

Rotorua Lakes

Asset Management Plan 2024-2034

FINAL



Executive Summary

The Rotorua Te Arawa Lakes Asset Management Plan (AMP) presents details of the assets associated with the restoration of water quality for the Rotorua Lakes and management of specific lake levels. The AMP focuses on 12 lakes within the Rotorua Lakes Programme, which all have targets for water quality specified in the Natural Resources Plan (NRP) for the Bay of Plenty region.

Asset Activity

The Rotorua Lakes Programme operates as a tripartite programme of lake management and restoration between the Bay of Plenty Regional Council (BOPRC), Te Arawa Lakes Trust (TALT) and Rotorua Lakes Council (RLC). The governing group is the Rotorua Te Arawa Lake Strategy Group (RTALSG) and was established out of the Te Arawa Settlement Act 2006.

The basis for the work contained within this AMP is directed by the requirements set out in the NRP and National Policy Standard for Freshwater Management (NPS-FM), as well as being directed by the Rotorua Lakes Management Strategy and its vision.

The lakes of the Rotorua district and their catchments are preserved and protected for the use and enjoyment of present and future generations, while recognising and providing for the traditional relationship of Te Arawa with their ancestral lakes.

Matakite:

E tiakina ana, e manaakitia ana hoki ngā roto o te rohe o Te Arawa hei painga mō tātau me ngā whakatipuranga e ara mai nei, ā, me te aro anō ki te hononga tuku iho o Te Arawa ki ō rātau roto

Lake Operations activities fall into two main categories:

- 1 **In-lake and in-stream interventions:** Temporary activities to improve lake water quality while more long-term sustainable land use changes are implemented and take effect.
- 2 **Lake level management and monitoring:** Activities that deliver service to the local communities to ensure specific lake levels are either managed or cater for future climate change scenarios and long-term data can be collected from key sites.

Asset Portfolio

The key objectives of this AMP are to document the key assets within the Rotorua Lakes Programme, outline their management approach including funding, service delivery, maintenance, and risk management. Bay of Plenty Regional Council currently manages and maintains approximately \$16.07 million worth of assets across the Rotorua Lakes activity, with a total replacement cost approximately \$24.9 million.

Asset type	Replacement cost	Fair Value
Ōhau Diversion Wall	\$17,740,800	\$11,063,040
P-Locking plants	\$1,863,200	\$1,122,220
Kaoro Fish passage	\$36,400	\$25,480
Ōkaro Wetland structures	\$245,700	\$140,970
Lake Ōkāreka outlet	\$3,764,100	\$3,379,660
Rotomahana Lake Outlet	\$745,100	\$208,640
Lake Rotomā Outlet	\$210,000	\$58,800
Lake Rerewhakaaitu Outlet	\$291,500	\$66,630
Total	\$24,896,800	\$16,065,440

The Ōhau Diversion Wall accounts for 74% of the total replacement costs. Structural maintenance has been undertaken as required, but inspection indicates significant additional maintenance is now necessary to maintain wall performance.

The Rotorua Lakes Operations activity faces some key issues and challenges.

Cultural impact: The presence of some structures, such as the Ōhau Diversion Wall, and activities such as alum dosing in lakes, have raised concerns with some community members. Ongoing engagement with iwi is needed to address conflicts and align with cultural values.

Community expectations: The community expects continuous improvement in water quality for each lake. However, it is important to communicate that water quality targets differ for each lake based on Trophic Level Index (TLI) targets and that annual variations and occasional algal blooms can occur, but do not indicate program failure. Furthermore, the community and especially landowners' appetite and justification for land use change to improve water quality, is tempered by the water quality they observe in the lakes. If an in-lake intervention is making a big improvement to water quality, this may be counterproductive to our need for long term land use change. Managing community expectations and providing clear information is crucial.

Program cost and timeframe: The Rotorua Lakes Programme is a high cost investment of around \$240m. As a result, the public are expecting to see a visible improvement in water quality. However, the programme is based on defining sustainable nutrient inputs to each lake and making these changes through improved land use. The subsequent improvements are likely to take many years, even decades, due to the legacy of nutrients in the groundwater as well as nutrients that can recycle from lake sediments. The response to this delay is to invest in short term response projects such as alum dosing and the Ōhau Diversion Wall, which as discussed above, raises concerns among some community members. This is an additional communication issue that requires ongoing attention. It is also worth noting that the significant contribution in funding for this activity from the Ministry for the Environment, totalling \$72.1 million, ceased in 2022.

Climate change impacts: Climate change poses significant challenges to reaching water quality targets. The potential challenge here is that over time nutrient reduction targets may need to be increased as a result, which may require existing assets longer than anticipated, or new additional assets not originally planned for. An increase in short-term interventions may also be required.

Climate change will also create more frequent lake level issues such as flooding and erosion. For example, continuous heavy winter rainfall has made meeting some lake levels difficult. Council upgraded the Lake Ōkāreka outlet pipeline, stream works and obtained resource consent to allow more than double the previous 239L/s flow to 500L/s outflow. During the 2022 winter, the outflow was run continuously at max flow of around 500L/s from mid-July to late December as the lake level continued to be above the max consent level, due to high rainfall. More recently, the occurrence of two summer cyclones and high summer rainfall made maintaining the lake below the max range challenging.

The TLI targets are affected by a range of environmental factors that are mostly beyond the control of the lakes programme. They comprise impacts that will change environmental conditions to such an extent that from year to year some lakes will meet their TLI targets, while some will not. The reasons will sometimes be identifiable, while most of the time the specific reason for not meeting target TLIs will remain a mystery.

Asset condition data: Limited availability of condition data poses challenges for informed decision-making regarding maintenance and renewal activities.

Effective asset management will provide significant support in achieving the objectives of the Rotorua Lakes activity and addressing the challenges and risks associated with water quality restoration and lake level management. The AMP highlights key projects, strategies and actions for the effective management of the asset portfolio. It outlines the planned operational and capital work programs, which aim to address the key issues identified in the asset portfolio, achieve defined levels of service, accommodate future demand, and manage associated risks.

Over the next decade, we estimate operational expenditure at \$102.5 million to continue meeting service levels and managing risks. As a result of the current Long Term Plan process currently underway Council will consider whether it would like to make further capital investment in lake and biodiversity restoration in the Rotorua catchments, i.e. more investment in constructed wetlands and a potential Regional Park. It is possible that Capital Investment over the period may increase to ~\$25 million on the basis of this decision making.

Thirteen improvement items have been identified to enhance the Rotorua Lakes AMP and overall asset management practices. These improvements encompass various aspects, including data collection and analysis, condition assessment programs, maintenance planning, and risk management.

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Part 1: Introduction

WHAT IS ASSET MANAGEMENT?

Infrastructure is essential for the health, safety, and transport of people, freight and all other things. It supports community wellbeing, and enables businesses and communities to develop and grow. Failure to invest in and maintain infrastructure poses a risk to the economic prosperity and sustainable future of people and regions.

Asset management is considered internationally as the preferred choice for driving improvement in most organisations that derive value by managing and operating infrastructure assets. It is now widely recognised that asset management can provide a framework and systematic approach to enable organisations to achieve improved performance and deliver community outcomes.

The overall goal of asset management is 'to provide the required level of service in the most effective and efficient manner for present and future customers', but it can be defined further as the systematic and coordinated activities and practices of an organisation to deliver on its objectives through the cost-effective lifecycle management of infrastructure assets. Asset management planning aims to translate community outcomes and organisational objectives into the operational delivery of asset-based services, through defined levels of service.

1.1 Purpose of the Asset Management Plan

WHAT IS THE PURPOSE OF THIS PLAN?

This Asset Management Plan (AMP) formally documents the long-term approach the Bay of Plenty Regional Council (Council) is taking to manage its infrastructural assets across the Rotorua Lakes portfolio and the services that contribute towards achieving the organisation's Strategic Direction and Community Outcomes.

The Rotorua Lakes Catchment programme is focused primarily on addressing water quality issues for the 12 lakes in the programme. The key objective for this programme is 'to meet community expectations for water quality in each lake'. The Lakes programme contains valuable assets with large capital values and long-term maintenance costs.

This AMP outlines these infrastructure assets, how they are managed, and the funding requirements to ensure they are maintained in a reasonable operational state. It also outlines the authorisations and management plans necessary to guide operation and maintenance.

The purpose of this plan is to:

- Achieve organisational and asset management objectives.
- Document key assets and improve knowledge of the Lakes asset portfolio.
- Demonstrate that the asset portfolio is being maintained.
- Recognise and manage risks to the Lakes asset portfolio.
- Ensure environmental, economic and financial sustainability.
- Ensure sustainability and resilience concepts are integrated within the activity.

HOW DOES THE AMP FIT IN COUNCIL?

The **Rotorua Lakes AMP** sets out the long-term approach Council will take to manage its asset portfolio and links Council’s organisational objectives and community outcomes with the asset management objectives and service levels.

The Council has a number of other key strategic documents, all working towards achieving the community outcomes. The relationship between these documents is illustrated and described below. Appendices 1 and 2 provide a list of other relevant plans, resource consents, and documents.



Document	Description	Relationship to AMP
Organisational Strategic Plan	The Organisational Strategic Plan assesses and adjusts the organisation’s direction in response to a changing operational environment, while articulating the organisational and customer expectations to be delivered through the organisation.	The Rotorua Lakes AMP converts the organisational objectives of the strategic plan into day-to-day activities so that assets are able to provide defined levels of service.
Long Term Plan	The Long Term Plan (LTP) sets Council’s strategic direction including Community Outcomes that Council is seeking to achieve. The LTP establishes the work we will deliver to our community over the next 10 years, as well as setting out how work will be funded, including through rates and various fees and charges.	The AMP provides the projected expenditure and work programmes to deliver agreed levels of service, for Council to consider in its budgeting and decision-making, where trade-offs between risk, cost and performance are considered.
Asset Management Policy	The Asset Management Policy outlines the objectives, requirements and responsibilities for undertaking asset management across the organisation.	The AMP converts the principles and actions into day-to-day actions and activities in order to deliver organisational objectives.

Strategic Asset Management Plan	The SAMP sets out the long-term approach Council will take to manage its assets and links organisational objectives with AM objectives.	The AMP takes direction from the SAMP to convert AM objectives into day-to-day operations and asset-based activities.
Lakes Strategy	The Lakes strategy sets out why people value the lakes, their concerns, and a vision for the future of the lakes. It connects the partner agencies involved with protecting and restoring the lakes and how they will manage the Rotorua Lakes catchments.	The AMP is informed by the Lakes Strategy and guides the day-to-day activities and long-term management of the Rotorua Lakes in order to achieve agreed service levels with stakeholders and communities.

1.2 Asset Management Plan structure

This document is structured into the following nine sections.

WHAT DOES THE AMP DESCRIBE?	
Introduction	The scope and purpose of the asset management plan is provided in this section. It illustrates the relationship and links between other key Council documents. The plan's timeframe, status, limitations, and structure are outlined.
Organisational and Strategic Overview	This section provides an overview of the Bay of Plenty region and presents context on the internal and external environment that the Council operates within relating to the Rotorua Lakes, including Council's strategic direction.
Activity and Asset Overview	This section provides an overview of the Rotorua Lakes activity and presents a summary of the asset portfolio covered by the AMP. Asset information includes asset types, condition, performance, criticality, and data confidence.
Levels of Service	Levels of service framework is covered, providing the link between the higher-level organisational objectives and community outcomes, with the agreed service levels and technical operational activities for the Rotorua Lakes portfolio.
Future Demand	This section sets out the key demand drivers, impact analysis and management strategies that the Rotorua Lakes group has, is or will undertake in order to plan ahead to manage projected future demand for the assets and activities.
Lifecycle Management	This section provides an overview of the Rotorua Lakes asset lifecycle process. Lifecycle management categories are presented and lifecycle strategies outlined for the Rotorua Lakes asset portfolio in order to achieve agreed service levels.
Risk Management	This section outlines the risk management approach for the Rotorua Lakes, indicating how risks are identified, assessed, analysed and treated. It discusses critical assets, and presents the risk register and risk management action plan.
Financial Planning	Financial requirements for the operation, maintenance, renewal and new capital works for the Rotorua Lakes activity and asset portfolio are outlined alongside financial policies, strategies, assumptions and valuations.
Audit and Improvement Plan	The improvement plan is a fundamental part of this AMP. It outlines what the Rotorua Lakes group plans to do over the following three years to improve its asset management practices. This includes resources, timeframes & reporting.

1.3 Status of the Asset Management Plan

AMP STATUS AND REVIEW

This Rotorua Lakes AMP is the draft version underlying the 2024-2034 Long Term Plan (LTP). It covers a 10-year time horizon and will be reviewed during annual budget planning processes and amended to show any material changes in service levels and/or resources available to provide those services as a result of budget decisions.

As such the AMP will be updated annually to ensure it represents the current:

- State of the asset portfolio and asset values (Part 3:);
- Service levels (Part 4:);
- Projected future demand (Part 5:);
- Lifecycle management strategies (Part 6:), which will be incorporated into the long term financial plan (Part 8:); and
- Risk management (Part 7:);
- State of the improvement plan (0).

The AMP will be comprehensively reviewed at three yearly intervals aligning with Council's LTP planning schedule every three years. However, it is a 'live' document and will be reviewed and updated when and where necessary to reflect:

- Responses to legislative and policy changes;
- New and/or improved data collected and subsequent analysis;
- Outcomes from service level reviews;
- New and/or improved management systems or tools;
- Emergency events that materially affect the AMP;
- Advances in asset management practices.

LIMITATIONS

This AMP has been prepared based on the following:

- Existing strategic objectives and community outcomes (2024-2034 Long Term Plan);
- Currently available asset information;
- Existing levels of service;
- A high-level future demand analysis;
- Existing lifecycle management plans, strategies, and intervention levels;
- Financial forecasts spanning 10 years (refer Part 8: for financial assumptions).

The following key limitations have been identified:

- The AMP is based on information from the 2022 Valuation. Some information on recently upgraded assets has not been included. This will be updated following the next Asset (Re)Valuation before 30 June 2024.
- Current and historical data on asset condition and performance was not available. This could impact planning and decision-making. Condition information is based on technical input from the Lakes Operations Manager.
- The update of this AMP was subject to time constraints, which has limited the depth and breadth of the analysis and planning activities. This has resulted in a narrower focus and incomplete coverage of certain aspects of the AMP, such as asset analyses and lifecycle management planning.

