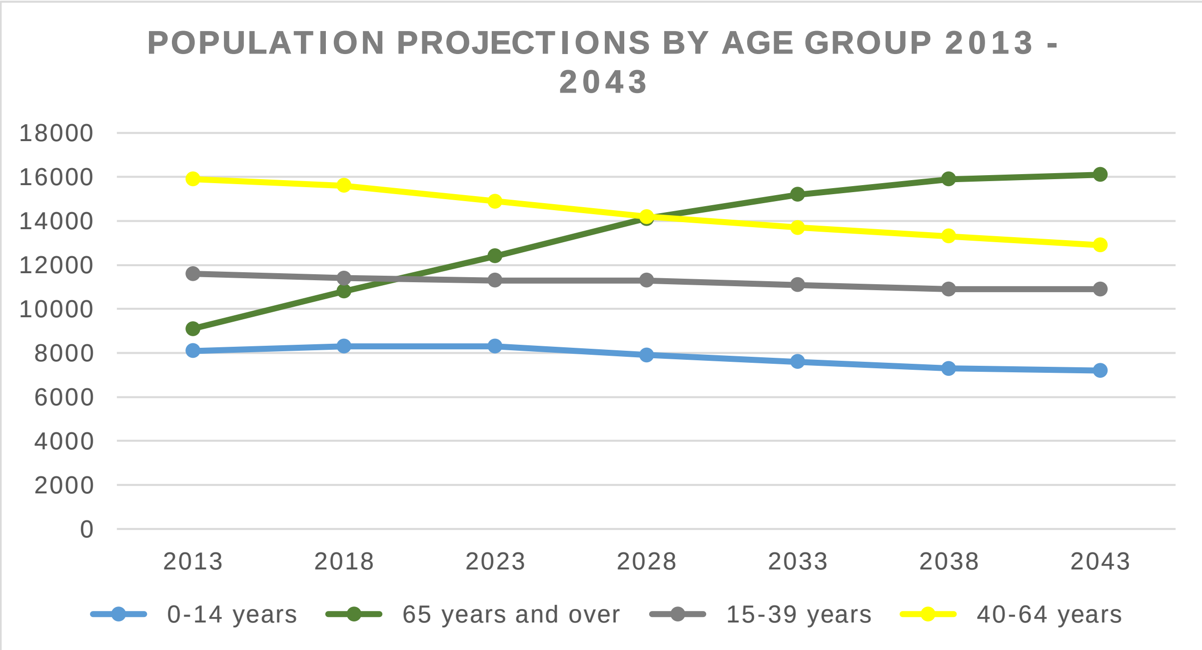


Figure 3-2 Population projections by age, 2013-2043

The increasing elderly population and fewer working people (50% rather than the current 60%) needs to be taken into consideration in financial planning, particularly when setting rates.

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

The main urban growth areas are the greenfield sites on the periphery of existing urban areas. Urban growth pockets have been identified to the north and west of Blenheim's existing town centre and these areas have been zoned for urban residential development.

Household sizes — The number of inhabitants per dwelling is also falling. This means the demand for housing will increase. With Marlborough's age distribution this could indicate there will be fewer wage earners per household, which has consequences for the future affordability of wastewater services.

3.2.2 Planning for Growth

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

According to historic Building Consent and Development Contribution information, growth is estimated to increase by 125 household equivalent units annually for the next ten years within Blenheim. This demand is expected to be much higher in the first few years, and drop off over time. Blenheim traditionally accounts for about 60% of all building consents for new dwellings, the remainder in the wider district.

When planning services with a long lead time, the anticipated increase in demand needs to factor in a margin of error. A 'just in time' approach is prudent both from the point of view of capital expenditure and the uncertainty of projections and assumptions. In contrast, from a financial planning perspective, it is prudent to anticipate a slower growth in the rateable property base and income from development contributions, with a subsequent delay in cash flow returning to the Council.

A further consideration is that many infrastructure assets have a planned life in excess of 80 years. As a large proportion of the total assets costs occurs in the initial construction phase, it would be expensive to underestimate the long term demand and be forced to upsize assets. Thus, the tactic employed is to err on the high side for such long life components, use the medium scenario for the design of shorter life components, and for all assets build 'just in time' to meet demand.

3.2.3 Ageing Population

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

Figure 3-2 highlights the population projections by age groups.

The increasing elderly population and fewer working people (50% rather than the current 60%) needs to be taken into consideration in financial planning, particularly when setting rates.

Population growth is an important factor for the projection of demand for future services. However, population growth alone is a poor indicator of changes in demand for infrastructural services.

Changes due to other factors such as climate change, environmental standards, national

Legislation, significant natural hazards, levels of service and other social aspects also have a significant impact on the demand for the service. It can be difficult to assess and quantify these factors as there is a less empirical relationship between the causes and the effects on the demand. However, it is important that these factors are included in assessments of future designs and included in planning and design of infrastructure.

Climate — Reduced flows in receiving waters effects the dilution rate of treated wastewater discharges. Increased storm events put pressure on capacity of wastewater networks influenced by inflow and infiltration.

Household Factors — The Census information is also analysed for other data that may influence wastewater discharge patterns such as the total number of properties, household occupancy rates, age distribution pattern and an estimation of temporary resident numbers.

Visitors — Tourists to the area can be a significant factor, particularly in Picton and Havelock. Current estimates are that the usual resident populations in Picton and Havelock can temporarily increase by up to 40% due to summer visitors.

Itinerant and seasonal worker populations can also be considerable, particularly in Renwick and Seddon. These people are not included in the 'usual resident' data, but estimates of temporary visitors are included when projecting peak demand for future water services.

Economic — The Council uses a number of sources of information on economic activity and future projections. The economy has a very significant influence on migration, both within the region and nationwide. The Council has a proactive economic development strategy that helps to encourage development of new opportunities, and assists and coordinates the growth of established business sectors.

The Council subscribes to BERL's (Business and Economic Review Ltd) information for relevant economic indicators.

3.2.4 Marlborough Urban Growth Strategy

In 2009 the Council embarked on a major project to develop a comprehensive urban growth strategy for the Marlborough region. Population projections were based on the previous Census which estimated growth over the next 25 years of approximately 9,300 additional residents across the region. The opportunity for infill housing and urban densification within the existing settlements was taken into consideration. Household and section sizes were also analysed and trends were projected into the future.

The data was used to inform a major consultative process with the public, expert stakeholders and Council staff. The quantity of land required was estimated and areas with potential to be developed into urban growth pockets identified. Wholly new settlement hubs were considered unlikely and future growth was assumed to occur on the periphery of existing settlement nodes. All areas of the region were considered for their growth potential and capacity to provide for future growth.

The final strategy was accepted by Council and published in March 2013[5]. The Canterbury earthquakes occurred during the development of the strategy and early drafts had to be revised after land around Blenheim, particularly to the east, was assessed as susceptible to liquefaction and lateral spread. The strategy forms a valuable platform for planning future capacity upgrades of all services.

In Blenheim, seven land parcels to the west and north of the town were identified as suitable for zoning for urban-residential development and these are outlined in red in the following aerial photo (Figure 3-3). A total area of around 240 hectares of urban-residential and a further 53 hectares of employment land is earmarked for development. In addition, a private development north of the Omaka Airfield and south of New Renwick Road was approved by the Environment Court following an appeal. The area known as Omaka Landings has provided a further 21 hectares of land for development.

The provision of utility services was considered from the outset of the project. The Wairau River drains from west to east. The new developments to the west of the town will naturally drain towards the town which will have an impact on the drainage of the existing settlement.

[5] Growing Marlborough — A Strategy for the Future. District-wide Overview and Decision Summary (March 2013)

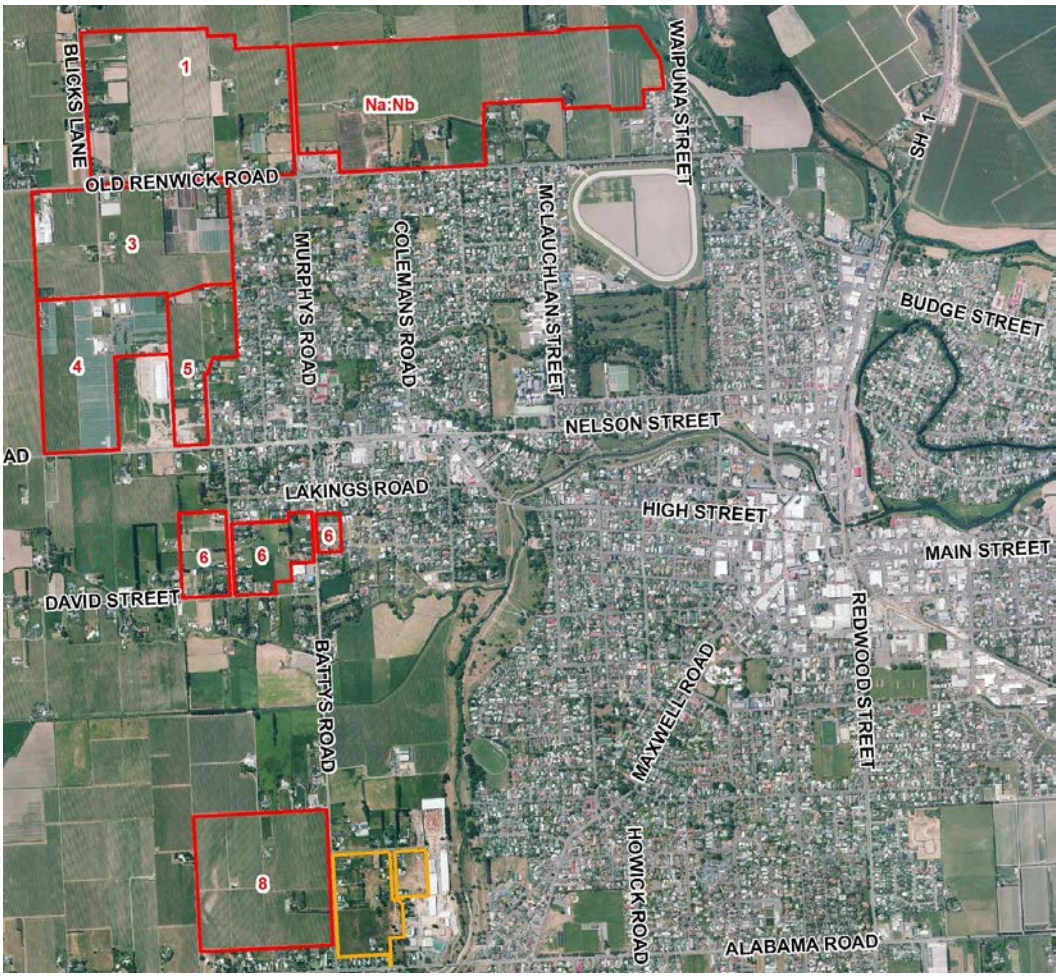


Figure 3-3 — Growth pockets identified and zoned for residential development

Site investigations have been undertaken to determine groundwater levels and the soakage capacity of the soils. This information has been used to prepare an outline plan for the early development zones at Na-Nb, Zone 1 and the Omaka Landings subdivision. The final plan is a balance between on-site soakage, the capacity of downstream drainage channels and infrastructure and the provision of stormwater detention to smooth the peak flows of run-off.

Research work continues to be undertaken by the Rivers and Land Drainage Department to prepare good design data and gain a solid understanding of the factors which influence stormwater and river flows. Blenheim has been categorised into 27 catchments and 224 sub-catchments. Rainfall patterns are analysed to establish the relationship between rainfall intensity, duration and location and the earlier weather and river flows. Flow monitoring is undertaken at critical locations in the drainage network. Actual flows are compared with the predictions from hydraulic models and the models refined to improve future projections.

The Urban Growth Strategy recognised the potential for infill housing within the existing urban zones. The specific sections were not detailed but a major exercise was undertaken to systematically assess the soakage capacity and run-off coefficient of the sub-catchments throughout Blenheim. The data has been used in the development of hydraulic models and can be adjusted as further infill progresses.

3.2.5 Climate Change

The two most significant impacts for stormwater services are outlined below;

- More frequent high intensity rainfall events will place greater demands on the stormwater system
- A change in flow characteristics with changing rainfall patterns

The advice on the Ministry for the Environment's website (updated December 2017) on the likely impacts of climate change in Marlborough is shown in Appendix 4.

There is still academic and political debate over man-made climate change and climatic variation. However it is reasonably certain that weather patterns are going through a period of change and the impact of the changes on stormwater flows will be very significant. Engineering design and evaluation methods have included a factor for climate change for many years. Hydraulic models can be programmed for different weather events and frequency of occurrence. A major hydraulic model exercise of the Redwood Street catchment in Blenheim has identified a number of upgrades that have been incorporated into the capital programme.

Sea level rise will also change the flow characteristics of the receiving waters. As the sea level rises there will be more resistance to rivers and drains discharging into tidal zones. The Rivers and Land Drainage Department is already considering the need for pump stations to be fitted to the outfall of some major drains to assist with discharge flows. A major review of climate change and levels of service is planned by the Rivers and Land Drainage Department around 2020.

Climate change is only one of the variables to take into account. However, it is critically important, and is being incorporated into the planning and design of infrastructure.

3.2.6 Resilience to Earthquakes

A significant earthquake in the next 50 years (on the Alpine Fault) has a 50% likelihood of occurring, and an 85% likelihood of occurring over the next 100 years. This event could be 10 times more powerful than the November 2016 event, with shaking lasting up to six minutes (compared to up to two minutes during the Kaikōura earthquake).

To prepare for such a large earthquake, new infrastructure is being built to high standards, and emergency power generation is provided.

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

The most significant implications of earthquakes for stormwater asset management are outlined below.

- Pump stations have been upgraded to resist the effects of ground shaking but significant damage could be expected from a very large event.

- Modern plastic pipe materials are more resistant to damage from ground shaking. However, around 77 km of pipe, 25% of the reticulation network (valued at approximately $45.6M) are over 50 years old.

- Ground movement may affect gravity pipelines laid to shallow gradients on the Wairau Plain.

The Council is prioritising the replacement of pipework and other assets made of older materials that are susceptible to natural hazards or have deteriorated more quickly than anticipated.

Our financial planning is another way we can recover as quickly as possible from emergency events, by ensuring we have financial reserves, flexible capital programmes and insurance to meet the expected losses.

3.3 Demand Impact on Assets

The identification of eight urban growth pockets has allowed detailed and timely assessment of the stormwater requirements. The new urban zones to the north and west of the town are located upstream of existing urban infrastructure and generally have a high water table and a low gradient across the sites. However early recognition of the development potential of this land has allowed an ‘accepted development plan’ to be established for the Na-Nb area and upgrade work to Casey’s Creek to be designed. During 2017 the preliminary design work and resource consents had been approved and a construction contract publicised for competitive tender.

The storm in May 2013 revealed a number of flooding incidents in the Muller Road/ Howick Road area of Blenheim. The post-event analysis led to further investigation using a detailed CCTV survey. The 600 mm steel stormwater main in Muller was found to be badly corroded and partially collapsed. Subsequently 348 metres of the pipe in Muller Road was renewed with a new 675 mm concrete main.

The report of the design investigation into the Redwood Street/Town Branch Drain (TBD) catchment was received in August 2015. The catchment covers around 280 hectares of Blenheim which is approximately 25% of the urban area. Consultants had used hydraulic models to evaluate ten upgrade options. The options were assessed, costed and ranked using Multi Criteria Analysis. The favoured option (Option 9) was recommended to Council in November 2015. The total cost of the solution was estimated at $20.6M with a further $2.5M for land purchase. It is estimated it will take 10 to 20 years to complete all aspects of the upgrade but the project can be readily broken down into phases with progressive benefits. Much of the capital investment will be to the Rivers and Land Drainage assets. In 2018 work commenced on the upper channel of the TBD. Later in 2018 a new 1250mm x 1000mm box culvert will be installed to connect the existing 1500mm stormwater main in Muller Road into the head of the TBD. This connection will provide an emergency overflow for the Redwood Street 750mm main. In the event of an emergency a valve can be opened to allow surcharges from Redwood Street into the TBD. Once the upgrades of the TBD have progressed to provide additional capacity the valve can be removed and the flows from Muller Road can be permanently diverted to the TBD. Capacity pressure on the Redwood Street main will be relieved and upstream drainage improved.

The urban development in the north-west of Blenheim contributed to the concerns of residents along Murphy’s Creek (see Chapter 2). The structured decision making process has helped to resolve the issues. The stakeholder group opted for Option G which is a hybrid solution including on-site detention areas, a partial overflow into the headwaters of Murphy’s Creek, new pipeline assets in Rose Street and Middle Renwick and an upgraded outfall pump station into Taylor River. The detention area and stormwater assets in the subdivision are costs to the developer. The new off-site infrastructure has been costed at $3.8M.

As a result of a number of subdivision applications at Grovetown, a comprehensive review of the township’s stormwater infrastructure was carried out. Grovetown is a flat, low-lying, low density township in the lower Wairau Valley. The stormwater system evolved from the original agricultural drainage network. The installation of a reticulated sewerage system in 2011 has helped to facilitate further growth in the township. An outline plan has been prepared to cope with future growth and will be implemented as further subdivision continues.

The capital expenditure budget programme to meet future demand is shown in **Error! Reference source not found.**.

3.3.1 Climate Change

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

While the climate change predictions remain mostly unchanged from the 2018 LTP, our consideration and investigation in to the impact of these predictions has improved. A Climate

Change Working Group has been established across the Council and a Climate Change Action Plan was adopted by Council in March 2020.

The Climate Change Action Plan has four main goals;

- Council contributes to NZ's efforts to reduce greenhouse gas emissions (including net carbon emissions).
- Marlborough District becomes more resilient to the impacts of climate change.
- The Marlborough community is informed of climate change actions and options for response.
- Council shows clear leadership on climate change issues.

Climate change is a long-term influence that has been incorporated in to the planning and design of long-life infrastructure. The effects and impacts that climate change poses across the Infrastructure Assets are highlighted within this Asset Management Plan.

More intense storms will put pressure on the capacity of existing networks. Overland flow paths and retention facilities will be utilised more frequently and may require additional education for the public of these features.

Hotter drier summers will have an impact on the regular flushing of stormwater mains and may allow debris to build up and cause blockage downstream in large events.

3.4 Demand Management Plan

More than 72% of the Council's stormwater assets are in Blenheim. The town has benefited from the Blenheim Stormwater Strategy and the identification of future growth pockets through the Growing Marlborough Urban Growth Strategy. The implementation of the stormwater strategy has been overseen by the cross-departmental Stormwater Action Group. The Group has provided sustained and coordinated progress towards the strategic objectives. Research has been undertaken to improve understanding of groundwater soakage capacity, run-off coefficients, design criteria and standards, and complex hydraulic modelling.

Coordinating design between urban stormwater flows and river flood management through the Stormwater Action Group has allowed for an efficient balance between upstream flow attenuation and downstream infrastructure capacity.

On-site soakage is the preferred option for stormwater disposal as it means there is no requirement for downstream infrastructure. However, a high groundwater table, unsuitable soils or steep gradients can restrict the areas in which this is a practical option.

Planning tools are used to predict run-off coefficients from new zones and infill housing. The design of floor levels for new dwellings in relation to the surrounding land and stormwater flows is a primary tool for managing future growth.

The diversion of roof water into storage vessels has been considered but is unlikely to provide adequate flow reductions during the more severe storm events when flows become problematic. Detention vessels have been required as a condition of the resource consent for specific sub-divisions where peak flows cannot be accepted into the system

'Source Control' continues to be the most effective demand management technique to protect the stormwater system from contaminants and spillages. By managing industrial and commercial site activities that have potential to pollute the stormwater system; the need for elaborate engineering solutions such as oil interceptors and silt traps is reduced.

The introduction of the 'Flood Watch' interactive maps onto the Council's website has provided benefit to the public by publishing 'live' data from the rainfall and river monitoring stations around the region. Whilst the stations are on the main rivers and the service mainly benefits the rural community, it is also a useful source of information for urban dwellers and helps to distribute contemporary information about storm events.

3.5 Asset Plans to Meet Demand

The main capital investments related to growth are summarised in Table 3-1. Details of the capital programme are in Appendix 8: Capital Budge 2021-2031.

Description	Budget	Growth %	Programmed Start
Stephenson to Stuart Streets Pipeline Upgrade	$1m	100	2025
Kinross St Pump Station Water Quality improvements	$0.25m	100%	2021
Picton Pipeline Upgrades	$0.29m	100%	Ongoing

Table 3-1 Capital Expenditure to meet demand

Chapter 4: Life Cycle Management Plan

The life cycle management plan is a coherent plan to deliver the best value for money for the assets' owners whilst providing satisfactory service to the customers. The plan seeks to anticipate future requirements, manage risks and optimise decision making throughout the assets' lives.

Components of the Life Cycle Management Plan

4.1 Background Data — asset capacity/performance, asset condition, asset valuation and historical data.

4.2 Infrastructure Risk Management

4.3 Routine Operations & Maintenance Plan

4.4 Renewal/Replacement Plan

4.5 Creation/Acquisition/Augmentation Plan

4.6 Disposal Plan

The lifecycle of an asset follows the progression shown below.

Planning	The process of preparing for a new asset, or non-asset solution, to a service delivery issue. Service delivery issues may derive from growth, a current or anticipated failure to meet levels of service or to replace a failing or obsolete asset. The planning process involves engineering expertise, legal compliance and community engagement to size, locate, programme and operate with consideration to design options, whole life costs, risks and non-asset alternatives.
Creation	The purchase, construction or vesting of an asset to the Council. The management of the design and construction to ensure the required quality is delivered on time and at the agreed cost.
Operation & Maintenance	The day to day running of the infrastructure to ensure a continual, effective and efficient service to the customer. Maintenance is the proactive and reactive repair and servicing of assets. It is undertaken with respect to the 'criticality' of the assets and the overall quality of the service delivered.
Rehabilitation	Proactive restoration of assets to extend the serviceability and ultimate life expectancy in a cost-effective manner.
Renewal	The controlled replacement of assets that have reached the end of their useful lives.
Disposal	The removal of redundant assets by decommissioning, physical removal, sale or reutilisation for an entirely different purpose (eg; using decommissioned sewer pipes as cable ducts).

4.1 Background Data

4.1.1 Physical Assets

Settlements establish in areas that take advantage of natural drainage channels for removal of stormwater. As the urban area develops and the buildings interrupt the natural drainage patterns it becomes necessary to install a more elaborate piped infrastructure and engineered channels to remove the surface water. The piped stormwater network is considerably shorter and younger than both the water and sewer networks.

Area	Length mains (km)	Pump Station
Anakiwa	0.8	
Blenheim	134.0	2
Grovetown	0.7	
Havelock	2.5	
Okiwi	0.8	
Picton	29.5	1
Renwick	5.5	
Riverlands	6.8	
Seddon	0.9	
Sounds	0.3	
Spring Creek	3.6	
St Andrews	0.3	
TOTAL	**185.8**	

Table 4-1 Stormwater Assets

Reticulation

Figure 4-1 shows the composition of the stormwater reticulation network. Around 90% of the entire network is constructed of three materials — concrete, PVC and asbestos cement. Generally concrete is the preferred material for larger diameter pipes (225 mm and greater), and PVC is commonly used for pipes up to 300mm diameter (it has replaced asbestos cement as the modern equivalent).

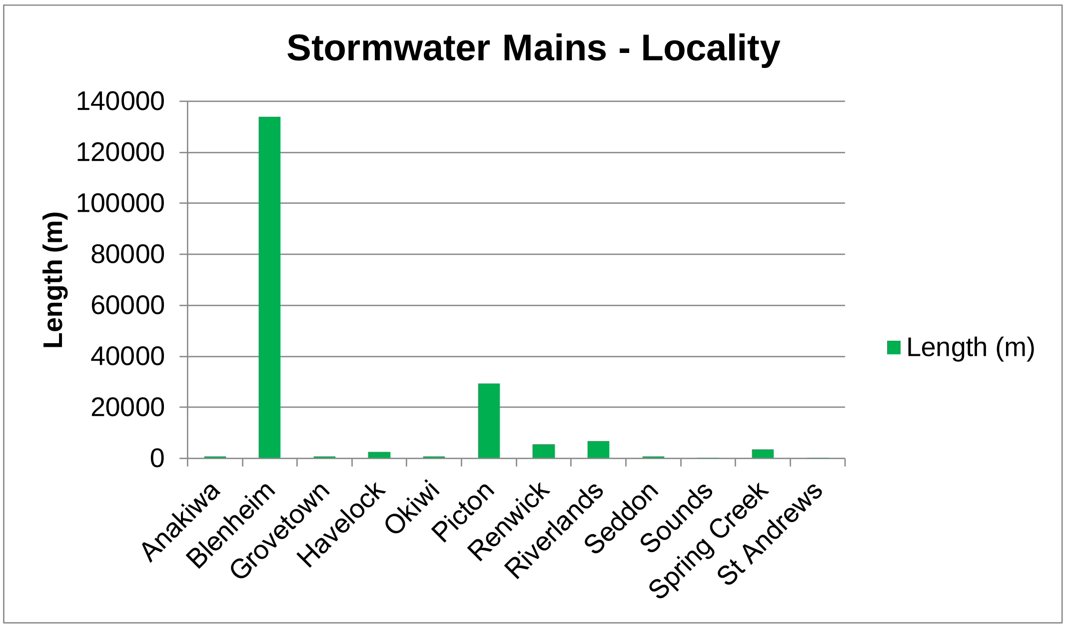


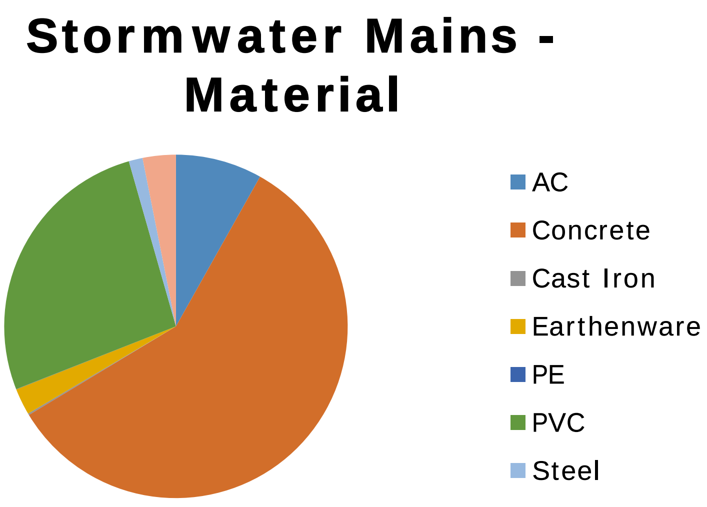
Figure 4-1 Length of Stormwater Mains by Area

Concrete is the oldest pipe material recorded in the current stormwater network. It has been used for at least 75 years in Marlborough. Over the years the method of manufacture has developed considerably. The early pipes were unreinforced and were cast in vertical moulds. Modern concrete pipes are now supplied as steel reinforced, centrifugally spun pipes, manufactured in accordance with NZS 3107. A variety of jointing methods, joint materials and linings have also been incorporated over the years.

