KAWERAU DISTRICT COUNCIL
Asset Management Plan 2020

Stormwater

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Version History

Version	Date	Notes	Author
2015	2015	Final version: AMP - 2015	Tom McDowall
1a	26/01/2018	First revision for 2018	Hanno vd Merwe
1b	31/01/2018	Review: Technical support officer	Tina Mitchell
1c	16/02/2018	Update after MOS review	Hanno vd Merwe
1d	20/02/2018	External review	Kelvin Hill (Western Bay DC)
2	20/03/2018	Submission to Council	Hanno vd Merwe
2a	15/10/2020	First revision for 2020	Tina Mitchell
2b	24/03/2021	Second revision for 2020	Tina Mitchell
2c	9/4/2021	Management Review	Hanno vd Merwe
2d	20/7/2021	Post Audit Review amendments	Tina Mitchell

SECTION ONE

Executive Summary

1.1. PURPOSE OF THE PLAN

The overall purpose of this Asset Management Plan is to describe Council's strategies for the management of its stormwater assets. The Plan enables Council to meet the present and expected future needs of the Community over a ten-year period (according to the 10 year Long Term Plan) and into the future (according to the 30 year Infrastructure Strategy).

The Plan details the assets Council owns and describes how the maintenance, renewal and replacement of these assets will be managed and funded to meet required levels of service for Council's Stormwater Activity in the most cost effective way for households and businesses.

The Asset Management Plan collates high-level management, financial, engineering and technical information from various sources and into a single document. It is a tool for communicating complex asset management information and strategies with stakeholders and interested parties.

An independent auditor evaluated the level of provision of asset management for the stormwater asset in 2017. The appropriate level was recommended to be raised from the Council's asset management policy of "Core" to "Intermediate" due to the higher risk to the health and well-being of the community in the event of stormwater assets failing to deliver an appropriate level of service.

The latest assessment of the current asset management level and the level required for "Intermediate" showed a gap of 14 percent overall for Stormwater. The asset management improvement actions include actions to close this gap.

1.2. ASSET DESCRIPTION

The Kawerau community is served by a Council owned and run stormwater system designed to manage rainfall run-off and mitigate surface water flooding. Stormwater is collected almost exclusively from the roading network and channelled through a network of pipes into natural waterways.

It currently consists of approximately 39.6 km of stormwater pipes and together with cesspits, manholes, stormwater outfalls, and other components are managed as part of the stormwater asset.

The table below summarises the key components of the system including additional infrastructure soon to be vested in Council following the residential developments of Porritt Glade and Central Cove.

These additions are shown in brackets in the table:

Key components

Length of piping (km)	38.6 (+0.6)
Number of cesspits	778 (+8)
Number of outfalls	20 (+1)
Number of manholes	526 (+3)

The replacement costs and depreciated values of the stormwater asset are shown below:

Replacement and depreciated values

Asset Type	Replacement value @ 30-6- 2019	Depreciated value @ 30-6-2020
Stormwater Pipes	$14,138,090	$3,587,203
Stormwater Structures	$3,887,390	$1,513,230
Total	**$18,025,480**	**$5,100,433**

1.3. LEVELS OF SERVICE

Customer levels of service

Council monitors and reports its actual performance against measures and targets contained in the Long Term Plan.

Council targets include the number of service requests, time taken to respond and the number of dwellings flooded because of stormwater system problems. The National Research Bureau three yearly community satisfaction survey undertaken in 2020, reports 84% resident satisfaction with the stormwater service that is above the peer group (75%) and national averages (72%).

Technical levels of service

Council seeks to maintain and operate a stormwater system in a manner that is fit for purpose and does not compromise public safety. It also seeks to comply with its stormwater resource consents at all times.

As with customer level of service, Council monitors and reports its actual performance against measures and targets contained in the Long Term Plan.

Constraints to levels of service

Constraints that may impact the ability to deliver the required levels of service include issues relating to funding, capacity, reliability and environmental performance.

Resource consents

Council currently holds resource consents from the BOP Regional Council (BOPRC) for three stormwater discharges into the Tarawera River and Ruruanga Stream.

Conditions relate to the volume and quality of discharge and require Council to maintain cesspits. A further 17 discharges are covered by existing use rights and are the subject of an application for a comprehensive consent.

Significant adverse effects

Stormwater collection and discharge has minimal effect on the environmental well-being of the community. Although stormwater carries contaminants from road surfaces, the receiving water is a large body of water, clear and fast flowing, capable of dealing with the discharges without any significant adverse effects.

1.4. FUTURE NEEDS

Due to a number of factors, Kawerau's stormwater network is generally adequate for current rainfall runoff demands and most of the network has some spare capacity. The soil is made up predominantly of Tarawera ash/pumice and is therefore exceptionally free-draining resulting in minimal instances of standing water. This has made possible to ensure that rainfall collected in the stormwater system is almost exclusively from the roadway, almost all buildings (aside from a small number in the CBD) draining stormwater to soak hole systems on their own property.

The Kawerau District has experienced low general population growth in demand for additional services however has continued to experience a consistent increase in residents over the age of 65. In the 2013 census, the total population of the Kawerau District was 6,363, a decrease of 8.1% or 561 people since the 2006 census. Despite the predicted further decline, the 2018 census showed a modest growth of general population to 7,460.

Council hopes to bolster these gains with economic development initiatives, such as the development of a new industrial park and promotion of the natural environment.

As well as increased demand from any new development, it is possible that if climate change continues to occur, that rainfall intensities and storm durations may increase, and the assets may require enhancement to cope with the increased flows.

A small number of small flood prone areas had been identified during significant rainfall events during recent years. Increasing the capacity (either installing additional drainage or increasing current drainage capacity) in these areas was considered.

It was considered in the Blundell Street area, the less invasive and more cost effective option of a series of detention basins being designed in order to arrest any sudden volume of run-off from the Tuwharetoa Farm land. Detention Basins were constructed in the farmland at the southern end of both Valley Road and Hardie Avenue.

The design of the River Road culverts carrying the Pumphouse Spring overflow stream were found to be a significant cause of flooding in the Fraser Street area. Designs were commissioned for replacement culverts that provided a larger free flowing structure. These new culverts are being installed from November 2020 and due for completion in April 2021.

There is a greater emphasis on the need to ensure that streams are more proactively maintained with a regular clearing of vegetation, in particular, the overflow stream and Ruruanga Stream as it runs behind The Village on Tamarangi Drive.

Other than those addressed above, the current stormwater systems are deemed sufficient and no other upgrades of capacity in the network are planned during the life of this Plan. Any problems created by changes in land use will be dealt with on case-by-case basis.

A new industrial park on SH34 would be required to manage stormwater by soakage into the ground, as there are no nearby streams for discharge into the river.

The life cycle of stormwater assets was assessed as being 100 years, however a recent evaluation of stormwater pipes suggests a more realistic life would be 120 years. Based on a 100-year life the replacement of significant lengths will not occur until 2057 in all regions not affected by geothermal activity.

Concrete and glazed earthenware pipes in the geothermal zone have a shorter expected life cycle of 35 years and are actively being replaced with PVC pipes and components. PVC pipes have an expected lifetime of 100 years in these areas.

1.5. LIFE CYCLE MANAGEMENT

1.5.1. *Assets*

Inlet/Outlet asset group

Included in this group are five major culverts (included in the Roading Network Asset Management Plan and not managed in this plan) and nearly 780 cesspits.

Service connections

Stormwater service connections are rarely required in Kawerau due to its sandy volcanic soils. Only the properties located within the town centre are connected to the town stormwater network equating to no more than 12%.

Pipes

The asset register records 39.6 km of pipe in various sizes. Practically all are rubber-ring jointed centrifugally moulded steel-reinforced concrete with the exception of glazed earthenware and PVC pipes in geothermal areas.