Part 2: Organisational overview and strategic environment

2.1 Overview of the region

The Bay of Plenty is located on the east coast of the North Island. The region incorporates the full extent of the coastline from Cape Runaway in the east, to Waihi Beach in the west and captures the coastal townships of Tauranga and Whakatāne. The region extends inland, generally to the ridge of the catchments that drain into the Bay of Plenty, including the Rotorua Lakes. The furthest point from the coast is the top of the Rangitāiki River Catchment which is 139 kms from the sea. On the ocean side, the region includes 18 offshore islands including the volcanically active White Island, and the sea extending out to the 12-nautical-mile boundary. The area of the region is 21,740 square kilometres, comprising 12,231 square kilometres of land and 9,509 square kilometres of coastal marine area (Figure 1).

The region has a number of prominent features, including islands such as Matakana, Tuhua (Mayor) and an active volcano; Whakaari (White Island). Other distinctive landmarks include the Rotorua lakes, and the Tauranga and Ohiwa Harbours.

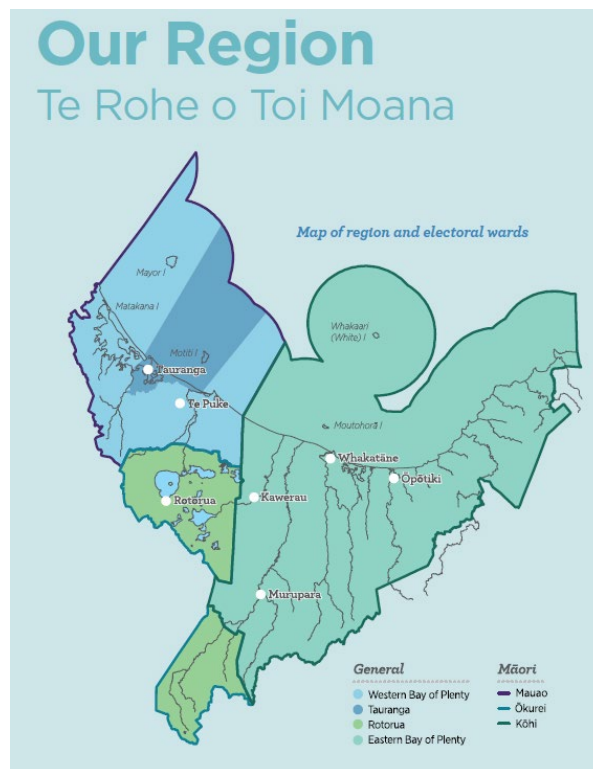


Figure 1: Map of Bay of Plenty region.

The region is volcanically active with the Taupo Volcanic Zone crossing the area between Whakaari (White Island) and Lake Taupo. The two major features of this zone include a number of extensive geothermal areas and a number of earthquake fault lines running in parallel within this zone. The abundance of waterways in the area combine to enhance the active lifestyle opportunities for the Bay's residents and visitors, but also presents a number of challenges regarding the protection, use, enjoyment, and provision of access to waterways, whilst protecting the surrounding areas from extreme flooding events.

2.2 Organisational overview

Bay of Plenty Regional Council (Council) are responsible for sustainably managing the region's natural resources on behalf of the community, for the benefit of present and future generations. Council is charged with the integrated management of land, air, and water resources and building more resilient communities in the face of a changing climate and natural hazards.

Council is governed by fourteen Councillors elected from four general constituencies: Tauranga, Rotorua, western Bay of Plenty and eastern Bay of Plenty. Voters on the Māori roll elect one councillor from three Māori constituency areas: Khoi, Mauao and Ōkurei. They in turn elect a chairperson who facilitates decisions about the committee structure that Council uses for decision-making. Work is overseen by a Chief Executive and a team of general managers. There are approximately 400 staff who are based around the region.

Council acknowledges the unique status of the relationship between the Crown and Māori under the Treaty of Waitangi. Council also acknowledges that the relationships it has with Māori are central to the fulfilment of its statutory responsibilities and will continue to utilise a range of different mechanisms to engage with the wider Māori community and ensure their views are represented.

2.3 Strategic environment

All organisations operate within specific environments and are influenced by various drivers and variables. The strategic organisational environment will impact and provide direction for the management of infrastructure assets. The internal context of the organisation will also influence the direction and scope of asset management, where visions and goals will in turn drive policies and objectives for asset management practice.

There is significant regulatory reform underway. Freshwater is one priority, and then there is change to the Resource Management Act, and even more significant change coming to the roles and responsibilities of local government in managing the ‘three waters’. The local government landscape is changing rapidly, and increasing requirements are driving us to evolve our relationships with tangata whenua. Community participation is also a critical element that we will continue to focus on.

The following sections will outline Council’s key drivers and influences relevant to the Rotorua Lakes activity. These range from the climate and how it affects the Rotorua Lakes, to the legislative and regulatory requirements that drive the way the activity is managed, to Council’s own Strategic Direction, vision and Community Outcomes it seeks to achieve.

2.4 Climate

The Bay of Plenty region is sheltered by high country to the west, south, and east, which means day-to-day variations of the weather are largely determined by the direction of the wind. While high country areas may receive rain with airstreams from any direction, most of the area receives a large part of its annual rainfall during periods of onshore north to northeast winds. Airstreams from the north and northeast have long trajectories over the warm ocean to the north of New Zealand and, as a result, the air flowing onto the Bay of Plenty under these conditions is very humid. As the whole region is exposed to the north, these airstreams often produce widespread and heavy rain, when the moist air is forced to ascend over the rising ground of the North Island.

The effects of climate change will impact the environment regionally, nationally, and globally. There will be changes in sea level rise, wind and weather patterns, and the frequency of extreme weather events. Effects of climate change will be an exacerbating effect on meeting water quality goals as well as having potential to impact lake levels, and increase erosion of outlet structures and streams.

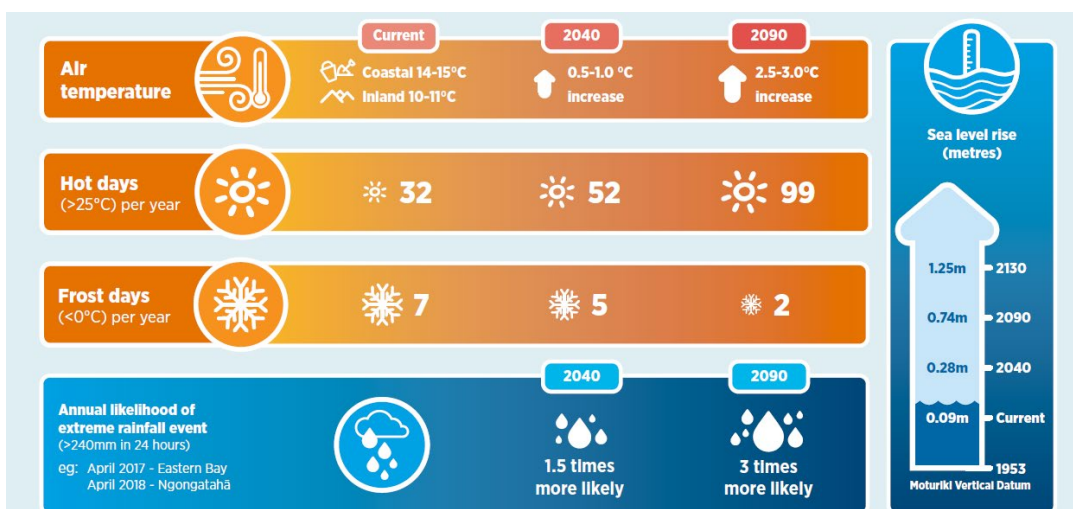


Figure 2: Likely climate change impacts for the Bay of Plenty region.

In June 2019, Council declared a climate change emergency, alongside the adoption of Council’s first Climate Change Action Plan¹, which was updated in 2021. Council’s Climate Change Statement² outlines Council’s view of what needs to occur in our region and the transformation changes needed to respond to climate change.

¹ <https://atlas.boprc.govt.nz/api/v1/edms/document/A3896371/content>

² <https://www.participate.boprc.govt.nz/tp/our-climate-change-statement>

2.4.1 Legislative and regulatory

The Bay of Plenty Regional Council also manages the Bay of Plenty environment pursuant to the requirements of the Resource Management Act (RMA). This Act is the basis of the Natural Resources Plan (NRP) for the Bay of Plenty.

Over recent times there has been a paradigm shift that has occurred in response to scientific knowledge, environmental regulation, and community expectations. An increasing awareness of the interrelationships between land use and water quality is leading to changes in regulatory requirements and community expectations. Recently the Government announced a National Policy Standard for Freshwater Management (NPS-FM) that adds to the existing requirements to protect water quality.

Statutory requirements impact on the way in which Council operates to meet its obligations to its stakeholders. Some key legislation that impacts the delivery of Rotorua Lakes activities and services are outlined below (Table 1: Key legislation relating to the Rotorua Lakes activity. (Table 1).

Council has also developed various policies, strategies and action plans to fulfil its role and align its activities to national standards and policies. This means that in establishing its programmes, the Rotorua Lakes activity must be aware of and adhere to these key documents and guidelines.

Table 1: Key legislation relating to the Rotorua Lakes activity.

Key Legislation	Summary
National Policy Statement for Freshwater Management 2020	The NPS-FM 2020 provides local authorities with updated direction on how they should manage freshwater under the RMA 1991. This updated version adds additional requirements to protect water quality and to manage freshwater in a way that 'gives effect' to Te Mana o te Wai.
Local Government Act 2002	The Local Government Act 2002 provides councils with a framework of powers to carry out democratic decision-making and action for and on behalf of its community. It also imposes accountability for prudent management and stewardship of community assets in the present and into the future. The LGA requires Council to identify its assets and how those assets will be managed.
Resource Management Act 1991 (RMA) and Amendments	The main legislation that sets out how we should manage our environment. It provides a national framework to manage land, air, water and soil resources, the coast and the control of pollution and contaminants. It promotes sustainable management and ensure integrated management of natural and physical resources at a national, regional and local level.
Regional Natural Resources Plan (RNRP)	The purpose of the RNRP is to promote the sustainable and integrated management of land and water resources within the Bay of Plenty. The RNRP has objectives, policies and methods to address issues of freshwater resources, including the beds and margins of water bodies.
Regional Water and Land Plan	The Regional Water and Land Plan is a vehicle used to meet the requirements of the RMA and this plan then in turn sets the water quality goals for Council to achieve by way of setting Trophic Level Indices (TLI) for each lake.

2.4.2 Economic

The Lakes Programme has been financed by Deed and Non-Deed funding since 2009. Deed funded lakes are those out of the twelve lakes that have been identified as the most in need of action and has Crown funding towards improving their water quality. The four priority lakes are: Rotorua, Rotoehu, Rotoiti, and Ōkāreka. The original Deed was signed in August 2009 and funding from MfE came to an end in 2022.

The Ministry for the Environment (MfE) has provided significant funding for Deed funded projects; contributing a total of \$72.1 million to the Deed funded activities. Bay of Plenty Regional Council and Rotorua Lakes Council have contributed a further \$72.1 million to Deed activities, totalling \$144.2 million. Both Councils have also provided a total of \$89.7 million towards non-Deed projects.

2.4.3 Community expectations

Community expectations, on-going monitoring of environmental effects, together with more awareness and attention towards the potential effects Council activities on the environment are changing the way that these activities need to be delivered and undertaken. Community expectations on the Rotorua Lakes programme primarily evolve from the wide range of stakeholders that have an interest in the development and management of the Rotorua Lakes. Multiple parties such as landowners, community groups, iwi, and the general public are likely to have differing expectations. These different expectations will directly impact upon the way in which the activity is managed.

While the overall expectation of undertaking the work detailed in this AMP is to improve the environment for the Rotorua Lakes, there can be occasions when some community members perceive some of the activities as negative. Furthermore, there can be unrealistic public expectations as to how much influence our management can have on controlling high or low lake levels for differing outcomes. Furthermore, with recent advances in technology over the past decade, communities are now expecting better access to Council data, especially data from live monitoring sites.

Lastly, the community and especially landowners' appetite and justification for longer-term land use change to improve water quality is tempered by the water quality they observe in the lakes. If a short term, in-lake intervention is making a big improvement to water quality, then longer term land use change may be seen by the community as unnecessary.

2.4.4 Strategic Direction

Council's Strategic Direction has been developed to support the well-being of our community and ties together our vision, community outcomes, strategic priorities and the way we work. Council's vision is "**Bay of Plenty Thriving Together – mō te taiao, mō ngā tāngata**". To deliver this vision, five community outcomes and eighteen goals have been established to support our five community well-beings.

Tō mātou aronga rautaki Our strategic direction



Te pae tawhiti

Ka eke panuku, ka eke ngātahi Te Moana a Toi - mō te taiao, mō ngā tāngata

Our vision

Bay of Plenty Thriving Together - mō te taiao, mō ngā tāngata

Te whāinga

E tū ai, e wana ai te rohe o Te Moana a Toi, he manawaroa, he ora, he mauri tū roa

Our mission

To create and enhance a resilient, healthy and sustainable Bay of Plenty region

Our community outcomes

<p>HUANGA HAPORI 1 He taiao ora</p> <p>COMMUNITY OUTCOME 1 A healthy environment</p> <p>Ka whakaō, ka whakawana mātou i te taiao kikokikome ngā pūnaha rauropi māori mō ō mātou hapori mēngā whakatipuranga o āpōpō. Ka tautokohoki mātou i ētahi atu ki te mahi i ēnei mahi.</p> <p>We maintain and enhance our physical environment and natural ecosystems for our communities and future generations. We support others to do the same.</p>	<p>HUANGA HAPORI 2 He hapori mata-hī awatea</p> <p>COMMUNITY OUTCOME 2 Future ready communities</p> <p>Ka arataki, ka tautoko ā mātou mahi ki Te Moana a Toi te whakapakaritanga o te tū ki ngā mōreareatanga māori, ā, kia pai ai te tauritanga mauri ora ki te āpōpō puhanga-warō iti.</p> <p>Our work in the Bay of Plenty guides and supports improved resilience to natural hazards and an equitable and sustainable transition to a low emissions future.</p>	<p>HUANGA HAPORI 3 Ngā hapori e honoa ana, e whakamanatia ana hoki</p> <p>COMMUNITY OUTCOME 3 Connected and enabled communities</p> <p>Ka āwhina mātou ki te hanga hapori tōhonohono, hapori mauri tū roa.</p> <p>We help provide connected and sustainable communities.</p>	<p>HUANGA HAPORI 4 He whanaketanga mauri tū roa</p> <p>COMMUNITY OUTCOME 4 Sustainable development</p> <p>Ka tautoko, ka manaaki hoki mātou i te whanaketanga mauri tū roa.</p> <p>We support and advocate for sustainable development.</p>	<p>HUANGA HAPORI 5 Te Ara Poutama</p> <p>COMMUNITY OUTCOME 5 The Pursuit of Excellence*</p> <p>Te mahi tahi ki te tangata whenua me te hapori ki te anamata taurikura me te anamata tautika.</p> <p>Partnering with tangata whenua and community towards a prosperous and equitable regional future.</p> <p><small>*While not a direct translation, 'Pursuit of Excellence' is a close approximation to 'Te Ara Poutama. Te Ara Poutama has its origins in Te Ao Māori and references the pathway accorded by Tāne to relieve the three baskets of knowledge that represent humanity's consciousness. From a contemporary perspective, Te Ara Poutama serves to inspire a commitment to innovation, excellence, and continuous improvement.</small></p>
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<p>Ngā kalwhakakaha</p> <p>Whakatīnanatanga Haumitanga Whakahoanga me te whai wāhitanga</p>	<p>Enablers</p> <p>Delivery Investment Partnership and engagement</p>	<p>Ā mātou mahi</p> <ul style="list-style-type: none"> Whai ai mātou ki te whakapakari i te rohe Ka kimi mātou i ngā kaupapa pāhekoheko, ā, ka mahi tahi hoki ki ētahi Tā mātou e mahi ai, mahia paitia ai He pai rawa ā mātou ratonga kiritaki Whakamana ai mātou i ngā herenga ki ngā iwi Māori Taki ai mātou i ngā mahi atamai hou, ā, kōore e wehi ki te whai huarahi kē kōa oti ai te mahi Whakamahi ai mātou i ngā korero what tikanga, tae atu ki te hangarau me te mātauranga Māori 	<p>How we work</p> <ul style="list-style-type: none"> We look to add value regionally We seek integrated solutions and we collaborate What we do, we do well We provide great customer service We honour our obligations to Māori We innovate and are not afraid to do things differently We use robust information, including technology and mātauranga Māori
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Ō mātou mātāpono