Asbestos cement was a popular material in the 1940s. Records show it was still being used into the 1980s. Modern plastics and particularly PVC were being introduced into the market in the latter part of the 20th century. Their acceptance was accelerated as the health risks associated with handling asbestos cement became more apparent.

A CCTV survey revealed a concrete arch structure from the roundabout at the High Street/Redwood Street intersection running north under Park Terrace. This was previously unknown. The arch was probably cast in place and is one of the oldest structures of the Blenheim stormwater system.

Figure 4-2 Mains Pipe material



Stormwater retic by decade of installation

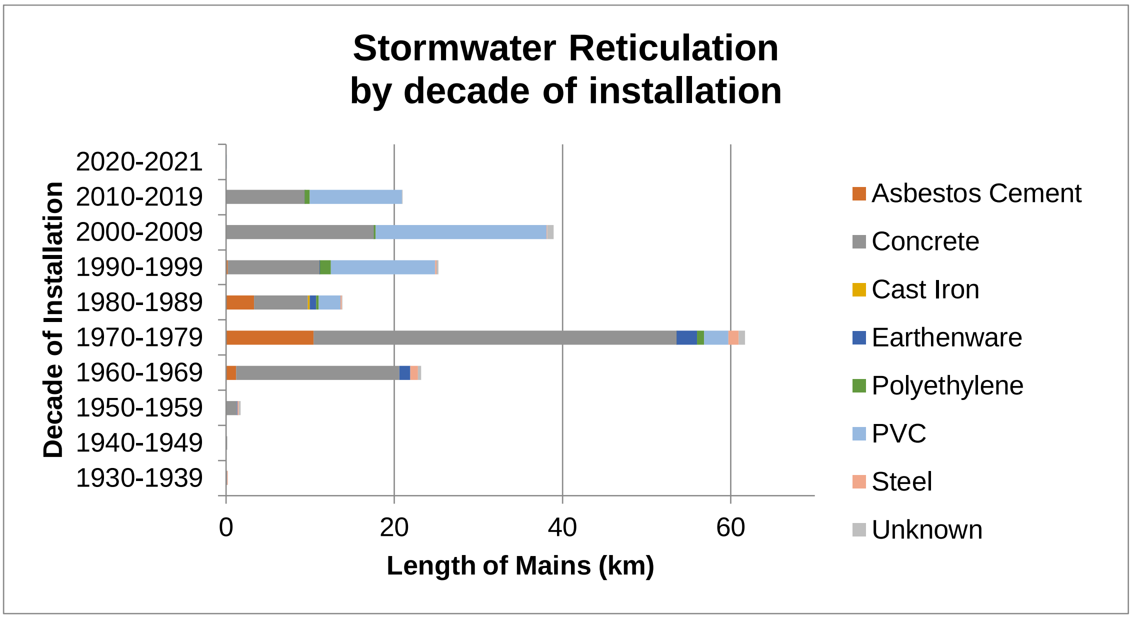


Figure 4-3 Stormwater pipe age and material

Pipe materials and standards of manufacture have evolved over the years. Modern materials are generally easier to handle, more robust and are constructed to a more consistent standard. However, when a new material is introduced there is often a fall in the overall life expectancy of the pipeline as the construction industry acquires the necessary skills and experience in using it.

A variety of pipe materials in the network have been grouped together as 'Other'. This is partly due to the different authorities that have administered stormwater across the region over the years. At various times the responsibility for stormwater infrastructure has been in the hands of drainage boards, town, county or borough councils, and in some cases privately installed schemes which have been adopted by the Council.

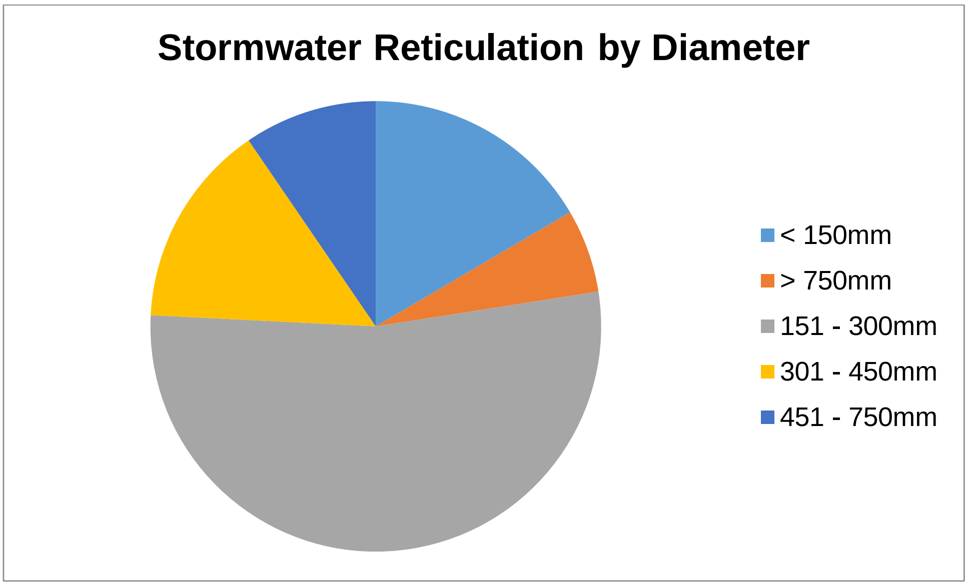


Figure 4-4 Stormwater Reticulation by Diameter

4.1.2 Asset Capacity/Performance

The overarching objective that has guided stormwater design was first defined nationally in the Building Act 1991 (superseded by the Building Act 2004). It states that:

- surface water from a storm with a 2% probability of occurring annually will not enter a building
- surface water collected or concentrated by a building or site shall not cause nuisance from an event that has a 10% probability of occurring annually.

These clauses set the standard for the building structure, floor levels and areas immediately surrounding the buildings. They are often referred to as the 50 year ARI (Average Return Interval) and the 10 year ARI, respectively. They guide planning approval through the resource consent process and have clear implications for the stormwater infrastructure serving the building sites.

The quantitative management of stormwater has two major components — conveyance and attenuation (through detention or soakage). A recent study of the stormwater system in Blenheim recognised the town could be roughly separated into two objectives based on the underlying topography of the town.

On the sloping terrain to the south of the town centre, rainwater flows off the impermeable surfaces. It accumulates and concentrates as it flows downhill. In intense storms this may become a threat to the properties downstream. In these circumstances the stormwater system needs to be designed to protect the lower lying property from the run-off from the hillside. The objective is to either retard the flow in order to limit the accumulation, or intercept the flow and direct it to a suitable watercourse away from low lying houses.

On the flat valley floor the absence of any appreciable gradient in this landscape means that rainfall can be slow to drain away. A high groundwater table is often associated with this type of land which restricts the soil's capacity to absorb rainwater. The resultant ponding becomes a threat to property owners and road users. The primary objective of the stormwater system on the valley floor is to convey the surface water away as rapidly as possible. The system is required to collect the surface water and channel it away from properties to water courses or land drains. Pumps are often necessary to accelerate the natural flow and lift water over the stopbanks.

The stormwater management goals in the two areas are quite different. The main objective on the flat alluvial plain is to speedily reduce and remove the ponded water. In hilly areas the downhill flows need to be attenuated. A degree of ponding is beneficial to avoid further flooding downstream. It is therefore important to consider the stormwater catchment as a whole and to recognise the primary purpose of the drainage infrastructure in the overall design.

About 60% of Blenheim's urban stormwater catchment is on the flat alluvial plain. Approximately 9% of the catchment is in the foothills of the Wither Hills. The remainder of the land has a shallow slope, typically with a gradient around 1:100, formed as an alluvial fan by the emergence of the Taylor River into the Wairau Valley[6].

4.1.3 Stormwater Conveyance

Rain water that cannot penetrate the soil runs across the surface of the land and collects into a variety of channels. In urban areas the accumulated stormwater is conveyed through pipes,

[6] The technical detail of this topic is explored in greater depth in "Procedures for Reviewing the Blenheim Stormwater Capacity and Providing for New Areas (Draft)" (Williman).

kerb channels on roadways, and through modified and naturally occurring water courses. The weather patterns in New Zealand are such that it is uneconomical to build specific infrastructure to accommodate flows from large, infrequent storms. The roadways therefore become useful alternative conveyance pathways. Many roads are specifically designed as secondary flow paths for stormwater. On the flat plains the roads serve as temporary detention ponds as there is often little gradient to permit a flow at the peak.

Historically there has been little consistency regarding the size of storm that should be accommodated by the primary stormwater infrastructure and that which spills over into the secondary flow path. Recommendations for the design of the piped water system have varied between the 2 and 10 year Annual Return Interval (ARI). The final design is likely to depend on a number of contributory factors — the permeability of the catchment area, the topography, and the vulnerability/sensitivity of the surrounding properties. Industrial areas tend to have less permeable surfaces than residential suburbs. Business may be severely interrupted by surface water flooding. In these instances the piped system may be designed for a greater capacity and be able to cope with more frequent storm events.

4.1.4 Performance

For the above reasons, measurement of the performance of stormwater systems can be difficult. The baseline set by the Building Act has become an accepted standard although in strict terms it only refers to buildings constructed after 1991. The interpretation of 'nuisance' is reliant on case law. During storm events the Assets & Services Department establishes an Incident Management Centre to deal with flooding incidents and analysis of customer 'Dwelling flooding' is interpreted as habitable floors of buildings, regardless of whether they are domestic, commercial or industrial buildings. 'Property flooding' refers to stormwater entering garages, outbuildings etc to an extent that is beyond the scope of expected ponding on private sections.

Rainfall intensity, duration and the preceding weather conditions have considerable influence on the volume of stormwater and the subsequent performance of the infrastructure and customers' experiences of a storm event.

4.1.5 Asset Condition

The condition of the stormwater reticulation is generally based on the age of the pipes. In general buried pipelines have a design life of 80–100 years. The actual life of buried assets is subject to many factors — pipe material, depth of pipe, groundwater level, workmanship during installation, interference from other utilities, surface traffic, ground movement, jointing materials, bedding and surround, etc. These factors may act singly or combine their effects. It is therefore very difficult to anticipate the condition of any particular asset or to predict trends in life expectancy.

The internal condition of pipes can be inspected with the use of a closed-circuit television camera (CCTV). A pipe's structural and service condition can be assessed through a nationally recognised pipeline evaluation technique. CTTV has been deployed to investigate suspect pipes and to assess the condition of pipes that may require upsizing.

Since the November 2016 earthquake sequence a CCTV monitoring programme has been undertaken on sewer and stormwater pipes. Early assessment showed the earthenware and vitreous clay pipes in Blenheim had been particularly damaged by the earthquake. Significant cracking and tomos were apparent in the pipe walls. Collapse is less common but can be expected to increase as the structural integrity of the pipes has been compromised.

In early 2018 the CCTV surveys continued to focus on the sewers. Individual stormwater pipelines were investigated if a problem was suspected. The stormwater reticulation will be systematically surveyed when resources become available. The programme will be informed by the outcome of the survey investigation but is likely to initially concentrate on the brittle material pipes — earthenware, vitreous clay and asbestos followed by the older concrete mains, more recent concrete and finally PVC and polyethylene.

The life expectancy of asbestos cement pipes has been derived from the tables published in the New Zealand Asbestos Cement Watermain Manual (2017). The manual uses data from practical experience gathered throughout New Zealand. The study was confined to pressure mains however envelopes for useful service lives of gravity pipes can be applied from this data.

Error! Reference source not found. shows the remaining life of stormwater reticulation in the serviced areas. Using the assumptions above it can be seen that less than 2% of the network will reach the end of its useful life in the next 20 years. However the projection would suggest that in the period from 2035 to 2065 almost half of the entire network will require replacing. There is a need to verify the assumptions in the projection.

It is desirable to smooth the renewals programme to make the workload manageable and to avoid too much disruption to the system. Equally, it is important to maximise the useful life of the underground assets but also to avoid failure to critical services and consequential flood damage. A timely programme of condition assessment through systematic CCTV survey will provide greater confidence in the condition grading and assist with the planning of future renewals programmes.

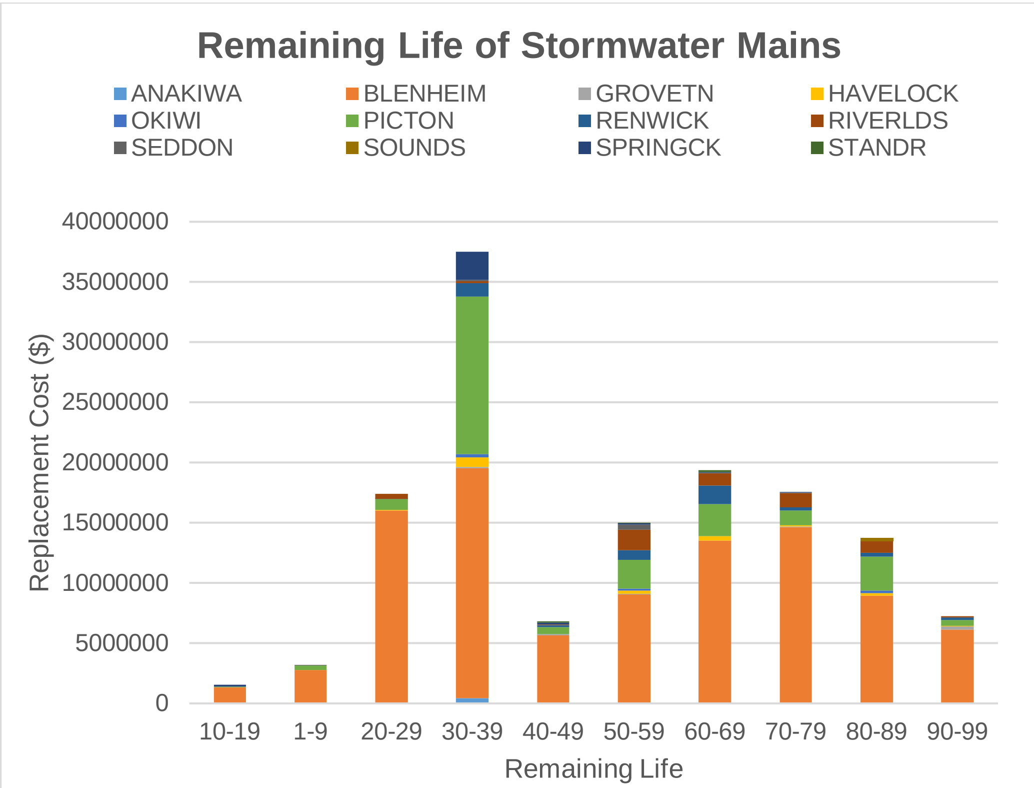


Figure 4-5 Remaining life of stormwater reticulation

The costs shown in Figure 4-6 have been determined from the revaluation data using the nominal life expectancy of stormwater assets within the system. The data suggests an average annual renewal expenditure of around $2.9M over the next ten years will be required. Based on the 2021-2031 budget and priority of asset renewals, what is physically possible and what is feasible beyond 2031, the renewals profile has been smoothed and is shown below.

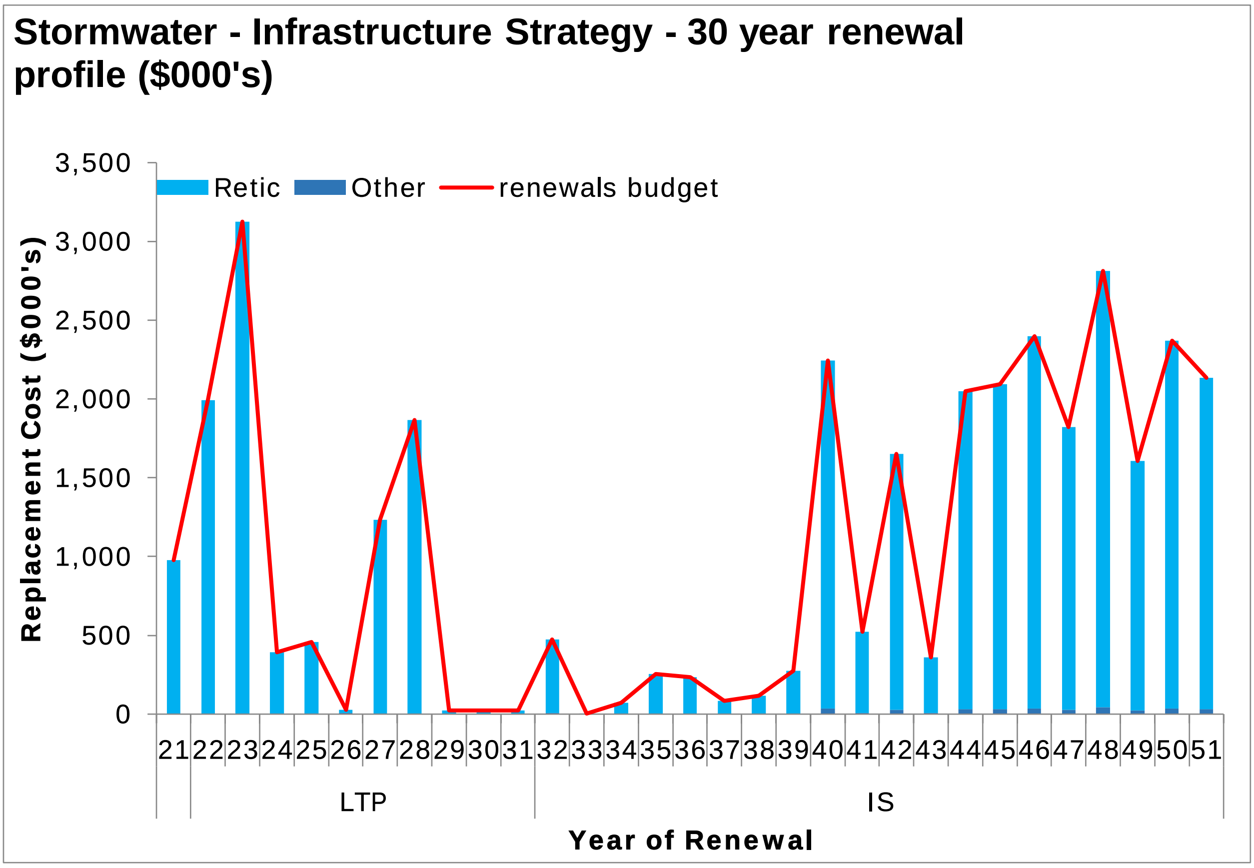


Figure 4-6 Stormwater Renewal Profile

Recognising timing, including delays, of major projects

Council recognises factors that can delay the proposed timing of projects and have a significant impact on the overall capital programme. Capital project timing has previously been delayed due to:

- Finalising community consultation;
- Obtaining land access;
- Obtaining resource consents;
- The limited availability of external professional expertise;
- Receiving acceptable contract price and contractor availability.

These factors have contributed to actual expenditure falling below budget in prior years. As a result, a strategic decision was taken to limit the financing of capital expenditure to approximately $70 million for the first three years of the LTP for core Council assets. To achieve this, adjustments have been made to reduce the capital expenditure budget in the first three years of the LTP. These adjustments are not specific to projects, and Council still aims to complete all of them over the next 10 years.

4.1.6 Stormwater Strategy

The Blenheim Stormwater Strategy provides detailed analysis and prioritisation of each of the Stormwater Management Areas.

A brief summary of the main issues is shown in Table 4-2 Summary of Key issues for Blenheim Stormwater Management Areas.

SW Management Areas	Description	Key Issues
Springlands	This area discharges in to Fultons Creek, Murphy's creek and Racecourse River. This SMAP is primarily zoned residential. However, there is rural catchment upstream to the west of the residential area	• Pipe and drain capacity limited • Urban growth/infill • Lack of soakage • High natural spring-fed water clarity • Sedimentation from dewatering of construction sites.
Opawa Loop	This area discharges into the Opawa River at a number of locations upstream of the Taylor River confluence. This area is made up of residential and some industrial areas	• Industrial and transport corridors • Inadequate pipe capacity
Central Blenheim	The Central Blenheim SMA discharges via a small number of discharge points in to the Lower Taylor River. This area is made up of a mixture of residential, high density residential, commercial and some industrial zonings.	• Lack of pip and pump capacity • Risk of flooding (especially Redwood Street)
Kinross	The Kinross SMA discharges via one main discharge point to the lower Opawa River downstream of the Taylor River confluence.	• Lack of pipe and pump capacity • Industrial and transport corridors • Soakage not available
Monro/Muller	This SMA discharges partly in the Taylor River system upstream of the Doctors Creek confluence and partly into the Central Blenheim area to the Lower Taylor River.	• Lack of soakage • Lack of pipe capacity • Flood prone • Urban growth/infill
Upper Taylor	This SMA discharges into the Upper Taylor River at a number of locations including the Rifle Range Creek. Part of this area discharges directly to ground soakage.	• Approach for accommodating future growth on southern zoned land • Good ground soakage
Town Branch	This area is collected in a series of drains that flow in an easterly direction. A pump station located on the edge of town pumps this stormwater to the Lower Opawa Rivers and another pumps to the Riverlands Co-op Drain. Therefore, this drainage system has no influence on water quality issues within the town itself except in high flows when the system capacity is exceeded and overland flow occurs.	• Lack of soakage • Insufficient pip capacity • Flood prone • Urban growth – development pressure • Outlet capacity constrained.
Wither	This SMA is firstly collected in natural watercourses in the lower parts of the Wither Hills. These natural watercourses then flow into the series of drains which enter the Riverlands Co-op Drain System. Some of this area discharges directly to ground soakage.	• Stream erosion • Not suitable for soakage • Flooding risk in some areas downstream • Urban growth • Industrial discharges downstream • Some limited capacity

Table 4-2 The Blenheim Stormwater Strategy Action Plan, which is included in the appendices, includes further details of the strategy proposals.

MAP COMING

Figure 4-7 — Blenheim stormwater catchments

4.1.7 Asset Valuation

The stormwater drainage assets are valued annually. Details of the valuation, process and methodology are included in the Asset Valuation report and a summary of the main asset values in 2017 is included in **Error! Reference source not found.** and **Error! Reference source not found.**.

Area	Site	ORC		ODRC		DISP	
BLENHEIM	Pump Station	$	206,325	$	109,589	$	3,563
BLENHEIM Total		**$**	**206,325**	**$**	**109,589**	**$**	**3,563**
PICTON	Pump Station	$	702,014	$	284,596	$	11,512
PICTON Total		**$**	**702,014**	**$**	**284,596**	**$**	**11,512**
Grand Total		**$**	**908,339**	**$**	**394,185**	**$**	**15,075**

Table 4-3 — Stormwater Plant Valuation 2020

Area	ORC		ODRC		DISP		Pipe Length 2017
ANAKIWA	$	461,305	$	226,321	$	6,029	849
BLENHEIM	$	82,033,981	$	50,832,955	$	980,071	125,578
GROVETN	$	227,691	$	104,089	$	2,898	294
HAVELOCK	$	864,954	$	657,700	$	10,716	1,310
OKIWI	$	551,588	$	326,840	$	6,064	822
PICTON	$	21,844,615	$	12,371,290	$	261,980	28,698
RENWICK	$	3,881,613	$	2,795,711	$	46,406	5,167
RIVERLDS	$	4,977,851	$	3,828,168	$	57,519	6,784
SEDDON	$	162,135	$	87,384	$	2,908	258
SOUNDS	$	237,670	$	199,643	$	2,377	332
SPRINGCK	$	2,485,173	$	1,070,146	$	31,041	3,385
STANDR	$	330,941	$	228,624	$	4,120	323
Grand Total	**$118,059,518**		**$**	**72,728,871**	**$**	**1,412,128**	**173,801**

Table 4-4 — Stormwater Reticulation Valuation 2020

ORC = Optimised Replacement Cost
ODRC = Optimised Depreciated Replacement Cost
DISP = Annual Decline in Service Potential

4.2 Infrastructure Risk Management

4.2.1 Risk Management

The Council's approach to risk management is outlined in the MDC Risk Management Strategy and Tools[7]. The strategy was initially developed by the Risk Management Steering Committee in 2001 in accordance with the AS/NZS 4360 Risk Management standard and later updated to ISO 3100 (2009).

[7] Risk Management Strategy and Tools. V3.2 (Dec 2011) MDC

The aim of the strategy is to identify, assess, and manage risks in a consistent and demonstrable way.

Our strategy is to:

- introduce tools and internal assistance that enables sections to complete a risk analysis relevant to their operation
- ensure our decision making is consistent and demonstrable
- develop a 'risk aware' culture that encourages everyone to identify risks and associated opportunities
- promote and foster communication and risk monitoring throughout the organisation.

This framework will be managed by the Risk Manager and supported by the executive management team.

The risks associated with all Council activities may be considered under a number of broad categories.

Legal	Events which may lead to criminal or civil proceedings taken against the Council.
Political	Events that prevent or restrict Council from leading the community and making prudent decisions on behalf of the community.
Economic	Events that cause a financial loss to the Council or cause loss or reduced profitability to commercial enterprise.
Environmental	Events which damage natural and man-made environments, resources and/or ecosystems.
Service Delivery	Events which cause an interruption of service, or result in a standard significantly below the levels of service agreed with the community.
Community Health	Events that may cause harm to the health and welfare of residents or visitors to the region.
Human Resources	Events that adversely affect the people who are directly or indirectly employed by the Council.
Financial	Events that cause unplanned financial loss or prolonged financial inefficiencies for Council or within the community.
Information Management	Events which cause damage or disruption to the information systems and infrastructure supporting Council activities.
Reputation	Events that may damage the reputation, image or public confidence in the competence of the Council to perform its core duties.

Table 4-5 The risks associated with Council activities

Risk is frequently defined as the product of the *likelihood* of an event occurring and the severity of the *consequences* that result. This common evaluation methodology has been used by the Council through a standard likelihood/consequence matrix. It is possible for an event or situation within the water supply to affect the Council and community across several of the categories listed above. For example a severe water shortage may affect the economic prosperity of the region and the health of the community. In extreme circumstances (such as a drinking water contamination issue) the event may have an impact on the reputation of the region leading to consequences at a local or national political level.