Manhole asset group

The asset register records 526 manholes in service, generally installed at changes in pipe direction or grade or at junctions of two or more pipes.

1.5.2. *Critical assets*

The stormwater pipes in the Town Centre are considered critical since a failure or collapse of a stormwater pipe may lead to flooding of the shops and businesses. The area is also in a geothermal zone and all the concrete pipes are being replaced with PVC pipes.

1.5.3. *New assets*

A small number of new assets have been added to the network since the last AMP through the two new housing developments in Porritt Drive and Bowen Street. The new industrial park located opposite the existing mill site commenced development during the period of the last AMP and continues to expand with stormwater assets constructed to Council requirements by the developer and to be vested in Council.

1.5.4. *Maintenance plan*

All stormwater maintenance is undertaken on an 'as required' basis. The costs for maintenance of the stormwater network are included in the stormwater activity.

1.5.5. *Renewal/Replacement*

The network has been divided into six zones: the first 5 zones are based on the estimated average date at which each zone was developed. The sixth zone is geothermal areas where concrete pipe replacement with PVC pipe is being accelerated.

The zones are:

1. 1955-1957 (~18 850 m)
2. 1962-1970 (~4 000 m)
3. 1973 (~5 350 m)
4. 1978 (~5 500 m)
5. 1980-1996 (~ 3 750 m)
6. 2000 to present (~1 150 m)

Historically, all assets in a zone are given the same installation date and therefore will have the same replacement date. The renewal funding for each zone has been averaged over eight years due to a range of reasons for variable deterioration rates. The objective is to maximise the life of the asset without compromising service. Extending the asset life reduces the overall cost to the Community.

Due to the greater than anticipated degredation of the pipe work in the town centre brought about by the corrosive nature of SO2 (Sulphur dioxide) a CCTV investigation project is programmed to be undertaken in 2021 to follow the line from the Town Centre to the river outfall. It is anticipated that a significant replacement programme will be required during the life of this plan.

1.5.6. *Deferred Maintenance and Disposal Plan*

There is no known deferred maintenance or specific disposals identified in the Plan.

1.6. FINANCIAL SUMMARY

As noted above, Kawerau's stormwater network is generally adequate for current rainfall runoff demands. There is some question about the impact of changing rainfall patterns and future stormwater requirements. However, most of the network has some spare capacity so it is anticipated that limited, localised upgrading should cope with changes in rainfall.

Due to the network being relatively young and standard lives being used for replacement analysis rather than physically assessing the lives of the pipe from in ground inspection, there is some risk associated with the amount of funding being allocated for future replacement. Performance analysis is planned and the funding model will be modified to better reflect the true deterioration rates.

1.7. ASSET MANAGEMENT SYSTEMS AND PROCESSES

Asset management outcomes

Responsibility for asset management outcomes lies with the Manager, Operations and Services.

Accounting and asset management systems

Ozone software is used for accounting and billing. All formal asset management financial reporting including valuation is currently held in Excel spreadsheets. This is being migrated into the AssetFinda system.

Key information flows and processes

Key information flows and process linkages are those which relate to the incorporation of Kawerau's Community Outcomes, the preparation and adherence to Council's annual budgets, environmental monitoring and compliance and to ongoing asset management which maintains levels of service to the community.

1.8. MONITORING AND IMPROVEMENT PLANNING

Improvement items are outlined in section nine of the Plan. Key improvement activities centre on continuing to increase the accuracy of Council's information relating to the stormwater assets.

The Leadership Team will monitor and review improvement items on a six monthly basis. The improvement plan will be reviewed each year as part of the annual plan development process.

SECTION TWO
Introduction

2.1. PURPOSE OF THE PLAN

The overall purpose of this Asset Management Plan is to describe Council's strategies for the management of its stormwater assets. The Plan enables Council to meet the present and expected future needs of the Community over a ten year period (according to the 10 year Long Term Plan) and into the future (according to the 30 year Infrastructure Strategy).

The plan details the assets Council owns and describes how the maintenance, renewal and replacement of these assets will be managed and funded to meet required levels of service for Council's Stormwater Activity in the most cost effective way.

The asset management plan collects high level management, financial, engineering and technical information from various sources and combines these into a single document. It is a tool for communicating complex asset management information and strategies with stakeholders and interested parties.

2.2. ASSET DESCRIPTION

In the Kawerau District, there is a network of pipes which collects stormwater almost exclusively from the roading network and disposes of it into natural waterways. Aside from a small number of buildings located in the CBD, properties are not connected to the stormwater network and drain to soak holes on their property.

Council conducts the operational, maintenance, renewal and construction activities relating to the stormwater network. In addition to these physical activities, there are administration activities including:

- Responding to requests from the public.
- Maintaining and applying for resource consents.
- Recording and costing of expenditure.
- Complying with accepted standards.
- Ensuring private development manages its own stormwater.
- Managing the asset inventory.

This asset management plan records these activities, providing reference to policies, management decisions and programmes. At the same time it demonstrates that the activity is being conducted in a responsible and cost-effective way, sustainable over the long term.

The Stormwater Activity requires the infrastructure listed below to be operated, maintained, renewed, added to and in rare cases, dismantled or abandoned.

The table below summarises the key components of the system including additional infrastructure soon to be vested in Council following the residential developments of Porritt Glade and Central Cove. These additions are shown in brackets in the table:

Table 1: Key components

Length of piping (km)	39.2
Number of cesspits	786
Number of outfalls	21
Number of manholes	526

2.3. OBJECTIVES OF ASSET OWNERSHIP

The goal of the Stormwater activity is to dispose of stormwater in a manner which protects the Community from flooding and minimises negative impacts to the environment.

The activity involves:

- Disposal of stormwater from the roading network.
- Repairing or replacing unsound pipes and other stormwater structures.
- Cleaning pipes and cesspits.
- Planning to meet future requirements, and improving operations.

Council's principal objectives are:

- To anticipate the time when it may be necessary to extend, upgrade or renew the existing stormwater network and to plan accordingly.
- To ensure the appropriate maintenance of the stormwater network is carried out in perpetuity, so that there is no decrease in value and to forecast the estimated future cost of doing so.
- To put in place a sound management regime for all matters relating to the stormwater network.

A number of legislative requirements relate to the collection and removal of stormwater. These include the Local Government Act 2002, the Resource Management Act 1991, the Health Act 1956 and Council's District Plan.

The vast majority of stormwater disposed of through the stormwater network comes from the roading network which is owned and operated by Council. Therefore, disposal of the stormwater should also be managed by Council.

Stormwater can have a significant detrimental effect on a large proportion of the Community if not properly managed. A flooding event on a property is often the culmination of events not originating on that property.

2.4. CONTRIBUTION TO COMMUNITY OUTCOMES

The Stormwater Activity contributes primarily to the Council Community Outcome that Council infrastructure and services are effective, efficient and sustainable.

2.5. LINKS TO OTHER STRATEGIC DOCUMENTS

Public infrastructure supports activity that contributes toward the economic, social, cultural and environmental wellbeing of the Community. In addition to stormwater infrastructure, Council owns the water supply and wastewater (sewerage) systems, the District's roads and footpaths, and its public parks, reserves, buildings and facilities. The parts that make up those networks and structures and the tools and equipment used to manage and maintain them, are known as Council's assets.

Every three years Council develops a Long Term Plan which sets out the range and level of services it will provide to meet identified Community needs and Community Outcomes and indicates anticipated expenditure on assets for the next 10 years. Each year Council adopts an Annual Plan, which contains the budget for Council services. Council's ability to deliver services and to do so at a reasonable cost depends on the condition, performance and risk profile of its assets.

Council's asset management planning is therefore closely linked to its Annual Plan and Long Term Plan.