- Whakapono
- Ngākau Pono
- Hautoa
- Manaakitanga
- Kotahitanga
- Whanaungatanga

Our values

- Trust
- Integrity
- Courage
- Showing care and respect
- Working together as one
- Forming and maintaining relationships and strengthening ties with communities

Our wellbeings

<p>He korowai Taiaki Taiao Environmental Wellbeing</p>	<p>He korowai aroha Social Wellbeing</p>	<p>He korowai whakamana tangata Economic Wellbeing</p>	<p>He korowai mātauranga Cultural Wellbeing</p>
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Figure 3: Council's Strategic Direction (2024-2034 Long Term Plan).

The Rotorua Lakes are seen as iconic by many New Zealanders. They have unique cultural, historical, social and economic value locally, regionally, and nationally. Through our Catchment Management group of activities, we maintain and improve water quality in rivers and lakes, primarily through working with landowners on more sustainable land use. Provision of the Rotorua Lakes activity contributes to all council outcomes and well-beings and five strategic priorities (Table 2).

Protecting our freshwater resources is key to environmental wellbeing. Through our Catchment Management group of activities, we maintain and improve water quality in rivers, lakes, and streams, primarily through working with landowners across the region on more sustainable land use, to help them reduce pollutants in our streams, rivers, and lakes. We also work with iwi and the community to improve the regional and indigenous biodiversity.

The vision for the Rotorua Te Arawa Lakes Programme is “The Lakes of the Rotorua district and their catchments are preserved and protected for the use and enjoyment of present and future generations, while recognising and providing for the traditional relationship of Te Arawa with their ancestral lakes”. This is discussed further in Part 3: and Part 4: . Council recognises that the Lakes Programme manages valuable community assets and due to the reasonable capital value and ongoing maintenance costs, these assets need to be managed in a manner that aligns with the way in which Council manages other strategically important assets.

Table 2: Rotorua Te Arawa Lakes contribution to Council's Strategic Direction.

Rotorua Te Arawa Lakes		
Community Outcomes	A Healthy Environment <i>He taiao ora</i>	
	Future Ready Communities <i>He hapori mata-hī awatea</i>	
	Connected and enabled communities <i>Ngā hapori e honoa ana, e whakamanatia ana hoki</i>	
	Sustainable Development <i>He whanaketanga mauri tū roa</i>	
	The Pursuit of Excellence* <i>Te Ara Poutama</i>	
Community Wellbeing	Social	
	Cultural	
	Economic	
	Environmental	

Part 3: Activity and asset overview

3.1 Activity overview

The Bay of Plenty Regional Council manages twelve lakes on behalf of the community, through the Rotorua Ta Arawa Lakes Programme (Lakes programme). These lakes are of regional and national significance as well as being a taonga to the people of Te Arawa.

The twelve lakes that are considered as part of this Asset Management Plan (AMP) are outlined and located below. You can also find out more information on this link: [Rotorua Te Arawa Lakes](#).

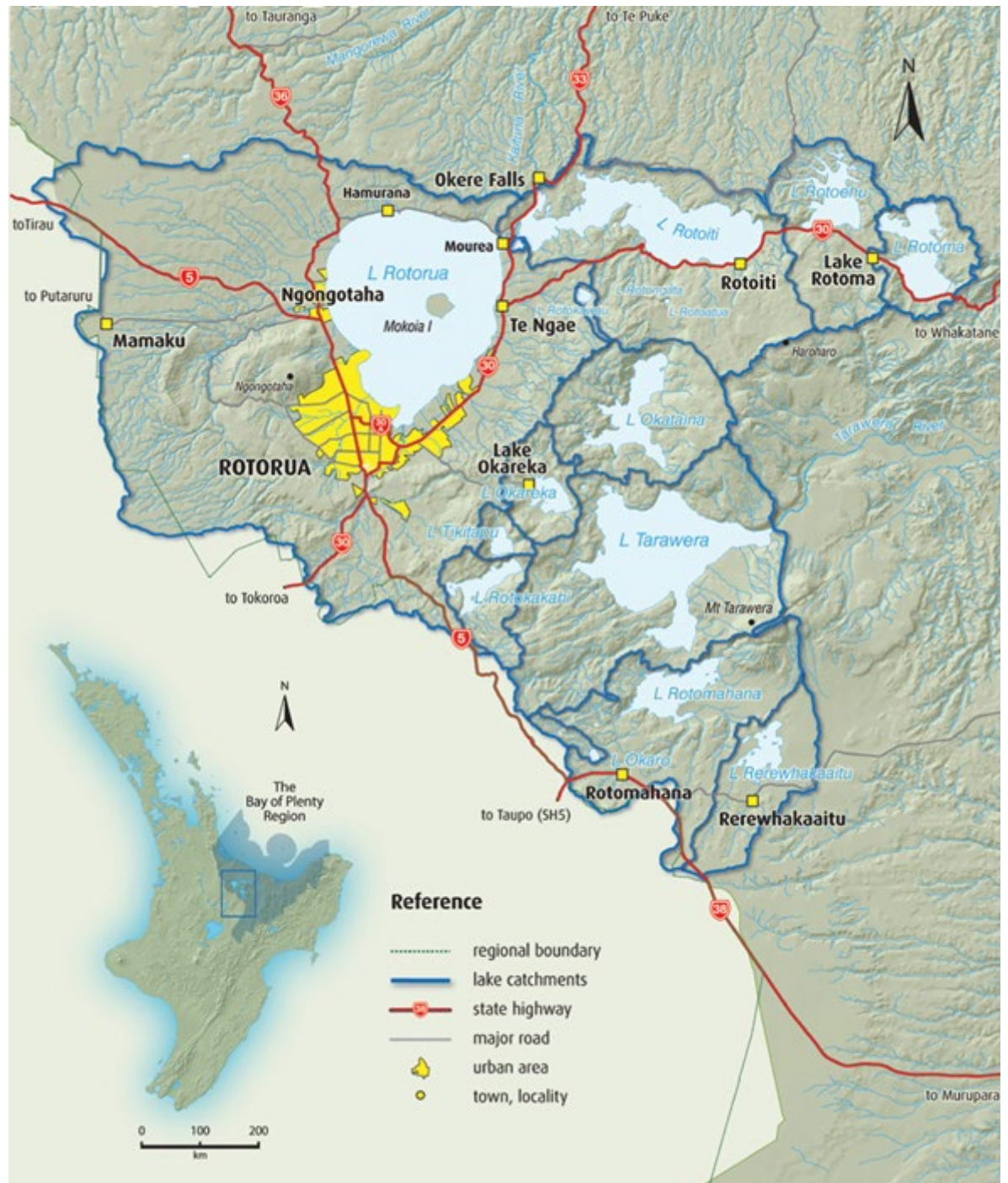


Figure 4: Locational map of Rotorua Lakes.

3.1.1 Why we do it?

History

The Rotorua Te Arawa Lakes are seen as iconic by many New Zealanders. They have unique cultural, historical, social, and economic value regionally and nationally.

In 1998, a Lakes Management Working Group initially established, to identify and address the problems arising from a lack of co-ordination between the many groups with interests in managing the lakes, and to consider how those concerned could work together to solve problems as effectively and efficiently as possible.

In 2000, a Lakes Management Strategy was released to the community for consultation and feedback, and a draft strategy was adopted in October 2002. This document set the original goals for the protection, use, enjoyment and management of the lakes.

The Rotorua Te Arawa Lakes Strategy (RTALS) group (former Lakes Management Working Group) was established through the Te Arawa Lakes Settlement Act 2006. This group set a goal to restore the lake water quality to a sustainable level. A set targets, action plans and tools were developed to achieve this goal.

On 18 April 2007, a Memorandum of Understanding between the Crown and the RTALS group was signed to formally establish a working relationship between the parties for the purpose of maintaining and improving the water quality of the lakes through the Rotorua Te Arawa Lakes programme (Lakes programme). Subsequent to the MoU the Crown agreed to supporting the Rotorua lakes programme with the \$72.1m deed funding, supporting a range of restoration projects and land use change.

Today

The Lakes Programme³ is a tripartite programme of lake management and restoration between the Bay of Plenty Regional Council (Council), Te Arawa Lakes Trust (TALT) and Rotorua Lakes Council (RLC), which is governed by the RTALS Group. The vision for the Lakes Programme is:

The lakes of the Rotorua district and their catchments are preserved and protected for the use and enjoyment of present and future generations, while recognising and providing for the traditional relationship of Te Arawa with their ancestral lakes.

Matakite:

E tiakina ana, e manaakitia ana hoki ngā roto o te rohe o Te Arawa hei painga mō tātau me ngā whakatipuranga e ara mai nei, ā, me te aro anō ki te hononga tuku iho o Te Arawa ki ō rātau roto

Statutory responsibility

The Bay of Plenty Regional Council also manages the Bay of Plenty environment pursuant to the requirements of the Resource Management Act (RMA). This Act is the basis of the Regional Natural Resources Plan (RNRP) for the Bay of Plenty. The RNRP has specific outcomes for the 12 Rotorua lakes, specifying water quality outcomes for each of these lakes and a requirement to address water quality issues by development and application of Action Plans. See Appendix 1:

Action plans completed pursuant to Natural Resource Plan for a listing of action plans. These will be superseded as the NPS-FM is implemented. Legislative and regulatory context to the Rotorua Lakes activity was covered in 2.4.1.

³ <https://www.rotorualakes.co.nz/vdb/document/533>

Although objectives are set in regulatory and statutory documents, partners within the Lakes Programme acknowledge that community expectations mean more than just meeting a scientific measure of water quality. Measures of community satisfaction can also include restoration of taonga species, mahinga kai, restoring the mauri of water, or simply improving water clarity. This is discussed more in Part 4: .

Council’s Strategic Direction from its 2024-34 Long Term Plan has been developed to support the well-being of our community and ties together our vision, community outcomes, strategic priorities and the way we work. Council’s vision is “**Thriving Together – mō te taiao, mō ngā tāngata**”. To support and deliver this vision, Council has agreed four community outcomes, that enable and support our four well-beings. Council’s Strategic Direction and how the Rotorua Lakes activity contributes to this was covered in 2.4.4.

3.1.2 What we do

The Rotorua Te Arawa Lakes programme is a focused programme of works primarily aimed at addressing water quality issues for the 12 lakes in the programme. The Rotorua Lakes activity focuses on ensuring the lakes are thriving by recognising and providing for Te Mana o te Wai (the intrinsic value of water).

We implement work for the Rotorua Te Arawa Lakes Programme, agreed by the Programme partners (Te Arawa Lakes Trust and Rotorua Lakes Council) and part-funded through a Deed of Funding Agreement with Central Government (covered in the next section).

Lake Operations activity assets fall into two main categories

Activity	Description
In-lake and in-stream interventions	Temporary activities to improve lake water quality while more long-term sustainable land use changes are implemented and take effect.
Lake level management and monitoring	Activities that deliver service to the local communities to ensure specific lake levels are either managed or cater for future climate change scenarios and long-term data can be collected from key sites.

The focus of operational staff falls into four areas

Ensure compliance with statutory consents and be able to demonstrate compliance if audited (this includes maintenance of necessary spread sheets and data bases for data collection).	Ensure data is collected that can be analysed and utilised to make informed decisions on operation of lake water quality interventions, such as alum dosing rates to each lake.
Aim to optimise operation of assets to achieve where possible maintenance of RMA Natural Resource Plan water quality targets as TLI.	Ensure assets are maintained to a good standard so that breakdowns or faults are avoided.

The interventions to improve water quality and the water level control are of high interest to local communities and attract considerable attention if water quality declines or lakes are outside their “normal” operational range.

Staff are committed to responding in two main ways:

- a) where appropriate respond to issues and resolve complaints, and
- b) provide science based and economic/cost explanations as to why natural environmental conditions may dominate lake conditions and a practical solution may not be appropriate.

An example of this is where an algal bloom occurs in a bay of Lake Rotorua. We cannot resolve the short-term issue, but we can provide a science-based explanation outlining why it may have occurred. Another example could be where heavy rainfall has pushed Lake Ōkāreka outside of its normal operational range, we can review our management plan to ensure it is still fit for purpose, to minimise out of spec events.

3.1.3 How we do it

Council needs to work with other councils, community groups, central government, iwi/hapū and other organisations to deliver both objectives and goals within the Lakes Strategy, as well as agreed levels of service within this Asset Management Plan to effectively support achieving Community Outcomes as set out in the Council’s Strategic Direction. Council maintains relationships with key service providers who contribute to the efficient operation of the Rotorua Lakes asset portfolio.

Council works with a number of parties to deliver the Rotorua Lakes programme and manage the overall goals and objectives of the activity. The main parties involved and their responsibilities are summarised in Table 3 below and illustrated in Figure 5.

Table 3: Key organisations involved in the Rotorua Lakes programme and their roles.