4.2.2 Objectives of Risk Management

The objectives of risk management for wastewater services are to:

- safeguard community health and wellbeing
- fulfil legal obligations
- maintain a core business activity and customer service
- safeguard continued economic activity
- protect the natural environment
- provide the most cost effective service
- protect the asset value
- protect inter-generational equity.

4.2.3 Risk Assessment in the Stormwater Activity

Under the guidance of the Council's Risk Manager a small team of senior operational staff, including the Operations & Maintenance (O&M) Engineer, assess the hazards associated with the operation of wastewater services.

The stormwater operation is analysed through its major constituent parts: pump stations and the reticulation network. General management practices are also analysed.

The risks are also separated on a network basis so that risks to the Havelock system, for example, can be separately assessed and analysed, compared to a similar risk in the urban Blenheim system.

The hazards are risk assessed on the standard Likelihood/Consequence matrix to establish a risk profile. The 'controls' for each risk are considered and assessed. The 'controls' are the plans, operational procedures, systems and regulations that can be implemented to mitigate either the likelihood or consequence of any given risk. Once the preferred controls have been identified, an action plan is prepared to implement the controls and ensure their efficacy. Finally, an assessment of the residual risk is made and either accepted or laid-off through insurance. High risks that cannot be readily mitigated are recognised and included in long term planning considerations.

The risk profile is reviewed and updated on an annual basis. New and modified infrastructure is included in the review and lessons from recent events are used to inform the assessments. Hazards are reassessed in the light of any new information or research.

4.2.4 Critical Assets

The criticality of particular components of the stormwater infrastructure is recognised in the risk assessment process. Generally, critical assets are those for which failure would cause widespread loss of service, serious public health risk or serious environmental damage. In each of the stormwater systems the critical assets are:

- the major trunk mains
- terminal pump stations.

Individual pipes or assets may be added to the list as the Stormwater Action Areas are developed further. The criticality rating will be recorded in AMIS for future reference.

The Assets & Services Department is an active participant in the Marlborough Engineering Lifelines Group and regularly contributes to coordination meetings and civil defence exercises to prepare and test for major events. Engineering Lifelines facilitate the exchange of information and planning between the utilities such as Marlborough Lines, Marlborough Roads, telecommunications companies, major transport hubs and other stakeholders.

4.2.5 Mitigation Measures

Infrastructure which is recognised as being critical to the stormwater system is subject to a number of 'risk treatments' to help mitigate the impacts of the hazard. Risk treatments can be applied through either:

- capital improvements — building new infrastructure to mitigate the risk, and/or
- operational treatments — implementing systems for the day-to-day operation of the wastewater system.

Capital improvements can be more readily incorporated into new or replaced infrastructure. Good design practice is to build in redundancy through duplication of assets, alternative sources, providing alternative supply routes and inter-connections, or through the provision of emergency standby facilities.

Operational treatments can include installing controls that are 'fail-safe', automated monitoring and control systems, rigorous Standard Operating Procedures, regular proactive maintenance and good alerting/response procedures for system malfunction.

4.2.6 Emergency Response Planning

The risk assessment and mitigation process of existing hazards; the consideration and implementation of future controls, and the management of the residual risks provides a structured framework for emergency response planning. For example, power failure is a significant risk to the operation of stormwater pumps. Examples of risk treatments are alternative backup connections to the power network, installation of permanent emergency generators, deployment of mobile generators and provision of additional storage. The preferred solution is selected and implemented, and the outcome reviewed.

4.2.7 Insurance

Council mitigates residual risk predominantly through insurance. The Council's Contract and Risk Policy Manager, with the assistance of an independent broker, considers all of Council's potential exposures. Insurable risk is mitigated through a combination of commercial insurance, insurance through the Local Authority Protection Programme (LAPP), and self-insurance (risk retention).

LAPP is a not-for-profit co-operative fund established by local authorities to provide mutual insurance for underground assets and other specialist structures that have in the past been difficult to insure through the commercial insurance market. The Council insures water, wastewater and stormwater reticulation, wastewater wet-wells and flood protection structures through LAPP. LAPP's reinsurance arrangements are managed by its broker AON New Zealand.

The Council's current threshold for claims is $3M at 100%. As the LAPP cover is for 40% of the claim after excess the threshold, once reached, is applied as an excess at $1.2M.

Central government has provided indemnity for 60% of the value of post-disaster recovery costs in relation to agreed critical community assets, on the condition that the local authority has made reasonable provision for the remaining 40%. However, the Government is currently reviewing this commitment.

Different criteria and thresholds apply to the 60% government funding. There is a summary available in the National Emergency management Agency (NEMA) Funding Guide.

In 2016 the Council employed AON/Tonkin & Taylor to undertake a Maximum Probable Loss assessment of water, wastewater, stormwater, roading and flood protection infrastructure. The study modelled two scenarios — a 1:500 year and a 1:1000 year earthquake event centred in the Marlborough region. The outcome of the study was a maximum probable loss prediction of $349M and $485M respectively. This was a significant increase on the previous estimate of $78M. The Council's current strategy is to use a combination of LAPP, government emergency funding, cash reserves and deferred capital expenditure to cover the costs of potential losses.

4.2.8 Engineering Lifelines

Assets and Services staff (including the O&M Engineer) are active participants in the Marlborough Engineering Lifelines Group, which has been chaired by the MDC Asset Management Engineer since its inception in 2008.

The Engineering Lifelines Group facilitates the exchange of information and planning with utilities such as Marlborough Lines and Marlborough Roads. The inter-dependencies between the Lifeline agencies are explored and plans are evolved within the CDEM 4R framework — Reduction, Readiness, Response and Recovery.

An annual action plan is prepared and agreed with all members. The Lifeline agencies also participate in civil defence exercises to test their response capabilities and to prepare for major events.

In 2016 the Lifelines agencies contributed to the update of the Marlborough Civil Defence Emergency Management (CDEM) plan[8]. The development of the plan included two regional risk assessment workshops. The workshops involved a thorough evaluation of the hazards in the region. A detailed risk assessment and prioritisation process was undertaken. Participation in the workshops provided insight into the relative risks and informed the discussion on the risk mitigation strategies required for the wastewater network.

4.2.9 Resilience

Following the Christchurch earthquake sequence there has been substantial research into the resilience of utility infrastructure. This is particularly relevant to Blenheim as the Wairau Plains has many common geological/geographical features with the Canterbury Basin and comparisons can be usefully made.

Lateral spread of the land adjacent to watercourses was particularly damaging to stopbanks, buried utilities, bridge abutments and other nearby structures. New setback standards are being incorporated into new designs.

Differential settlement was also a problem, particularly for pipelines passing from normal ground conditions to rigid structures such as bridge abutments or connections to pump stations. Similarly, buried chambers have a tendency to ‘float’ in liquefied ground conditions, causing damage to assets. Flexible joints, paired gibaults and resilient materials are incorporated into the design of new and replacement assets at these transition zones.

Post-earthquake surveys have shown a marked difference in the performance of different materials. Modern materials such as PVC, and particularly polyethylene, were more resilient to ground shaking than some of the traditional materials such as earthenware, vitreous clay, un-reinforced concrete and asbestos cement.

The Stronger Christchurch Infrastructure Re-build Team (SCIRT) has been generous in publishing its findings and solutions. The team has created a depository of technical advice and engineering standards which will help local authorities to design and build more resilient infrastructure in future.

Gravity drainage systems are particularly affected by ground movement and SCIRT has provided alternative designs systems such as mini pumped systems and vacuum systems.

The Council has embarked on a thorough investigation of the sewer and stormwater reticulation networks following the November 2016 Kaikōura Earthquakes. A closed circuit TV (CCTV) survey programme has been initiated and the older, brittle materials such as earthenware,

[8] Marlborough Civil Defence Emergency Management Plan 2017-22 (MDC)

vitreous clay, asbestos cement and unreinforced concrete pipes have been prioritised for inspection. The programme has initially focused on the sewer network as the consequences of failure for public health are more severe than for damage to the stormwater network. However, it is evident that the damage is similar on both networks.

Ground displacement and ground shaking has caused significant damage to linear assets. The earthenware and vitreous clay pipelines in Blenheim have been particularly affected. There is significant evidence of longitudinal and circumferential cracking, joint displacement and holing. The structural integrity of the pipes has been compromised and failure is likely. The assets' life expectancy was adjusted for the 2017 revaluation and the earthenware asset value has been impaired.

The Council is in discussion with the Department of the Prime Minister and Cabinet (DPMC) on government funding support for earthquake damage. A consultant has been employed to evaluate the damage surveys and advise the DPMC.

Following the Christchurch Earthquake sequence there has been substantial research and information on the resilience of utility infrastructure. The Wairau Plain has many common geographical features with the Canterbury Basin and comparisons can be usefully made.

Lateral spread adjacent to watercourses was particularly damaging to stopbanks, utilities and other structures. New standards are being incorporated into planning and engineering designs. Setback standards define how close buildings can be located to incised watercourses.

Manholes and wet-wells tended to 'float' in liquefied ground conditions. New design standards have been developed to mitigate this effect.

4.2.10 Natural Hazards — Learning From Experience

New Zealand is exposed to a whole range of serious natural hazards — volcanoes, earthquakes and numerous severe weather events. By definition, the most severe events are less frequent. However the less frequent, lower intensity events also test both the structural integrity of the infrastructure and the management systems in place to respond to natural hazard events.

In July 2013 a 6.5 Magnitude earthquake off the coast of Seddon was followed by a sequence of aftershocks. On 14th November 2016 the simultaneous rupture of a number of faults around Culverden generated an earthquake of 7.8 Magnitude — the third largest earthquake recorded since European settlement. The immediate effect on the wastewater system was lower than expected. However, a major CCTV survey programme has been initiated and discovered substantial structural damage to the earthenware and vitreous clay pipelines.

The Stronger Christchurch Infrastructure Rebuild Team (SCIRT) has been generous in publishing its findings and solutions. They have created a repository of technical advice and engineering standards which will assist local authorities to design and build more resilient infrastructure in future.

The CCTV survey is also examining the older concrete mains (CC, CC-RF and CC-SR).

There were extensive power outages along the east coast south of Blenheim following the earthquake. The power supply to Upton Downs Pump Station was interrupted which caused downstream water shortages.

On the following day (15 November 2016) a major storm in the north of region caused severe local flooding. In Havelock a section of the main sewer was removed when ground was scoured along Mahakipawa Road.

After each major event a debriefing review is undertaken to examine the lessons learnt. Operational practices are updated where necessary, specifications are modified and design improvements are incorporated into future construction works. .

4.3 Routine Operations and Maintenance Plan

The operation and maintenance plan of the stormwater system sets out the procedures and tasks necessary to deliver the agreed level of service to the stakeholders, whilst ensuring the asset continues to meet its minimum life expectancy. A formal plan has not been documented but in practice includes the strategic drivers to provide for public safety, health and well-being.

Operational Works — Routine operational works will be undertaken by suitably trained and supervised staff or contractors at sufficient intervals to ensure the efficient functioning of the system.

Repairs — Reactive repairs will be assessed and undertaken in a timely fashion to minimise disruption to the service, meet the customer service expectations, minimise collateral damage or danger, and avoid unnecessary nuisance.

Preventative Maintenance — Planned maintenance schedules are implemented to minimise risk and costs of premature failure, promote the effective and efficient functioning of assets, and optimise the whole life service potential of the infrastructure.

Operational management — Operational activities are undertaken by Assets & Services engineering officers and technicians under the direction of the O&M Engineer to ensure the outcomes and service standards are achieved in the most efficient and cost-effective manner.

System Control and Monitoring — The stormwater assets are monitored and data is communicated to automatic or manual control mechanisms. Systems are controlled to operate within predefined ranges, and procedures are implemented to respond to detected abnormalities according to need.

Incident management — Assets & Services Department staff prepare and plan for managing emergency incidents to mitigate the effects of major storm events or system failures, and to return to business as usual as soon as possible.

4.3.1 Operational Management

General maintenance and repairs of the stormwater infrastructure in Blenheim, Renwick, Havelock and Seddon are undertaken by the staff in the Works Operations section of the A & S Department. Works Operations repair and maintain the reticulation and provide a 24/7 call-out service. Routine maintenance schedules have been established to inspect, clean and maintain screens, gratings, channels, culverts and pump stations in the system.

A full-time technician is employed to oversee the maintenance of electrical and telemetry components within the system. More specialist work is contracted out to specialist electrical, mechanical, telemetry or civil engineers.

Similar work in Picton is undertaken through a term contract. The term contract was retendered in 2014 and awarded to the incumbent contractor for a further three years, with two options to renew for two years each. The contract is managed by a dedicated MDC engineering officer. The conditions of the contract specify the operational procedures, skills of the operatives and the quality of materials and fittings to be used. Renewal of the contract is reliant upon meeting minimum key performance indicators. This maintenance contract will be retendered in 2021.

SCADA telemetry is installed on three pump stations at Waitohi (Picton), Dry Hills and Hardings Road. The telemetry data is returned to the engineering officers who have direct access to monitor real time data and trending of the parameters. A 24/7 standby roster is maintained to monitor the system and an automated tiered alerting system is employed to ensure system alarms are responded to in a timely way.

A new asset management information system was introduced in December 2014 to replace the existing Hansen asset information management system. Work orders created in the system software record all scheduled and reactive maintenance as well as the attributes of the assets worked upon.

Maintenance schedules are programmed to automatically generate work orders for routine servicing. The maintenance history from the existing Hansen AMIS has been migrated. Collating this data and developing reports allows asset performance to be analysed.

The recent history of stormwater operational costs is shown below. There was a significant increase in depreciation costs in 2008/09 when pipe laying costs were reviewed. Depreciation continues to contribute a very significant proportion of the overall operational costs. This reflects the relative simplicity of a largely gravitational reticulation. Reticulation maintenance costs have increased over the period but remain as a relatively small proportion of the total. Future expenditure is shown in Chapter 5

4.3.2 O & M Decision Making

The maintenance decision making process seeks to return the best compromise from four main conflicting pairings.

Levels of service and risk versus costs — A 'Rolls-Royce' fully guaranteed 24/7 stormwater service can be delivered to Marlborough customers; however the cost of providing such a service has to be balanced against the willingness and ability of the community to pay.

The costs of providing improved levels of service can reach a point where the marginal cost becomes disproportionate to the benefit. For example, responding to a blocked sewer in two hours does not involve a significantly greater cost than responding in three hours. However, improving the response time to, say, less than one hour would involve significant additional cost in terms of disruption to the scheduled work programme. The current level of service has been developed to best balance current customer expectation with the cost of delivering the service.

Asset maintenance versus renewal — The A&S Department seeks the optimum balance between replacing an asset that is reaching the end of its useful life and the costs of repairing it. Currently this is achieved using the judgment of the operational engineers. One of the priorities of the asset management information system upgrade is to provide good data on maintenance costs and frequency to support the engineers' decisions.

Planned versus unplanned maintenance — A well planned preventative maintenance schedule may reduce disruption to service, reduce whole life costs, schedule work to be undertaken in a cost-effective and organised manner, and reduce the risks associated with failure. However, the costs of investigating and implementing the correct intervention interval can be high and the risks associated with the failure can be low. In these circumstances it can be cost-effective to allow the asset to fail and respond to the breakdown. Planned maintenance schedules have evolved for the critical components of the wastewater infrastructure. More formal documentation and evaluation of the current process is required as there is a reliance on the experience of individual staff that may not be sustainable.

Efficient asset utilisation versus providing redundant capacity — There is a strong efficiency motive to correctly size and optimise the use of assets. However there can be serious consequences to the failure of some critical assets and a level of redundancy or contingency options can be a valuable attribute. In wastewater infrastructure this is most commonly seen in duplicate pumps at sewage pump stations, additional storage designed into wet-wells, and in some cases provision of links between pipelines or treatment processes.

The above decision making process exists within the context of risk. The function of each of the components of the infrastructure is assessed for its critical contribution to achieving the desired outcomes. The maintenance status of each asset can then be prioritised, and maintenance tasks and programmes can be planned accordingly.

Data on the performance and condition of the infrastructure is continually reviewed and monitored by the Operations Engineer and staff. Short term trends can be readily identified through trending software within the SCADA system.

4.3.3 Summary of Operational Costs

A summary of operational expenditure since 2016 and the forecast spending from 2021-31 is shown below

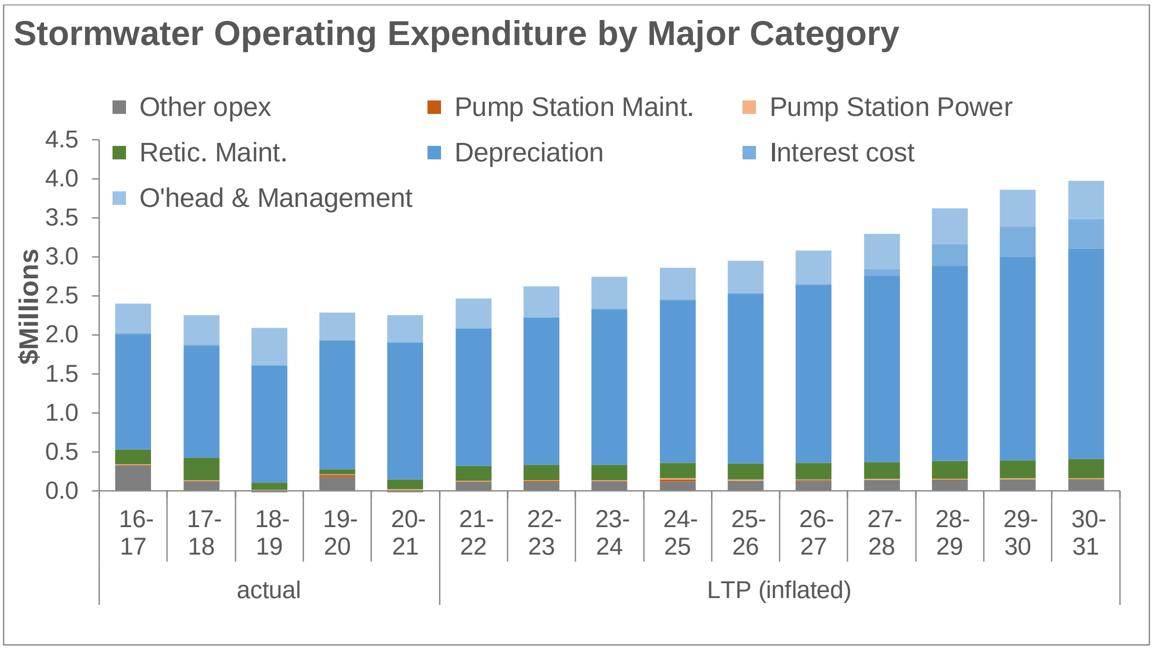


Figure 4-8 Stormwater Operating Expenditure by Major Category

The total operational costs have remained fairly consistent at just over $2M annually in the past three years. The dominant costs are depreciation, overheads, management and loan servicing costs, accounting for around 80% of the total. The costs of mains maintenance remains low despite the aging reticulation network. The costs of Traffic Management are on the rise as requirements and demands for services increase.

4.3.4 Renewal/Replacement Plan

The renewal strategy is designed to maintain the overall condition and performance of the asset infrastructure through a continuous, progressive cycle of replacement.

The renewal programme is based on the following factors.

Age — The age of each asset is recorded in the asset management information system. A nominal useful life for each asset is allocated based on industry standards, experience or factual assessment.

Condition — The condition of assets will be assessed through systematic survey and asset condition grading and also through casual observation during reactive or routine maintenance.

Performance — Information is gathered on the performance of assets through post-storm analysis of surcharging and surface flooding. Consent compliance issues are recorded and contaminant ingress or inflow incidents are investigated and traced to the source.

Maintenance Costs — Routine and reactive maintenance is recorded against individual assets. Both the quantum of maintenance and the costs are used to assess the full life cost of asset ownership.

Customer Service Delivery — Requests for service and customer complaints are analysed.

Economic Obsolescence — the availability of spares, skills, techniques or restricted access through resurfacing etc may affect the physical useful life of an asset.

Renewal of stormwater assets is planned through the Stormwater Action Group in conjunction with the Operations & Maintenance Engineer and the Planning & Development Engineer. A schedule of potential renewal schemes is maintained and updated by the Operations & Maintenance Engineer. The renewal strategy is heavily influenced by the continued rapid growth in demand. Wherever possible renewals are coordinated with capacity upgrades and the costs shared between the two drivers.

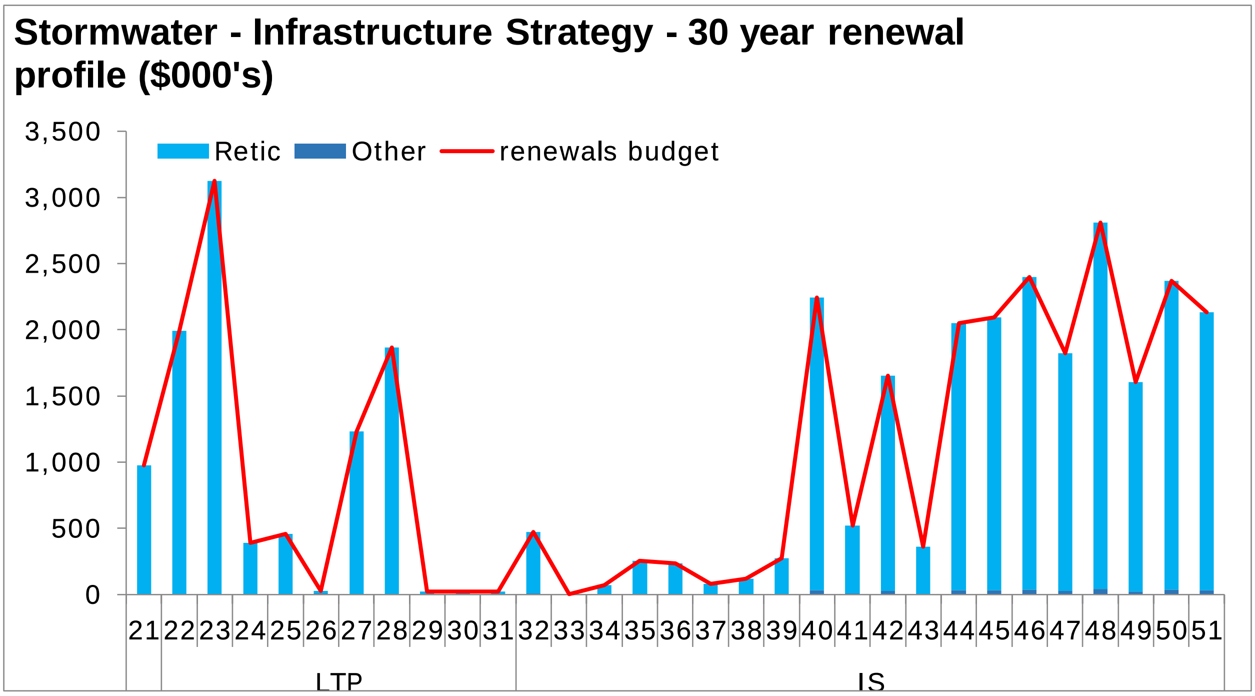


Figure 4-9 Stormwater Infrastructure Strategy 30 year Renewal Profile

Similarly, additional priority will be awarded to projects where the existing asset is under-performing, causing a level of service issue. The costs of all capital projects are distributed between the main drivers — renewals, improvement to levels of service, and growth.

Intervention points are established based on the criticality of the asset. Pipes and pumps that are critical to the drainage system are not allowed to fail. They are routinely monitored and maintained, and renewal is planned to avoid service failure.

Currently, non-critical assets are allowed to fail and are renewed when the cost of maintenance or service interruptions become untenable. This strategy ensures the useful life of the asset is maximised and delays the cost of renewal for as long as possible. This is considered a rational approach at this time. The condition of the whole asset base has yet to be determined through comprehensive survey and assessment. The sequence and detailed design of urban development is still to be established. There is, *therefore, a motivation for delaying renewals whilst the overall strategies for the Stormwater Management Areas are further developed.*

is informed by the revaluation data. There is a significant peak in pipeline replacement activity forecast in 20 to 30 years' time. From a practical project management point of view and for financing purposes it is desirable to 'smooth' the peaks. A more detailed renewal programme will be developed once the pipe condition assessment and data analysis has been undertaken, and will be included in on-going updates of the Stormwater Management Area Plans.

Asset upgrades are included in the capital programme and the costs apportioned between growth, renewal and improved level of service (see Table 4.9.) The capital investment programme to meet growth is shown in Chapter 5: **Error! Reference source not found.**.

4.4 Creation/Acquisition/Augmentation Plan

All capital upgrade projects for the stormwater infrastructure follow a process from inception though to construction and commissioning, as outlined below.

Identification of need — New infrastructure may be required to meet forecasts of growth in demand, and issues with level of service will be identified through performance monitoring and customer feedback.

Project prioritisation — Projects are prioritised through a risk management process of likelihood/consequence but prioritisation will also be influenced by the overall objectives of the relevant Stormwater Area Management Plan once this is completed, as well as by cost and timescale, and the structural integrity of the drainage areas.

Alternatives and options — Alternative solutions including non-infrastructure solutions are considered before examining different design options.

Once an outline design solution has been agreed, detailed design can proceed. Further options or unforeseen problems may be encountered at this stage and the decision making process may need to be reviewed. Additional specialist consultancy and peer review continues through the process.

Project approval — Realistic design options are evaluated by the engineering hierarchy and presented to the Council's Assets & Services Committee for approval. The outline budget costs and the sources of funding are also considered at this time and aligned with the objectives of the Long Term Plan. The decision of the A & S Committee is tabled at the full Council meeting for ratification.

Detailed design — An approved project will progress to detailed design. Specialist engineering consultants are often employed as they have greater experience in the design of major works. Draft designs are submitted to the engineer and may be passed on for peer review. Generally, all engineering works are designed to national or international specifications and standards. The standards may be amended to local conditions. The design criteria set out in the draft document 'Procedures for Reviewing Blenheim Stormwater Capacity and Providing for New Areas' is likely to provide the basis for future infrastructure projects.

Tender — Once a final design has been proposed and agreed with Council engineers, most construction projects are publicised for competitive tender. The Council has a rigorous procurement policy which was recently subject to scrutiny from an independent lawyer following unsupported allegations of corruption. His findings were that Council's procurement systems were very robust and no corruption was found. Returned tenders are evaluated on the basis of a series of pre-determined weighted attributes. The weighted attribute methodology is designed to provide the best possible overall outcome and may consider matters such as health and safety, value for money, productivity, certainty of outcome, previous experience, innovation and risk.