This Asset Management Plan was developed in conjunction with the Kawerau District Council Long Term Plan 2021-2031. It will underpin and be integrated into that document and Annual Plans made over the next ten years.

SECTION THREE
Levels of Service

3.1. CUSTOMER LEVELS OF SERVICE

The following customer levels of service agreed upon in the 2018-28 LTP:

Table 2: Customer Levels of Service (LOS)

LOS	Performance Measure	Target
Council provides an effective stormwater network which removes stormwater to protect dwellings from flooding (System adequacy)	The number of flood events that occur in the District.	No more than 10
Response times	The median response time to attend a flooding event, measured from the time that Council receives notification to the time that service personnel reach the site.	Less than one hour
Discharge compliance	Compliance with Council's resource consents for discharge from the system, measured by the number of: • abatement notices • infringement notices • enforcement orders, and • convictions, received by Council in relation to those resource consents.	No notices, orders or convictions

3.2. TECHNICAL LEVELS OF SERVICE

Council will continue to monitor and report its actual performance against measures and targets described in the LTP. All reporting is done through quarterly reports to the Council by the Manager, Operations and Services.

3.3. CONSTRAINTS TO LEVELS OF SERVICE

The constraints which impact on levels of service of the stormwater network are shown in the table below.

Table 3: Constraints to Levels of Service

Constraint	Component	Comments
Capacity	Residential Service Connections	Residential houses do not connect to the stormwater network.
	Industrial Service Connections	Some industrial properties in Manukorihi Drive have a 100mm pipe connection to the network from their underground stormwater storage tanks.
	Public Networks	There are no known capacity constraints with the current network of pipes during typical rainfall events. Extreme events have exceeded the network capacity in localised areas. Modification to the overland flow paths next to rural areas have occurred allowing roadways to act as flow paths rather than inundating homes.
	Rainfall Intensities	There are no available calculations as to the maximum capacity of the stormwater network. However, the system has managed to accommodate heavy rainfalls with minimal flooding of the roads. Flooding is typically caused by cesspit blockages rather than insufficient capacity.
	Cesspits	The cesspits block with leaves, especially in the autumn. Stormwater then flows to the next available cesspit. Cleaning of cesspit lids prior to and during rain events prevents flooding of properties.
Reliability and Security of Service	Public Networks	Asset failures occur due mainly to cesspit blockages. Pipe blockages are cleared immediately they are detected. Tree roots are a common cause. If possible, offending trees are removed to prevent repeat events.

	Catastrophic failure	Failure due to natural disaster could be extensive. However, overland flow paths will minimise inundation of buildings.
Environmental Performance	Consents	All existing discharge points to natural waterways are covered by resource consents. Because the stormwater comes from the roading network the presence of unknown contaminants in the stormwater from other sources is unlikely.
	Future requirements	A stormwater management plan has been lodged with the BOPRC which covers the long term discharge consent and any collection issues.

3.4. RESOURCE CONSENTS

Council's current resource consents are shown in the table below.

Table 4: Resource Consents

Consent No.	Name	Purpose	Expiry Date
63046	Tarawera River - Manukorihi Drive	Stormwater discharge	31 March 2025
20227	Ruruanga Stream – Valley Road 200m downstream from culvert	Stormwater discharge	1 October 2026
20757	Ruruanga Stream – Valley Road just downstream from culvert	Stormwater discharge	None

Table 5: Resource Consent Conditions

Consent No.	Conditions
63046	Maximum discharge, maximum suspended solids, free of certain substances, maintain structure.
20227	Maximum discharge, substantially free from suspended solids and certain substances, cesspits to be adequately maintained.
20757	Maximum discharge, substantially free from suspended solids and certain substances, cesspits to be adequately maintained.

3.5. SIGNIFICANT ADVERSE EFFECTS

The collection and discharge of stormwater has minimal negative effect on the environmental well-being of the community. The stormwater contains contaminants (grit, organic material, and chemicals) from the road surface. However, the receiving water (Tarawera River) is large, clear and fast flowing and capable of dealing with stormwater discharges when the conditions of the resource consents is adhered to. The road network is predominantly low volume with minimal heavy traffic which reduce chemical contamination.

SECTION FOUR

Risk Management

4.1. RISKS

4.1.1. *Physical Risks*

Physical risks are generally:

- As a result of the inevitable natural process of deterioration.
- Because of actions of other parties working or travelling in the vicinity of the assets.
- Because of natural disasters (earthquakes/flooding).

Durable materials, good workmanship, and careful planning will not always be sufficient to prevent physical damage by people or natural events (severe flooding damaging outlet structures). In the last 20 years there has been no damage to the stormwater network from flooding. This indicates that the current system is at minimal risk from the more common natural disasters such as flooding.

4.1.2. *Financial Risks*

Financial risks are those which result in decreased cash flow and/or inability to afford the works that are required. They include loss of a major ratepayer (requiring the fixed cost burden to be absorbed by the remaining ratepayers), failure to take advantage of any available subsidies and replacing assets before end of useful life, resulting in less than optimal life-cycle cost.

4.1.3. *Health and Safety Risk*

Health and safety risks arise as a result of physical actions or omissions of Council staff or contractors, or equipment failure. Health and safety risks are minimised by training staff and employing reputable contractors for maintenance and new works.

4.1.4. *Environmental Risk*

There are risks of prosecution due to failing to comply with the law. The right of the Bay of Plenty Regional Council to change consent conditions during the term of the consent represents a regulatory risk exposure to Council. The consequence of this risk could be a requirement to improve the quality of the stormwater by treatment or an upgrade of the network.

4.1.5. *Regulatory Risk*

The right of the BOP Regional Council to amend consent conditions during the term of consent represents a regulatory risk exposure to Council. However, the change normally only occurs due to failure to meet existing consent conditions. The consequence of this change would be modified treatment practices, which could have capital and operational cost consequences. BOPRC would conduct significant dialogue with Council prior to actually amending conditions and there would normally be a time frame within which to implement changes.

The special rights and status of Tangata Whenua in the resource consent process also represents a risk to Council. Council believes it can minimise this risk by maintaining cordial relationships with local Iwi.

There is also a risk of prosecution if Council fails to comply with legislation.

4.2. RISK MITIGATION

Council actions taken to mitigate risks are set out in the table on the next page.

Insurance
Council has adequate insurance in place to cover the replacement and/or repair of buildings and other valuable assets in this group.

Civil defence and emergency response plans
Council has staff dedicated to the recovery of Council services in the event of a civil defence emergency. Two Council buildings (Council Chamber and Firmin Lodge) have Civil Defence designations for use in the event of a disaster.

Financial

Council funds depreciation at a rate commensurate with the loss of life of the various asset components. This funding is invested until required for replacement.

Table 6: Risk Mitigation

Key Exposure	Risk Probability	Residual Exposure Consequence	Mitigation
Physical			
Seismic Event	Medium	Significant	Earthquake design Standards
			Redundancy in reticulation
			Insurance cover
Flood Event	High	Medium	Well built and maintained outfalls
			Surface flows paths defined and well maintained
			Insurance cover
Damage by Others	Low	Moderate	Staff available 24/7
			Respond to reports of damaged or missing manhole lids
			Insurance cover
Failure due to deterioration of assets	High	Low	Asset performance monitoring
			Staff available 24/7
			Renewal Programme
Financial			
Reduction in subsidy rate	Low	Low	Changes low and advised well in advance
Health and Safety			
Injury to persons or property due to operations	Moderate	Low	Employ reputable contractors/qualified staff
			Insurance cover
Damage to property, injury or death due to assets being in public places or during flood	Low	Moderate	Topography of District and soil permeability reduces risk of flooding
			Outlets well established and no failure history during previous rain events
			Insurance cover
			Staff available 24/7 to attend to blockages
Environmental			
Stormwater quality	Moderate	Moderate	Spills on road cleaned up as soon as detected
			Staff trained in handling notified spills
			Tarawera River quick flowing
Regulatory			
Failure to comply with resource consents	Low	Low	Monitoring of consent conditions to ensure compliance
Change of consent conditions	Low	Low	EBOP negotiates consent conditions before changing and allows agreed time frames to comply

SECTION FIVE

Future Needs

5.1. CURRENT CAPACITY

The capacity of the network is adequate to handle current stormwater inflows which occur from time to time. Since storm water primarily service roads, only additional roading would justify additional stormwater infrastructure. All roads are fully develop and borders need to expand before additional roading (and therefore stormwater) will be considered.