Agency	Role within Lakes programme
Te Arawa Lakes Trust	<ul style="list-style-type: none"> - Representatives of 52 iwi hapū of Te Arawa as outlined in Schedule 2 of the Te Arawa Lakes Settlement Act 2006. - Landowner of the Te Arawa lakebeds. - Lead and monitor cultural components of the Lakes strategy. - Involved and engaged in Lakes programme deliverables.
Rotorua Lakes Council	<ul style="list-style-type: none"> - Administer the relevant sections of the RMA 1991. - Provide and maintain urban sewerage and stormwater discharge assets. - Plan for and manage land uses within lake catchments through District Plan. - Fund agreed portions of the Deed funded projects.
Bay of Plenty Regional Council	<ul style="list-style-type: none"> - Implement the Lakes strategy. - Administer the relevant section of the RMA 1991. - Monitor and report water quality issues. - Implement the Recreation and Aquatic Pest Management Strategy. - Plan for and manage land uses within lake catchments through Regional Policy Statement and Regional Water and Land Plan. - Fund agreed portions of Deed funded projects.

The Lakes Programme is financed by Deed and Non-Deed funding. Deed-funded lakes are those out of the twelve lakes that have been identified as the most in need of action and has Crown funding towards improving their water quality. These lakes are: Rotorua, Rotoehu, Rotoiti, and Ōkāreka.

The Ministry for the Environment (MfE) has provided significant funding for Deed-funded projects, and will, by 2032, contribute a total of \$72.1 million to the Deed-funded activities. Bay of Plenty Regional Council and Rotorua Lakes Council will contribute a further \$72.1 million to Deed activities, totalling \$144.2 million. Both Councils have also provided a total of \$89.7 million towards non-Deed projects. The original Deed was signed in August 2009 and funding from MfE will come to an end in 2032.

To implement the objectives of the organisation, the AM Policy, and the Lakes programme, Council have a dedicated in-house team working operationally alongside the Te Arawa Trust and Rotorua Lakes Council. These key roles and responsibilities within Council are outlined below:

Table 4: Key roles and responsibilities within Council relating to Rotorua Lakes activity.

Role	Key responsibilities
Operations Manager	<ul style="list-style-type: none"> - Science projects to support Programme activities - Lake Action Plans oversight and updates - Management of lake levels - Alum dosing - In-lake and in-stream interventions - Weed harvesting
Operations Officer	<ul style="list-style-type: none"> - Support to the constructed wetlands project - Stakeholder relationship management - Day-to-day management of operations activities.

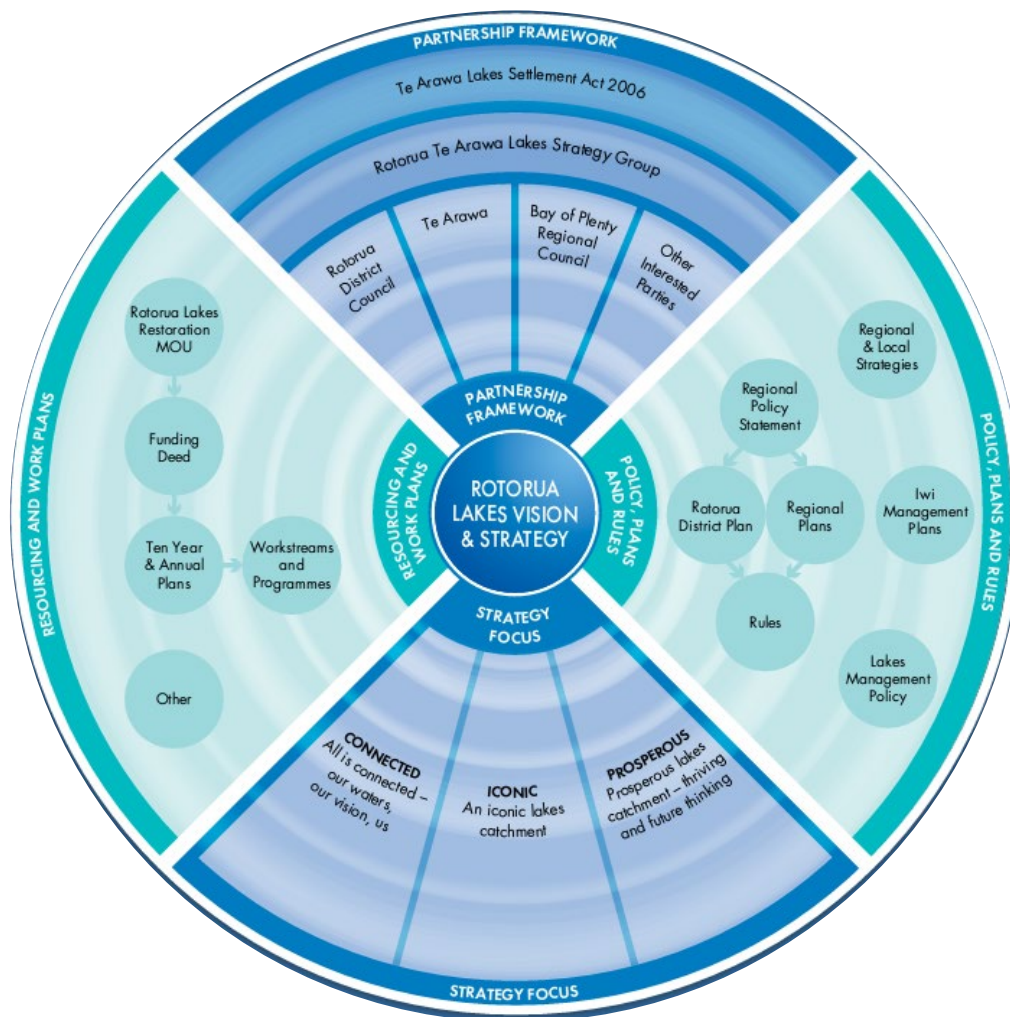


Figure 5: Overview of interrelationships that operate around Rotorua Lakes Strategy.

3.1.4 Significant negative effects of this activity

The Local Government Act (Schedule 10) requires an outline of any significant negative effects that an activity may have on the social, economic, environmental or cultural well-being of the community.

The Rotorua Lakes activity and services generally provide significant public good to the community with respect to the environment. However, there are some adverse impacts that are generally well managed. Most issues are easily mitigated through appropriate management, operational techniques and on-going monitoring. The following table summarises the key negative effects.

Table 5: Potential significant negative effects from Rotorua Lakes activity.

Negative effect	Potential mitigation
Increased pressure on watercourses leading to lake erosion, e.g. Waitangi Stream, due to climate change storm frequency.	Maintain inspections and monitoring on streams where we actively control flows to ensure we are predicting maintenance needs early.
Negative connotation of dosing alum into lakes.	Continue to undertake impact studies, include taonga species, and include iwi in monitoring programme. Make sure science for lake decline is available to public and especially landowners.
Ōhau Wall is seen as negative to iwi in the local area and downstream on Kaituna.	Long term consent achieved, continue to undertake effects monitoring and engage with iwi on effects and possible mitigation.

3.2 Asset overview

Council currently manages and maintains approximately \$11.78 million worth (fair value) of assets across the Rotorua Lakes activity, with a total replacement cost approximately \$23.54 million. Table 6 below summarises the asset value and replacement cost of the major asset types.

Appendix

3:

Asset type	Replacement Cost	Fair Value
Ōhau Diversion Wall	\$17,740,800	\$11,063,040
P-Locking plants	\$1,863,200	\$1,122,220
Kaoro Fish passage	\$36,400	\$25,480
Ōkaro Wetland structures	\$245,700	\$140,970
Lake Ōkāreka outlet	\$3,764,100	\$3,379,660
Rotomahana Lake Outlet	\$745,100	\$208,640
Lake Rotomā Outlet	\$210,000	\$58,000
Lake Rerewhakaaitu Outlet	\$291,500	\$66,630
Total	\$24,896,800	\$16,065,440

Rotorua Lakes Asset Portfolio summary provides a summary of value at the asset level.

Table 6: Asset replacement cost and fair value.

3.2.1 Replacement costs

The total replacement costs for the Rotorua Lakes asset portfolio is \$24.9 million. Figure 6 below provides a summary of the replacement costs by major asset type. A more detailed breakdown by asset type is provided in 3.3. The Ōhau Diversion Wall accounts for 73% of the total replacement costs. The Kaoro fish pass and Ōkaro wetland structures only account for 1% of the total replacement costs. The remaining asset types, the three P-locking plants (9%), and the various lake outlet structures (17%) account for a quarter of the total replacement costs.

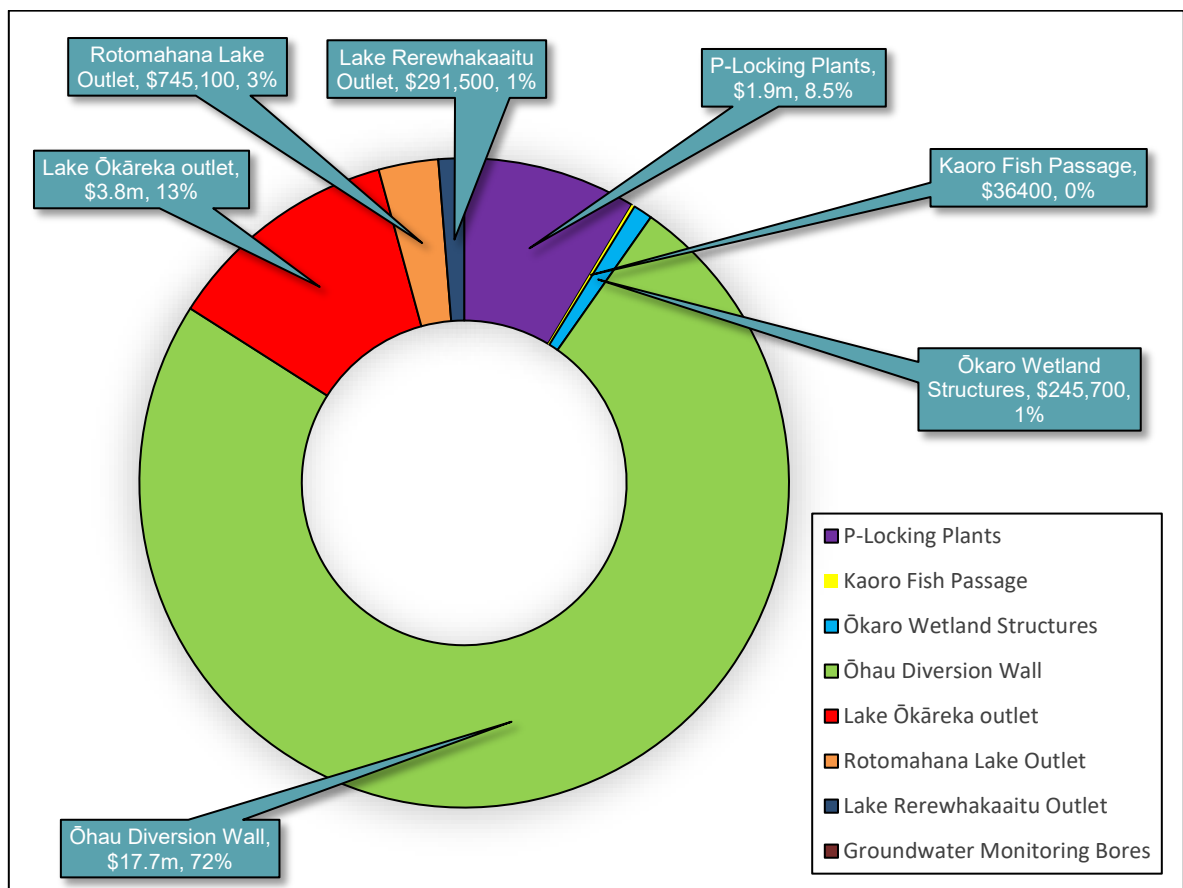


Figure 6: Replacement costs for major asset types in Rotorua Lakes portfolio.

3.2.2 Age

Providing age data at the asset type/facility level for assets that have many components, such as the phosphorus (P-) locking plants, offers minimal useful information. Using the average age and average remaining life of an asset based on its components is misleading due to the variety of component types, material, function, useful lives, etc. Please refer to 3.3 for age information and analysis at the component level for each asset type, which is also discussed further in Part 6: on Lifecycle Management.

In general, there have been a number of new assets constructed/installed, a number of assets and components have been replaced, and there have been several assets/components removed or considered redundant. In the next ten years there are 140 components across four asset types/facilities that will reach the end of their useful lives. Over 90% of those components belong to the three P-locking plants. This information is based on the 2024 Asset Valuation.

3.2.3 Asset condition

It is critical that Council has clear knowledge of the condition of their assets and how they are performing. The condition of an asset relates to its physical integrity and a condition score provides a good indication of the position of an asset in its lifecycle, whether any assets are underperforming and enables identification of the reasons for any performance deficiencies.

Asset condition is typically determined by undertaking a site visit/survey and visually inspecting each asset, and then grading the physical condition using a 1-5 rating system as detailed below. These gradings can be used to analyse the asset data and provide renewal profiles and determine maintenance programmes.

Table 7: Asset condition grading system.

Grading	Condition	Description of condition	
1	Very Good	Very good condition	Only planned maintenance required
2	Good	Minor defects only	Minor maintenance required (5%) plus planned maintenance
3	Average	Maintenance required to return to accepted LoS	Significant maintenance required (10-20%)
4	Poor	Requires renewal	Significant renewal/rehabilitation required (20-40%)
5	Very Poor	Asset unserviceable	Physically unsound and/or beyond rehabilitation (over 50%)

In preparation for the registered valuation which took place 30 June 2021, all assets were inspected during the week commencing 1 March 2021, with the exception of assets located in lakes or underground/underwater. Only a sample of groundwater monitoring bores were inspected. The valuer assessed each asset and allocated condition grades as per Table 7, at component level.

The condition of the assets below does not account for any changes that have taken place since the date of inspection. No condition information was available in a suitable format for this AMP and instead condition, performance and any key issues have been summarised by the Lakes Operations Managers in the following sections. Improving the condition assessment programme has been identified as an improvement (9.3).

3.2.4 Asset performance


Performance can be expressed by being able to state with confidence that there is an appropriate asset for the defined level of service, in the appropriate condition, and therefore know it will perform reliably. In other words, when an asset fails to meet the required level of service. The performance of individual assets has not been considered as part of this AMP as the necessary data is not available. Council will first focus on improving asset condition collection and recording, and can then turn its focus to asset performance.

Performance in terms of meetings agreed service levels is covered in 4.3.

3.3 Asset type information

The following section outlines details of each asset including expected maintenance costs. Appendix 2 contains specific details of resource consents and management plans for each asset.