It is usual for specific contracts to be prepared for every tender. Each one is updated to include the latest standards, materials and techniques. A specialist contract lawyer is employed to check and review contracts prior to tendering.

Construction — The construction phase is normally managed by Council's project engineers, supported by specialist consultant project managers and supervisors. A risk register is compiled at the beginning of each project and is monitored throughout the construction to help ensure smooth progression and successful outcomes.

Significant variations in the final design may have to be returned to the Assets & Services Committee for verification and approval. Papers are regularly submitted to the Committee to advise the governance body of progress on the major projects.

Capital projects which are currently under consideration are listed in **Error! Reference source not found.**.

Project	**Driver**	**Stage**	**Comments**
Redwood Street/Town Branch Drain	LoS, Growth & Renewal	Detailed option paper presented to Council.	Option 9 recommended. An initial budget of $10M (of a total estimate of $20.4M) approved and allocated. To be manged between stormwater and Rivers
Murphy's Creek	Growth	Alternatives and options	Investigation into water quality issues and stakeholder consultation on creek capacity
Casey's Creek	Growth	Alternatives and options	Investigation into channel upgrade and detention options prior to urban development
Taylor River Catchment Quality Monitoring	ILoS	Identification of need	Water quality monitoring to set benchmark levels and identify potential problems

Table 4-6 Capital projects under consideration (ILoS = increased level of service)

Vested assets — The Council will accept ownership of assets constructed by private developers. These are normally pipes and pump stations created as part of a land development subdivision. The assets will be accepted only if they are designed and constructed to the rigorous standards prescribed in the Code of Practice for Subdivision (NZS4404: 2004) and amended by MDC. The process is supervised by the Infrastructure Project Engineer and is subject to his final approval related to the quality of the assets.

Purchased assets — Specific assets may be purchased directly by Council staff. Generally there are sufficient in-house engineering skills to select the suppliers and evaluate the purchase options. External assistance from consultants may be sought when selecting suppliers of specialist plant and equipment.

4.4.1 Capital Investment Strategy

A number of techniques have been developed to identify and prioritise the demands for new and upgraded infrastructure. These are discussed in more detail in the chapters relating to levels of service and future demand (chapters 2 and 3).

Dynamic hydraulic models have been developed to provide detailed and accurate predictions of capacity throughout most of the reticulation networks. The models for Havelock and Seddon are currently less advanced.

The models are built to represent the individual characteristics of each of wastewater networks, including their response to rainfall through infiltration and inflow. They are then used to simulate a demand pattern or system configuration. The outputs of the models are compared with the actual flows, pump run times and pressures of rising mains in the system so the models can be calibrated and verified.

Areas of low capacity can be found through the models. The causes of localised problems, such as under-sized pipes, inflow and infiltration, can be identified and solution options considered.

New developments, requests for connections to the system, or increases in demand, can be added to the model in order to predict the likely effects. The benefit of dynamic models is that multiple combinations of demand parameters can be compiled into different scenarios, the consequences can be quickly determined and possible remedies tested.

The models are used both in-house and by specialist design consultants to derive preliminary design solutions. Depending on the size and costs of the project, the design options may be peer reviewed. The models are constantly under review and development.

The upgrade to the Hardings Road STP with tertiary treatment through a new wetland, partial disposal through land irrigation and a new combined outfall was thoroughly discussed with all major stakeholders through a consultative committee process. This was particularly important due to the historic and cultural significance of the site to local iwi.

There is a current prediction that the area of land in Marlborough used for vine cultivation will increase by 29%. The provision of treatment for future industrial growth at the Blenheim wastewater treatment plant will need considerable forward planning to meet increased demand. Outline plans are prepared for the additional treatment but are not detailed until the extent and timing of the growth is more apparent. Council continues to consult with representatives from the industry although there is often a reluctance from businesses to reveal their future projections. The costs of upgrades are met by the industry and part of the planning process is to negotiate a method for recovering the costs.

Construction costs are one of the criteria to be considered when evaluating major investment projects. The whole life costs of the new infrastructural assets are evaluated along with the cultural, social and environmental implications. Tools and techniques such as Cost/Benefit Analysis, Assessment of Environmental Effects and Cultural Impact Assessments have recently been employed on major projects and will continue to be used.

The Council uses a variety of methods to communicate with communities that may be affected by proposed capital works, including consultation through the annual plan and long term plan (LTP) processes, meetings with residents' associations, distribution of pamphlets to households and information on the Council's website. Consultative working groups are particularly valuable for specific larger projects. Many community concerns can be raised and addressed through the group meetings.

Vested Assets — The Council will accept ownership of assets constructed by private developers. These are normally extensions to the reticulation to serve new subdivisions. The assets will only be accepted if they are designed and constructed to rigorous standards. The process is supervised by the Infrastructure Project Engineer and subject to their final approval regarding their quality.

Purchased Assets — The Council has previously purchased wastewater assets or taken them over by agreement from private owners. There are no plans for similar acquisitions in the future.

4.4.2 Summary of Future Costs

In the past the wastewater capital works programme has been adjusted to meet the overall Council rating target. Deferment of major capital expenditure has been one of the techniques used to reduce overall Council expenditure and balance the budget.

The capital budget is shown in Appendix 8: Stormwater Capital Budget 2021-2031. The budget is based on the Council engineers' estimates or outlines cost estimates and includes contract costs, design, supervision, land purchase, access costs and a contingency sum. The estimates are moderately to highly accurate. However, the programme has traditionally been optimistic as it assumes the optimum progression through the feasibility, design, public consultation, consent approval and land purchase processes. This is a conservative, but necessary, assumption to ensure that all necessary funding is in place for the programmed start date. However, the progression of construction projects is seldom straightforward and unspent finance is carried forward to future budgets. This needs to be carefully managed to ensure undue costs are not incurred through capital funds being misaligned with expenditure.

Error! Reference source not found. shows the distribution of costs between growth, level of service and renewal for the major capital schemes proposed over the next ten years. The capital investment outline over 30 years is shown in the Infrastructure Strategy 2021-51.

Asset Type	Project	LoS %	Growth %	Renewal %	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031
Combined														
Connections	New Connections		100%		$0.5M									
Blenheim														
Pipelines	Murphys Creek Pipeline	35%	65%		$3.7M									
Pipelines	Redwood St - Muller to Stephenson)			100%		$1M								
Pipelines	Muller Rd stormwater renewal			100%	$3.6M									
Pipelines	Scott St, Lewis St to Redwood St			100%			$0.75 M							
Pipelines	Stephenson to Stuart St	100%							$1M					
Pipelines	Graham St - Stephenson - Boys college - Francis St			100%						$2.5M				
Pump Stations	Water Quality infrastructure for Kinross St	100%			$0.25 M									
Picton														
Pipelines	Pipelines	100%			$0.29M									
Blenheim, Picton, Renwick														
Pipelines	Pipeline Renewals			100%	$0.29M									

Table 4-7 Stormwater Capital Project and their Drivers

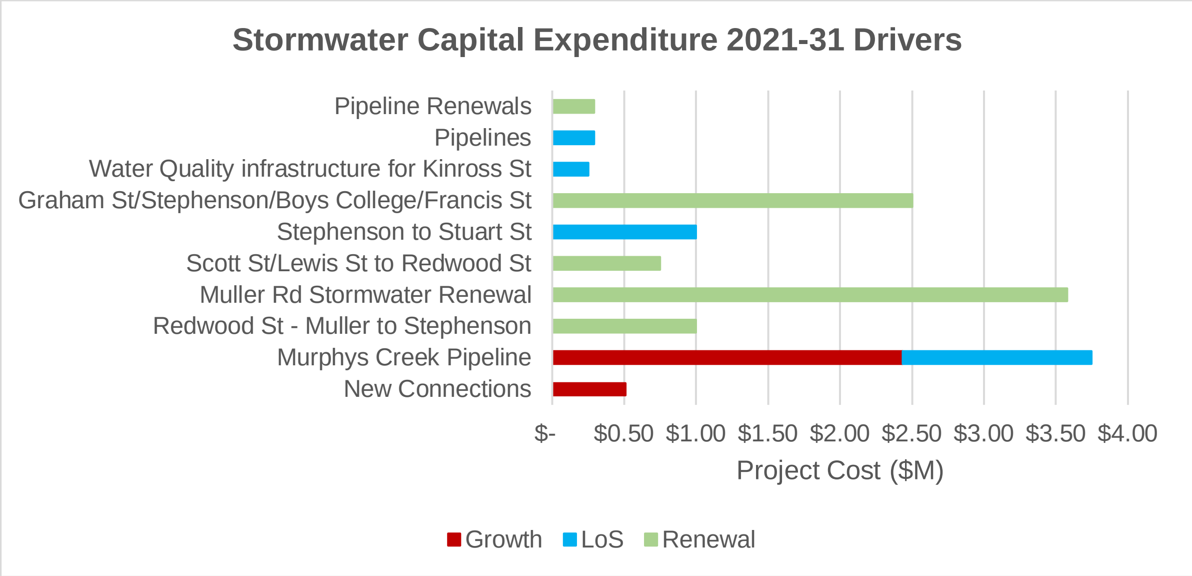


Figure 4-10 Stormwater Capital Expenditure 2021-31 Drivers

4.5 Disposal Plan

There is a need to plan for the disposal of assets that are no longer operational. The plan recognises the costs and benefits of redundant assets.

Underground assets are normally decommissioned and left in the ground. They have a residual value as they can often be re-commissioned, or the pipelines can be used as conduits for other services. However, they may also represent a continuing cost of ownership through the liability of collapse or ground subsidence, require continued maintenance, create unwanted flow paths for groundwater or present an obstacle to other services.

Chapter 5: Financial

The stormwater supply activity accounts for around 2.1% of Council expenditure. The stormwater activity is significantly smaller than water supply and wastewater but implementation of this asset management plan will have important consequences for the overall budget, and for ratepayers and other sources of funding which support this activity.

Pressures to improve the quality and quantity of stormwater have been discussed in chapters 2 and 3 of this plan. Affordability has been highlighted as a key challenge in the Infrastructure Strategy, which is exacerbated by the anticipated change in demographics in the region over the 30 year span of the strategy. The Council has developed financial plans and strategies to meet the financial demands of the future. A summary of the direction signalled in these financial plans and strategies is outlined in section 5.1 below.

Generally, these financial data and projections are for the ten year period 2021-31. Longer term forecasts are included in the Infrastructure Strategy.

Components of the Financial Section

5.1 Financial Strategy and Projections

The Council has developed a number of key strategies and plans that meet statutory requirements and explain how the financial demands of the future will be met. Documents such as the Financial Strategy, the Revenue and Financing Policy, the Treasury Policy and the Development Contributions Policy form the basis for Council's financial planning.

The policies and plans are regularly reviewed and updated. The cycle usually corresponds with the three-year update of the Long Term Plan.

The Council's financial statements are published in detail in the Long Term Plan and the Annual Reports. They are prepared in accordance with the Local Government Act 2002 and comply with Generally Accepted Accounting Practices in New Zealand. They comply with New Zealand's International Financial Reporting Standards (NZIFRS) and other applicable financial reporting standards as appropriate to public benefit entities. All documents are scrutinised and approved by Audit New Zealand.

The Financial Strategy was updated and published for public consultation in April 2021. The strategy seeks to demonstrate how Council will:

- ensure that the levels of rates and borrowing are financially sustainable and kept within pre-set limits
- maintain levels of service
- maintain the assets it owns on behalf of the community
- provide for growth and changing demand patterns within the District
- fund improvements to infrastructural and other community facilities
- manage Council's investments and liabilities.

Council's responsibility for financial prudence is defined by statutory obligation and is recognised in the Financial Strategy:

"Under section 101 of the Local Government Act 2002, Council considered its financial management responsibilities where it must manage revenues, expenses, assets, liabilities, investments and general financial dealings prudently and in a manner that promotes the current and future interests of the community. The Council also considered whether it was sustainable to undertake the level of capital expenditure proposed in the Long Term Plan together with increased operating costs associated with the higher debt level. If the Council has too much debt then future ratepayers will subsidise current ratepayers. If population growth, which is expected to fund the growth portion of assets incorporated into the capital expenditure programme, does not occur or occurs at a slower rate this may either increase rates or slow the delivery of capital projects.

"The policy of fully funding depreciation except for Community Assets has been continued in the Long Term Plan 2021-31 and is considered an appropriate measure to ensure the concept of intergenerational equity is maintained. That is, current ratepayers will pay for its use and a share of its replacement cost in relation to the assets provided."

The strategy continues with regard to maintaining the assets in the following way:

"The policy of fully funding depreciation except for Community Assets has been continued in the Long Term Plan and is considered an appropriate measure to ensure the concept of intergenerational equity is maintained. That is, current ratepayers will pay for its use and a share of its replacement cost in relation to the assets provided."

Regarding growth, the strategy states:

"Council believes that, as development increases the consumption of its current infrastructure capacity and accelerates the requirement for new infrastructure, developers should bear the cost of this increased demand.

"Through the application of its Development Contributions Policies to fund the cost of this additional infrastructure, Council is seeking to achieve an appropriate balance between encouraging growth and reducing the potential for additional burden on the ratepayer.

"Undertaking development in a planned, co-ordinated manner can reduce costs as infrastructure development is not responding to "adhoc requests" for isolated, scattered, piecemeal development. Responding to adhoc development can mean that parts of the infrastructure networks are replaced earlier in their life than optimum while allowing other parts of the network to remain comparatively underutilised."

Regarding levels of service the strategy states:

"During the development of the 2021-31 Long Term Plan, the Council considered how to maintain its current levels of service, operating expenditure and capital expenditure needed to replace existing assets and provide new infrastructure and facilities to meet the levels of growth that are forecast within the 10 years of the Long Term Plan. The Long Term Plan as presented should, for the majority of activities, enable Council to maintain current levels of service."

Stormwater infrastructure will develop over the course of the plan in response to urban growth, improvement to the level of service and providing additional resilience to climate change impacts.

The Financial Strategy makes it clear that to achieve the required financial prudence there were four main factors to consider:

- *The estimated expenses of achieving and maintaining the predicted levels of service provision set out in the Long Term Plan, including the estimated expenses associated with maintaining the service capacity and integrity of the assets throughout their useful life;*
- *The projected revenue available to fund the estimated expenses associated with maintaining the service capacity and integrity of assets throughout their useful life;*

- *The equitable allocation of responsibility for funding the provision and maintenance of assets and facilities throughout their useful life;*
- *The funding and financial policies.*

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

The strategy identifies that in general:

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

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

The major stormwater projects are primarily to:

- provide stormwater facilities for new subdivisions whilst protecting downstream areas
- improve the quality of stormwater discharges to the environment
- upgrade existing infrastructure to meet the levels of service and cope with urban infill and climate change.

The renewals expenditure based on expected useful life has been budgeted to "fill the gaps" between the major projects.

Beyond the planning horizon of the asset management plan and into the later 15 years of the Infrastructure Strategy the focus of capital expenditure is forecast to move to renewals. The capital investment outline over 30 years is shown in the Infrastructure Strategy 2018-48.

5.1.1 Operational Maintenance Expenditure

There are increasing pressures on the operational expenditure from a number of causes:

- improved levels of service may require additional cleaning and routine maintenance to ensure reliable drainage
- growing infrastructure will require additional maintenance and depreciation costs
- maintenance of ageing infrastructure will require additional maintenance
- an increased asset condition assessment programme will be necessary to assist with renewals planning
- mitigation of risks through insurances will fluctuate as national and international insurance markets respond to demand and claims.

The financial impact of these decisions have been estimated and included in budget projections into the future (see Table 5-1.)

Historical operational expenditure is discussed in Chapter 4 (Lifecycle Management).

	Stormwater - 2021-31 (inflated)									
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Reticulation - mains maintenance	118,500	113,368	116,270	119,494	122,932	126,371	130,347	134,753	139,373	143,672
Reticulation - open drains maintenance	36,000	37,272	38,226	39,286	40,416	41,547	42,854	44,302	45,821	47,235
Reticulation - connection maintenance	21,125	21,871	22,431	23,053	23,716	24,380	25,147	25,997	26,888	27,717
Monitoring	15,000	15,530	15,927	16,369	16,840	17,311	17,856	18,459	19,092	19,681
Pump Stations - power	10,000	10,353	10,618	10,913	11,227	11,541	11,904	12,306	12,728	13,121
Reticulation - manholes maintenance	9,750	10,094	10,353	10,640	10,946	11,252	11,606	11,999	12,410	12,793
Reticulation - berm sump maintenance	6,000	6,212	6,371	6,548	6,736	6,924	7,142	7,384	7,637	7,872
Pump stations - other	2,000	12,424	7,433	24,008	2,245	2,308	2,381	2,461	2,546	2,624
Pump stations - mechanical	1,500	1,553	1,593	1,637	1,684	1,731	1,786	1,846	1,909	1,968
Pump stations - telemetry	300	311	319	327	337	346	357	369	382	394
total infrastructure costs	**220,175**	**228,989**	**229,540**	**252,273**	**237,080**	**243,711**	**251,379**	**259,876**	**268,787**	**277,076**
operating costs	99,460	100,837	103,417	106,256	109,277	112,298	115,770	119,606	123,624	127,383
depreciation	1,762,299	1,891,811	1,995,758	2,080,817	2,175,747	2,282,290	2,395,246	2,501,791	2,601,711	2,703,383
interest expense	6,459	5,103	3,693	2,224	778	105	78,229	276,838	389,526	375,354
overheads allocated	380,698	396,485	409,199	417,403	428,704	440,166	452,282	465,092	478,558	491,055
Total operating costs	**2,469,092**	**2,623,225**	**2,741,607**	**2,858,974**	**2,951,586**	**3,078,571**	**3,292,906**	**3,623,204**	**3,862,207**	**3,974,251**

Table 5-1 Projected operational expenditure 2018-28

5.1.2 Capital Expenditure

The major focus for capital expenditure over the first years of the plan will be the upgrades to the Blenheim Stormwater Management Areas of Redwoodtown/Town Branch, Murphy's Creek, Casey's Creek and Fulton's Creek

The following charts show the major projects of the capital investment programme.

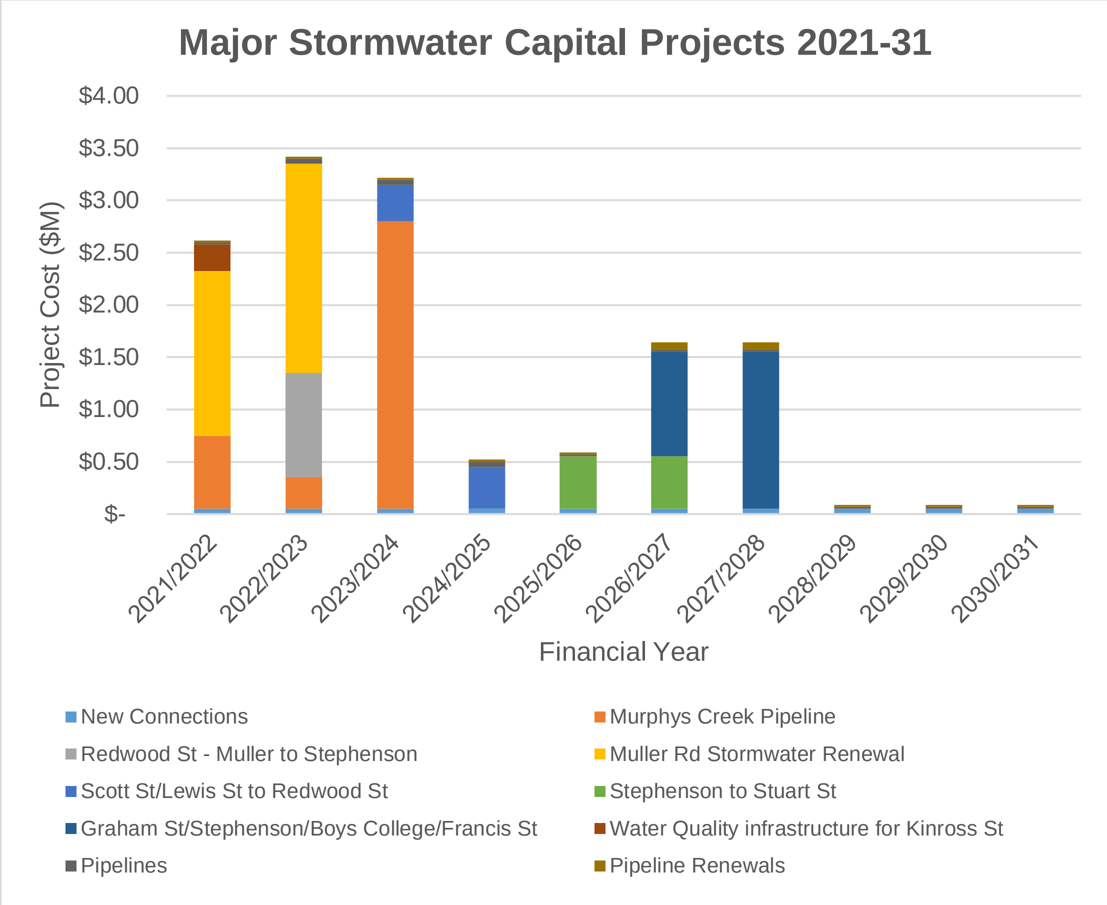


Figure 5-1 Major capital projects 2021-31

The proposed timing of the capital expenditure is shown in Figure 5-1. However, the actual timing of the delivery of the capital programme is highly dependent on preliminary investigation and preparation — resource consent approval, land purchase, public consultation, etc. Thorough investigation is time consuming but valuable to ensure smooth progress of works and certainty of contract cost and delivery. It is common to under-estimate the time required for project preparation to ensure Council approval and funding are sourced in good time. However, unnecessary finance servicing costs can be incurred if funds are secured too early and not spent.

In the past five years the Council's overall actual Capital Expenditure has ranged from $1.21M in 2015 to $2.4M in 2019 with an average of $1.67M. Over the past five years, actual spend has been above the budget. This is shown in Figure 5-2 Stormwater CAPEX Budget vs Actual.

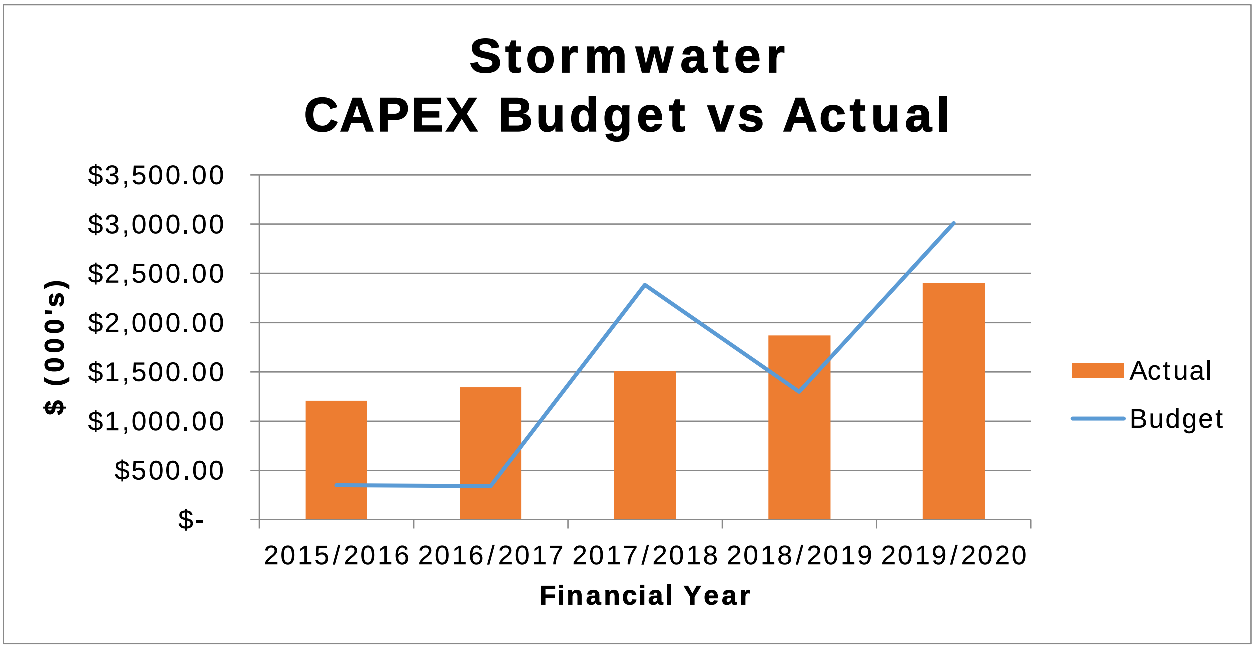


Figure 5-2 Stormwater CAPEX Budget vs Actual

Capital project timing has been delayed due to:

- finalising community consultation
- obtaining land access
- obtaining resource consents
- accessing available external professional expertise
- receiving acceptable contract prices and contractor availability.

As described throughout the Infrastructure Strategy, there are many projects and some demand for improved services from all of the core activities. However, it is unlikely that projects will rapidly overcome the obstacles described and accelerate much beyond an annual expenditure of $71M. It has there been decided to limit capital financing to $71M per annum for the first three years of the LTP. The effect that has on the Stormwater Capital Programme is shown in detail below.

	Stormwater - 2021-31 (inflated)									
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Stormwater: Blenheim										
renewal	1,623,667	2,070,658	-	-	-	57,704	59,519	-	-	-
other capex	1,190,000	1,594,406	3,542,596	698,410	830,775	2,008,086	8,082,699	6,509,971	305,476	314,897
Stormwater: Havelock										
renewal	-	-	-	-	-	-	-	-	-	-
other capex	1,000	1,035	1,062	1,091	1,123	1,154	1,190	1,231	1,273	1,312
Stormwater: Picton										
renewal	359,000	9,318	9,556	9,821	16,279	10,387	10,713	11,076	11,455	11,809
other capex	25,000	56,943	58,400	60,020	28,067	28,852	29,760	30,765	31,820	32,802
Stormwater: Renwick										
renewal	10,000	10,353	10,618	10,913	11,227	11,541	11,904	12,306	12,728	13,121
other capex	3,000	3,106	3,185	3,274	3,368	3,462	3,571	3,692	3,818	3,936
Stormwater: Spring Creek										
renewal	-	-	-	-	-	-	-	-	-	-
other capex	2,000	2,071	2,124	2,183	2,245	2,308	2,381	2,461	2,546	2,624
level of service										
growth										
capitalised overheads										
Total capex	**3,213,666**	**3,747,890**	**3,627,543**	**785,711**	**893,083**	**2,123,494**	**8,201,737**	**6,571,502**	**369,117**	**380,500**
level of service	515,000	160,476	1,073,733	54,563	583,788	600,118	23,808	24,612	25,456	26,241
growth	706,000	461,757	2,161,996	273,908	281,790	289,672	6,310,219	6,523,507	319,477	329,330
renewal	1,992,667	3,125,658	391,814	457,240	27,505	1,233,704	1,867,711	23,382	24,184	24,929
Total capex	**3,213,666**	**3,747,890**	**3,627,543**	**785,711**	**893,083**	**2,123,494**	**8,201,737**	**6,571,502**	**369,117**	**380,500**

Table 5-2 Stormwater Capital Budget 2021-2031

The following table (Table 5-3) shows the projected capital expenditure through to 2051 and corresponds to the objectives in the Infrastructure Strategy.