Some extreme events (high intensity and short duration) have exceeded the network's capacity in recent years in several locations. Blockages occur several times per year in various locations, temporarily reducing capacity.

5.2. FUTURE DEMAND

Kawerau District has experienced and is expected to continue to experience low growth in demand for additional residential areas. The network is designed for development upstream but extreme events occurring in recent years, may mean upgrading the existing network in some instances.

Any problems created by changes in land use will be dealt with on case-by-case basis. For example a new industrial park on SH34 will be required to manage stormwater by soakage into the ground as there are no nearby streams for discharge into the river.

5.3. TRENDS

Population growth

The Kawerau population had fallen between the 2006 and 2013 census, however the 2018 census found growth of 17.3% in 5 years against all projections for the district. Into the future, it is projected to rise with medium projections indicating a population of 8,000 by 2028.

Council is engaging in economic development initiatives to attempt to bolster this trend, and indeed the latest 2018 census for Kawerau was 7,460 that may indicate resurgence in the town.

As is the case with the rest of NZ, the population is aging with an increasing fraction of the population receiving state funded superannuation and employment benefits. The average income in respect to the national average is expected to continue to decrease and there will be an increased requirement for external funding to maintain the infrastructure in the future.

Existing and required capacity

Kawerau District is experiencing and is expected to continue to experience very low growth in demand for stormwater capacity. A number of vacant sections in the town are being developed. The existing stormwater network will cope with the additional demand from this additional roading as the stormwater system was designed for these areas.

The boundary between Whakatane and Kawerau districts was adjusted in 2012 facilitating the creation of a new industrial park on SH34 opposite the existing mill site. Industrial development commenced in 2018 and is continuing with a small amount of additional roadway. These additional assets will be vested to Council in the future. The industries themselves will not impact on the stormwater network as these sites will manage their own stormwater on site.

As is the case with the rest of NZ, the population is aging with an increasing fraction of the population receiving state funded superannuation and employment benefits. The average income in respect to the national average is expected to continue to decrease and there will be an ongoing requirement for external funding to maintain the stormwater infrastructure in the future.

Table 7: Statistics NZ Population Projections – Kawerau District

Population Change 2006–2043 (NZ Stats)								
Projected Range	2006 *Census*	2013 *Census*	2018 *Census*	2023	2028	2033	2038	2043
High				8,110	8,410	8,650	8,830	8,970
Medium	6,921	6,363	7,460	7,910	8,000	8,020	7,970	7,860
Low				7,720	7,610	7,410	7,140	6,800

5.4. NEW CAPITAL REQUIREMENTS

There are no new significant capital requirements during the life of the Plan. Council will replace existing assets only.

Any new land developments in the industrial park or any future residential development would install their own stormwater soaking holes or storm water drains that may be vested to Council at a later date.

SECTION SIX

Lifecycle Management

6.1. CRITICAL ASSETS

Asset criticality is the relative risk of high cost arising from failure of that asset. Criticality is determined by the cost and risk of potential failures and the relative importance on society and the environment. Evaluating the different failure modes of critical assets determines what maintenance, capital expenditure and conditioning monitoring needs to be planned.

In general, critical assets are maintained on risk management principles, whereas non-critical assets are maintained reactively (replace on fail).

Of the stormwater assets, only the network in the Town Centre as considered critical. The culverts in River Road is also a critical stormwater asset; however it is managed with the other structures in the Roading asset management group.

Town Centre

Stormwater pipes installed prior to 2006 were primarily concrete which degrade at accelerated rates near geothermal areas. Failure of stormwater pipes in these areas carry a significant risk of localised flooding. As the Town Centre experiences significant geothermal degradation, failures of the stormwater network in this area could cause significant economic loss. A number of the concrete pipes and manholes in the Ranfurly Court area of the Town Centre were replaced with PVC pipes and structures in 2019 and 2020 with further stages planned for replacement through Jellicoe Court during the life of this plan.

6.2. INLET/OUTLET ASSET GROUP

Five major culverts under roads are included in the Roading Asset Management Plan.

The asset register records 778 cesspits. The majority of these are part of the roading network and are maintained under that function. All are constructed of concrete with a cast iron grate, often including an open back entry to minimise blockage from accumulated debris. Cast iron grates, in frames which permit them to be opened for cleaning, are concreted in place over the cesspit. The bottom level of the cesspit is below the outlet pipes to allow silt, stones and other debris to be trapped.

The outlet asset group includes 20 outfalls recorded on the asset register. An outfall is where a stormwater pipe discharges into a natural water course.

6.3. SERVICE CONNECTIONS

Stormwater service connections are rarely required in the District due to the sandy volcanic soils that provide adequate soakage for private discharges via soak holes.

In the town centre, roofs discharge to the public network equating to no more than 12%. The property owner is responsible for maintenance and replacement of service connections to the stormwater network.

6.4. PIPE ASSET GROUP

The asset register records 39.6 km of pipe in 1,376 lengths. The stormwater pipe network is made up of pipe from 225mm to 1,200mm in diameter. A large proportion of the pipes are less than 450mm in diameter. There are lengths of subsoil drain of 100 to 150mm in diameter.

Almost all pipes are rubber-ring jointed centrifugally-moulded steel-reinforced concrete. The pipes in the geothermal area are a mixture of High Density Poly Ethylene (HDPE), glazed earthenware, PVC and reinforced concrete. The subsoil drains in the Beattie and Hardie Avenue area are 100-150mm diameter slotted drain coil.

Asset Install Dates

The network has been divided into six zones: the first 5 zones are based on the estimated average date at which each zone was developed. The sixth zone is geothermal areas where concrete pipe replacement with PVC pipe is being accelerated.

The zones are:

1. 1955-1957 (~18 850 m)
2. 1962-1970 (~4 000 m)
3. 1973 (~5 350 m)
4. 1978 (~5 500 m)
5. 1980-1996 (~ 3 750 m)
6. 2000 to present (~1 150 m)

Historically, all assets in a zone are given the same installation date and therefore will have the same replacement date. To allow for the spread of installation dates and due to a range of reasons pipes will deteriorate at different rates, the renewal funding for each zone has been averaged over eight years. The objective is to maximise the life of the asset without compromising service. Extending the asset life reduces the overall cost to the Community.

Data Validation

The physical location of almost all the cesspits and manholes has been reviewed to verify that they are in the correct location.

It is estimated that the location of the cesspit and manholes is 95%.

The diameter of the pipes has been taken from the original as built plans. Several of the diameters have been checked in the field and these corresponded with the plans. It has been assumed that the balance of the diameters correspond with the original plans.

Checks have been undertaken with the AssetFinda data to verify that the pipes continue to increase in diameter as they go downstream.

It is estimated that the diameter of the pipes is 95% accurate based on these evaluations performed the previous two years.

All the pipes have been determined as being concrete except where they are known to be something else (PVV, HDPE). Videos taken as a result of blockages and staff observations verify this assumption.