3.3.1 Ōhau Diversion Wall

Asset Type	Ōhau Diversion Wall	Quantity	1	
Replacement Cost	\$17,740,800	Value	\$11,063,040	
Overview				
<p>The Ōhau Diversion Wall is located in Lake Rotoiti and was built in 2008. The diversion wall has been built to reduce the amount of nutrients reaching Lake Rotoiti from Lake Rotorua via the Ōhau Channel. Water from Lake Rotorua is now diverted down the Kaituna River rather than entering Lake Rotoiti, and due to reduced nutrient loading has helped improve the water quality in the lake. Resource consent for the wall located in Lake Rotoiti was granted for 35 years pursuant to the conditions of consent RM16-0527.</p>				
				
Asset Summary				
<p>The gross replacement cost for the Ōhau Diversion Wall is \$17,740,800, which accounts for over 68% of the Lakes portfolio. The Depreciated Replacement Cost (DRC) (or fair value) is \$11,063,040, 58% of the Lakes portfolio.</p> <p>The components vary in age and remaining useful life with most assets approximately 40-60% through their effective life. There are four components due to reach the end of their lives in the next 10 years. The research, design and consenting component reaches the end of its useful life next year (2024).</p>				
Component	Useful Life	Remaining Life	Replacement Cost	Fair Value
King Piles (75 m)	40	21	2,225,400	1,691,310
Piles (30 m)	25	8	4,306,800	1,914,140
Sheet Piles	22	5	3,646,200	1,620,540
Steel Walers and Timber Facing	20	12	674,700	492,260
Timber Walers	22	5	549,200	174,750
Navigation Equipment	15	3	100,300	41,300
Research, Design and Consenting	15	1	5,536,600	4,429,280
Total			\$17,740,800	\$11,063,040
Condition and performance				
<p>Corrosion identified on the diversion wall in 2014 has led to the development of a Structural Management Plan to ensure the wall meets its service life of 50 years. Structural components have been installed in 2019/20 to delay major remediation by 10 years. Programmed inspections will determine the degree of corrosion and staged repairs will be programmed as necessary. The Structural Management Plan details inspection frequency as well as repair options.</p> <p>The most recent testing shows structurally the wall is sound and programmed maintenance was undertaken in 2019/20 to install a stiffener waler. Planned maintenance of holes in sheet piles is now necessary. Some product testing may be necessary before full installation.</p>				

Structural maintenance has been undertaken as required, but inspection indicates significant additional maintenance is now necessary to maintain wall performance.	
Condition rating	3 - Average
Key Issues	
▶ While the wall is structurally sound, the performance in stopping contaminated water from Lake Rotorua flowing to Lake Rotoiti is partially compromised. Repairs are programmed in the current LTP term.	

3.3.2 Phosphorus locking (P-locking) plants

Asset Type	Phosphorus locking plants	Quantity	3
Replacement Cost	\$1,863,200	Value	\$1,122,220

Overview

Council manages three phosphorous locking (P-locking) plants in the Rotorua District. P-locking plants are used to reduce available phosphorous from a water body by using a “locking” chemical such as alum. P-locking plants target point sources that are high in phosphorus with the aim of reducing the concentration of phosphorous entering water bodies.




Asset Summary

The gross replacement cost for the P-locking Plants is outlined below. The total replacement for all three is \$1,863,200, which accounts for around 8% of the Lakes portfolio. The Depreciated Replacement Cost (DRC) (or fair value) is \$1,122,220, also around 9% of the Lakes portfolio.

The components all vary in age and remaining useful life. There are 128 components due to reach the end of their lives in the next 10 years. This is based on the 2024 Valuation.

Lake	P-Locking Plant	Replacement Cost	Fair Value
Rotorua	Puarenga	\$542,400	\$270,440
Rotorua	Utuhina	\$614,300	\$421,750
Rotoehu	Waitangi Soda Springs	\$703,500	\$430,030
Total		\$1,863,200	\$1,122,220
Condition and performance			
<p>These plants have operations manuals, which are upgraded as necessary to take account of any changes in regulations and any change to operations, to improve factors such as safety as well as changes to dosing protocols.</p> <p>The current operation of the Rotoehu alum dosing is to dose into the Waitangi Stream. Research has shown that at times this dosing location is not the best location. As a result, the new application adds the option of dosing in the centre of the lake and the dosing protocol will provide guidance on the appropriate dose at each location.</p>			
Condition rating (See Table 7)		1 – Very Good	
Only planned maintenance required.			
Key Issues			
<p>► All three P-locking plants have progressed through a re-consent process to continue dosing alum. The new consents are RM18-0213 (Puarenga and Utuhina) and RM19-0730 (Waitangi Soda Springs). new consent will be issued for a term of 10 years.</p>			

3.3.3 Kaoro Fish Pass/Trout Barrier

Asset type	Kaoro Fish Pass/Trout Barrier	Quantity	1
Replacement Cost	\$36,400	Value	\$25,480
Overview			
<p>The Kaoro Fish Pass is located in the Hamurana Stream on the northern edge of Lake Rotorua. It was built in 2012. The aim of the pass/barrier is to protect local koaro fish from predation by trout. The barrier is designed to allow koaro access to the area while excluding trout. Resource Consent 67041 was granted in 2012 for a term of 35 years for the structure.</p>			
			

Asset Summary				
The assets that form the fish pass include 3 x base slabs and 2 x wing walls. The fish pass currently has around 75% of its effective life remaining. The gross replacement cost is \$36,400 which accounts for less than 1% of the Lakes portfolio. The Depreciated Replacement Cost (DRC) (or fair value) is \$25,480, <1% of the Lakes portfolio.				
Component	Useful Life	Remaining Life	Replacement Cost	Fair Value
Concrete with SS grill	40	26	\$36,400	\$25,480
Condition and Performance				
The asset does not require substantial maintenance, but some redesign may be necessary to improve its ability to block the upstream passage of trout into the exclusion area.				
Condition rating (See Table 7)			1 – Very Good	
The structure is in good condition.				
Key Issues				
<ul style="list-style-type: none"> Some work is required to improve the barrier performance, but local iwi and DoC are indicating due to potential effect on upstream water quality they would like to remove the barrier. They are assessing options. 				

3.3.4 Ōkaro Wetland Structures and Storm Interception Bunds

Asset Type	Ōkaro Wetland Structures + Bund	Quantity	1
Replacement Cost	\$245,700	Value	\$140,970
Overview			
<p>Ōkaro Wetland was developed by the programme to aid in the restoration of Lake Ōkaro. This involved the construction of wetland to intercept catchment flows from the main contributing stream. The wetland is located on private farmland as well as partly on a Rotorua Lakes Council reserve. All the structures are located on private land but BOPRC is involved in maintaining them in working order.</p> <p>The structures include inlet control and piping, high flow overflow, flow gauging and high flow bunding at two dams 600 m and 860 m upstream to help mitigate high flows to minimise the activation of the high flow wetland bypass.</p>			
Asset Summary			
The gross replacement cost for all the wetland components is \$245,700 which accounts for less than 1% of the Lakes portfolio. The Depreciated Replacement Cost (DRC) (or fair value) is \$140,970, around 1% of the Lakes portfolio. All the components are less than halfway through their useful life, with over twenty years until some components approach the end of their lives.			
The land at the Lake Ōkaro wetland has been excluded from the most recent valuation. The formation of land made by excavating soil from farmland to form wetland ponds is now incorporated in the land and its value is reflected in the land value.			
Component	Useful life Years	Remaining life	Fair value
Total			\$140,970

Condition and Performance	
The wetland, control structures and detention bunds are maintained by a combination of BOPRC contractors and landowner maintenance.	
Condition rating (See Table 7)	2 - Good
Recent inspections and maintenance has addressed any historic lack of maintenance. Regular inspections are necessary to make sure issues are minimised.	
Key Issues	
▶ All these structures are located on private land.	

3.3.5 Lake Ōkāreka Outlet

Asset Type	Lake Ōkāreka Outlet Structures and Stream Protection works	Quantity	N/A
Replacement Cost	\$3,764,100	Value	\$3,379,660
Overview			
<p>Lake Ōkāreka is 340 ha with no natural surface outlet. It has a small lake side community with homes close to the lake shore. In the 1960s the water level of the lake increased to such an extent some lakeside homes were flooded and the community pushed for an outlet to be constructed.</p> <p>The outlet, managed by BOPRC, consists of an open canal conveying water to an inlet screen and pipeline. The gravity pipeline then discharges into the Waitangi Stream, a tributary of Lake Tarawera. In 2022 BOPRC completed the final upgrade of the pipeline and outlet to the Waitangi Stream. This was the final phase in an upgrade of the complete Lake Ōkāreka outlet control, with new rock weir outlet, new pipeline and outlet to the Waitangi Stream and upgraded erosion protection works on the Waitangi Stream.</p>			

Asset Summary				
The gross replacement cost for all the outlet structures and stream protection components is \$3,764,100 which accounts for nearly 10% of the Lakes portfolio.				
The intake, pipe structures and erosion protection works are all less than six years old.				
Component	Useful life Years	Remaining life	Replacement cost	Fair value
Pipeline components	40-70	31-61	\$2,347,600	\$2,089,070
Stream protection components	45	41	\$1,416,500	\$1,290,070
Overall total			\$3,764,100	\$3,379,660
Condition and Performance				
The flow capacity consented is now 500L/s and is modelled to enable lake level control up to a 1:100 year rainfall event. This is designed to protect homes in the Ōkāreka community.				
The outlet structure, pipeline and Waitangi Stream banks have all recently been upgraded to cater for a maximum flow of 500L/s and prevent stream bank erosion as a result of higher flows.				
Condition rating (See Table 7)			1 – Very Good	
Upgrading of the pipeline and stream structures since 2017 has set this asset in exceptionally good order.				
Key Issues				
▶ There are some homes close to the Waitangi stream. Works have been undertaken that ensure these homes are not at risk from increased stream flows.				

3.3.6 Rotomahana Lake Outlet

Asset type	Rotomahana Lake Outlet	Quantity	1
Replacement cost	\$745,100	Value	\$208,640
Overview			
This is a lake overflow structure built in the 1970s in response to high lake levels. The structure comprises an earth channel leading to a concrete basin and culvert. The structure is important in controlling high lake levels on the Rotomahana isthmus. This is an important structure to ensure management of the lake level, to prevent unnecessary pressure bearing on the isthmus which separates Lake Rotomahana from Lake Tarawera. This is an earth fall formation that fell into place in the 1880 Mount Tarawera eruption.			

The structure comprises an earth channel leading to a concrete basin and culvert.



Lake Rotomahana

Outlet control and pipe

Outlet culvert to Lake Tarawera

Asset Summary

The gross replacement cost for the outlet components is \$583,300 accounting for nearly 3% of the Lakes portfolio. The Depreciated Replacement Cost (DRC) (or fair value) is \$158,250, around 1.5% of the Lakes portfolio. Both components have 17 years (or 24%) remaining useful life.

Component	Useful Life	Remaining Life	Replacement Cost	Fair Value
Headworks	75	21	138,800	38,870
Pipeline	75	21	606,300	169,770
Total			\$745,100	\$208,640

Condition and performance

Bay of Plenty Regional Council has a Management Plan for the monitoring and inspection of the structure. These inspections are programmed six monthly as well as being triggered by large rainfall events, large earthquakes and high lake levels. The aim is to identify any evidence of isthmus failure and ensure civil defence is alerted in such an event.

Council has undertaken the first recorded clearance of the channels leading to and from this structure since construction.

Condition rating (See Table 7)

1 – Very Good

This is an old structure but is maintained in good order.

Key Issues

- ▶ The structure is on private land
- ▶ Access to the structure is difficult via Lake Rotomahana or Tarawera.

3.3.7 Rotoma Lake Outlet

Asset type	Rotoma Lake Outlet	Quantity	1
Replacement cost	\$210,000	Value	\$58,800
Overview			
<p>This is a lake overflow structure built in the 1970s in response to high lake levels. The structure comprises a concrete basin and culvert then leading to an armoured channel connected to a small natural stream that flows to lake Rotoehu. The structure has never flowed since construction as the lake has never reached the overflow level of RL318.21m. The lake came within about 600mm of flowing into this overflow structure through the natural low point saddle in 1972 and then again in 2023. As a result, in 2023 staff undertook appropriate maintenance to ensure the structure was fit for purpose if the overflow occurred.</p> <p>A resource consent was issued for this overflow in the 1970s and expires in October 2026. It has as a condition a limit on exercising the consent until the level of Lake Rotoehu is controlled. There is no management control of Lake Rotoehu.</p> <p>The structure comprises a concrete basin and culvert then leading to an armoured channel connected to a small natural stream that flows to lake Rotoehu.</p>			



Natural overflow point

Concrete basin leading to culvert pipe and armoured channel.

Asset Summary				
The gross replacement cost for the outlet components is \$210,000 The Depreciated Replacement Cost (DRC) (or fair value) is \$58,800, around 1.5% of the Lakes portfolio. Both components have 21 years (or 24%) remaining useful life.				
Component	Useful Life	Remaining Life	Replacement Cost	Fair Value
Headworks and Pipeline	75	21	210,000	58,800
Total			\$210,000	\$58,800
Condition and performance				
<p>Bay of Plenty Regional Council undertakes monitoring and inspection of the structure. These inspections are triggered by lake level, and recent high lake levels have triggered appropriate maintenance to ensure if necessary the structure conveys flows safely from the natural overflow saddle.</p> <p>Council has undertaken the first recorded clearance of the channels leading to and from this structure since construction.</p>				
Condition rating (See Table 7)			1 – Very Good	
This is an old structure but is maintained in good order.				
Key Issues				
<ul style="list-style-type: none"> ▶ The structure is on private land, staff are working with the land owners to put in place an easement for ongoing occupation an maintenance. 				

3.3.8 Lake Rerewhakaaitu Outlet

Asset Type	Lake Rerewhakaaitu Outlet	Quantity	1
Replacement Cost	\$291,500	Value	\$140,970
Overview			
<p>Lake Rerewhakaaitu has an outlet drain located at Ash Pit Road. In 2018 the lake level peaked and started to cause flooding of farmland surrounding the lake. Investigations revealed that an outflow control structure had been constructed in the outlet drain to the Mangaharakeke Stream, a tributary of the Rangitāiki River in the 1960s. Responsibility for management of this structure was uncertain and rather than consume additional time trying to understand the ownership of this structure, BOPRC committed to managing the outlet drain.</p> <p>There is no resource consent to manage lake levels. Staff do not see a need to obtain a resource consent as the drain is a modified waterway. Council are not actively managing water levels but ensuring that high lake levels are not exacerbated by keeping the outlet clear. This minimises risks associated with more frequent high rainfall as a result of climate change.</p> <p>The objective is to keep the drain clear by making regular inspections of the drain, keeping it clear of vegetation occasionally and undertaking excavation of the drain on a regular basis.</p>			
Asset Summary			
<p>The gross replacement cost for the outlet is \$291,500 accounting for just over 1% of the Lakes portfolio. The Depreciated Replacement Cost (DRC) (or fair value) is \$140,970, around 0.6% of the Lakes portfolio. The outlet has 14 years (or 24%) remaining useful life.</p> <p>A bridge approximately 15m x 4m concrete will replace culvert near Ashpit Road.</p>			

Component	Useful Life	Remaining Life	Replacement Cost	Fair Value
Bridge replacing culvert	70	16	\$291,500	\$140,970
Condition and Performance				
Bay of Plenty Regional Council has now developed an outlet management regime that details inspection and maintenance for the outlet. The drain was cleared by long reach digger in 2023.				
Condition rating (See Table 7)			1 – Very Good	
The main issue with this structure is undertaking annual and 5 yearly maintenance. This is currently up to date.				
Key Issues				
<ul style="list-style-type: none"> ▶ Structure is on private land, ▶ There are no environmental triggers for maintenance such as lake level. BOPRC just provides a service to keep the outlet clear. 				