	Stormwater 2021-51 (Inflated)					
	21-26	26-31	31-36	36-41	41-46	46-51
Stormwater: Blenheim						
renewal	3,694,324	117,223	-	-	-	-
other capex	7,856,188	17,221,129	-	-	-	-
Stormwater: Havelock						
renewal	-	-	-	-	-	-
other capex	5,311	6,160	-	-	-	-
Stormwater: Picton						
renewal	403,974	55,440	-	-	-	-
other capex	228,430	153,999	-	-	-	-
Stormwater: Renwick						
renewal	53,111	61,600	-	-	-	-
other capex	15,933	18,480	-	-	-	-
Stormwater: Spring Creek						
renewal	-	-	1,435,254	5,127,447	15,503,453	22,295,261
other capex	10,622	12,320	-	-	-	-
level of service						
growth						
capitalised overheads						
Total capex	**12,267,894**	**17,646,350**	**1,435,254**	**5,127,447**	**15,503,453**	**22,295,261**
level of service	2,387,560	700,236	717,627	2,563,723	7,751,726	31,065,765
growth	3,885,450	13,772,205	717,627	2,563,723	7,751,726	31,065,765
renewal	5,994,884	3,173,909	1,435,254	5,127,447	15,503,453	22,295,261
Total capex	**12,267,894**	**17,646,350**	**2,870,508**	**10,254,894**	**31,006,905**	**84,426,792**

Table 5-3 Project Capital Expenditure 2021-51

5.1.3 Growth/Levels of Service/Renewals

In accordance with Schedule 10(3) of the Local Government (Financial Reporting) Regulations 2011, capital expenditure budgets are apportioned between three elements — renewal, improvement in levels of service and growth. Correctly apportioning the costs is important to ensure funding is retrieved from the appropriate sources. It is normally obvious at the outset of a capital project as to the main 'driver' — growth, level of service or renewal. The council's strategy to apportioning costs is to assess the expired/remaining life of an asset and to attribute the depreciated value of the life-to-date to 'renewal'. This value is obtained from the annual asset revaluation. The remaining costs are apportioned between growth and level of service according to the additional capacity or improvement experienced by the customers.

In instances where new assets are built or modern, serviceable assets are replaced it is possible to assign costs to growth and/or levels of service only.

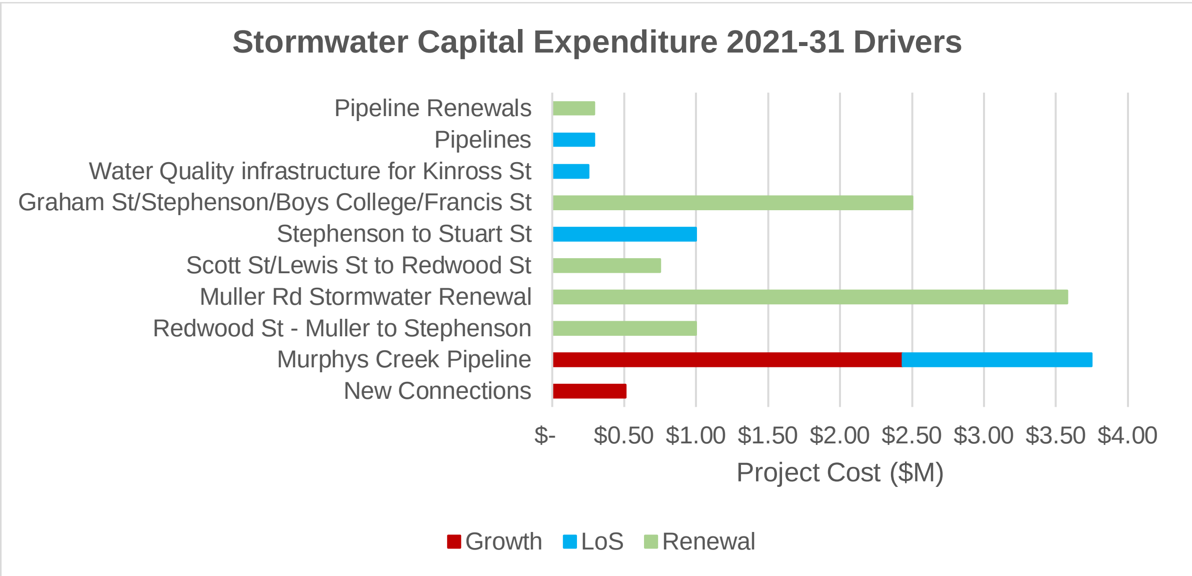


Figure 5-3 Stormwater capital investment by main drivers

Figure 5-33 show how the costs of the major capital projects have been attributed to the major drivers — growth, level of service and renewals. This information is used within the financial models to ensure funding is collected from the appropriate source.

5.2 Funding Strategy

The Revenue and Financial Policy sets out the sources of funding available to Council and how the funding source is allocated between different activities and the drivers for expenditure (growth, level of service and renewal).

There are several sources of funding for the stormwater activity — general rates, targeted rates, lump sum contributions, fees and charges, interest and dividends from investments, borrowing, proceeds from asset sales, development contributions, grants and subsidies and other sources as permitted by statute.

In determining which funding sources were appropriate, Council considered the following matters in relation to each activity to be funded:

- the community outcomes to which the activity primarily contributes
- the distribution of benefits between the community as a whole, any identifiable part of the community, and individuals
- the period in or over which those benefits are expected to occur
- the extent to which the actions or inaction of particular individuals or a group contribute to the need to undertake the activity
- the costs and benefits, including consequences, for transparency and accountability, of funding the activity distinctly from other activities
- the overall impact of any allocation of liability for revenue needs on the current and future social, economic, environmental, and cultural well-being of the community.

The sources of funding and the approach taken by Council are listed in the Revenue and Financing Policy, which highlights the funding sources for every Council activity and any sub-activity which may exist. The policy shows the rating tools which Council has determined to be fair and equitable for each activity.

As noted previously, the stormwater activity contributes to the Community Outcomes of:

- **Environment** by providing urban drainage networks that effectively manage flood risk and control potential surface contamination from entering aquatic environments
- **People** and **Economy** by providing a safeguard against stormwater flooding of residential and commercial property.

The beneficiaries of the stormwater systems are identified in the Revenue and Financing Policy in the following way

"Owners of developed properties require that there are systems for the collection and disposal of stormwater. Developers who are adding to the demands placed on schemes which require the Council to undertake new capital works related to growth will also contribute to these costs."

Separate Targeted Rates and Charges

"The benefit of funding drainage distinctly is that only those within urban drainage areas will contribute to their funding and rural drainage systems will be funded by rural areas."

The Council considers separate targeted rates are the most equitable funding mechanism for stormwater services based of the benefits assessed for the targeted area.

5.2.1 Operational Expense Funding

Prior to determining the "residual amount to be funded by general-type rates", Council identifies all other funding sources appropriate to the type of cost incurred for the stormwater service after the exclusion of fees, charges, subsidies, grants and general revenue.

Fees and Charges — These have been set at a level to recover private benefits where it is practical and economic to do so, unless there have been determinations arising from previous funding reviews to fund all or part of such benefits from rates.

Grants and Subsidies — These are sought and applied for whenever they are available.

General Revenues — These are allocated to geographic rating areas in proportion to the gross general-type rates and charges.

The Council has determined the fair and equitable charge for the operational costs of the stormwater service to be funded through a combination of general rates, uniform annual charges and metered charges. The allocation of charges is dependent on geographical location and the details are included in the Long Term Plan.

Funding of Capital Investment

The sources of funds for capital expenditure are as follows:

- development and financial contributions.
- capital grants and subsidies (where available).
- user charges.

- general revenue sources.
- Council financial reserves, including Depreciation Reserves.
- loans
- targeted rates (directly charged).

5.2.2 Development Contributions Policy

The purpose of the Development Contributions is to recover an appropriate proportion of the costs of growth-related capital expenditure from participants in the property development process, rather than from general rates or any other indirect funding source. The full policy is included in the LTP.

Marlborough District has experienced significant growth over the last decade. Although this is often hailed as positive for the community, growth also presents a number of challenges. Not least is Council's task of expanding infrastructure networks to support the increased use of essential services.

The cost of expanding these networks is often high, and the issue of funding inevitably arises. Funding the expansion of these core networks entirely from general rates (or other indirect means) is inequitable, because existing ratepayers may neither cause these works to occur, nor materially benefit from them. As a result, alternative means for funding these capital works must be considered. Development Contributions is one such source.

Council considers the use of the Development Contributions mechanism under the Local Government Act 2002 to provide a fair and robust means of recovering the cost of growth as compared to charging ratepayers.

Council adopted a Development Contributions Policy that became effective 1 July 2009. The Development Contribution Policy is reviewed three yearly and updated based on the latest forecasts.

The latest review of the full policy is included in the Long Term Plan 2021-31. The Development Contributions Policy replaces the Financial Contributions that were operative under the Resource Management Plans.

Charges are calculated for each catchment and each activity on the basis of:

- the expected scale and timing of capital works required to service growth
- the expected rate and timing of developments for which the works are required.

The growth projections used to determine income from Development Contributions in the modelling are based on long run straight line averages using the Department of Statistics population projections.

The capital expenditure used for modelling what the appropriate charges include:

- expenditure previously incurred to create spare capacity to enable future development to occur
- expenditure beyond the ten year programme which is required to cater for the cumulative effects of growth
- an assessment of expenditure which relates to future growth beyond the life of the LTP.

Development Contribution amounts are calculated and applied in terms of Household Equivalent Units (HEU) for each respective service.

At the time of Development application including Building Consent, Resource Consent, and Service Connection applications, the Household Equivalent Unit calculation is completed for each respective service and multiplied by the corresponding amount to achieve the Development Contribution payable to Council.

The due date for payment is typically:

- For subdivision resource consents – prior to issue of the section 224(c) certificate
- For other resource consents – 180 days from granting or prior to the commencement of consent, whichever is earlier.
- For building consent – 180 days from granting or prior to Code Compliance Certificate, whichever is earlier.
- For certificates of acceptance – prior to granting the Certificate.
- For service connections – prior to connection.

5.3 Valuation Forecasts

5.3.1 Asset Valuation

The asset valuation has been undertaken annually since 2008. The asset register of stormwater reticulation consists of nearly 4,000 pipes with individual age, length, diameter and life expectancy characteristics. A data set has been collected of the out-turn costs of stormwater and wastewater pipeline renewal contracts. From this data set a cost curve has been established and unit rates for pipe-laying estimated. The rates are reviewed and updated each year and used in the re-valuation. A summary of recent valuations is shown in The Gross Replacement Cost is the sum of the replacement costs of each of the components if it is replicated with *modern equivalent asset* and recognises the use of modern materials, standards and installation techniques to replicate the existing system.

The Depreciated Replacement Cost distributes the value of the asset across its useful life.

“The way in which depreciation is allocated over the life of the asset must reflect the pattern in which the assets’ future economic benefits are expected to be consumed by the entity.” (NZ International Accounting Standard 16).

The above straight line depreciation is considered appropriate for the assets included in this valuation. The Depreciated Replacement Cost has therefore been calculated by:

Depreciated Replacement Cost = Replacement Cost x (Remaining Life/Life Expectancy).

The Annual Depreciation (Decline in Service Potential) spreads the current value of the asset across the remaining life of the asset. (Depreciated Replacement Cost /Remaining Life).

It is Council policy to fully funded depreciation. The Annual Decline in Service Potential is used for determination of Council’s general and targeted rates for the funding of future infrastructure renewal. The Annual Decline in Service Potential of Wastewater Assets at the time of the 2020 Valuation was $3.52M.

The valuation provides fundamental information for the Long Term Plan as required by Schedule 10 of the Local Government Act 2002. It has been prepared in accordance with the New Zealand Accounting Standards Board Public Benefit International Public Sector Accounting Standard 17 – Property, Plant & Equipment (PBE IPSAS 17) and follows the guidance provided by the National Asset Management Steering Group (NAMS) in the New Zealand Infrastructure Asset Valuation and Depreciation Guidelines, Version 2 (2006).

An annual report is compiled by the Asset Management Engineer in collaboration with the engineering managers. It is peer reviewed by an independent external valuer and scrutinised by auditors from Audit NZ.

A sharp increase in the valuation occurred in 2008 when the unit rates were re-assessed. Prices had increased as a result of high global demand and an economic boom in many international markets. Since then prices have stabilised substantially although there is evidence that the current rates are again under pressure. The rates have not been increased in response to the latest data as it is not clear if the prices are a transient spike or a long term trend.

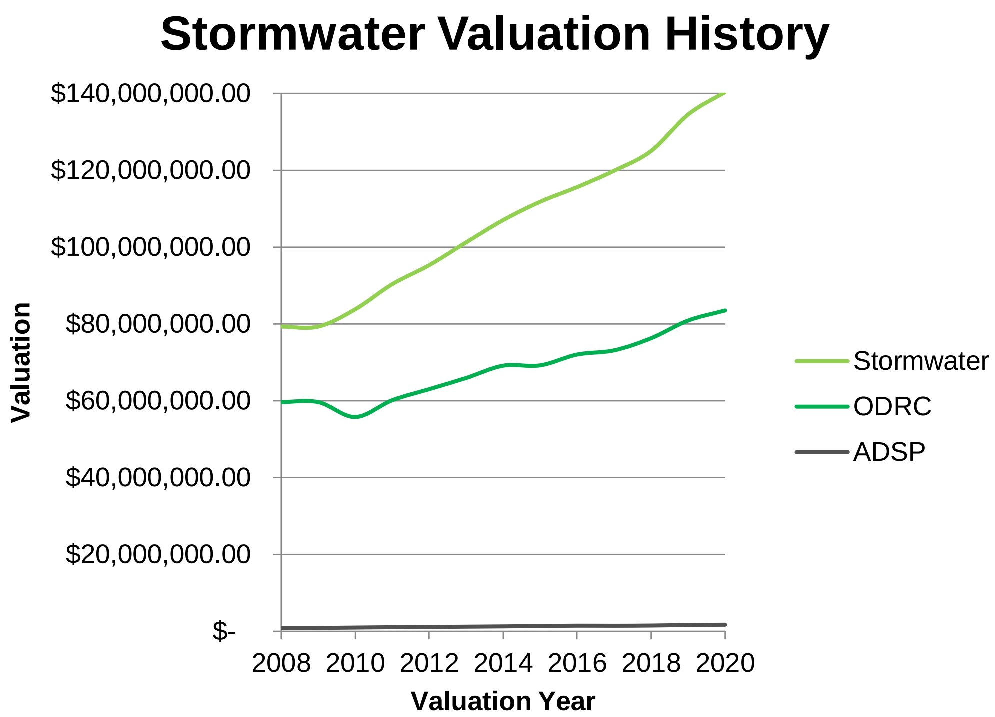


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Figure 5-4 Stormwater Asset Valuation History

New assets are added to the register as they are bought, built or vested to the Council. There has been a steady increase in assets in recent years as new subdivisions have been developed, including new stormwater treatment structures.

New assets are added to the register as they are bought, built or vested to the Council.

5.3.2 Depreciation Methodology

The Gross Replacement Cost is the sum of the replacement costs of each of the components if it is replicated with *modern equivalent asset* and recognises the use of modern materials, standards and installation techniques to replicate the existing system.

The Depreciated Replacement Cost distributes the value of the asset across its useful life.

"The way in which depreciation is allocated over the life of the asset must reflect the pattern in which the assets' future economic benefits are expected to be consumed by the entity." (NZ International Accounting Standard 16).

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5.3.3 Revaluation Rates

In recent years the revaluation rates have been increased by the application of an index derived from the Capital Goods Price Index published by Statistics New Zealand.

A cost curve has been established by graphing the out-turn costs of pipe renewals contracts undertaken within the region. The data is updated with all new contract costs. Between 2013 and 2015 an additional 8% was factored into the rates for pipe-laying and 12% for plant and equipment. The increase to contract rates covers design, supervision and other overheads.

Recent tender prices have shown a sharp increase in pipe-laying costs, particularly at larger diameters. Whilst these have been added to the data, the cost curve has not been realigned as there is some doubt as to whether this is a permanent increase in prices or a transient peak. Council will continue to review and adjust them as necessary.

In 2017 revaluation rates were exchanged with five other local authorities and information from a survey by Hayes Consulting. No immediate adjustments were required as a result of the comparison.

In the foreseeable future depreciation will continue to be calculated on a straight line basis.

There are significant and unpredictable risks to the valuation process — including prices of raw materials, local plant and labour costs, and fluctuations in international exchange rates. Perhaps the major risk to future valuations is a significant shift in life expectancy of a large group of assets, if either a material type is deteriorating faster than expected or an external influence is causing accelerated deterioration to an assets group.

The earthquake in November 2016 caused some damage to the wastewater reticulation. Subsequent CCTV surveys has shown significant damage to the stormwater and wastewater earthenware pipes. The surveys have not been completed but in 2017 there was sufficient evidence to reduce the life expectancy of wastewater and stormwater earthenware and vitreous clay pipes to a maximum of five years.

Optimisation

The Marlborough stormwater systems are relatively young and continuing to expand as the population continues to grow. None of the systems are over-designed or have significant redundant capacity. There are no opportunities for optimisation identified at this time.

5.4 Key Assumptions

The key assumptions including the level of uncertainty, risk and financial impact for all Council activities are described in the Long Term Plan – see Appendix 6 – LTP Assumptions.

Topics include: legislation, inflation, interest rate on Council borrowing, population growth, economic life, subsidy rates, natural disasters, taxation framework, asset ownership and valuation, sources of funding for capital projects, climate change and the emissions trading scheme and resource consents.

Issues specific to stormwater assets are described below or in greater detail elsewhere in this asset management plan.

Pipe life expectancy is based on the NAMS Guidelines with the exception of asbestos cement which is based on the tables in the New Zealand Asbestos Cement Watermain Manual 2001. The life expectancy varies with the diameter of the pipe and the subsequent wall thickness. Life expectancy of the diameters has been capped at 100 years.

Replacement of reticulation pipework will be with modern materials — PVC, polyethylene, ductile iron, steel or concrete. All plant and equipment will be replaced with modern equivalents.

Pipe-laying rates are inclusive of manholes, valves, hydrants, air valves, fittings apparatus and branch connections. The rates are an average across all ground conditions and depths and include trench support and de-watering.

Reticulation pipework below a nominal diameter of 75 mm is assumed to be predominantly installed in non-carriageway locations and with a proportion of low-dig installation techniques. Assumptions on pipe life expectancy have been described above.

Service lines are valued separately at connection fee rate. An adjustment is made if meters are included in the rate and the meters valued separately.

The adopted life expectancies suggest there is a significant amount of pipe-work that is beyond its theoretical life. A programme of targeted pipe surveys is to be undertaken in the future to determine condition trends and amend life expectancy if necessary.

The life expectancy of plant and equipment assumes the continuation of the good standard of planned pre-emptive maintenance currently undertaken. The NAMS guidance on life expectancy has generally been followed unless there is clear local evidence to the contrary.

Reticulation Assets	Diameter (mm)	USL (years)	National AC Pipe Manual USL Envelope (years)
Asbestos Cement	20-40	38	
	50	38	38-40
	75-80	43	14-42
	100	53	17-52
	150	72	17-67
	200	90	21-70
	225	100	21-75
	250	98	39-67
	300-375	100	21-99
	≥ 450	38	28-135
Asbestos Cement in Renwick	All	*4	
Aluminium	All	75	
Cast Iron	All	100	
Cured in Place Pipeline (CIPP - Relining)	100-150	77	
	225	80	
	250	98	
Concrete	All	80	
Copper	All	40	
Drum	All	50	
Ductile Iron	All	100	
Earthenware	All	77	
Earthenware WW & SW in Blenheim and Picton	All	*4	
EW Relined	All	*60	
Fibreglass	All	100	
Field Tile	All	75	
Novaflow	All	60	
PE	All	100	
PVC	All	100	
Ribstop (Relining)	All	75	
Steel	All	100	
Steel - Galvanised Seddon/Awatere	All	40	
Vitrified Clay	All	80	

Non-Reticulation Assets	Civil	Electrical	Mechanical
Biofilter	40	25	
Pump Station	40	25	40
Source			
Storage			
Treatment Plant	100	25	*40|80|100
Meters		10	10

Table 5-4 Asset. Life expectancies used in revaluation

5.4.1 Data Confidence

The data quality is regarded as good. Of the pipes recorded in the asset management database one or more of the attributes (age, diameter or material type) was missing for around 1% of records. Estimates were made for the missing data based on adjacent pipes or the known history of land drainage in the area.

The following table provides an indication of the quality of data held regarding the stormwater reticulation in each of the service areas.

Quality of Asset Data - All Stormwater Mains							
INSTALLATION DATE RELIABILITY							
Reliability		# assets		Length (m)		Value ($)	
0	Unknown	1309	16%	25445.5	14%	$ 20,264,343.07	15%
1	Actual data known	3639	45%	86484.1	46%	$ 64,679,648.54	47%
2	Data based on confidence of other attributes	2201	27%	55876.6	30%	$ 38,077,170.13	27%
3	Best guess to nearest decade	905	11%	19991.4	11%	$ 15,790,012.26	11%
MATERIAL RELIABILITY							
Reliability		# assets		Length (m)		Value ($)	
0	Unknown	685	9%	13879.3	7%	$ 10,316,345.21	7%
1	Actual data known	5772	72%	143734.3	77%	$ 106,552,492.80	77%
2	Data based on confidence of other attributes	1145	14%	23034.3	12%	$ 16,859,119.50	12%
3	Best guess to based on dia or install date	452	6%	7149.7	4%	$ 5,083,216.49	4%
DIAMETER RELIABILITY							
Reliability		# assets		Length (m)		Value ($)	
0	Unknown	638	8%	13684.3	7%	$ 10,337,556.51	7%
1	Actual data known	6379	79%	158801.6	85%	$ 117,366,948.28	85%
2	Data based on confidence of other attributes	765	9%	12104.3	6%	$ 8,767,008.89	6%
3	Best guess to based on material or install date	272	3%	3207.4	2%	$ 2,339,660.32	2%
TOTAL DATA QUALITY							
Reliability		# assets		Length (m)		Value ($)	
0	Unknown	2632	11%	53009.03	9%	40918244.79	10%
1	Actual data known	15790	65%	389020.1	69%	288599089.6	69%
2	Data based on confidence of other attributes	4111	17%	91015.16	16%	63703298.52	15%
3	Best guess to based on other attributes	1629	7%	30348.52	5%	23212889.07	6%

Quality of Asset Data - Stormwater Mains	C

Table 5-5 Estimate of Data Quality

Chapter 6: Plan Improvement and Monitoring

Council asset management practices and processes are continually evolving to help improve decision making related to the operation and investment in high value infrastructure. New data collection practices are being deployed. Advances in electronic data management and performance monitoring technology is providing improved information to support key decisions.

Previous asset management plans and subsequent decisions are reviewed and the plan is adjusted to meet the changing demands of customers and stakeholders and to match the financial realities of the future.

Components of the Improvement and Monitoring section

6.1 The Status of Asset Management Practices — current and desired state of AM processes, data and systems.

6.2 2014 Improvement Programme Review — review of progress on the 20015/25 improvement programme.

6.3 2018–21 Improvement Programme — issues identified and to be progressed.

6.4 Monitoring and Review Procedures — includes three yearly AMP reviews, annual asset revaluations, and six monthly monitoring of levels of service.

6.5 Performance Measures — including the national non-financial performance measures.

6.1 Status of Asset Management Practices

6.1.1 Asset Management Information System

The Assets & Services Department has used proprietary databases for the collection of asset data for over 20 years. A project was commenced in 2011 to upgrade the asset management information system. The project was led by the Information Systems Department and a small team of subject experts. External consultants were employed to examine the asset management information needs throughout the Council including Reserves, River Control, Regulatory, Fleet, Libraries, Property, the Harbour Master and others.

In February 2013 the Works and Assets module of the TechnologyOne software was purchased. Extensive effort was required to build and configure the software to meet the needs of water, wastewater and stormwater asset management. The project evolved to include the revision and integration of the financial accounting system. In December 2014 all data from the previous (Hansen) database was migrated and the new system went live.

The register of assets and their attributes is stored in the Asset Management Information System (AMIS) along with the maintenance history, maintenance schedules and performance data. The system is linked to service requests, the Council's document management system and the financial expenditure database.

The AMIS has universal access across the Council. Editing rights are controlled but ownership of the data is devolved as close to the source of the data as possible.

The quality and completeness of the stored data is continually improving. Data is extracted from a variety of historical and contemporary records — service record plans, property files, new connection records, as-built records (internal and contractor) and maintenance works orders. The quality of historical data can be variable and considerable effort is deployed to check the accuracy of the data sources.

Ensuring there is consistency and accuracy in contemporary data collection is also a challenge. Discussions with staff throughout the A&S Department has resulted in the development of a protocol that defines a common understanding of the accuracy of asset data and the confidence in the source data. In conjunction with this work there has been an ongoing effort to ensure contract specifications and in-house record checks are consistent with the required information.

6.1.2 Geographical Information System

The ESRI ARCMap GIS system has become a cornerstone for information management within the Council. The AMIS has an automated interface with the GIS. The GIS has many tools and features that can be leveraged by the AMIS and a well-developed integration was a prime criterion in the selection of the AMIS upgrade.

Stormater asset information can be viewed by all staff across the Council through the GIS viewer, Dekho. Brief details of the asset are available on an inquiry window within Dekho including the asset reference number for additional information

6.1.3 Computer Modelling

The Council has very high quality in-house network modelling capability which is augmented by specialist consultants. Models are used extensively to predict the behaviour of the reticulation network and as a planning tool for future designs.

Models are verified by on-site observations and measurement and have a high level of reliability. They are extensively used to predict flows and pressure in the water supply system, and to model the effects of infrastructure upgrades and operational configuration.