Asset Lives

The oldest of the pipes are currently 60 years old (installed in 1957). There have been no collapses of stormwater pipe in Kawerau except in areas that are impacted by geothermal activity (Town Centre). There have been no sign of deterioration of the internals of the pipes when inspections have been undertaken for blockage reasons.

A section of concrete *sewer* pipe from Zone 1 (1957) was removed in 2015 and tested in the Opus Lab in Christchurch. The pipe was assessed as Grade 3 - Moderate Condition. The pipe was assessed as having a further 40 years of life. The section through the pipe which shows to level of cement that has leached from the pipe showed the following

- External deterioration: 0.0 to 2.6mm
- Internal deterioration: 0.8 to 10.3mm

The internal deterioration is in the lower section of the pipe which is what would be expected in a sewer pipe.

A stormwater pipe has no water in it for over 90% of its life and when there is water present it is a lot less aggressive than wastewater. It could reasonably be assumed that the minimum rate of deterioration occurring on the inside of the wastewater pipe would be occurring in a stormwater pipe.

This hypothesis has been confirmed by taking a number of 50mm cores through stormwater pipes and painting the edges with Phenolphthalein which shows a similar very small reduction in cement

(A phenolphthalein solution was applied to the prepared plugs of pipe, and when the phenolphthalein turns magenta in colour this indicates sound concrete. Where the phenolphthalein does not react with the concrete surface this indicates the cement has leached and the pipe wall has deteriorated.)

Based on the results of the sewer pipe testing, plug samples taken and tested, visual observations of pipe surface quality it is considered that a conservative life for concrete stormwater pipes would be at least 100 years.

A more realistic life would be approx. 120 years and it would not be unreasonable to expect the concrete stormwater pipe life in Kawerau to exceed 120 years. The deterioration of stormwater pipes will be continuously evaluated in the future and updated with later findings. Based on current knowledge, a lifespan of 120 years will be used to determine replacement dates and costs for all concrete stormwater structures.

The expected life of PVC pipes are considered to exceed that of concrete and a 120 year lifespan will be used as well. No evaluation of glazed earthenware has been performed to date and the existing 80 year life will be used. Most glazed earthenware occur in the geothermal Zone 6 and will be replaced early.

Table 8: Asset lives – Stormwater

	Current life	Recommended
Concrete Pipes	70	120
PVC Pipes	70	120
Glazed Eathernware	80	80
Manholes	70	120
Sumps/Cesspits	70	120
Outlets	70	120

The size and age distribution of the network is illustrated below.

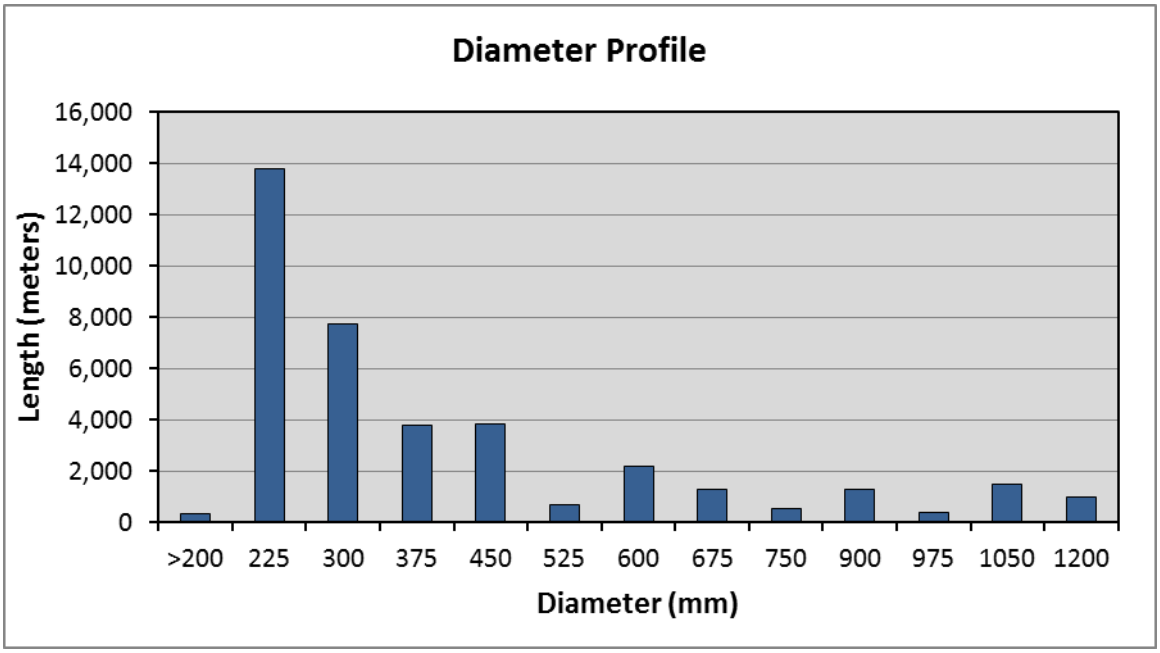

Figure 1: Diameter Profile of Stormwater Pipes

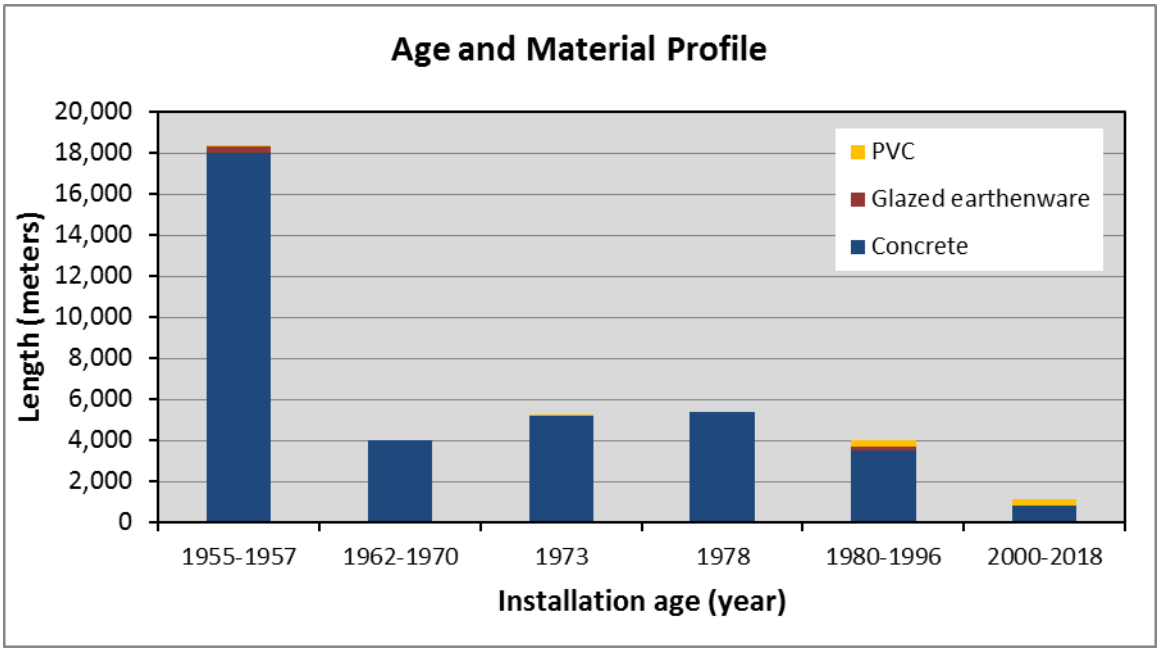

Figure 2: Age/Material Profile of Stormwater Pipes

6.5. MANHOLE ASSET GROUP

The asset register records 526 manholes in service, generally installed at changes in pipe direction or grade or at junctions of two or more pipes. Most are of standard 1,050mm diameter, made of precast reinforced concrete with cast iron lids. There are galvanised iron rungs in the sides of the manholes for access.