3.4 Key issues

The Rotorua Lakes Programme has a unique set of issues to deal with that create community apprehensions and present some potential risk to its ongoing sustainability. The following is a summary of the author's (Lakes Operations Manager) view on many of these issues:

- 1 The cultural impact of some structures and activities such as alum dosing in our lakes.
- 2 Concerns around the Ōhau Diversion Wall and alum dosing. The main concern here is potential and real conflict with iwi values and views. We are often seen as only engaging with iwi when resource consents are required and in between times we just get on with business. Our focus is now to try and develop ongoing relationships around managing these types of structures and operations, which will potentially lead to agreements and contracts which BOPRC will need to pay for, rather than expecting engagement on a "voluntary" basis. Specific agreements will lead to commitment to delivery on both sides.
- 3 General community expectations are that BOPRC will deliver improved water quality for each lake year on year. There are two issues with respect to this: (a) each lake has a specific Trophic Level Index (TLI) target, they are not all the same and so water quality for each lake will differ, depending upon what is technically feasible and (b) even where some lakes meet their target TLI (say Rotorua at a TLI of 4.2) annual TLIs will vary and algal blooms are possible. This requires some level of communication with the community to understand that lake water quality will continue to vary and that variations in water quality do not indicate programme failure.
- 4 Our communities now are expecting better access to Council data, especially data from live monitoring sites. Currently data from the monitoring buoys is available online. Keeping access to data provides a useful service for the public, assists in their understanding of lake processes and programme progress and also importantly provides greater trust of Council if we make data accessible.
- 5 The Rotorua Lakes Programme is a high cost investment for the Lake Strategy Group Partners (BOPRC, RLC and TALT, along with MfE investment) of about \$240m. As a result, the public are expecting to see a visible improvement in water quality. The programme is based on defining sustainable nutrient inputs to each lake and making these changes through improved land use. The flow on improvements are likely to take many years, even decades, due to the legacy of nutrients in the groundwater as well as nutrients that can recycle from lake sediments. The response to this delay is to invest in short term response projects such as alum dosing and the Ōhau Diversion Wall. Some other interventions while being long term in nature do provide a short response time, such as sewage reticulation of lakeside communities. This is an additional communication issue that requires ongoing attention.

- 6 Climate Change is an additional issue that has the potential to make reaching water quality targets more challenging, as well as create more frequent lake level issues such as flooding and erosion. The Water Quality Technical Advisory Group (WQTAG) has recently released a Statement on this for Council and public information (see Appendix 3). The potential risk or issue here is that over time nutrient reduction targets may need to be increased as a result.
- 7 The community and especially landowners' appetite and justification for land use change to improve water quality, is tempered by the water quality they observe in the lakes. If an in-lake intervention is making a big improvement to water quality, this may be counterproductive to our need for long term land use change. A community understanding of the science around short term interventions as well as the long term land use change is important. The success of alum dosing in Lake Rotorua could lead to this view.

3.5 Data confidence

Clear data reliability provides clarity over the robustness of plans and provides decision-makers with confidence. It is important to understand its strengths and weaknesses of data. Data reliability has been scored using Table 9 and is based on technical estimates from a professional team within the Council's Rotorua Lakes team (Table 8).

Table 8: Data confidence for Rotorua Lakes asset portfolio.

Data	Unknown	Very uncertain	Uncertain	Reliable	Highly reliable
Location					X
Quantity					X
Value					X
Condition				X	
Performance				X	

Table 9: Data confidence grading system.

Confidence Grade	Description
Highly reliable	Data based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment. Dataset is complete and estimated to be accurate $\pm 2\%$
Reliable	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate $\pm 10\%$
Uncertain	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated $\pm 25\%$
Very Uncertain	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete and most data is estimated or extrapolated. Accuracy $\pm 40\%$
Unknown	None or very little data held.

Part 4: Levels of Service

The overall goal of asset management is 'to provide the required level of service in the most effective and efficient manner for present and future customers', whilst meeting legislative requirements. "Levels of Service" (LoS) is an asset management term that incorporates the service element of delivering a community activity (Rotorua Lakes) in conjunction with the measurable targets that can be used to determine how effectively the activity has been delivered.

Asset management planning enables the relationship between levels of service and the cost of the service to be determined. This relationship is then evaluated in consultation with the community and stakeholders to determine the level of service they are willing to pay for.

The Rotorua Lakes Catchment programme is focused primarily on addressing water quality issues for the 12 lakes in the programme. The key objective for this programme is "to meet community expectations for water quality in each lake". The Lakes programme contains valuable assets with large capital values and long term maintenance costs.

Asset management planning aims to translate community outcomes and organisational objectives into the operational delivery of asset-based services, through defined levels of service.

4.1 Linking levels of service and community outcomes

The Local Government Act (LGA) provides for local authorities to determine its role in promoting the social, economic, environmental, and cultural wellbeing of their communities. It provides a framework for local authorities to decide how they will undertake activities.

The LGA requires service levels to be developed with the community in mind, to ensure that there is a community perspective applied to the development of traditionally technical service levels.

Schedule 10 of the LGA (Appendix 4:

LGA 2002 Schedule 10 **Requirements**) outlines the general requirements for the development of service levels. These requirements are:

- Statement of intended LoS provision for the Activity including performance measures.
- Performance measures and targets that will enable the community to assess the LoS for major aspects of the service that have not already been set as standard measures.
- A summary of any material changes to the cost of providing the service and the associated reasons for the change.

This AMP is prepared under the direction of the Council's Strategic Directions and 2024-2034 Long Term Plan (LTP) and Strategic Asset Management Plan (SAMP). The LTP outlines the community outcomes that the Council's vision, objectives and strategic priorities aim to achieve. Community outcomes are the outcomes that a local authority aims to achieve through the provision of infrastructure services. The SAMP outlines the levels of service framework to be used by the activity.

Council's community outcomes were presented in 2.4.4 of this AMP. The provision of the Rotorua Lakes assets, activities and services contributes to two Community Outcomes, three community well-beings, and four strategic priorities. The vision for the Rotorua Te Arawa Lakes Programme is "The Lakes of the Rotorua district and their catchments are preserved and protected for the use and enjoyment of present and future generations, while recognising and providing for the traditional relationship of Te Arawa with their ancestral lakes".

The Rotorua Lakes activity LoS 4.3 provide the link between these community outcomes, to the more detailed operational activities and work programmes. This is represented in Table 11 in 4.3 which shows the links between community outcomes, customer values, and levels of service and performance measures.

4.2 Customers and stakeholders

4.2.1 Who are our customers and stakeholders?

For the Rotorua Lake Operations Team, our customers are more the public and specific interested groups. Sometimes individuals can be our customers, and stakeholders where lake water quality is impacting on their part of the environment, say if flooding is having a more localised impact or an area of weed growth is impacting their lake access for example.

Our levels of service (LoS) are therefore more general and focused on serving the community needs. Unfortunately, our work outcome is heavily influenced by environmental factors that we have no influence on, so in making LoS targets we need to be mindful that the outcomes may not be achieved at times, simply due to prevailing weather conditions or ongoing Climate Change.

4.2.2 What do they value?

Customer values provide the cornerstone to the development of LoS from both a customer and technical point of view. The customer values considered important for the Rotorua Lakes activity and their associated strategic objectives are summarised below.

Table 10: Customer values considered important for the Rotorua Lakes activity.

Customer Value	Activity strategic outcomes
Accessibility/Quality	The right of public access , use and enjoyment of the lakes.
Safety	Assets are operated and maintained to provide a safe working environment and to deliver a safe recreational environment for users.
Community engagement	The requirement to take into account the principles of the Treaty and to provide for the relationship of Tangata Whenua with their ancestral resources. The community and key stakeholders are adequately consulted and informed in all significant decisions.
Sustainability	The principle of sustainable resource management; ensuring each generation can continue to use and enjoy resources of the Rotorua district.

4.2.3 Consultation and engagement

Consultation has been undertaken with the community as part of the ongoing development and review of the Lakes Strategy. The community are also engaged and consulted with every three years as part of Council's Long Term Plan process, and every year as part of Council Annual Plan process.

Engagement with the community is built into the Rotorua Lakes Programme. At a high level the Rotorua Lakes Programme comes under the control of the Rotorua Te Arawa Lake Strategy Group, a co-governance group, that was set up as a requirement of the Te Arawa Settlement Act. The Group comprises six members, two from each of the Te Arawa Lakes Trust (the lake bed owners), Rotorua Lakes Council and Bay of Plenty Regional Council. Regular meetings of the Group set policy for the Rotorua lakes Programme of lake restoration and management.

A number of the projects and assets within this management plan require resource consent. Part of that process involves pre-consent engagement with the community and specifically iwi. Through the consent process this engagement becomes more specific to enable dialogue on addressing environmental impacts.

Ongoing operations also involve regular programmed and responsive meetings with our stakeholders. Key regular meetings include iwi and also formally established lakeside community groups. We also have regular contact with some NGO's and key personnel who champion some specific as well as general lake water quality and lake level issues.

Regular contact with key people and groups helps us establish constructive relationships, enables us to hear local concerns and issues and enables managed responses to help address issues and avoid unnecessary escalation.

4.3 Rotorua Lakes levels of service and performance measures

The table below shows the LoS statements and associated performance measures and targets for the Rotorua Lakes activity. These LoS and targets are what we think we can make an operational difference to and explain why we may not have met the desired LoS if there is a failure. It is critical that there is a clear line of sight from community outcomes and customer values, through to the levels of service and performance measures, and ultimately the operational actions 'on the ground'. Table 11 illustrates this line of sight. Three key LoS statements are represented in Council's 2021-31 LTP. These are highlighted in **bold** in the table below.

Table 11: Rotorua Lakes levels of service and performance measures 2022/23.

Community Outcome	Customer Value	Level of Service	Customer/ Stakeholders	Asset	Performance Measure	Current Target	Current Result	Performance Measure Procedure
Safe and resilient communities	Safety	Protect homes from flooding, keep lake in operational range, and avoid low levels.	Ōkāreka community	Lake Ōkāreka level management	Keep lake in operational range.	80%	30%	Lake level recorder
					Prevent homes flooding.	100%	100%	Lake level recorder
					Avoid low levels.	90%	100%	Lake level recorder
A healthy environment	Safety	Minimise erosion, undertake regular inspections, repair identified damage.	Iwi and other landowners	Waitangi Stream management	Undertake inspections according to LMP frequency. High stream flows have been reduced due to health and safety concerns. Staff are reviewing stream inspection frequency.	100%	100%	Condition assessment
					All erosion addressed within two months of identifying. No erosion issues in the past 12 months.	100%	100%	
Freshwater for life	Sustainability	Maintain plant operation to avoid algal blooms.	Iwi and community	Alum dosing plants	Maintain in-lake P levels within protocol targets.	70%	75%	Annual reporting of TLI to Council and Ministry for the Environment
		Improve indigenous		Rotorua Lakes	Number of Rotorua Lakes that have reached their TLI (based on 3-year average)	3		

		biodiversity and waterbodies.			Do the non-complying lakes exceeding the three year TLI by more than 0.2 units have a valid action plan and are all actions being implemented?	Yes		
		Operation and maintenance of wall to protect Lake Rotoiti.		Ōhau Diversion Wall	Undertake programmed inspections on time. Budget for any necessary repairs in annual plan or long term plan as necessary.	100%		Condition assessment

4.3.1 How have we performed

Lake level target for Ōkāreka has been exceeded due to extremely high rainfall during the past winter, along with a series of cyclones during the summer. It felt like the rain was never going to stop! Other targets were largely met except the in-lake P levels for Lake Rotorua. This again was most likely due to extreme weather conditions but we may never really know the real cause with the passage of time, as the environment is complex and guided by a large number of drivers that interact in a complex way to impact our man-made outcomes/targets that are largely chosen without any rigorous scientific basis.

Lake Statistics (Water Quality Attributes)

Lake	Trophic Level Index		National Policy Statement for Freshwater Management (NPS-FM) Lakes Attributes 2022/23				10 Year Trends				Contact Recreational Attributes		
	TLI 2022/23 (TLI Target)	TLI 3 Year Average	Total Nitrogen Median	Total Phosphorus Median	Chl-a Median	Chl-a Max	Total Nitrogen	Total Phosphorus	Chl-a	Water Clarity	Blue-green health warning	Cyano-bacteria Biovolumes 2020-23	Swimming water quality – faecal ¹
Ōkāreka	3.0 (3.0)	3.1	B	A	B	A	■	■	■	■	N/A	N/A	Good
Ōkaro	4.5 (5.0)	4.6	C	B	C	C	■	■	■	■	Yes	C	Good
Ōkātina	2.7 (2.6)	2.7	A	A	B	A	■	■	■	■	N/A	N/A	N/A
Rerewhakaaitu	3.6 (3.6)	3.3	B	A	B	C	■	■	■	■	N/A	N/A	Good
Rotoehu	4.3 (3.9)	4.3	A	B	B	B	■	■	■	■	Yes	C	Fair
Rotoiti	3.8 (3.5)	3.7	B/B	B/B	C/B	B/A	■	■	■	■	Yes	B	Good
Rotokakahi*	3.6 (3.1)	3.5	B	B	B	A	■	■	■	■	N/A	N/A	N/A
Rotomā	2.5 (2.3)	2.5	A	A	A	A	■	■	■	■	N/A	N/A	Excellent
Rotomahana	3.9 (3.9)	3.7	B	B	B	B	■	■	■	■	N/A	N/A	N/A
Rotorua	4.2 (4.2)	4.3	B/B	B/B	C/C	C/B	■	■	■	■	Yes	A	Poor
Tarawera	2.9 (2.6)	2.8	A	B	A	A	■	■	■	■	No*	N/A	Excellent
Tikitapu	2.8 (2.7)	2.9	B	A	B	A	■	■	■	■	N/A	N/A	Fair

*Italicised figures are based on Te Wairoa Stream monitoring and a three-parameter TLI (no Secchi disk).
¹ NPS-FM Human contact attribute based on 95 percentile E. coli over the most recent five bathing seasons. The lowest (worst) grade is shown where lakes have more than one bathing site.
 * Lake Tarawera is not routinely monitored, however ad-hoc samples collected in response to public concern, has resulted in health warnings in past seasons.