6.1.4 Financial Forecasting

An extract/transform/load programme has been developed to undertake the annual revaluation of assets from the asset register. Unit rates and prices are updated from contemporary contract prices and where possible are verified with rates from other councils. Where insufficient direct information is available, historical construction/purchase costs are inflated through nationally published construction cost indices.

Current financial forecasts are considered to be moderate to good. Asset condition grading and subsequent determination of life expectancy is being improved. Further refinement of asset components and unit rates estimation may be expected in future.

The quantum of capital expenditure forecasting is good/very good. Project costs are regularly reviewed as they progress or particular cost pressures become apparent. Estimation of the timing of capital works is more challenging. Public consultation, land purchase and resource consent applications can be very time consuming and the outcomes are difficult to predict. Project budgets are normally scheduled on a best case scenario to ensure sufficient funds are available for projects to proceed on time.

6.1.5 Customer Service Data

The introduction of the Water Services Database in 2010 and the accurate logging of customer service requests have added great value to asset management. The database was superseded in December 2014 following the introduction of the TechnologyOne AMIS and the use of the Customer Request Management module.There is now a good mechanism for registering customers' calls and recording response times. There is a facility to sort and filter service requests in order to monitor the performance of assets.

6.1.6 Asset Data Collection

Asset data is constantly being updated and checked. Assets & Services staff are converting the hard copy asset records to a digital format in the linked Geographical Information System (GIS) and the AMIS database. The spatial information on the location of assets, zones and catchment areas is kept in the GIS whilst the individual asset attributes are stored in the AMIS. A small team of staff systematically 'sweep' through a networked area, trawling through the data sources to extract accurate attribute details in order to test the systems are operating correctly.

% Complete	Blenheim	Picton	Havelock	Renwick	Riverlands	Awatere	Wairau Valley	Grove'n/ Spring Ck
Water	100	50	100	100	85	75	80	na
Waste-water	100	50	100	100	70	60	na	90
Stormwater	100	50	100	90	70	50	na	40

Table 6-1 Data capture completion

Information sources include as-built drawings supplied when the asset was constructed. These are produced when the asset is built and can therefore be quite old. Quality can be variable and many drawings are in imperial measurements. Recent as-built drawings can be either hard copy or electronic CAD drawings. These are carefully scrutinised by the Asset Development Officer and the asset will not be accepted for adoption by the Council until the drawings meet the specified standard.

From time to time specific surveys are undertaken. Often plans and long-section drawings are produced and data such as depth and invert levels of underground pipes recorded. Closed circuit TV (CCTV) surveys of sewer and stormwater pipelines are generally undertaken to investigate specific problems or confirm particular requirements. The surveys are reviewed by engineering staff and pipe condition grades are assessed and recorded. The location of laterals can also be ascertained and recorded.

Applications for connections from the mains to new properties or subdivisions are kept as separate records. The Council's property files often record the location, size and material of underground services within the property boundary.

The repairs and maintenance operatives return records of the assets they have worked on. In the past the quality of the records has been variable, with little consistency in how they are provided. Recently efforts have been made to improve the quality of this source of information. Field staff have been trained and mentored in the data requirements. Ongoing training is provided to ensue standards are maintained. The current status of data quality is shown in **Error! Reference source not found.**6 Estimate of Data Quality.

6.2 Improvement Programme Progress and Update

During the preparation of this asset management plan, improvements have been identified that will assist in the management of assets and delivery of services in future. Improvement is required as technology progresses, the operating environment changes and the aspirations of stakeholders evolve. The provision of wastewater services is also subject to changes in the legal framework and the political climate. Business processes need to continuously adapt to meet new demands.

Progress on the 2018-28 improvement plan and the 2021 improvement plan is detailed in the following Wastewater Asset Management – Improvement Plan.

6.3 2021-31 Improvement Programme

Issues identified, and to be progressed in future, are outlined below.

STORMWATER ASSET MANAGEMENT - IMPROVEMENT PLAN

	2018 Improvements	2018 Responsibility	2018 Target Date	2021 Update	2021 Improvements	2021 Responsibility	2021 Target Date
ASSET REGISTER	Use the sorting and audting funcitons of the new AMIS to search and "scrub" data for accuracy and inconsistencies	Asset Management Engineer	2018 onwards	Data collection team consistently carry out this process.			
	Continue with asset transfer from hard-copy to electronic format using accepted quality protocols for Picton, Spring Creek and Grovetown	Asset Management Engineer	2019-2020				
ASSET MANAGEMENT INFORMATION SYSTEM	Develop reporting functionality and apply appropriate advanced AM reports	Asset Management Engineer	2018 onwards				
	Improve mobile field data collection systems	Asset Management Engineer	2020	No development of field data collection system but improvements to data capture through work orders	Support use of field data collection systems as they are developed	Data Capture Team, IT, Operations and Maintenance Engineer	2024
	Continuework to seek stabilisation of the GIS integration tool	Asset Management Engineer	2019	Tool is functional in Windows 10 upgrade through IT support. Future functionality options still required	Continue to support tool until alternative solution/software is developed	Data Capture Team, IT	2024
				Maintenance schedules established within AMIS where applicable			

STORMWATER ASSET MANAGEMENT - IMPROVEMENT PLAN							
	2018 Improvements	**2018 Responsibility**	**2018 Target Date**	**2021 Update**	**2021 Improvements**	**2021 Responsibility**	**2021 Target Date**
MODELLING	Monitor the improvements to the Redwood Street/Town Branch Drain predicted by the dynamic hydraulic model as construction progresses	Stormwater Action Group (SAG)	Ongoing	11/19 Onsite works have commenced			
	Commission modelling for other catchments in accordance with the Blenheim Stormwater Strategy	Stormwater Action Group (SAG)	Ongoing	10/19 Fultons Creek Flood Modelling Report completed and used in the Springlands SMAP			
URBAN GROWTH	Develop integrated agreed sevice plans for each growth pocket to ensure efficient coordinated infrastructure	Infrastructure Projects Engineer/SAG	2018 onwards	Springland SMAP completed and resource consent for discharge awarded	Establishing resource consent requirements around monitoring, discharge, consultative groups	Stormwater Action Group (SAG)	2021 and ongoing
	Ensure new subdivisions provide adequate stormwater treatment to meet resource consent conditions	Infrastructure Projects Engineer/SAG	2018 onwards	Springland SMAP completed and resource consent for discharge awarded	Develop sequential planning as areas are released for development and reliability of growth trends improve	Infrastructure Projects Engineer/SAG	Ongoing
FINANCIAL FORECASTS	Review and update unit rate cost curves	Asset Management Engineer	Annually	2019 and 2020 Valuation undertaken in similar process to 2018, plans to review rates where data is available for 2021 Valuation and include all assets within AMIS	Review rates where asset data is available	Asset Management Engineers	2021

STORMWATER ASSET MANAGEMENT - IMPROVEMENT PLAN							
	2018 Improvements	**2018 Responsibility**	**2018 Target Date**	**2021 Update**	**2021 Improvements**	**2021 Responsibility**	**2021 Target Date**
	Revise the Development Contributions Policy in line with current growth predictions and infrastructure costs	Chief Financial Officer	2018	Housing Assessment and Development Contribution data has determined future growth of 125 HEU's annually.	Continue to improve these projections as census data and improvements to national trends are released	Infrastructure Projects Engineer	Ongoing
CONDITION MONITORING	Develop a condition survey and monitoring strategy for stormwater reticulation assets with the focus on critical reticulation	O&M Engineer/Asset Management Engineer	2018	Using Maintenance Data to collect specific details on condition and performance of assets			
	Ensure CCTV survey data and condition assessments are stored and retrievable for future planning	Asset Management Engineer	2018 onwards	AMIS has not been developed to store this data, team working on alternative solution	Find alternative solution for storing and retrieving data	Development Team	2024
	Improve condition grade recording and reporting systems within the asset management information system	Asset Management Engineer	2018 onwards	Using Maintenance Data to collect specific details on condition and performance of assets			
	Continue to improve site feedback mechanisms from routine repair and maintenance activities	O&M Engineer/Asset Management Engineer	2018 onwards	Regular monitoring of data capture through work orders to improve quality of asset and condition data			

STORMWATER ASSET MANAGEMENT - IMPROVEMENT PLAN							
	2018 Improvements	**2018 Responsibility**	**2018 Target Date**	**2021 Update**	**2021 Improvements**	**2021 Responsibility**	**2021 Target Date**
PERFORMANCE MONITORING	Improved performance monitoring and reporting to be developed through AMIS	Asset Management Engineer/SAG	2019	Continual data collection through work orders	Improve methods are identifying maintenance requirements of assets	Asset Management Engineer, Operations and Maintenance Engineer	
	Ensure Taylor River monitoring data informs the repair/renewals programme	O&M Engineer/SAG	2018	Springland SMAP and Resource Consent requirements specify monitoring and reporting requirements that must be established	Monitoring and reporting requirements must be established within the first 12 months of the consent	Stormwater Action Group (SAG)	2021
PROACTIVE MAINTENANCE SCHEDULING	Proactive maintenance schedule of asset groups	Asset Management Engineer/O&M Engineer	2018 onwards	Maintenance schedules established within AMIS where applicable			
RESILIENCE					Improve understanding of interdependencies across Lifelines Sector	Asset Management Engineer, Lifelines Utilities Co-ordinator, Operations and Maintenance Engieneer	2024

STORMWATER ASSET MANAGEMENT - IMPROVEMENT PLAN							
	2018 Improvements	**2018 Responsibility**	**2018 Target Date**	**2021 Update**	**2021 Improvements**	**2021 Responsibility**	**2021 Target Date**
CLIMATE CHANGE					Consider impact of climate change in all forward works planning	Planning and Development Engineer, Operations and Maintenance Engineer, Climate Change Action Group	On going as knowledge increases

6.4 Monitoring and Review Procedures

The asset management plan is a compilation of day to day planning and management by the engineering managers and other senior Assets & Services staff. Subsequently the asset management plan is 'live' and under constant review.

The asset management plan is formally reviewed and updated every three years. The update is drafted to coincide with the development of the Long Term Plan. It includes a detailed summary of the information used and decisions made during the planning process. The draft asset management plan is submitted to an external consultant for peer review.

The Council's asset management plans are made available to the auditors of the Office of the Auditor General (OAG) during the audit of the Long Term Plan and the intervening Annual Plans.

The introduction of increased business intelligence reporting from the asset management information system will help to ensure the currency and accuracy of asset data collection.

Asset valuation is undertaken annually. The valuations and all supporting calculations are submitted to an external valuer for independent verification. The valuation is scrutinised by Audit NZ to ensure asset management is adequately resourced in future plans and budgets.

Levels of service performance indicators are monitored at six monthly intervals and reported to the Council's Executive Management Team. Council results in relation to the performance indicators are published in the Annual Report, which is made publicly available. The Council intends to elevate the status of performance measures and supplement them with other internal benchmark measures in future. These will be under constant review and published on the internal intranet. Progress has already been made towards this goal.

6.5 Performance Measures

The Local Government Act 2002 Amendment Act 2014 enabled the introduction of national non-financial performance measures for water, wastewater, stormwater, roading and flood protection. The introduced measures for water supply are broadly similar to the previous levels of service measures of drinking water quality, response and resolution of service requests and the number of customer complaints. The addition of performance measures for water losses and household consumption may focus more attention on these areas.

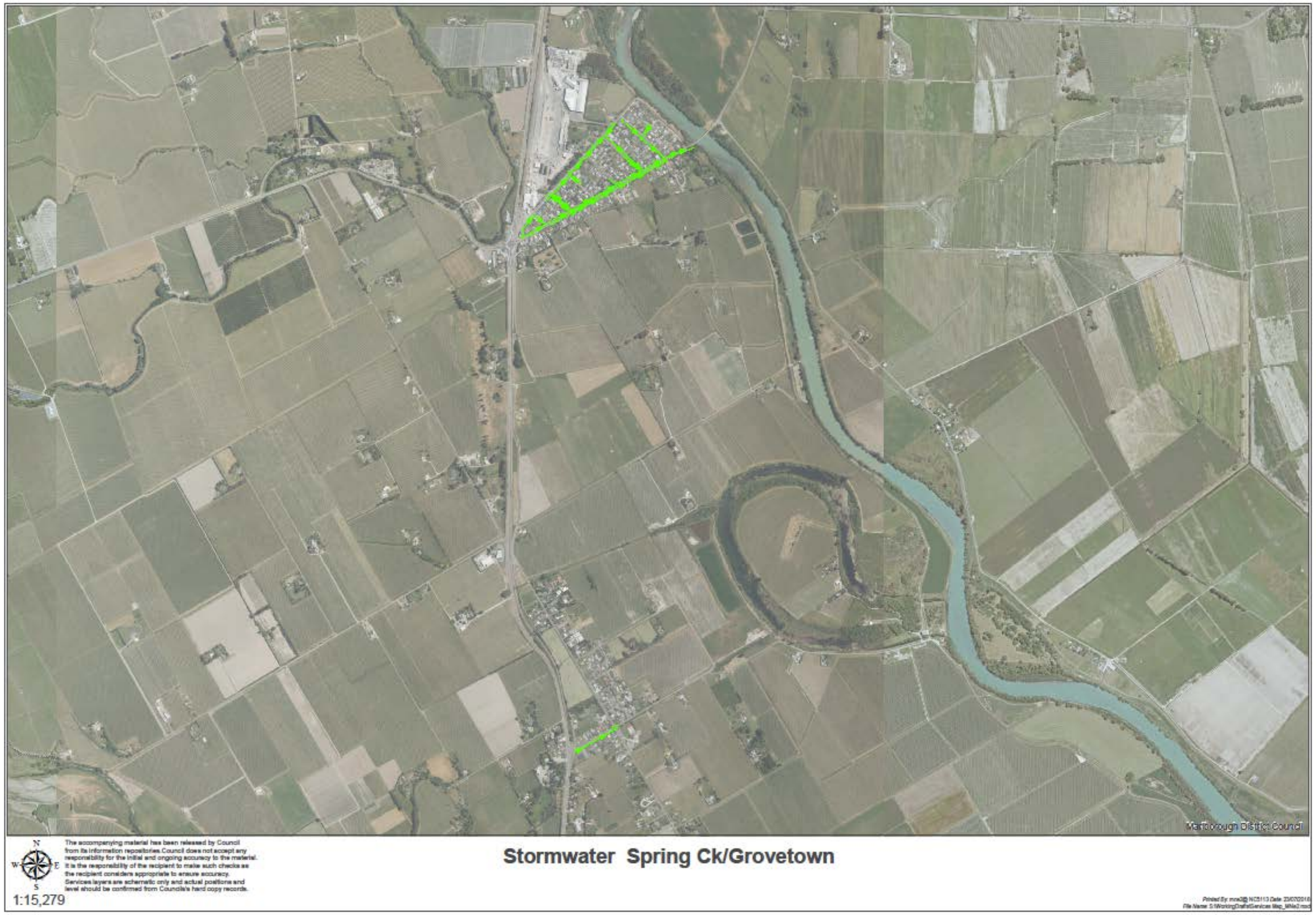
Some performance measures adopted by the Council have been difficult to measure, and there was no defined interpretation of the method of measurement. Detailed methodologies have subsequently been documented for each measure to ensure repeatable consistency and accuracy. Recommendations by the OAG to improve the control environment, including the data collection and storage mechanisms, have been actioned.

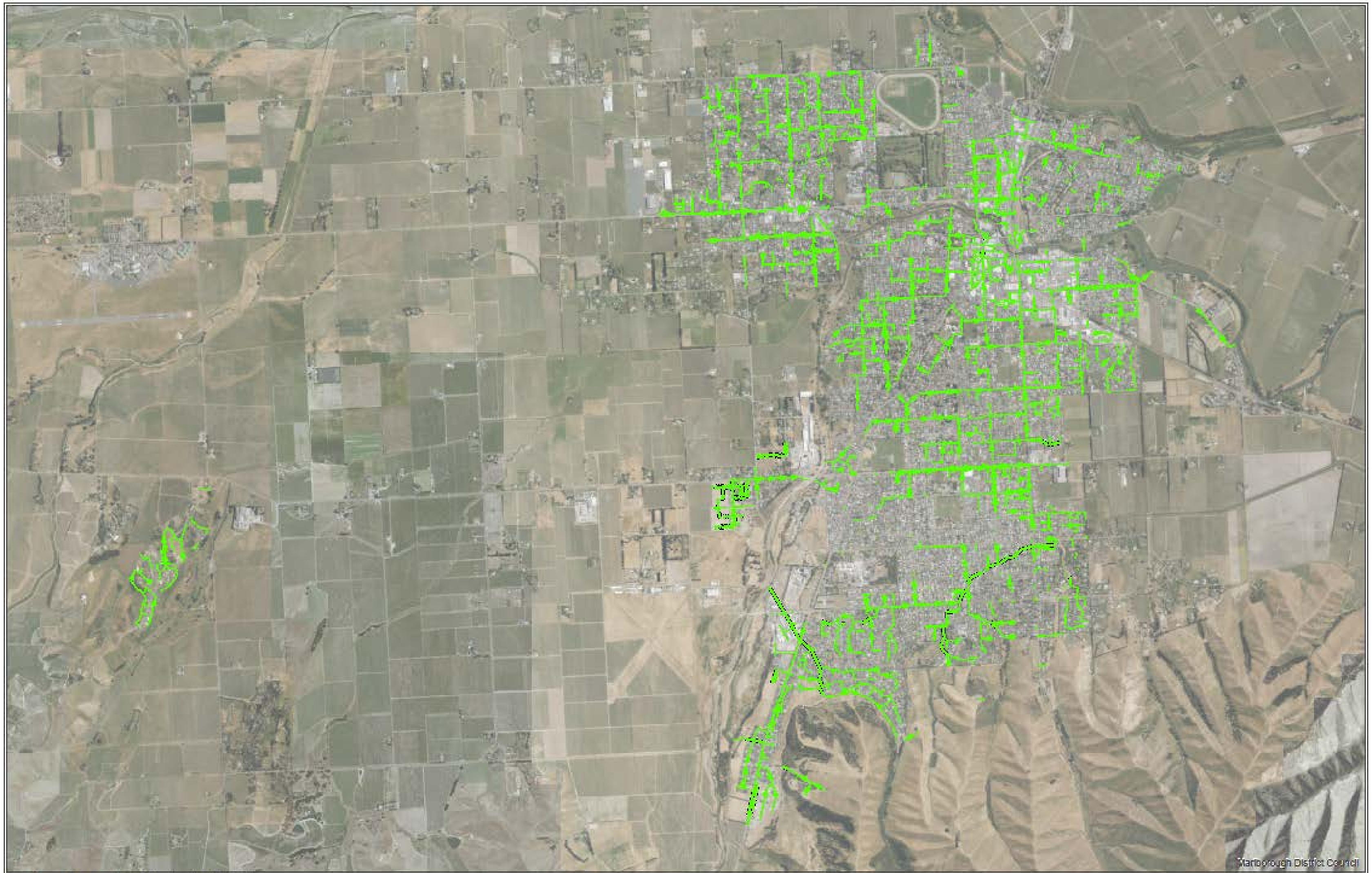
The AMIS is partially integrated with the customer request management system. There is a capability to trace service requests to subsequent work orders. The system allows response time monitoring, symptom and fault analysis, interruption and restoration monitoring, and cost recording.

The Council also participates in the annual National Performance Review undertaken by Water NZ. Over fifty councils regularly submit data for the annual reviews covering over 90% of the population of New Zealand. The data is categorised into large, medium and small participants (some water service providers are not councils). The report covers the three water services and provides an opportunity for councils to compare their performance on a large number of financial and non-financial performance indicators. Inevitably there is some difficulty in 'normalising' data across numerous agencies but the report still provides a good comparative guide on the performance of the Council's water supply activity within a national context.

Stormwater specific performance measures are shown Appendix 2 – Levels of Service 2021-2031

Appendix 1: Stormwater Asset Maps





N
W E
S
1:28,521

The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Council's hard copy records.

Stormwater Blenheim

Stormwater Havelock

N
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1:12,732

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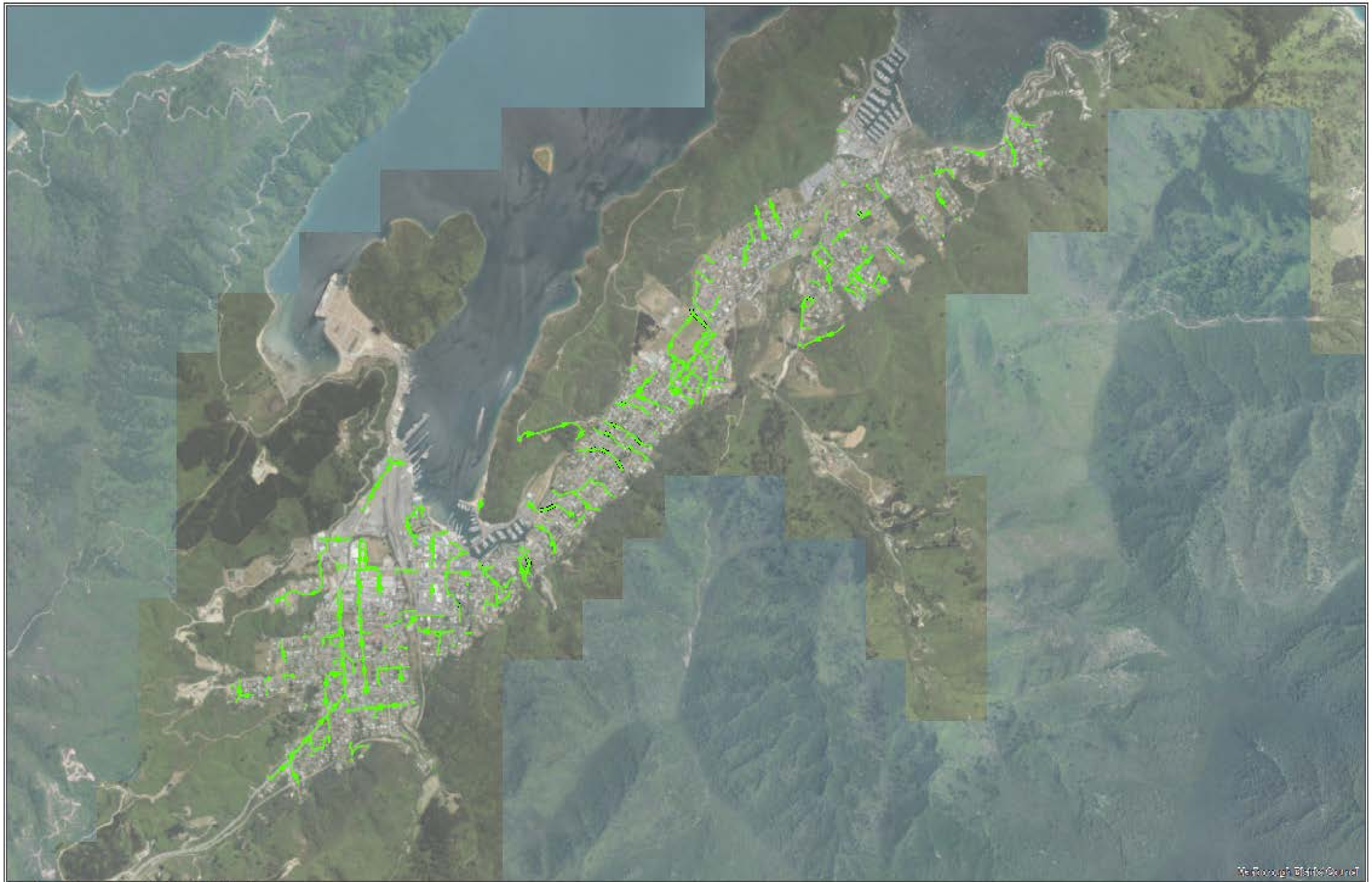


Stormwater Picton

N
W E
S

The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Councils's hard copy records.

1:20,372

Stormwater Renwick

1:5,093

The accompanying material has been released by Council from its information repositories. Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Council's hard copy records.

Appendix 2: Levels of Service 2021-31

Levels of Service 2021-31: Stormwater Drainage

Performance Targets (for the financial year)

Level of Service	Indicator	Baseline	2021-22	2022-23	2023-24	2024-31
Customer satisfaction Provide an overall level of service that meets or exceeds residents' expectations.	Resident satisfaction with this service as measured by survey (10 = service delivered extremely well).	6.5	6.5	6.5	6.5	6.5
	The number of complaints received by a territorial authority about the performance of its stormwater system, expressed per 1000 properties connected to the territorial authority's stormwater system.	1.8	≤ 1.8	≤ 1.8	≤ 1.8	≤ 1.8
System adequacy Provide a reliable stormwater service.	The number of flooding events that occur in a territorial authority district.	Actual number to be reported	Actual number to be reported	Actual number to be reported	Actual number to be reported	Actual number to be reported
	For each flooding event, the number of habitable floors affected, expressed per 1000 properties connected to the territorial authority's stormwater system.	2.6	≤ 2.6	≤ 2.6	≤ 2.6	≤ 2.6
Discharge compliance Minimise the environmental risks of stormwater discharge.	Compliance with the territorial authority's resource consents for discharge from its stormwater system, measured by the number of: (a) abatement notices (b) infringement notices (c) enforcement orders, and (d) convictions, received by the territorial authority in relation those resource consents.	0	0	0	0	0
Response times Provide a service that is timeley and responsive to customers' needs.	The median* response time (in hours) to attend a flooding event, measured from the time that the territorial authority receives notification to the time that service personnel reach the site. (*The statistical median is the time in which half of calls are responded to in less time and half in more time.)	1 hour	≤ 1 hour	≤ 1 hour	≤ 1 hour	≤ 1 hour

Appendix 3: Blenheim Stormwater Strategy Action Plan

Report

Blenheim Stormwater Strategy - Action Plan

Prepared for Marlborough District Council (Client)

By Beca Carter Hollings & Ferner Ltd (Beca)

28 May 2009

Revision History

Revision Nº	Prepared By	Description	Date
A	Greg Lee	Draft	21 May 2009

Document Acceptance

Action	Name	Signed	Date
Prepared by	Greg Lee		
Reviewed by	Graham Levy		
Approved by	Greg Pollock		
on behalf of	Beca Carter Hollings & Ferner Ltd		

Table of Contents

Glossary

AEP	Annual Exceedance Probability. A statistical term defining the probability of an event of a given size being equalled or exceeded in any year, expressed as a percentage. For example, a 5% AEP event has a 5% chance of being equalled or exceeded in any one year.
BMP	Best Management Practice. Methods (programmes, systems or structures) used to control or prevent contamination of receiving environments.
CMA	Coastal Marine Area
CSC	Comprehensive Stormwater Consent. The purpose of a CSC is to consent multiple activities associated with stormwater management and discharge within urban catchments[1].
Contaminants	Includes any substance or heat that when discharged into water or onto land, changes or is likely to change the physical, chemical or biological condition of that land or water onto or into which it is discharged.
MDC	Marlborough District Council
Modified Watercourse	A watercourse or river that has always existed in some form in the general area. However, the watercourse has been modified by engineering works to alter is original form or alignment such as, for example concrete or gabion lining, or channel straightening works.
River	Is a continually or intermittently flowing body of freshwater and includes a stream and modified watercourse, but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation and farm drainage canal).
RMA	Resource Management Act 1991
Sediment	Eroded material that can include adsorbed contaminants.
SMAP	Stormwater Management Area Plan
Stormwater	Water that falls to the ground, runs off the surface into streams, lakes, marine areas or underground aquifers and includes the contaminants washed off surfaces by water.