No formal process of manhole inspection for deterioration is in place. When maintenance activity has been undertaken, no deterioration on the inside of manholes has been detected (except in geothermal areas).

If significant deterioration is detected, the manholes will either be replaced or relined

An asset life for manholes of 120 years have been recommended in line with concrete stormwater pipes in section 6.4. except in geothermal areas.

6.6. PERFORMANCE ISSUES

As well as increased demand from any new development, it is possible that if climate change continues to occur, that rainfall intensities and storm durations may increase, and the assets may require enhancement to cope with the increased flows.

A small number of small flood prone areas had been identified during significant rainfall events during recent years. Increasing the capacity (either installing additional drainage or increasing current drainage capacity) in these areas was considered.

It was considered in the Blundell Street area, the less invasive and more cost effective option of a series of detention basins being designed in order to simply arrest any sudden volume of water that flowed from the Tuwharetoa farmland. Detention Basins were constructed in the farmland at the southern end of both Valley Road and Hardie Avenue.

The design of the River Road culverts carrying the Pumphouse Spring overflow stream were found to be a significant cause of flooding in the Fraser Street area. Designs were commissioned for replacement culverts that provided a larger free flowing structure. Installation of these new culverts commenced toward the end of 2020 and is due to be completed in April 2021.

There is a greater emphasis on the need to ensure that streams are more proactively maintained with a regular clearing of vegetation, in particular, the overflow stream and Ruruanga Stream as it runs behind The Village body corporate housing on Tamarangi Drive.

Other than those being addressed above, the current stormwater systems are deemed sufficient and no other upgrades of capacity in the network are planned during the life of this Plan. Any problems created by changes in land use will be dealt with on case-by-case basis.

6.7. DATA RELIABILITY

The stormwater data has been assessed as reliable. All the data has been imported into a digital database (AssetFinda) and validated. High correlation between records and actual assets were found and the rare anomalies have being corrected.

6.8. MAINTENANCE PLAN

Most stormwater maintenance is currently undertaken on an ‘as required’ basis. The low level of public complaint about flooding is a measure of the success of maintaining the asset.

Cesspits

These are cleared of debris on a regular basis during autumn and year round prior to forecast rain events including ongoing clearing during the event.

Any complaints about surface flooding are attended to immediately to ensure the cesspits are cleared of any subsequent built up debris.

Pipes

Minimal preventative maintenance is required for stormwater pipes. Faults and blockages are repaired as reported and asset information updated as part of the operation. Investigative camera work is undertaken from time to time predominantly in and downstream of the geothermal area.

Manholes

Regular maintenance of manholes is considered unnecessary. Reactive maintenance includes clearing occasional blockages and replacing broken lids and frames. Stormwater maintenance is generally undertaken on an ‘as required’ basis. The low level of public complaint about flooding is a measure of the success of maintaining the asset.

6.9. New Assets

Stormwater capacity in the existing residential network is anticipated to be static for the duration of the planning period. Some detention basins have been constructed to protect the integrity of the stormwater system from farm run-off.

A small amount of additional asset constructed as part of the two new housing developments (Porritt Glade and Central Cove) and will be vested in Council in the near future.

The continuing development of the industrial park opposite the existing mill site will have stormwater assets constructed by the developer to Council’s requirements to then be vested in Council.

6.10. Deferred Maintenance

There is no known deferred maintenance with the stormwater network and the full service potential of the asset is being maintained.

6.11. Disposal Plan

There are no specific disposals identified in the Plan. Pipes that are no longer required or are replaced due to failure will not be retrieved as they have no value.

SECTION SEVEN

Financial Forecasts

7.1. FUTURE REQUIREMENTS

Table 9: Estimated Financial requirements

	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Operations	66,000	31,000	26,000	31,910	32,840	33,790	34,770	35,770	36,810	37,880
Depreciation	245,500	245,500	245,500	268,264	268,264	268,264	292,287	292,287	292,287	318,460
Interest					1,406	6,727	12,289	18,090	24,266	30,707
Overheads	20,060	9,620	8,340	9,940	10,340	10,790	10,820	11,190	11,790	11,810
	331,560	**286,120**	**279,840**	**310,114**	**312,850**	**319,571**	**350,166**	**357,337**	**365,153**	**398,857**
Asset Renewals	221,400	250,000	50,000	751,400	785,960	821,330	857,470	894,340	932,800	972,910
	552,960	**536,120**	**329,840**	**1,061,514**	**1,098,810**	**1,140,901**	**1,207,636**	**1,251,677**	**1,297,953**	**1,371,767**

7.2. FUNDING POLICY

The stormwater system provides both public and private benefits but it is not possible for Council to determine the proportion of each or to charge each group of users. For this reason Council has assessed the stormwater activity as 100 percent public good.

7.3. VALUATION

The stormwater network infrastructure is revalued by a competent valuer on a three yearly valuation cycle. Assets are valued at fair value determined on a depreciated replacement cost basis. The most recent revaluation is effective as at 30 June 2019.

7.3.1. *Asset basis of valuation*

The Optimised Depreciated Replacement Cost (ODRC) refers to today's cost of replacing the asset with another asset which provides the same level of service most efficiently and depreciated over the life of the asset to reflect its current value and remaining economic life. The optimised replacement cost assigned to each asset has been determined by suitably qualified and experienced professional persons and has been peer reviewed.

7.3.2. *Expenses*

Maintenance and operating costs are expensed in the year they are accrued.

The capitalisation threshold for stormwater assets has been set at $5,000 or the actual value of individual components where they are identified in the asset register.

7.3.3. *Changes in asset valuation*

The costs associated with renewing assets and providing new or improved asset infrastructure are capitalised and depreciated in accordance with the assessed economic life of each asset. This also applies where a developer provides infrastructure to be vested in Council.

7.3.4. *Capitalisation Threshold*

The following definitions are used for asset management purposes and the financial treatment is summarised below:

Maintenance is work done that is of an operational nature that can contribute to the asset life reaching its maximum potential but neither increases the value nor extends the remaining life of any asset.

Renewal is work done to replace an existing asset. The cost of replacement must be recorded as a capital expenditure, be greater than $1,000 and recorded in the asset register as a new asset with a unique identifier.

If the asset replaced is discarded or sold it must be removed from the asset register and any residual value must be formally written off.

An addition to the asset register is required when a new asset is created with a value exceeding $1,000. A new asset must be uniquely identified, and recorded in the asset register. The record in the asset register requires an assessment of the asset's remaining life expectancy (based on straight-line depreciation or estimated remaining life).

Where the asset register recognises an individual component worth less than $1,000, or where a length of pipe greater than 12 metres is replaced, the threshold does not apply and the additional value is capitalised.

7.4. KEY ASSUMPTIONS

The current valuation and renewal profiles are based on data currently available.

7.4.1. *Asset condition*

In the case of the stormwater network, the condition is taken as being directly related to its age unless better information is available. The keeping of samples from repairs on pipes that are approaching the end of their useful life provides additional information. While a more planned inspection would provide a more direct assessment of condition, the cost of such programmes is high with camera work generally only performed in and downstream of the geothermal area.

7.4.2. *Replacement cost*

The projected replacement costs and depreciated values shown in the table below have been derived from Council's asset register.

Further work identified in the improvement plan, will be carried out to verify the condition of the assets and the potential need for future replacement.