What is The Trophic Level Index?

The Trophic Level Index is a number used to indicate the health of lakes in New Zealand. As a general rule of thumb the higher the number, the worse the water quality in the lake.

The number is calculated using four separate water quality measurements – total nitrogen, total phosphorous, water clarity, and chlorophyll-a.

National Policy Statement for Freshwater Attributes

To protect ecosystem and human health, attributes are measured to help determine the extent to which specific values are provided for. There is a range of different physical, chemical, microbiological and ecological attributes, and one attribute may apply to more than one value.

Attributes are graded A-D (E), with the National Bottom Lines set for some attributes. 'A' indicated ecosystems are healthy and resilient, or low risk to human health; to 'D' aquatic communities are in a persistent degraded state, or risk to human health from contact recreation is high.

Contact Recreation

Bathing and contact recreation sites are monitored during Summer throughout the Rotorua Lakes, to inform the public when and where it is safe to interact with the water. Not all lakes, or all bathing sites can be monitored, so popular and culturally significant sites are prioritised. Sites can be graded from Poor to Excellent based on attribute statistics in the National Policy Statement for Freshwater (NPS-FM).

Cyanobacteria are monitored in lakes with a history of algal bloom activity. Health warnings are issued by Toi Te Ora based on the volume of potentially harmful cells in the water, and sites are graded according to the NPS-FM.

A	Excellent
B	Good
C	Fair/Moderate
D	Poor



Lake Statistics (Ecological Attributes)

Lake	Lake Submerged Plant Index ¹				Abundance	Kōura		Kākahi		Cattfish		Trend Key
	LakeSPI	LakeSPI Native Index ²	LakeSPI Invasive Index ²	Invasive Submerged Plants Present		Trend	Reason for Change	Abundance	Trend	Abundance	Trend	
Ōkāreka	High	B	B	d	Moderate	Stable	N/A	Present	N/A	Absent	N/A	
Okaro	High	C	B	c	Absent	N/A	N/A	Absent	N/A	Absent	N/A	
Ōkātaina	High	B	C	d	Abundant	Stable	N/A	Present	N/A	Absent	N/A	
Rerewhakaaitu	Moderate	C	C	b, d	Present	Stable	N/A	Present	N/A	Absent	N/A	
Rotoehu	Poor	C	D	a, c, e	Present	Worsening	Declining water quality	Moderate	N/A	Absent	N/A	
Rotoiti	Moderate	C	C	a, b, c, d, e	Moderate	Worsening	Catfish predation	Abundant	Stable	Abundant	Stable	
Rotokakahi*	Moderate	C	C	c	Moderate	Stable	N/A	Abundant	N/A	N/A	N/A	
Rotomā	High	B	C	d	Abundant	Stable	N/A	Abundant	N/A	Absent	N/A	
Rotomahana	Moderate	C	C	a, b	Absent	N/A	N/A	Absent	N/A	Absent	N/A	
Rotorua	Moderate	C	C	b, c, d	Moderate	Worsening	Catfish predation	Abundant	Improving	Abundant	Worsening	
Tarawera	Moderate	C	C	a, b, c, d, f	Abundant	Improving	Unknown	Abundant	N/A	Absent	N/A	
Tikitapu	High	B	C	d	Present	Worsening	White Tail Disease	Absent	N/A	Absent	N/A	

¹ based on LakeSPI survey data collected between 2018 and 2023; data from Rotokakahi Mar-2018.
² the LakeSPI native and invasive indices refer to tables 11 and 12 in the NPS-FM.
Invasive Submerged Plants: a) Ceratophyllum; b) Egeria; c) Elodea; d) Lagarosiphon; e) Potamogeton crispus; f) Ranunculus trichophyllus

Lake Submerged Plant Index (Lake SPI)

The LakeSPI programme monitors macrophytes (aquatic plants) which are used to classify the ecological condition of lakes. The ecological status of a lake can be characterised by the composition of native and invasive plants.

'LakeSPI' index is a synthesis of components from both the native condition and invasive impact condition of a lake, and provides an overall indication of lake condition. The higher the score the better the condition.

Kōura and Kākahi Monitoring

Kōura and Kākahi monitoring is carried out by Dr Ian Kusabs of Kusabs and Associates Ltd. Kōura monitoring is undertaken on all the Rotorua Te Arawa Lakes.

Regular kākahi monitoring surveys are undertaken in Lakes Rotorua and Rotoiti to monitor the long-term effects of lake restoration initiatives on kākahi populations in the shallow littoral zone of these lakes.

Catfish Monitoring

Catfish were first detected in Lake Rotoiti in March 2016 and in Lake Rotorua in December 2018. Surveys have been undertaken to detect their presence in the other lakes. So far they are limited to these lakes.



LakeSPI / Cultural / Cattfish	
A	Excellent/Abundant/Absent
B	High/Moderate/Present
C	Moderate/Present/Common
D	Poor/Absent/Abundant



4.4 Level of Service Issues

1 Lake Ōkāreka level

Continuous heavy winter rainfall has made meeting the high lake level difficult. Staff have upgraded the outlet pipeline, stream works and obtained resource consent to allow more than double the previous 239 L/s flow to 500 L/s outflow. During the 2022 winter the outflow was run continuously at max flow of around 500 L/s from mid-July to late December as the lake level continued to be above the max consent level, due to high rainfall. Again, the occurrence of two summer cyclones and high summer rainfall made maintaining the lake below the max range challenging.

2 Meeting 3-yearly TLI water quality standard for lakes is always going to be challenging.

The TLI targets are affected by a range of environmental factors that impact water quality and are mostly beyond the control of the lakes programme. They comprise seasonal impacts, year to year impacts and on-going climate change impacts that will change environmental conditions such as ambient temperatures, rainfall, wind effects on lake mixing and stratification, to such an extent that from year to year some lakes will meet their TLI targets, while some will not. The reasons will sometimes be identifiable, while most of the time the specific reason for not meeting target TLIs will remain a mystery. A more achievable standard recommended by the Water Quality TAG is to ensure that where the three-year TLI is exceeded by more than 0.2 TLI units, then review the adequacy of the Action Plan and implementation. If the review indicates appropriate actions are identified and being implemented then no further action; if further options are available consider reviewing actions.

4.4.1 Reporting LoS and performance measures

Reporting is the responsibility of the programme delivery team with the agreed budgets in accordance with the baselines. Levels of service performance measures are monitored regularly by the Lakes Operations Manager to track progress against performance measures and targets. Performance against service level delivery against the LoS within the LTP is reported to the community and Council each year.

The Lakes Operations Manager also reports to the Organisational Asset Management Steering Group (OAMSG) several times a year. Activity performance, activities undertaken and planned work programmes are discussed at the meetings.

The Lakes Operations Manager also has numerous other reporting requirements as part of the Lakes Strategy and associated Programme Management Plan. These updates do not exclusively report on the LoS presented in this AMP, but do relate to the same metrics such as TLI and in-lake P levels.

Part 5: Future demand

Planning for future demand is imperative to provide an economically sustained pathway to meet the needs of the region. The provision of the Rotorua Lakes activity and its management is considered an important element to enable Council to achieve its Strategic Direction and service its communities effectively.

Schedule 10 of the Local Government Act requires that demand be considered as part of asset management planning to ensure that future requirements are identified and planned for. The Schedule 10 requirement will reduce the chances of unforeseen surprises or 'financial shocks', and ultimately provides a sustainable, economic pathway to meet the needs of our future communities. The ability to predict future demand for Rotorua Lakes assets and services enables the Council to plan ahead and identify the best way of meeting that demand.

The Rotorua Lakes Programme is not providing a specific service to customers, it is more providing a wider environmental service. It does connect with the community, specifically iwi because of their special relationship with the lakes and their ownership, specific lake communities who associate with their local lake, as well as other groups with a particular interest in lake water quality and health. It is likely that with time, community expectations to providing good water quality will continue to increase, partly to do with increasing environmental understanding, as well as population growth and development that has led to a decline in environmental health in the past.

5.1 Demand Driver Summaries

This section outlines the key demand drivers that influence Rotorua Lakes activities. Forecasts are presented for demand drivers where data is currently available, and a qualitative assessment of how the forecast demand may affect future service delivery is discussed. Demand management strategies are indicated. The demand drivers that are discussed as part of this section include:

- Climate Change,
- Legislation and Regulatory, and
- Stakeholder Expectations.

5.1.1 Climate Change



Impact on Activity/Assets

Effects of climate change will be an exacerbating effect on meeting water quality goals as well as having potential to impact lake levels and increase erosion of outlet structures and streams. Heavy rainfall and associated runoff increase sediment erosion and losses of particulate phosphorus. Their effect on nitrogen delivery is more variable but increased losses are also expected.

With the forecast number of hot days (>25°C) expected to increase, impacts on lake ecosystems may be profound due to increased water temperature and vertical stratification. Shallow polymictic lakes (Rotorua, Rotoehu and Rerewhakaaitu) are most vulnerable because a warmer climate will increase the frequency and duration of intermittent stratification events, which will increase the probability of bottom-water anoxia, nutrient releases from bottom sediments and availability of these nutrients to enhance algal growth upon re-mixing. The deeper monomictic lakes will have longer periods of seasonal stratification, which will also increase the risk of bottom-water anoxia (Lake Tarawera) or extend the duration of anoxia (Lake Rotoiti).

The Trophic Level Index (TLI) is used as the primary indicator of water quality for the Rotorua Lakes, and comprises the criteria of one performance measures as part of the activity's level of service (covered in the previous chapter). Based on model simulations for some lakes, TLI values can be expected to increase by approximately 0.2 units by 2090, more so in polymictic lakes. This will make achieving related levels of service more difficult, which may result in increased costs due to increased maintenance and activity in order to achieve these levels of service moving forward.

All the above will likely result in the need for increased short term interventions which increases operational expenditure and may lead to negative community feedback, which can be exacerbated due to the increased frequency and/or duration of alum dosing required. Additionally, the length of time the assets are needed beyond what was initially planned, may need to be extended to continue working towards achieving water quality targets, which may result in unplanned asset replacement costs.

Conversely though, there may be some positive impacts because of climate change. Planning is currently underway for a study that will investigate these potential positive impacts. This study is due to be completed early 2024, the result of which will be used to inform and update this AMP where applicable.

Climate change is acknowledged as a significant priority in Council's 2024-2034 Long Term Plan. Council is to planning to develop an Asset Management Sustainability Framework, which will specifically relate to Council's assets and how they can contribute to Council's climate change and sustainability goals. Council's Property group are also currently developing a Sustainability Strategy for the organisation which is likely to impact on activity delivery and asset management.

Examples include new levels of service and performance measures relating to climate change and sustainability, increased reporting requirements and compliance costs, upgrading/replacing assets with longer lasting materials or additional components, extending the life of existing assets, repurposing redundant assets, or using technology that reduces the amount of carbon used by assets or during activities.

Management Strategy

Climate Change is now a normal part of thinking in the Rotorua Lakes Programme when new projects are being developed, to ensure problems are anticipated and mitigated at an early stage.

The Engineering department of Council is currently undertaking modelling regarding lake levels because of climate change predictions. The report will be available soon, and the results will help inform the planning of appropriate management strategies, if required.

The Rotorua Lakes team will work to support Council's climate change goals and objectives with regards to sustainability and resilience.

5.1.2 Legislation and regulatory

Demand Driver	Legislation and regulatory
Overview	
<p>There are a number of key regulations or legislation that impact on the Rotorua Lakes activity and the management of its asset portfolio. Legislative change can significantly affect Council's ability to meet minimum levels of service that have been agreed with the community. The key legislative Acts related to this activity were discussed in more detail in 2.4.1.</p> <p>Resource Management Act (RMA): Council is responsible for implementation of the RMA to protect water quality and quantity. The Government is repealing the Resource Management Act 1991 (RMA) and enacting new laws to transform the way the environment is managed. Three new pieces of legislation are planned to be enacted: Spatial Planning Act, the Natural and Built Environment Act, and the Climate Adaptation Act. One of the objectives of the new RMA that relates most to the Rotorua Lakes activity is 'to better prepare for adapting to climate change and risks from natural hazards and better mitigate the emissions'. Transitioning to the new RMA system is planned within the next ten years.</p> <p>National Policy Statement for Freshwater Management (NPS-FM) 2020: The NPS-FM 2020 provides local authorities with updated direction on how they should manage freshwater under the RMA. The release of the NPS-FM in 2020 has put more requirements on councils to set water quality targets and formulate action plans, to make sure waterways meet minimum standards set by the community.</p> <p>Council's number one priority in the 2021-2031 Long Term Plan (LTP) is responding to the significant regulatory reform programme, which also extends beyond the RMA changes alone. This priority has continued through into the 2024-2034 LTP.</p>	
Impact on activity/assets	
<p>Resource Management Act (RMA): The impacts on the Rotorua Lakes activity from the regulatory reform and new pieces of legislation is anticipated to be minor, as focus appears to be more on the built environment and spatial planning. Council will track and monitor developments to anticipate whether any changes will materially affect the Rotorua Lakes activity or the way the assets are managed.</p> <p>National Policy Statement for Freshwater Management (NPS-FM) 2020: The (Regional) Natural Resource Plan (RNRP) was updated in March 2021 to incorporate new clauses from the NPS-FM. The NPS-FM legislation is unlikely to have an impact on the Rotorua Lakes assets over the short term within the current LTP cycle, but could have an impact over the longer term. This will mainly be related to the length of time an activity is needed, such as increased frequency and/or duration of alum dosing, or the length of time an asset is needed. An example here being the Ōhau Diversion Wall, which may be required beyond its current useful life which will lead to increased capital and operational expenditure.</p> <p>Because of changes to the above legislation and laws that set out how we look after areas like water quality, resource management, consents and compliance, Council is preparing to change the way we work as this will ultimately impact the Local Government landscape. It remains unclear exactly what this means for the Rotorua Lakes activity, and we will continue to monitor developments. Any new information and subsequent impacts will be updated within this AMP.</p>	

Management Strategy

Council has been proactive in this area as it has developed policy and set standards of water quality in the PNRP, and has developed action plans for a number of the lakes – see Appendix 1: Action plans completed pursuant to Natural Resource Plan.

Plan Change 10 (Lake Rotorua Nutrient Management) which became operative since November 2022, introduces rules to limit the amount of nitrogen entering Lake Rotorua from land use. The plan change is aimed at improving the quality of the water in Lake Rotorua, and reduce the need for short term interventions and assets over the longer term.