[1] In the context of these guidelines, an 'urban catchment' is considered to be a defined urban area for which a CSC is sought. The defined urban catchment may be the entire urban area from which rainfall is collected and consist of many hydrological sub-catchments. It is likely to have multiple stormwater discharge points to receiving water that are located both within and beyond it's boundaries.

Stormwater Management Area Plan	A unit which represents the areas catchment (area within which runoff is carried under gravity drainage system to a common outlet) plus, selected adjacent areas where the aspiration is for those areas to be managed by the same network or process
Stormwater Network	A system of pipes and ancillary works to collect and convey stormwater to the place of discharge.
Suspended Solids	Sediment or other solids either suspended or floating in runoff.
WARMP	Wairau Awatere Resource Management Plan
Watercourse	See River

1 Introduction

Stormwater management in Blenheim is a critical challenge for the town, both currently and when future potential growth is concerned. Many challenges are created by the flat topography and unique and sensitive receiving environments.

The Blenheim Stormwater Strategy has been developed in order to provide a clear, long term direction for stormwater management in Blenheim. It provides a a guide to making decisions on the future management of the stormwater system and in this context provides a number of goals and policies. This Strategy also provides a basis for applying for a comprehensive discharge consent of stormwater in Blenheim.

This document provides a suite of actions which deliver improvements wanted by the strategy. This Action Plan, therefore, needs to be read in conjunction with the Stormwater Strategy.

1.1 Responsive Process

This document is a living document. The priority of and specifics of actions will be modified following analysis of monitoring information and in response to any issues identified. Modification is anticipated to be needed following the first year of operation which will in particualr entail examination of the priority of actions listed in schedule 1.

It is proposed that Council should establish a working group, with a small focussed team to guide the development of the strategy and ensure that it is integrated with the action plan. This working group should:

- Work to a program;
- Seek to gain the appropriate budgets; and,
- Review the outcomes of the process over the agreed duration of the project.

1.2 Stormwater Strategy

This Strategy has a number of goals, policies and actions. The Strategy firstly identifies a range of issues, both at a generic and a catchment level. A total of eight stormwater management areas are identified to assist in managing stormwater and developing priorities. A number of receiving environments are also affected by the Strategy. These are shown in the Figure 1.

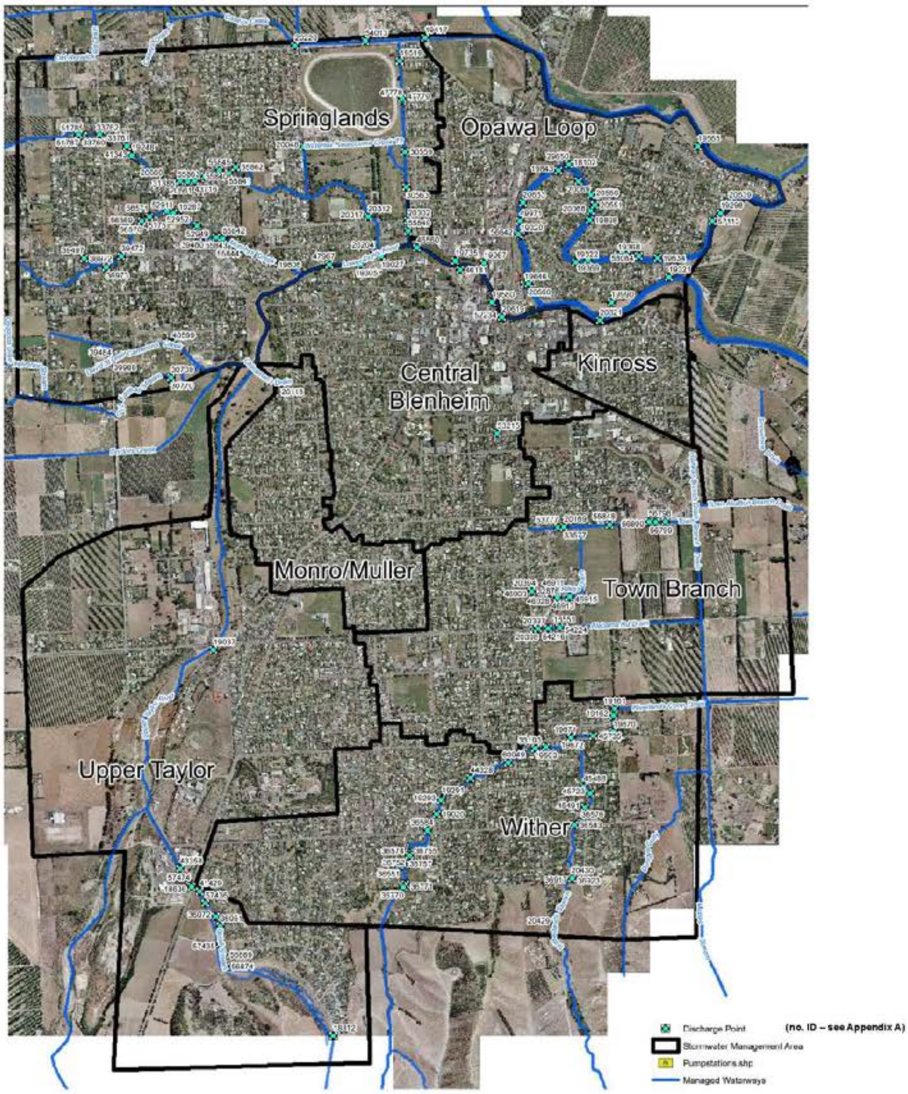
The strategy is aimed primarily at Council to assist the assets and operations team in managing stormwater. There are a number of other stakeholders too, including other parts of MDC (acting as regulators, for example), the development community, and Blenheim residents and ratepayers.

The goals and policies of the Strategy have been developed to provide an integrated approach and to guide the management of stormwater for Blenheim. The Strategy has the following, over-arching goals:

Integrated Management	
Goal 1	**To provide an integrated approach to the management of stormwater in Blenheim.**
Goal 2	**To support the implementation of the strategy with a comprehensive monitoring and enforcement program.**

Asset Management and Flooding	
Goal 3	**To ensure the stormwater network provides an appropriate response during flooding events so that people and property are protected to accepted standards.**
Goal 4	**To provide guidance on effective and efficient management of MDCs stormwater assets.**
Receiving Environment	
Goal 5	**To maintain or enhance the environmental performance of the stormwater system, and quality of receiving environments.**
Stakeholder engagement and education	
Goal 6	**To engage with key stakeholders, and educate wider community on the importance of integrated stormwater management.**
Planning and Regulation	
Goal 7	**To ensure the planning and regulatory framework remains responsive to integrated stormwater management.**
Goal 8	**To gain a comprehensive discharge consent for Blenheim's stormwater network for a 35 year term.**

Figure 1: Stormwater Management Areas and Receiving Environments


Springlands
Opawa Loop
Central Blenheim
Kinross
Monro/Muller
Town Branch
Upper Taylor
Wither
Discharge Point
(no. ID – see Appendix A)
Stormwater Management Area
Pumpstations.shp
Managed Waterways

2 Actions

The actions are arranged in schedules which correspond with the 6 management approaches listed in the Strategy document and are provided as schedules 2 to 7 of this report. Schedule 1 of this report provides a selection of actions from schedules 2 to 7 which are proposed to be brought forward first.

A full list of actions (by identifier number only) cross referenced to the schedules 1 - 7 of the Action Plan is provided overleaf (table 2-1). The colour indicates priority and also those projects which are 'ongoing' are identified. Once these are implemented and if needed (subject to annual review) they can continue to be delivered for a number of years.

Timeframes

The implementation of this stormwater strategy relies on three key timeframe periods, as follows:

- **Short Term** – this is the 0-5 year period, which specifically is the initial period to be governed by the comprehensive discharge consent, and allows a range of further investigations, monitoring and other activity.
- **Medium term** – this is the 5-10 year period; during which is it anticipated most of the catchment management plans will be prepared and finalised.
- **Ongoing** and/or long term – these may be tasks that occur in the short or medium term, or may be long term tasks that take 35 years (or the life of the stormwater strategy combined with the comprehensive discharge consent).

Priorities

Each action is assigned a priority, as follows:

- **High** – must be undertaken either to address a known or imminent issue which is or will shortly cause significant adverse effects, or which is to be required as part of the comprehensive discharge consent.
- **Medium** - must be undertaken either to address a known or imminent issue which is causing adverse effects or which may be causing effects but which are of lower risk, or which is to be required as part of the comprehensive discharge consent.
- **Low** - to be undertaken as part of the wider implementation program, but not critical to addressing immediate effects or issues, but part of the strategic direction of the strategy.

In order to identify important tasks more readily, the following 'traffic light' rating system is used to identify those projects which need to be initiated as soon as practicable ('red light') versus those that are medium term ('orange light') or long term/ ongoing but of lower priority ('green light').

Table 2-2: Prioritisation of Actions

	High	Med	Low
Short Term	Red	Orange	Green
Medium Term	Red	Orange	Green
Ongoing - Long Term	Orange	Green	Green

Table 2-1: Overview of Actions by Schedule (colour coding indicates priority)

All Actions	Ongoing?	Actions to be Implemented first	Integrated Management	Asset management and flooding	Receiving Environment	Stakeholder and Education	Planning and Regulation
1a	✓	1a	1a				
1b		1b					1b
1c		1c	1c				
1d						1d	
1e			1e				
1f		1f	1f				
2a	✓		2a				
2b		2b			2b		
2c					2c		
2d			2d				
2e						2e	
2f		2f	2f				
2f							
2g			2g				
3a		3a	3a				
3b		3b	3b				
3c			3c				
3d	✓		3d				
3e							3e
3f			3f				
3g		3g	3g				
4a		4a		4a			
4b		4b		4b			
4c	✓			4c			
4d				4d			
4e							4e
4f				4f			
4g			4g				
4h	✓			4h			
4i				4i			
5a				5a			
5b				5b			
5c		5c		5c			
5d							5d
5e							5e
5f				5f			
5g				5g			
5h				5h			
5i							5i
5j		5j		5j			
6a					6a		
6b	✓				6b		
6c	✓				6c		
6d	✓				6d		
6e	✓		6e				
6f	✓				6f		
7a		7a			7a		
7b	✓				7b		
7c	✓				7c		
7d					7d		
7e	✓						7e
7f		7f					7f
7g		7g					7g
7h					7h		
7i	✓		7i				
8a		8a	8a				
8b			8b				
8c			8c				
8d			8d				
9a	✓						9a
9b	✓						9b
9c	✓		9c				
9d	✓						9d
9e		9e	9e				
9f	✓						9f
9g		9g					9g
10a				10a			
10b	✓		10b				
10c							10c
10d		10d		10d			
10e				10e			
10f				10f			
10g				10g			
10h				10h			
11a	✓						11a
11b	✓						11b
11c	✓				11c		
11d	✓						11d
12a		12a				12a	
12b						12b	
12c						12c	
12d						12d	
13a						13a	
13b							13b
13c		13c					13c

3 Schedule 1: Implementation – Stage 1

This Schedule provides a summary of the key activities to be undertaken in the first stage of implementation. This is considered to be the first five years, or should the comprehensive discharge consent identify an alternative timeframe, the point at which the first key monitoring report is completed, and the strategy reviewed.

This schedule should be reviewed and updated annually, and aligned with budgets and inputs to the annual plan process.

Prior to any of the actions below being carried out, an assessment of costs and benefits of carrying out each of the actions, should be done. Costing should also include the costs involved in installing any stormwater treatment devices.

Specific actions also identify timeframes and priorities for implementation. These are explained below.

Resource Consent Application

The first task once this Strategy is adopted is to lodge a resource consent for the comprehensive discharge consent (or CSC). This will involve the preparation of an Assessment of Environmental Effects in accordance with the Fourth Schedule of the RMA, and associated documentation.

Priority Implementation Measures

The following table identifies those priority implementation measures which are considered critical to the first implementation period, and which are likely to be required by any consent conditions for the comprehensive discharge consent.

Indicative budgets are provided where possible, for the purpose of external costs

#	Action	Priority	Timeframe	Indicator
1a	Review specific stormwater management information including flooding and stormwater contaminant levels on an annual basis.	High	Short	●
1c	Develop and implement a specific environmental monitoring program aimed at identifying the relative contributions and issues associated with urban versus rural water quality.	High	Short	●
1f	Establish clear overall accountability for stormwater management across both network and urban streams/waterways for quantity and quality.	High	Short	●

#	Action	Priority	Timeframe	Indicator
2f	Prepare comprehensive stormwater catchment management plans for all catchments within the Blenheim area, priority based on risk. A risk based programme priority is provided in table below	High	Medium	●
3a	Develop a comprehensive monitoring programme to support the resource consents and enable a staged and prioritised approach to addressing stormwater management issues across the City.	High	Short	●
3b	Undertake monitoring to allow refinements in the application of the strategy principles and action plan requirements, within the boundary of any subsequent resource consent granted for stormwater discharge.	High	Short	●
3g	Review Implementation Programme annually (need some questions answered, including who does the review, should initially be driven by assets, submitted to regulatory to satisfy consent conditions occurs annually and must be tangible.	High	Short	●
8a	Review results of water quality monitoring and distinguish rural and urban contaminants and effects for receiving environments upstream of urban Blenheim to determine level of change occurring as a result of non-point source rural discharges.	High	Short	●
9e	Provide for integration between Stormwater Strategy and Urban Growth Strategy in LTCCP to ensure funding for future services is earmarked ahead of time (and give priority to identified catchments/works).	High	Short	●
4a	Determine the level in the roading hierarchy where it is acceptable to have flooding by secondary flows	High	Short	●
4b	Develop specific outcomes sought in relation to each type of land use, in particular set standards for the level of protection that should be offered to open space, commercial, industrial and residential development.	High	Short	●
5c	Identify and map areas where discharge to ground or ground soakage is possible and appropriate, and ensure this is linked into the WARMP and building consent processes.	High	Short	●

#	Action	Priority	Timeframe	Indicator
5j	In assessing discharge applications any additional discharge shall not compromise the performance of the downstream drainage system. This shall take into account potential discharge from other zoned but undeveloped land draining to the drainage system.	High	Short	●
10d	Identify where stormwater systems and treatment devices are not performing.	High	Short	●
2b	Develop a risk-based framework to managing land use and stormwater contaminants.	High	Short	●
7a	Develop specific guidelines on dewatering techniques for construction projects.	High	Short	●
12a	Improve the understanding of the effects of stormwater derived sediments and contaminants on the ecological and amenity values of the receiving environments.	High	Short	●
1b	Review the stormwater strategy within five years to determine the appropriateness of this Stormwater Strategy and associated stormwater discharge consents.	High	Short	●
7f	Develop a bylaw on tradewaste connections which provides Council sufficient powers to remedy/prosecute any non-compliance with the standards and rules.	High	Short	●
7g	Review WARMP rules to ensure they provide sufficient ability to regulate land use, including specifically industrial and commercial landowners.	High	Short	●
9g	Review approach to collecting development contributions to ensure it remains responsive (preference to move to LGA rather than RMA).	High	Short	●
10c	Develop bylaws for new connections of industrial and commercial premises to the Council stormwater network, including for treatment of stormwater quality.	High	Short	●
13c	Apply for comprehensive discharge consent.	High	Short	●

Program of Stormwater Management Area Plans

Based on the above priorities (and as described in section 6 of the Stormwater Strategy Technical Report), the programme for preparation of SMAPs could be, as follows (note that the following prioritisation does not allow for emerging potential future development locations):

Stormwater Management Area	Year 1	Year 2	Year 3	Year 4	Year 5	Years 5-10
Monitoring data	■					
SMAP Guidelines prepared.	■					
Blenheim Central		■				
Opawa Loop			■			
Springlands			■			
Kinross				■		
Monro/Muller					■	
Upper Taylors						■
Town Branch						■
Wither						■

The prioritisation shown above is provisional and the first year of implementation involves the collection of further monitoring data. Once this data has been collected and analysed, and taking into consideration parallel work streams of the Council (e.g. on urban growth) the prioritisation of preparation of Stormwater Management Plans may be modified. It is thus understood for example that Town Branch and Springlands may be brought forward earlier (in the first tranche of work) in response to emerging future development locations and pressures.

4 Schedule 2 – Integrated Management Actions

#	Action	Priority	Timeframe	Indicator
1a	Review specific stormwater management information including flooding and stormwater contaminant levels on an annual basis.	High	Ongoing	
1c	Develop and implement a specific environmental monitoring program aimed at identifying the relative contributions and issues associated with urban versus rural water quality.	High	Short	
1e	Identify and utilise appropriate databases including GIS to integrate rivers and stormwater network; to ensure validity of information and update as necessary. Allow access to database to facilitate good data availability.	Medium	Short	
1f	Establish clear overall accountability for stormwater management across both network and urban streams/waterways for quantity and quality.	High	Short	
2a	Maintain a total environmental perspective in managing the stormwater network and receiving environment.	High	Ongoing	
2d	Prepare or revise design codes and guidelines to support the use of appropriate stormwater management practices.	Medium	Medium	
2f	Prepare comprehensive stormwater catchment management plans for all catchments within the Blenheim area priority based on risk.	High	Medium	
2g	Develop a comprehensive network plan for Blenheim which identifies at a city-wide level the basic model for moving stormwater from land to receiving environment, including any significant needs to re-divert catchments to alternative receiving environments.	High	Medium	
3a	Develop a comprehensive monitoring programme to support the resource consents and enable a staged and prioritised approach to addressing stormwater management issues across the City.	High	Short	
3b	Undertake monitoring to allow refinements in the application of the strategy principles and action plan requirements, within the boundary of any subsequent resource consent granted for stormwater discharge.	High	Short	
3c	Undertake monitoring to demonstrate the result of investment in stormwater management infrastructure and management techniques.	Medium	Short	

#	Action	Priority	Timeframe	Indicator
3d	Continue research to better understand the monitoring of the environment.	High	Ongoing	🟡
3f	Undertake monitoring to assess the effectiveness of management methods.	High	Medium	🔴
3g	Review Implementation Programme annually (need some questions answered, including who does the review, should initially be driven by assets, submitted to regulatory to satisfy consent conditions occurs annually and must be tangible.	High	Short	🔴
4g	Integrate capacity upgrades with urban growth strategy for Blenheim.	High	Medium	🔴
6e	Any development relating to existing and future waterways (including channels/drains) shall incorporate as appropriate multiple functions (recreation, access for maintenance, habitat, visual amenity, connectivity).	High	Ongoing	🟡
7i	Wherever a stormwater quantity storage device is being constructed, consider opportunities to achieve quality improvement (and any other objectives).	High	Ongoing	🟡
8a	Review results of water quality monitoring and distinguish rural and urban contaminants and effects for receiving environments upstream of urban Blenheim to determine level of change occurring as a result of non-point source rural discharges.	High	Short	🔴
8b	If rural contributions to water quality are considered significant, develop a specific action plan for addressing these water quality challenges, including (a) Create and protecting riparian buffers between stormwater sources and watercourses; (b) Re-evaluate whether stormwater treatment options being pursued in urban Blenheim are not providing best value for money; (c) Retrofit stormwater treatment devices in existing drainage systems should problems be identified. This should include options for employing the use of wetlands (including constructed wetlands) and other retention systems along stormwater drains.	High	Medium	🔴

#	Action	Priority	Timeframe	Indicator
8c	If urban contributions to water quality are considered significant, develop a specific action plan for addressing these water quality challenges, including (a) Create and protecting riparian buffers between stormwater sources and watercourses. (b) Re-evaluating whether stormwater treatment options being pursued in urban Blenheim are not providing best value for money (c) Retrofit stormwater treatment devices in existing drainage systems should problems be identified. This should include options for employing the use of wetlands (including constructed wetlands) and other retention systems along stormwater drains.	High	Medium	
8d	Map stream classifications.	Medium	Short	
9c	Where significant pressure for brownfield development occurs in any one SMA, review priorities for preparing SMAP.	Medium	Ongoing	
9e	Provide for integration between Stormwater Strategy and Urban Growth Strategy in LTCCP to ensure funding for future services is earmarked ahead of time (and give priority to identified catchments/works).	High	Short	
10b	Monitor the effectiveness of existing stormwater treatment practices, particularly those provided for industrial and commercial sites.	High	Ongoing	

5 Schedule 3 – Asset Management and Flooding Actions

#	Action	Priority	Timeframe	Indicator
4a	Determine the level in the roading hierarchy where it is acceptable to have flooding by secondary flows	High	Short	
4b	Develop specific outcomes sought in relation to each type of land use, in particular set standards for the level of protection that should be offered to open space, commercial, industrial and residential development.	High	Short	
4c	Prepare comprehensive flood maps for each SMA to identify areas where insufficient capacity in network exists. This should occur as part of the SMAP for each specific catchment.	Medium	Ongoing	
4d	Develop a transparent framework for making decisions in relation to how network flow problems will be solved in each catchment.	Medium	Medium	
4f	Undertake further evaluation of Flow levels to assist in providing clear guidance for asset managers and future developments.	Medium	Medium	
4h	Infill subdivision development will not be approved until the network can accept flow without compromising standards.	High	Ongoing	
4i	Existing serviced development can only occur where capacity exists: define acceptable standards and future growth areas.	Medium	Medium	
5a	Reduce hydrological effects of development on more frequent storm peaks to manage potential effects on stream morphology and erosion.	Medium	Medium	
5b	Minimise the impact of new greenfields development on existing, runoff patterns, including requiring new development to limit peak runoff rates to existing levels and minimise runoff volumes.	High	Medium	
5c	Identify and map areas where discharge to ground or ground soakage is possible and appropriate, and ensure this is linked into the WARMP and building consent processes.	High	Short	
5f	Develop agreed maximum limits of site impervious coverage that are appropriate for each catchment, and ensure rules and/or education measures are in place to minimise the amount of impervious cover of keep it within the acceptable limits.	High	Medium	
5g	Identify options for reducing existing impervious cover, in particular through best practice on Council owned or developed property.	Medium	Medium	

#	Action	Priority	Timeframe	Indicator
5h	Explore whether the reuse of stormwater is a viable option in parts of Blenheim, including the use of rainwater storage tanks on private properties.	Medium	Medium	
5j	In assessing discharge applications any additional discharge shall not compromise the performance of the downstream drainage system. This shall take into account potential discharge from other zoned but undeveloped land draining to the drainage system.	High	Short	
10a	Develop and implement stormwater management action plans for each catchment, based on priorities identified in this strategy.	High	Medium	
10d	Identify where stormwater systems and treatment devices are not performing.	High	Short	
10e	Identify and map infrastructure in poor condition in each catchment – make sure this information is available and is utilised when making capacity upgrade decisions.	Medium	Short	
10f	Identify retrofit opportunities to upgrade existing stormwater systems that have been identified as discharging to priority catchments. This should occur in conjunction with land intensification decisions to identify areas where infill is most appropriate.	Medium	Medium	
10g	Undertake mapping and auditing of soakpits, including development of a database of information.	Medium	Short	
10h	Develop improved understanding of current runoff characteristics including informal storage and runoff coefficients. Incorporate results into design techniques and guidelines.	Medium	Short	

6 Schedule 4 – Receiving Environment Actions

#	Action	Priority	Timeframe	Indicator
2b	Develop a risk-based framework to managing land use and stormwater contaminants.	High	Short	
2c	Identify high risk sites based on criteria developed in 2B and develop an auditing and action program for high risk land users to improve quality of discharges from these sites.	High	Medium	
6a	Map riparian margins along existing streams, and identify areas where future riparian margins should be protected or enhanced, including for flood storage, ecological, access and water quality objectives.	Medium	Medium	
6b	Avoid piping or channelling stream channels, including first order streams.	High	Ongoing	
6c	Maintain sufficient water flows in streams to support aquatic life, with a particular emphasis on maintaining baseflows.	Medium	Ongoing	
6d	Avoid constructing stormwater quality improvement devices 'on line' within perennial watercourses, and where there is on-line flood attenuation, ensure fish passage is provided.	High	Ongoing	
6f	Any instream works/structures to provide for fish passage.	High	Ongoing	
7a	Develop specific guidelines on dewatering techniques for construction projects.	High	Short	
7b	Maximise the use of appropriate stormwater quality control measures at source for new industrial and commercial development.	High	Ongoing	
7c	Encourage/require good housekeeping systems on existing commercial and industrial sites.	High	Ongoing	
7d	Apply industry specific Codes of Practice, which include environmental management procedures and for major transport corridors.	Medium	Medium	
7h	Until such time as monitoring shows otherwise, Council will not require point source/stormwater treatment from existing residential.	Low	Short	
11c	Promote the use of stormwater methods that minimise, retain and treat direct stormwater runoff.	High	Ongoing	

7 Schedule 5 – Stakeholder Engagement and Education Actions

#	Action	Priority	Timeframe	Indicator
1d	Develop a broader MDC wide awareness campaign on environmental issues, including stormwater. This should include targeted education packages, including for homeowners to ensure they understand what can and cannot be discharged into Council's stormwater system.	Medium	Short	🟡
2e	Identify examples of best practice that Council will accept.	Low	Short	🟢
12a	Improve the understanding of the general public of the effects of stormwater derived sediments and contaminants on the ecological and amenity values of the receiving environments.	High	Short	🔴
12b	Carry out industry specific education programmes, outlining the impact of the specific contaminants on the environment.	High	Medium	🔴
12c	Improve the understanding of costs associated with managing flooding and contamination issues.	Medium	Medium	🟡
12d	Develop partnerships with local schools specifically on stormwater management and stream protection. provide resource materials.	Medium	Medium	🟡
13a	Develop guidelines/training – regular and ongoing programme for regulatory staff processing/compliance consents (SW, subdivision, building).	Medium	Short	🟡

8 Schedule 6 – Planning and Regulation Actions

#	Action	Priority	Timeframe	Indicator
1b	Review the stormwater strategy within five years to determine the appropriateness of this Stormwater Strategy and associated stormwater discharge consents.	High	Short	
3e	Set standards and/or guidelines where practicable to enable useful and comparative environmental assessments to be undertaken.	Medium	Medium	
4e	Review WARMP to review activity status for infill development and recommend changes. The review should also determine the most appropriate status for greenfield and brownfield residential development, including reviewing densities and activity status (so that consents can be declined if there is inappropriate provision for stormwater disposal).	High	Medium	
5d	In development areas, retain good surface infiltration characteristics wherever practicable.	Medium	Medium	
5e	Identify groundwater recharge areas and minimise the effects of development on water quality in these areas, in particular in the Springlands catchments.	Medium	Medium	
5i	Review building consent processes for alignment with stormwater strategy.	Medium	Medium	
7e	Have a progressive enforcement programme to discourage potential polluters, specifically for industrial and commercial sites.	Medium	Ongoing	
7f	Develop a bylaw on tradewaste connections which provides Council sufficient powers to remedy/prosecute any non-compliance with the standards and rules.	High	Short	
7g	Review WARMP rules to ensure they provide sufficient ability to regulate land use, including specifically industrial and commercial landowners.	High	Short	
9a	Subdivision and development of greenfield sites should be designed and managed so as to emphasise the protection and enhancement of streams, lakes, watercourses, wetlands and the coast and the enhancement or restoration of riparian vegetation.	Medium	Ongoing	
9b	Structure planning processes should be undertaken and include full consideration of matters relating to stormwater issues.	Medium	Ongoing	
9d	Develop designs and stormwater management techniques (e.g. LID) that minimise the need for stormwater infrastructure, especially reticulated systems with direct discharges to streams.	Medium	Ongoing	

#	Action	Priority	Timeframe	Indicator
9f	Any significant new development at residential density on parent lots >10ha or rezoning shall be subject to structure planning to identify key infrastructure connections to Councils existing networks (amongst other things).	Medium	Ongoing	
9g	Review approach to collecting development contributions to ensure it remains responsive (preference to move to LGA rather than RMA).	High	Short	
10c	Develop bylaws for new connections of industrial and commercial premises to the Council stormwater network, including for treatment of stormwater quality.	High	Short	
11a	Ensure stormwater strategy is a key driver in developing future land use and growth options for Blenheim, particularly in those catchments or parts of the network where there are already significant capacity constraints.	High	Ongoing	
11b	Encourage development styles and stormwater management methods that mimic natural runoff patterns.	High	Ongoing	
11d	Ensure that appropriate techniques are supported by design codes to provide for best practice application – revise codes if necessary.	High	Ongoing	
13b	RPS or WARMP Review – any review of RMA policy/regulation should incorporate the provisions in, and preferably give-effect to the Stormwater strategy (via comprehensive review or variation).	High	Medium	
13c	Apply for comprehensive discharge consent.	High	Short	

Appendix 4: Ministry for the Environment advice on Climate Change December 2017

The advice on the Ministry for the Environment website (updated December 2017) on the likely impacts of climate change in Marlborough is as follows:

“Projections of climate change depend on future greenhouse gas emissions, which are uncertain. There are four main global emissions scenarios ranging from low to high greenhouse gas concentrations. This page presents regional projections as a range of values from a low emissions to a high emissions future.