Table 10: Replacement Costs and Depreciated Values

Asset Type	Replacement value @30-6-2019	Depreciated value @30-6-2020
Stormwater Pipes	$14,138,090	$3,587,203
Stormwater Structures	$3,887,390	$1,513,230

The procedure for calculating network replacement costs is:

- Pipeline replacement will be carried out utilising HDPE pipes.
- Alternative replacement technologies such as relining existing pipes will be considered on a case by case basis.
- The construction environment for Council is brown field (replacement of existing) rather than green field construction.
- Unit rates for replacement are derived from peer review and other recent tenders and quotes.
- Replacement includes manholes and cesspits. Unusual pipes will be replaced with the next size up.
- No optimisation or efficiencies in pipe size or lengths have been allowed for in replacement costs.

7.4.3. *Depreciated value and life expectancy*

Straight line depreciation has been adopted for all above ground assets. The life expectancies used to calculate depreciated values for stormwater pipes are shown in the table on the next page.

The asset lives of the different components has been derived in section 6.4. The expected asset lives have significantly increased for zones 1 to 5 and the pipes and structures in zone 6 is being replaced in the next couple of years.

7.4.4. *Population*

Further sustained decline in population as predicted by Statistics NZ may seriously erode the rating base of the District, placing a higher burden on the remaining residents for any infrastructure upgrades and possibly affecting capacity to fund renewal works. Population trends must therefore be reviewed as frequently as reliable data can be obtained.

7.4.5. *Other assumptions*

- All expenditure is stated in 2020 values, with allowance made for the inflation over the planning period.
- All costs are GST exclusive.
- Operational costs are generally shown to increase in relation to inflation.
- Renewal costs are based on anticipated replacement requirements.
- The costs of insurance and risk mitigation are included in the forecasts.
- Climatic and other environmental trends are expected to continue as they have in the recent past.
- The plan provides scope for some growth in industrial/commercial demand.

7.4.6. *Development Contributions*

Section 106 of the Local Government Act 2002 requires local authorities to adopt development contributions or financial contributions policies.

Spare capacity in Council's infrastructure means it can cope with some growth. Therefore Council does not need to extend infrastructure to cope with increasing demand.

Council's policy is to not assess development contributions but to retain the provisions of the District Plan that allow the assessment of financial contributions.

7.4.7. *Financial Contributions*

New subdivisions or developments may require the extension of Council infrastructure networks for water supply, wastewater disposal and roading.

Council's financial contributions policy provides that the cost of these extensions is the responsibility of those who create the demand. Developers may be required to make financial contributions to meet the full cost of additional infrastructure necessary to support their subdivision or development.

SECTION EIGHT

Asset Management Systems & Processes

8.1. Responsibilities for Asset Management Outcomes

The Asset & Contract manager is responsible for the development of this asset management plan, including maintaining the integrity of Council's asset information.

The Three Waters manager is responsible for the identification, budget, planning, programming and undertaking of works required for the maintenance and renewal of Council's Stormwater assets.

The Manager, Finance & Corporate Services is responsible for providing an overview of the development of this asset management plan, for ensuring that future projects are incorporated in Council's Long Term Plan and that there is consistency between these documents.

The Manager, Operations and Services is responsible for delivering the outcomes for the Community Facilities and Property activity. This includes ensuring that the assets are maintained and operated to Council's requirements, and that adequate budgeting for maintenance, operating and improvement costs are provided.

8.2. Accounting and Asset Management Systems

8.2.1. *Billing/Accounting system*

Council currently uses Ozone software for its accounting and billing systems. It does not store or compute asset management information, but can be used to determine the number of connections to the wastewater and the number of properties billed for separate wastewater rates.

Currently, all formal asset management financial reporting including valuation is held in Excel spreadsheets. This will be migrated into the AssetFinda system.

8.2.2. *AssetFinda*

AssetFinda is the software used to manage and produce asset inventory reports. It is integrated with 'Map Info' data tables to permit input, querying, reporting and financial modelling using the asset register data. The spatial location of the three waters assets are laid over aerial maps, property boundaries.

Attaching information such as pump performance, type etc. to assets is a desirable improvement. The addition of photographs and 'as built' drawing to the asset will improve the data.

The software has yet to have financial data added to allow financial modelling for current replacement and depreciation value reporting.

The software has functionality to enable maintenance, renewal and resource consent monitoring activity scheduling and can be integrated into Ozone software's automated service request processes.

New asset information (location, installation date, materials' construction etc.) is entered into AssetFinda as the asset is commissioned.

The default valuation process used by AssetFinda is capable of recognising asset condition, extending the life of an asset and recalculating revised depreciation value and annual depreciation.

The improvement plan proposes that the appropriate financial information be entered into AssetFinda and the maintenance scheduling functionality be initiated.

8.2.3. *Hard copy plans*

Layout details of the pipes and structures are available for most of the stormwater asset.

8.3. Key Information Flows and Processes

Key information flows and process linkages include:

- Translating the Community Outcomes into detailed levels of service that can be embodied into Asset Management Plans.
- Preparation of annual budgets, and ongoing reporting.
- Updating asset data as information becomes available through maintenance and service repairs.
- Ongoing compliance monitoring and reporting of environmental performance.
- Ongoing management of the asset to ensure that service levels are maintained.

8.4. Quality management

Management is governed by the requirements of the discharge consent. The results are compiled for submission to BOPRC in accordance with consent conditions.

8.5. Maintenance

Maintenance is carried out reactively for most asset faults. The criteria which will result in renewal rather than further maintenance are:

- Is the asset important for maintaining service levels and have the service levels in the current year already been compromised by failures? If yes, consider renewal.
- What has been the failure history? If the current failure is part of a series, then consider renewal.

- Is the cost of the maintenance comparable to the cost of renewal? Where repair costs are high (e.g. reinstatement of road pavement) then consider renewing a logical minimum quantity of asset to prevent further expensive repair costs.
- Will maintenance preserve asset life? If yes, then carry out maintenance.

8.6. Policies for renewing assets

Replacing network components with larger components to improve capacity is treated purely as renewal capital expenditure. This is because the additional cost of larger components is not material compared with the renewal cost of component of the same kind.

8.6.1. *Renewal*

Renewal of assets will occur in accordance with practice described earlier in document.

8.6.2. *Constructing new assets*

Following many years of no demand for additional capacity, recent land developments for industry and residential have resulted in the need for additional new assets.

Funding to provide additional capacity would be treated on its merits, but in most cases the funding would be sought from property developers.

8.6.3. *Assets vested in Council*

Subdivisions that include the construction of new roads include stormwater assets. These are installed at subdivider's expense to approved Council standards and then vested in Council.
'As built' new works either occur due to subdivisions, or the installation of new assets. In both instances, detailed records of new works are obtained. These new assets are added to the AssetFinda database.

8.7. Asset disposal

Most of the components are essential to continuing provision of the service. Extensive decommissioning and disposal is very unlikely.

SECTION NINE

Monitoring Improvement Planning

9.2. Asset Management Performance Measures

The broad objectives of asset management are:

- To optimise the life of the assets
- To minimise life cycle costs
- To maintain agreed levels of service

Although it is possible to measure the success or otherwise of the asset management activity over the long term against the three criteria above, it will obviously be difficult to measure success or otherwise in the short term in a way that management control can be exerted. For example, it will be impossible to determine whether the life of a facility has been "optimised" until the actual age nears the expected life and a remaining life assessment can be meaningfully carried out.

An assessment of the asset knowledge and processes currently carried out, in terms of "best practice for a NZ authority of this size" provides an indication of how well Council is likely to be meeting these long term objectives. This assessment is therefore part of the Improvement Plan. It should include evaluation of the monitoring of operations and costs to provide information on the achievement of service level (both public measures and technical standards). It should cover previously-planned improvement actions, noting whether these have been achieved and how they are contributing to current processes. It should check how the initiatives undertaken are 'rolled out' from asset management staff to those carrying out the work, and how carefully field information is recorded and returned to add to the asset knowledge case.

9.3. Improvement Actions

Table 11: Improvement Actions

Improvement Item	Comment	By When	By Whom	Cost
Review population projections	Information will be provided by Statistics NZ	Census 2023	AMC	$0
Expand knowledge of AssetFinda functionality	Training staff (ACM & 3WM)	Ongoing improvement	MOS	$3,000
Review asset life expectancy	• Expert advice required. • Test pipes and manholes for deterioration	June 2021 and triennially thereafter	3WM	$10,000
Add as built plan information to AssetFinda	Resource	Annually	ACM / 3WM	$2,000
Add information like pipe material and condition into AssetFinda	Resource	Ongoing improvement	ACM / 3WM	$10,000
Add financial and valuation information against assets into AssetFinda	Resource	Ongoing improvement	ACM	$10,000
Input asset replacement costs to AssetFinda	Resource	June 2021 and triennially thereafter	ACM / 3WM	$2,000
Conduct asset revaluations	Resource	June 2021 and annually thereafter	MFCS	$5,000

ACM = Asset and Contract manager

3WM = Three Waters manager

MOS = Manager Operations and Services

MFCS = Manager Finance and Corporate Services

9.4. Monitoring and Review Procedures

The Leadership Team will monitor and review improvement items on a six monthly basis. This plan will be reviewed annually as part of annual plan development.

SECTION TEN

Appendices

10.1. APPENDIX A - DETAILED ASSET DESCRIPTION

ASSET STORMWATER PIPES	DESCRIPTION	MATERIAL	QTY	YEAR
STORMWATER PIPES - ZONE 1	1050	CONCRETE	768	1956
STORMWATER PIPES - ZONE 1	900	CONCRETE	612	1956
STORMWATER PIPES - ZONE 1	750	CONCRETE	427	1956
STORMWATER PIPES - ZONE 1	700	CONCRETE	223	1956
STORMWATER PIPES - ZONE 1	675	CONCRETE	936	1956
STORMWATER PIPES - ZONE 1	600	CONCRETE	1045	1956
STORMWATER PIPES - ZONE 1	450	CONCRETE	1209	1956
STORMWATER PIPES - ZONE 1	375	CONCRETE	2136	1956
STORMWATER PIPES - ZONE 1	300	CONCRETE	2458	1956
STORMWATER PIPES - ZONE 1	225	CONCRETE	3532	1956
STORMWATER PIPES - ZONE 1	LATERAL	CONCRETE	2070	1956
STORMWATER PIPES - ZONE 2	575	CONCRETE	129	1965
STORMWATER PIPES - ZONE 2	450	CONCRETE	85	1965
STORMWATER PIPES - ZONE 2	375	CONCRETE	237	1965
STORMWATER PIPES - ZONE 2	300	CONCRETE	1288	1965
STORMWATER PIPES - ZONE 2	225	CONCRETE	753	1965
STORMWATER PIPES - ZONE 2	LATERAL	CONCRETE	540	1965
STORMWATER PIPES - ZONE 3	1200	CONCRETE	778	1973
STORMWATER PIPES - ZONE 3	825	CONCRETE	133	1973
STORMWATER PIPES - ZONE 3	675	CONCRETE	204	1973
STORMWATER PIPES - ZONE 3	450	CONCRETE	841	1973
STORMWATER PIPES - ZONE 3	375	CONCRETE	628	1973
STORMWATER PIPES - ZONE 3	300	CONCRETE	996	1973
STORMWATER PIPES - ZONE 3	225	CONCRETE	471	1973
STORMWATER PIPES - ZONE 3	LATERAL	CONCRETE	720	1973
STORMWATER PIPES - ZONE 4	1050	CONCRETE	591	1978
STORMWATER PIPES - ZONE 4	900	CONCRETE	300	1978
STORMWATER PIPES - ZONE 4	600	CONCRETE	559	1978
STORMWATER PIPES - ZONE 4	450	CONCRETE	520	1978
STORMWATER PIPES - ZONE 4	375	CONCRETE	291	1978
STORMWATER PIPES - ZONE 4	300	CONCRETE	820	1978
STORMWATER PIPES - ZONE 4	225	CONCRETE	1051	1978
STORMWATER PIPES - ZONE 4	LATERAL	CONCRETE	400	1978
STORMWATER PIPES - ZONE 5	1200	CONCRETE	85	1985
STORMWATER PIPES - ZONE 5	1050	CONCRETE	228	1985
STORMWATER PIPES - ZONE 5	975	CONCRETE	346	1985
STORMWATER PIPES - ZONE 5	675	CONCRETE	66	1985
STORMWATER PIPES - ZONE 5	600	CONCRETE	94	1985
STORMWATER PIPES - ZONE 5	525	CONCRETE	528	1985
STORMWATER PIPES - ZONE 5	450	CONCRETE	92	1985
STORMWATER PIPES - ZONE 5	375	CONCRETE	129	1985
STORMWATER PIPES - ZONE 5	300	CONCRETE	224	1985

STORMWATER PIPES - ZONE 5	LATERAL	CONCRETE	180	1985
STORMWATER PIPES - ZONE 6	675	GLAZED EARTHENWARE	188	1962
STORMWATER PIPES - ZONE 6	600	GLAZED EARTHENWARE	175	1962
STORMWATER PIPES - ZONE 6	300	CONCRETE/EARTHENWARE	151	1958
STORMWATER PIPES - ZONE 6	300	CONCRETE/EARTHENWARE	80	1962
STORMWATER PIPES - ZONE 6	750	CONCRETE	36	2011
STORMWATER PIPES - ZONE 6	750	CONCRETE	14	2012
STORMWATER PIPE RAUTAHI	300	PVC	50	2003
STORMWATER PIPE RAUTAHI	225	PVC	33	2003
STORMWATER PIPES - ZONE 6	300	CONCRETE/EARTHENWARE	55	2003
STORMWATER PIPES - ZONE 1	225	CONCRETE	15	2006
STORMWATER PIPES - LANDFILL	900	CONCRETE	63	2006
STORMWATER PIPES - MANUKORIHI STREAM	450	CONCRETE	50	2014
STORMWATER PIPES - RANFURLY COURT		PVC	1	2016
STORMWATER PIPES - RANFURLY COURT		PVC	1	2017
STORMWATER PIPES - RANFURLY COURT		PVC	1	2019
STORMWATER PIPES - PIRIPIRI CRESCENT	450	PVC	280	2020
STORMWATER PIPES - TIWHATIWHA CRESCENT	300	PVC	96	2020
ASSET	**DESCRIPTION**	**MATERIAL**	**QTY**	**YEAR**
STORMWATER STRUCTURES				
STORMWATER OUTFALL - TARAWERA RIVER	OUTLET	CONCRETE	17	1966
OUTFALL - STONEHAM WALK	STRUCTURE	CONCRETE	1	1970
OUTFALL - HILLDALE PARK	STRUCTURE	CONCRETE	1	1983
STORMWATER MANHOLES - DISTRICT WIDE	MANHOLE	CONCRETE	514	1966
STORMWATER MANHOLES - ADDITION 2016	MANHOLE	CONCRETE	1	2016
STORMWATER MANHOLES - ADDITION - Porritt	MANHOLE	CONCRETE	9	2020
STORMWATER SUMPS	SUMP	CONCRETE	776	1966
STORMWATER SUMPS - NEW	SUMP	CONCRETE	1	2018
STORMWATER EARTHWORKS - 2017	EARTHWORKS	EARTHWORKS	1	2017
STORMWATER EARTHWORKS - 2018	EARTHWORKS	EARTHWORKS	1	2018
STORMWATER EARTHWORKS - 2019	EARTHWORKS	EARTHWORKS	1	2019
STORMWATER EARTHWORKS (various)- 2020	EARTHWORKS	EARTHWORKS	1	2020