The projected changes are calculated for 2031–2050 (referred to as 2040) and 2081–2100 (2090) compared to the climate of 1986–2005 (1995).

Temperature — Compared to 1995, temperatures are likely to be 0.7˚C to 1.0˚C warmer by 2040 and 0.7˚C to 3.0˚C warmer by 2090.

By the end of the century, Marlborough is projected to have from 6 to 38 extra days per year where maximum temperatures exceed 25˚C. The number of frosts could decrease by around 7 to 19 per year.

Rainfall —Rainfall will vary locally within the region. The largest changes will be for particular seasons rather than annually.

Summer rainfall in Blenheim is projected to increase by up to 9 per cent by 2090.

According to the most recent projections, extreme rainy days are likely to become more frequent in Marlborough by 2090 under the highest emissions scenario.

Snowfall — The Marlborough region is likely to experience significant decreases in seasonal snow. By the end of the century, the number of snow days experienced annually could decrease by as much as 30 to 40 days in some parts of the region. The duration of snow cover is also likely to decrease, particularly at lower elevations.

Less winter snowfall and an earlier spring melt may cause marked changes in the annual cycle of river flow in the region. Places that currently receive snow are likely to experience increasing rainfall as snowlines rise to higher elevations due to rising temperatures. So for rivers where the winter precipitation currently falls mainly as snow and is stored until the snowmelt season, there is the possibility for larger winter floods.

Wind — The frequency of extremely windy days in Marlborough by 2090 is likely to increase by between 2 and 10 per cent. There may be an increase in westerly wind flow during winter, and north-easterly wind flow during summer.

Storms — Future changes in the frequency of storms are likely to be small compared to natural inter-annual variability. Some increase in storm intensity, local wind extremes and thunderstorms is likely to occur.

Sea-level rise — New Zealand tide records show an average rise in relative mean sea level of 1.7 mm per year over the 20th century. Globally, the rate of rise has increased, and further rise is expected in the future.”

Appendix 5: Marlborough District Council Climate Change Action Plan 2020

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
1. Council contributes to NZ's efforts to reduce greenhouse gas emissions (including net carbon emissions).	(a) Contribute to the reduction of emissions as directed by the Climate Change (Carbon Zero) Amendment Act 2019, emissons budgets and other applicable regulation.	(i) Undertake a baseline inventory of Council emissions by end of 2020; and the regular monitoring of Council's greenhouse gas emissions.	$	Regular monitoring of emissions and review targets.	Regular monitoring of emissions and review targets.
		(ii) Identify and prioritise activtiies to reduce emissions from Council offices (eg refrigeration emissions from air-conditioning, reduce travel by holding virtual meetings, working from home etc) Council operations (eg methane from landfill) and Council vehicle fleets.	Staff time	Implement emissions reduction programme.	Implement and review emissions reduction programme.
		(iii) Facilitate a higher number of strategically located electric vehicle charging stations and electric bike docks/charging stations across the district. Continue to increase the number of plug-in hybrid vehicles in Council's fleet and investigate use of electric vehicles.	Staff time $	Investigate opportunities to transition the majority of Council's fleet away from fossil fuels (i.e. replace with plug-in hybrid and electric vehicles).	Transition the majority of Council's fleet away from fossil fuels (i.e. replace with plug-in hybrid and electric vehicles).
		(iv) Review Council's Procurement Policy to include consideration of emissions as a factor.	Staff time	Implement reviewed Procurement Policy.	Further review Procurement Policy.
		(v) Continue to invest in forest plantations and participate in the Emissions Trading Scheme programme. Explore opportunities to undertake carbon	BAU	Continue to invest in forest plantations and participate in the ETS programme. Explore opportunities	Continue to invest in forest plantations and participate in the ETS programme. Explore opportunities

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		sequestration planting on Council land.		to plant carbon forests on Council land (e.g. river berm land).	to plant carbon forests on Council land (e.g. river berm land).
		(vi) Continue to work with communities to develop catchment care programmes (eg riparian margin restoration, habitat enhancement, land stability, planting in Council parks & reserves and within roading corridors), to sequester carbon in conjunction with the Indigenous Biodiversity National Policy Statement (once in force).	BAU	Continue to work with communities on catchment care and biodiverstiy programmes.	Continue to work with communities on catchment care and biodiverstiy programmes.
		(vii) Continue to support landowner applications to the government's Billion Trees fund (and other relevant funds).	BAU	Continue to support landowner applications to the government's Billion Trees fund (and other relevant funds).	Continue to support landowner applications to the government's Billion Trees fund (and other relevant funds).
		(viii) Investigate energy efficient design and renewable energy options for Council buildings.	$	Implement energy efficiency and renewable energy generation actions (eg solar panels on Council's buildings).	Monitor technology developments for improvements to energy efficiency and implement these where feasible.
		(ix) Continue to develop Council's Waste Management & Minimisation Plan to reduce total waste to landfill (including promotion of the circular economy, education, service changes etc).	$	Develop further programmes to support waste reduction.	Develop further programmes to support waste reduction.
		(x) Investigate options for reducing green waste to landfills.	Staff time	Review programmes for reducing green waste to landfills and composting.	Implement programmes for reducing green waste to landfills and composting.

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
	(b) Council decisions for planning and infrastructure design supports private individuals and businesses to reduce their emissions by 80% by 2050. *Targets are based on Zero Carbon Act and will be adjusted if necessary to meet the legislation.*	(i) Collaborate with central government initiatives for incentivising: (a) low carbon footprint buildings; (b) highly energy efficient buildings; (c) renewable energy use in buildings; (d) reductions in refrigeration emissions from air conditioning and disposal of refrigerants; (e) enhanced urban/subdivision design.	Staff time	Implement preferred options.	Implement preferred options.
		(ii) Through the Marlborough Environment Plan (MEP) and other means, continue to explore housing intensification to reduce the need for car travel.	$	Implement the MEP.	Review and implement the MEP.
		(iii) Investigate options for further promoting the Warmer Homes programme.	Staff time	Support & promote the Warmer Homes programme.	Support & promote the Warmer Homes programme.
		(iv) Review renewable energy generation provisions in the MEP.	BAU	Planning documents enable renewable energy generation.	Planning documents enable renewable energy generation.
	(c) Year on year, use of alternative modes of transport increases, whereas use of single-occupancy internal combustion engine vehicles on Marlborough roads declines.	(i) Through the Regional Land Transport Plan, and in conjunction with NZTA, investigate options for increasing use of public transport (where this will provide the best outcome) and prepare action plan to increase public transport use.	BAU	Implement action plan to increase public transport use.	Implement action plan to increase public transport use.
		(ii) Investigate ways to incentivise use of alternative transport modes, such as ride sharing and EVs.	Staff time	Investigate ways to incentivise use of alternative transport modes, such	Investigate ways to incentivise use of alternative transport modes, such

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
				as ride sharing and EVs.	as ride sharing and EVs.
	(d) Use of active transport (e.g. walking, cycling etc) as a form of transportation increases year on year.	(iii) Through the Regional Land Transport Plan, continue investment in new and (maintenance of) existing active transport networks.	BAU	Increased investment in new and maintenance of active transport networks. Impediments to use of network are steadily removed.	Increased investment in new and maintenance of active transport networks.
		(iv) Through the MEP and implementation of the Bike/Walk strategy, implement requirements on new developments to provide for active transport.	BAU	Effectiveness of provisions are monitored and reviewed as necessary.	Effectiveness of provisions are monitored and reviewed as necessary.
		(v) In conjunction with central government and local agencies, fund infrastructure programmes and activities that support increased use of active transport network.	$	Fund active transport infrastructure programmes and activities.	Fund active transport infrastructure programmes and activities.
		Continue to seek and obtain co-funding for active transport network development and maintenance.	BAU	Continue to seek and obtain co-funding for active transport network development and maintenance.	Continue to seek and obtain co-funding for active transport network development and maintenance.
2) Marlborough District becomes more resilient to the impacts of climate change.	(a) Progressively improve network infrastructure resilience to climate change risks across all Council networks.	(i) Prepare infrastructure risk and resilience assessment Asset Management Plans (AMPs) identifying critical infrastructure (i.e. water supply sources, stormwater, wastewater, transportation, and solid waste) and their vulnerability to natural hazards and climate change. The plans will also identify what	BAU	AMPs account for climate change risks, uncertainty, and resilience for the entire life of current and future infrastructure (i.e. future proof design). All assets should be assessed for climate change risks at their	Implementation of AMPs through network development projects. Funding obtained through future plans.

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		infrastructure will become redundant.		proposed location, before decisions on siting of a new asset/replacement of existing assets are made. Funding for repair or replacement of network infrastructure incorporates accounting for climate change risks and resilience.	
		(ii) Review Council's policy on emergency funds, to ensure it anticipates repair/replacement and relocation costs that factor in climate change risks ("build back better"). Investigate the potential funding requirements of implementing this policy.	Staff time	The Long Term Plan 2021-2031 incorporates emergency funds that anticipate repair/replacement/ relocation costs that factor in climate change risks.	Funding maintained or increased as risks increase.
	(b) New coastal development and infrastructure accounts for climate change risks, including sea level rise.	(i) Develop a coastal hazard plan including consideration of the extent of the risks, options, and regulatory responses for adaptation, relocation, coastal structures etc.	BAU	Develop a coastal hazard plan.	Implement the coastal hazard plan.
		(ii) Regulatory activities (resource and building consenting) continue to account for sea level rise based on the MEP provisions and the latest MfE Guidance.	BAU	Regulatory activities (resource and building consenting) continue to account for sea level rise based on latest MfE Guidance.	Regulatory activities (resource and building consenting) continue to account for sea level rise based on latest MfE Guidance.
		(iii) Undertake and support national initiatives to undertake mapping	$	Undertake mapping	Update mapping

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		of the coastal margins.			
		(iv) Use the Dynamic Adaptive Pathways Planning (DAPP) and other appropriate tools in decision-making where appropriate.	BAU	Use DAPP and other tools	Use DAPP and other tools
	(c) Ecological adaptation to climate change is taken into account when making decisions.	(i) Review options for how Council can be more agile and responsive to increased biosecurity risks (including marine pathway biosecurity risks) and pest management requirements, in response to the changing climate; including through the Regional Pest Management Strategy.	Staff time	Implement new options for biosecurity and pest management.	Implement new options for biosecurity and pest management.
		(ii) Continue to support the Marlborough Environment Awards and seek opportunities to recognise climate change initiatives through the Awards.	BAU	Seek opportunities to recognise climate change initiatives through the Marlborough Environment Awards.	Seek opportunities to recognise climate change initiatives through the Marlborough Environment Awards.
2. The Marlborough community is informed of climate change actions and options for response.	(a) Council leads the establishment of a climate change forum.	(i) Encourage community collaboration and active involvement with the Forum	Staff time	Establish and lead Forum.	Establish and lead Forum.
	(b) Encourage private adaptation and business adaptation to climate change by providing clear and applicable information	(i) Obtain updated information on local climate impacts and collate and publicise relevant information.	BAU	Ongoing information gathering and publication.	Ongoing information gathering and publication.
		(ii) Maintain Council's website climate change pages with relevant and up-to-date information on local impacts, options for Council and private mitigation, and Council's adaptation options and responses.	Staff time	Website maintenance and updates.	Website maintenance and updates.

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		(iii) Incentivise and support ideas for innovation from the community	$	Incentivise and support ideas for innovation from the community.	Incentivise and support ideas for innovation from the community.
		(iv) Continue to implement the Climate Change Integrated Work Programme.	BAU	Continue to implement the Climate Change Integrated Work Programme.	Continue to implement the Climate Change Integrated Work Programme.
3. Council shows clear leadership on climate change issues.	(a) Council's elected representatives demonstrate regional leadership.	(i) Promotion of innovations, changes and initiatives that individuals and businesses can take to reduce emissions, benefit from climate changes and improve resilience.	$	Promotion of innovations, changes and initiatives that individuals and businesses can take to reduce emissions, benefit from climate changes and improve resilience.	Promotion of innovations, changes and initiatives that individuals and businesses can take to reduce emissions, benefit from climate changes and improve resilience.
		(ii) Liaison and collaboration with local government agencies, iwi, central government and others to provide clear and consistent messaging and and directions for change.	Staff time	Liaison & collaboration with local government agencies, iwi, central government & others to provide clear & consistent messaging & directions for change.	Liaison & collaboration with local government agencies, iwi, central government & others to provide clear & consistent messaging & directions for change.
	(b) Council's staff work collaboratively to implement the Climate Change Action Plan.	(i) Formation of a Climate Change Working Group comprising staff across Council to champion implementation of this plan which is supported by Council management and Councillors	Staff time	Climate Change Working Group continues to champion implementation of this Action Plan	Climate Change Working Group continues to champion implementation of this Action Plan
	(c) Decisions of Council consider the implications of climate change for current and future generations.	(i) Include assumptions for climate change in the Long Term Plan, including provision for uncertainty, based on latest scientific evidence from the	Staff time	Include assumptions for climate change in the Long Term Plan, including provision for uncertainty, based on the	Include assumptions for climate change in the Long Term Plan, including provision for uncertainty, based on latest

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		Intergovernmental Panel on Climate Change (IPCC).		latest scientific evidence.	scientific evidence.
		(ii) Incorporate funding provision in the Long Term Plan to implement this Action Plan.	BAU	Incorporate funding provision in the Long Term Plan to implement this Action Plan.	Incorporate funding provision in the Long Term Plan to implement this Action Plan.
		(iii) Develop an internal staff policy for guiding & informing agenda items, reports & projects.	BAU	Review and monitor implementation of the policy.	Review and monitor implementation of the policy.
	(d) Council reports on its progressive implementation of this Action Plan.	(i) Reporting on progress towards targets of this Action Plan is included in Council's Annual Report.	BAU	Annual reporting.	Annual reporting.

Appendix 6: LTP Assumption

COPY AND PASTE FROM LTP WHEN FINALISED

Appendix 7: Valuation Details

2020 Stormwater Valuation					
Area	**Asset Type**	**ORC**	**ODRC**	**ADSP**	**Length (m)**
BLENHEIM	Pump Station	$ 221,363.19	$ 110,070.95	$ 3,805.44	
	BLENHEIM Total	$ 221,363.19	$ 110,070.95	$ 3,805.44	
PICTON	Pump Station	$ 769,688.57	$ 277,045.82	$ 12,979.90	
	PICTON Total	$ 769,688.57	$ 277,045.82	$ 12,979.90	
	OTHER TOTAL	**$ 991,051.76**	**$ 387,116.77**	**$ 16,785.34**	
ANAKIWA	Reticulation	$ 495,691.28	$ 223,474.28	$ 6,484.86	830.37
BLENHEIM	Reticulation	$ 97,149,300.72	$ 59,019,146.36	$ 1,175,526.90	134047.27
GROVETN	Reticulation	$ 570,662.27	$ 427,247.52	$ 6,457.65	719.93
HAVELOCK	Reticulation	$ 1,833,851.09	$ 1,041,375.74	$ 22,174.12	2486.79
OKIWI	Reticulation	$ 607,053.52	$ 339,682.48	$ 6,674.19	822.34
PICTON	Reticulation	$ 24,600,360.54	$ 12,928,590.15	$ 297,742.21	29486.88
RENWICK	Reticulation	$ 4,536,554.59	$ 3,102,753.42	$ 54,734.66	5518.36
RIVERLDS	Reticulation	$ 5,486,287.62	$ 4,128,756.34	$ 66,018.63	6793.47
SEDDON	Reticulation	$ 626,945.80	$ 367,912.17	$ 8,626.06	862.70
SOUNDS	Reticulation	$ 261,569.07	$ 211,870.96	$ 2,615.69	331.70
SPRINGCK	Reticulation	$ 2,839,179.99	$ 1,097,652.62	$ 35,798.84	3578.99
STANDR	Reticulation	$ 364,218.99	$ 238,012.01	$ 4,533.77	322.76
RETICULATION TOTAL		**$ 139,371,675.48**	**$ 83,126,474.05**	**$ 1,687,387.58**	**185801.56**
STORMWATER TOTAL		**$ 140,362,727.24**	**$ 83,513,590.82**	**$ 1,704,172.92**	

Appendix 8: Stormwater Capital Budget 2021-31

	Stormwater - 2021-31 (inflated)									
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Stormwater: Blenheim										
renewal	1,623,667	2,070,658	-	-	-	57,704	59,519	-	-	-
other capex	1,190,000	1,594,406	3,542,596	698,410	830,775	2,008,086	8,082,699	6,509,971	305,476	314,897
Stormwater: Havelock										
renewal	-	-	-	-	-	-	-	-	-	-
other capex	1,000	1,035	1,062	1,091	1,123	1,154	1,190	1,231	1,273	1,312
Stormwater: Picton										
renewal	359,000	9,318	9,556	9,821	16,279	10,387	10,713	11,076	11,455	11,809
other capex	25,000	56,943	58,400	60,020	28,067	28,852	29,760	30,765	31,820	32,802
Stormwater: Renwick										
renewal	10,000	10,353	10,618	10,913	11,227	11,541	11,904	12,306	12,728	13,121
other capex	3,000	3,106	3,185	3,274	3,368	3,462	3,571	3,692	3,818	3,936
Stormwater: Spring Creek										
renewal	-	-	-	-	-	-	-	-	-	-
other capex	2,000	2,071	2,124	2,183	2,245	2,308	2,381	2,461	2,546	2,624
level of service										
growth										
capitalised overheads										
Total capex	**3,213,666**	**3,747,890**	**3,627,543**	**785,711**	**893,083**	**2,123,494**	**8,201,737**	**6,571,502**	**369,117**	**380,500**
level of service	515,000	160,476	1,073,733	54,563	583,788	600,118	23,808	24,612	25,456	26,241
growth	706,000	461,757	2,161,996	273,908	281,790	289,672	6,310,219	6,523,507	319,477	329,330
renewal	1,992,667	3,125,658	391,814	457,240	27,505	1,233,704	1,867,711	23,382	24,184	24,929
Total capex	**3,213,666**	**3,747,890**	**3,627,543**	**785,711**	**893,083**	**2,123,494**	**8,201,737**	**6,571,502**	**369,117**	**380,500**

Appendix 9: Stormwater Capital Budget 2021-51

	Stormwater 2021-51 (Inflated)					
	21-26	26-31	31-36	36-41	41-46	46-51
Stormwater: Blenheim						
renewal	3,694,324	117,223	-	-	-	-
other capex	7,856,188	17,221,129	-	-	-	-
Stormwater: Havelock						
renewal	-	-	-	-	-	-
other capex	5,311	6,160	-	-	-	-
Stormwater: Picton						
renewal	403,974	55,440	-	-	-	-
other capex	228,430	153,999	-	-	-	-
Stormwater: Renwick						
renewal	53,111	61,600	-	-	-	-
other capex	15,933	18,480	-	-	-	-
Stormwater: Spring Creek						
renewal	-	-	1,435,254	5,127,447	15,503,453	22,295,261
other capex	10,622	12,320	-	-	-	-
level of service						
growth						
capitalised overheads						
Total capex	**12,267,894**	**17,646,350**	**1,435,254**	**5,127,447**	**15,503,453**	**22,295,261**
level of service	2,387,560	700,236	717,627	2,563,723	7,751,726	31,065,765
growth	3,885,450	13,772,205	717,627	2,563,723	7,751,726	31,065,765
renewal	5,994,884	3,173,909	1,435,254	5,127,447	15,503,453	22,295,261
Total capex	**12,267,894**	**17,646,350**	**2,870,508**	**10,254,894**	**31,006,905**	**84,426,792**

Appendix 10: Stormwater Operation Budget 2021-31

	Stormwater - 2021-31 (inflated)									
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Reticulation - mains maintenance	118,500	113,368	116,270	119,494	122,932	126,371	130,347	134,753	139,373	143,672
Reticulation - open drains maintenance	36,000	37,272	38,226	39,286	40,416	41,547	42,854	44,302	45,821	47,235
Reticulation - connection maintenance	21,125	21,871	22,431	23,053	23,716	24,380	25,147	25,997	26,888	27,717
Monitoring	15,000	15,530	15,927	16,369	16,840	17,311	17,856	18,459	19,092	19,681
Pump Stations - power	10,000	10,353	10,618	10,913	11,227	11,541	11,904	12,306	12,728	13,121
Reticulation - manholes maintenance	9,750	10,094	10,353	10,640	10,946	11,252	11,606	11,999	12,410	12,793
Reticulation - berm sump maintenance	6,000	6,212	6,371	6,548	6,736	6,924	7,142	7,384	7,637	7,872
Pump stations - other	2,000	12,424	7,433	24,008	2,245	2,308	2,381	2,461	2,546	2,624
Pump stations - mechanical	1,500	1,553	1,593	1,637	1,684	1,731	1,786	1,846	1,909	1,968
Pump stations - telemetry	300	311	319	327	337	346	357	369	382	394
total infrastructure costs	**220,175**	**228,989**	**229,540**	**252,273**	**237,080**	**243,711**	**251,379**	**259,876**	**268,787**	**277,076**
operating costs	99,460	100,837	103,417	106,256	109,277	112,298	115,770	119,606	123,624	127,383
depreciation	1,762,299	1,891,811	1,995,758	2,080,817	2,175,747	2,282,290	2,395,246	2,501,791	2,601,711	2,703,383
interest expense	6,459	5,103	3,693	2,224	778	105	78,229	276,838	389,526	375,354
overheads allocated	380,698	396,485	409,199	417,403	428,704	440,166	452,282	465,092	478,558	491,055
Total operating costs	**2,469,092**	**2,623,225**	**2,741,607**	**2,858,974**	**2,951,586**	**3,078,571**	**3,292,906**	**3,623,204**	**3,862,207**	**3,974,251**

Appendix 11: Stormwater Operational Budget 2021-51

	Stormwater 2021-51 (Inflated)					
	21-26	26-31	31-36	36-41	41-46	46-51
Reticulation - mains maintenance	590,564	674,516	757,838	867,509	993,051	1,136,762
Reticulation - open drains maintenance	191,199	221,759	249,152	285,208	326,483	373,730
Reticulation - connection maintenance	112,197	130,129	146,204	167,362	191,582	219,307
Monitoring	79,666	92,399	103,813	118,837	136,034	155,721
Pump Stations - power	53,111	61,600	69,209	79,225	90,690	103,814
Reticulation - manholes maintenance	51,783	60,060	67,479	77,244	88,422	101,219
Reticulation - berm sump maintenance	31,867	36,960	41,525	47,535	54,414	62,288
Pump stations - other	48,110	12,320	13,842	15,845	18,138	20,763
Pump stations - mechanical	7,967	9,240	10,381	11,884	13,603	15,572
Pump stations - telemetry	1,593	1,848	2,076	2,377	2,721	3,114
total infrastructure costs	**1,168,057**	**1,300,830**	**1,461,519**	**1,673,025**	**1,915,138**	**2,192,290**
operating costs	519,247	598,682	674,513	772,126	883,865	1,011,775
depreciation	9,906,432	12,484,420	13,516,916	13,516,916	13,516,916	13,516,916
interest expense	18,258	1,120,052	1,876,768	1,876,768	1,876,768	1,876,768
overheads allocated	2,032,489	2,327,154	3,398,538	3,890,361	4,453,359	5,097,832
Total operating costs	**13,644,483**	**17,831,139**	**26,746,908**	**36,649,179**	**51,448,806**	**73,307,624**