5.1.3 Stakeholder expectations

Demand Driver	Stakeholder expectations
Overview	
<p>Trophic Level Index: General community expectations are that BOPRC will deliver improved water quality for each lake year on year. There are two issues with respect to this: (a) each lake has a specific Trophic Level Index (TLI) target, they are not all the same and so water quality for each lake will differ, depending upon what is technically feasible and (b) even where some lakes meet their target TLI (say Rotorua at a TLI of 4.2) annual TLIs will vary and algal blooms are possible. This requires some level of communication with the community to understand that lake water quality will continue to vary and that variations in water quality do not indicate programme failure.</p> <p>Cultural Impact: The main concern here is potential and real conflict with iwi values and views in relation to the cultural impact of some structures and activities such as alum dosing and the Ōhau Diversion Wall.</p> <p>Land Use Change: The programme is based on defining sustainable nutrient inputs to each lake and making these changes through improved land use. The flow on improvements are likely to take many years, even decades, due to the legacy of nutrients in the groundwater as well as nutrients that can recycle from lake sediments. The response to this delay is to invest in short term response projects such as alum dosing and the Ōhau Diversion Wall.</p> <p>The community and especially landowners' appetite and justification for land use change to improve water quality, is tempered by the water quality they observe in the lakes. If an in-lake intervention is making a big improvement to water quality, this may be counterproductive to our need for long term land use change. A community understanding of the science around short term interventions as well as the long term land use change is important.</p> <p>Council Data: Our communities now are expecting better access to Council data, especially data from live monitoring sites. Currently data from the monitoring buoys is available online, however the monitoring bores were not monitored regularly or consistently before 2020. This has led to accusations of lack of transparency and Council drawing conclusions with a lack of data.</p>	
Impact on activity/assets	
<p>Trophic Level Index: Complaints when blooms do occur and questioning of the lakes programme spending when blooms do occur.</p> <p>Cultural Impact: Could lead to shorter consents and/or possibly non-approval at consent stage. Negativity towards Ōhau wall operation and works; which may be required longer than 50 years.</p> <p>Land Use Change: If positive outcomes are not realised quickly, landowners and the public may see this as a failure, leading to reduced motivation for land use change.</p> <p>Council Data: If information and data is not available, people will draw their own conclusions which may be unhelpful, and lack of transparency.</p>	

Management strategy
<ul style="list-style-type: none"> ▪ Continue research around the reason for lake blooms and keep the public informed via media and good one to one response and working with interested groups. ▪ Continue to undertake impact studies, including taonga species, and include iwi in monitoring. ▪ Continue to undertake monitoring and engage with iwi on effects and possible mitigation. ▪ Make sure science for lake decline is available to public and especially landowners, support landowners in BMP and reduce impacts. ▪ Make live monitoring data available from monitoring buoys and lake level on the Council website. Additional reports are made available on the Council and programme website. ▪ Undertake a number of interventions in parallel with the sustainable land use change that have a more rapid response time, such as alum dosing, the diversion wall and sewage reticulation.

5.2 Summary of Demand forecasts, impacts and management

The following section brings together some of the issues and impacts outlined above, the associated risk level, and sets out the mitigation options. Also refer to the Risk Management section (Part 7:).

Issue	Impact	Risk	Mitigation option
Negative connotations of dosing alum into lakes from iwi and some community.	Could lead to shorter consents and possibly non-approval at consent stage.	Moderate	Continue to undertake impact studies, include taonga species, and include iwi in monitoring programme.
Alum dosing may be seen by some of the community as fixing problem.	Reduce motivation for land use change.	Low	Make sure science for lake decline is available to public and especially landowners, support landowners in BMP and reduce impacts.
Ōhau Wall is seen as negative to iwi in the local area and downstream on Kaituna.	Negativity towards the wall operation and works.	Low	Long term consent achieved, continue to undertake effects monitoring and engage with iwi on effects and possible mitigation.
Community expectations that restoration work will prevent any algal blooms and this will occur immediately.	Complaints when blooms do occur and question the lakes programme spending when blooms occur.	Medium	Continue research around the reason for lake blooms and keep the public informed via media and good one to one response, and working with interested groups.
Access to Council information and data e.g. reports and monitoring.	If information and data is not available, people will draw their own conclusions which may be unhelpful, and lack of transparency.	High	Make live monitoring data available from monitoring buoys and lake level on the Council website. Additional reports are made available on the Council and programme website.
Some restoration actions such as land use change take many years to have a positive impact due to groundwater lags.	The landowners and public may see this as a failure if positive outcomes are not realised quickly.	High	Undertake a number of interventions in parallel with the sustainable land use change that have a more rapid response time, such as alum dosing, the diversion wall and sewage reticulation.
Climate Change is predicted to make meeting lake targets more challenging and may require more work to reduce nutrients.	It may involve going back to landowners in future for additional changes, which may be seen as negative.	High	Release WQTAG statement on Climate Change to make sure community aware of issues. Where impact has been evaluated, ensure this is included in future decisions such as flooding at Lake Ōkāreka.
Alum may be needed for longer than initially projected.	There might be difficulty renewing consent in the next 10 years, and loss of confidence in programme.	Medium	Continue research and monitoring around the restoration progress and predictions of recovery.

Ōhau Wall may be required for longer than 50 years.	Wall has corrosion issues and this will add cost to keep it serviceable for longer.	High	Continue to undertake programmed maintenance and inspections to ascertain need for upgrades.
Increased pressure on water courses leading to lakes, e.g. Waitangi Stream due to climate change storm frequency.	More budget may be needed to maintain water courses and minimise erosion.	High	Maintain inspections and monitoring on streams where we actively control flows to ensure we are predicting maintenance needs early.
Changes in legislation and policy that lead to increased need to improve water quality.	May lead to more stringent TLI or water quality standard. More effort and money required to meet the new needs.	High	Consider options in restoration that may overreach targets if cost is marginal.

5.2.1 Non-asset Demand Management

The Rotorua Lakes Programme has always had some investment in this area (non-asset demand). This is basically engaging with the community, with a focus on engaging the “right” local community groups and iwi. There is always opportunity for improvement and thinking about new ways of getting better engagement. For example, we are starting to work with specific iwi groups around using their monitoring to provide impact assessment of parameters that are meaningful to them.

There is also some desire for other community members or groups to undertake monitoring. The advantage of this is that these people and groups then become more engaged, more knowledgeable and can contribute their knowledge and experience to programme knowledge and decisions.

An issue that needs to be considered here is how do we make this work ongoing so that we get good long-term data sets and long-term engagement with enthusiastic people. These people generally need some form of resourcing to ensure they can afford to do the work, which may be monitoring some aspect as well as possibly passing information on to other people. Their information/data needs to be collected by Council or other body to ensure the long-term data is not lost. We have a working example of this with a member of the Lake Tarawera community, where BOPRC pays for their travel costs in monitoring while UoW collects and stores the long term data, which now forms a long term data set used in assessing water quality changes.

More traditional means of engaging with the community around the lakes programme are also prioritised. Communications are managed by various press releases and via the dedicated Rotorua Lakes Programme website. The programme is responsible for the publication of a multitude of science and monitoring reports. These reports are made available to the public via the website. In addition, BOPRC works with the UoW to hold regular science presentations from experts and students on lake research and restoration. Public attendance at these meetings is high.

Some of the challenge in keeping a high public profile with these methods is the effort required to keep the website up to date and relevant. It is important that resourcing and commitment to reviewing the website is a Council priority.

Part 6: Lifecycle management

6.1 Overview

This section details how the Council plans to manage and operate its Rotorua Lakes asset portfolio. This is achieved through lifecycle management strategies and work programmes encompassing a whole-of-life asset approach. Lifecycle asset management is the cycle of activities associated with planning for, creating, operating, maintaining, replacing, rehabilitating, and disposing of assets.

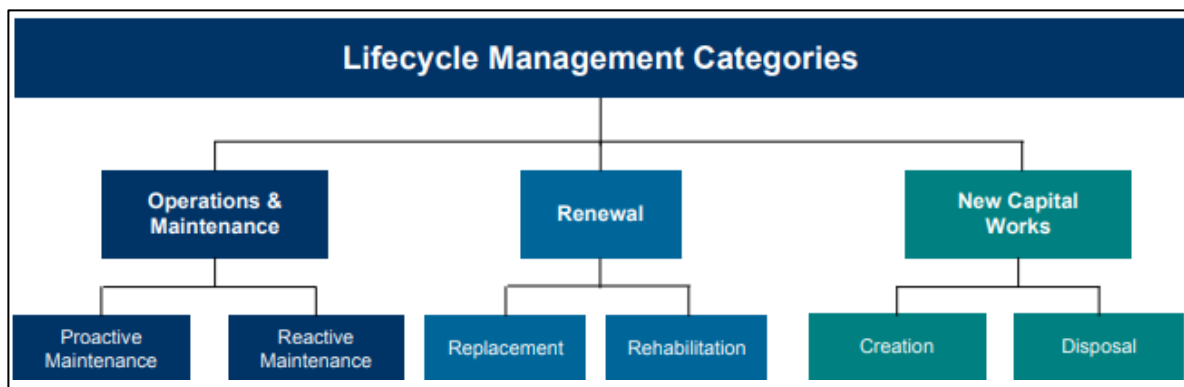


Figure 7: Lifecycle management categories.

The lifecycle management programme covers the three key lifecycle categories necessary to manage an asset over its whole life and also deliver required levels of service. These categories are illustrated and described below.

Table 12: Description of lifecycle management categories.

Category	Description
Operations and Maintenance	Operations and maintenance activities are those required for the on-going work that is necessary to keep the Rotorua Lakes assets operating. Maintenance includes all actions necessary for retaining an asset as near as practicable to the current levels of service, including the day-to-day work necessary and can include immediate repair work.
Renewals	Renewal is major work which does not increase the asset's service level, but restores, rehabilitates, replaces or renews an existing asset to its original level of service, performance and/or capacity.
New Capital Works	New capital works involve those that create a new asset that did not previously exist, or works which upgrade or improve an existing asset beyond its existing capacity. They may result from changing demand, social or environmental needs. New capital works also include activities necessary to dispose of decommissioned assets.

The following sections will provide further discussion on the specific strategies and programmes involved for each category, in the planning of lifecycle management for the Rotorua Lakes asset portfolio.

6.2 Operations and maintenance planning

Operations include regular activities to provide services that affect service levels including quality and function through the types and timing of activities, and the design of the infrastructure. For example, alum dosing frequency, asset condition assessments, p-locking plant inspections.

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including the regular, ongoing day-to-day work necessary to keep assets operating. Maintenance may be classified into reactive or planned (proactive) work activities.

Reactive maintenance is unplanned repair work carried out in response to customer/stakeholder service requests, natural hazard events, and management/supervisory directions. Reactive maintenance activities are undertaken by operational personnel. Investigations and studies undertaken by external personnel also inform maintenance planning and activities.

Table 13: Sources and descriptions of reactive maintenance.

Source	Description
Fault Notification	Faults are identified during operational inspections, routine surveillance, and remote monitoring alarms. Operational personnel will record the fault in the field including any photographic evidence. Defects will then be assessed for severity and maintenance planned.
Remote Monitoring	Operational personnel are notified of faults through remote monitoring network. Operational personnel then programme an inspection and fault response, and depending on the fault cause(s), plan any maintenance to remediate any issues accordingly.
Flood Damage	Flood (or other hazard) damage repairs are identified as those works required to repair, replace or upgrade existing assets to the levels of service that existed prior to the event. Observations made during/after the event are collated and contribute to maintenance plans.
Public Notification	Landowners and lake users typically notify operational personnel directly about any issue or defect they have observed. A site inspection is planned and undertaken to record the observed defect and plan maintenance accordingly.

Planned (proactive) maintenance is repair work that is identified, planned and managed through formulated plans and documents, such as Operations and Maintenance regimes, Lake Management Plans, or manufacturer's guidelines. These activities include inspection, assessing condition, actioning the work and reporting what was done, to develop a maintenance history and improve maintenance and service delivery performance.

Table 14: Sources and descriptions of planned maintenance.

Source	Description
Condition Assessment	Regular inspections are essential for identification of areas requiring maintenance before major problems develop. Failure is pre-empted through inspections, monitoring and maintenance, paying particular attention to known weak areas and assets of higher criticality.
Operational Management Plans	Several Lakes and associated structures have an Operational Management Plan (OMP) which set out the specific procedures and frequencies for operating and maintaining the assets and activities. The OMP informs the development of annual maintenance plans.
Manufacturers Specifications	Manufacturer's maintenance manuals are used for some assets, such as p-locking plants, to identify planned maintenance activities and their frequencies, which in turn inform the maintenance plan. Manufacturer's specifications are included within the respective OMP.

As mentioned above, several the Rotorua Lakes and associated assets have Operational Management Plans (OMP) in place (or are currently in development/planned). The OMPs outline the maintenance strategies and activities to ensure the assets are operated and maintained on a day-to-day basis to consistently achieve optimum service. The OMPs inform the development of the maintenance plans, which are prepared annually and outline the maintenance activities required each year to maintain the assets at the required levels of service.

Appendix 2 contains a list of management and maintenance plans and procedures relating to each structure, with links attached. The expectation of the Lakes Operations Manager is that each of the assets will have OMP. A number of these are currently in development and need to be finalised, and others are planned and need to be developed.

6.3 Renewals Planning

Several the Rotorua Lakes assets are ‘short-term’ projects, with the aim to support improvements in water quality and then cease maintenance of these assets. As a result of this, our initial expectations are that they will not require renewal. However, as outlined earlier in this AMP, there is a possibility that these assets may be required for longer than initially programmed. This is applicable to the Ōhau Diversion Wall and the alum dosing plants. At this stage, this is not clear and will only become evident with time as we better understand the impact and timing of land use change on lake water quality. The Rotorua programme has also taken on responsibility for a number of lake level management projects (Okareka, Rotomahana, Rerewhakaaitu and Rotoma). These assets will be required on an on-going basis.

6.3.1 Renewals Strategy

Until a time when the need for the assets has become clearer or if Council achieves Lake water quality targets over the long term, renewals planning still plays a crucial role in ensuring the ongoing functionality and performance of the Rotorua Lakes asset portfolio. To effectively plan for renewals, it is essential to consider the age, condition and performance of the assets. Table 15 below outlines the key renewal strategies for the Rotorua Lakes portfolio, with further discussion further below.

Table 15: Asset renewal strategies for Rotorua Lakes assets.

Strategy	Description
Age-based	Uses estimated or known age of the asset/component as a key determinant for renewal. While this can be a simple and straightforward strategy, it may not always reflect the actual condition of the asset, as some assets can deteriorate faster or slower than expected due to various factors such as usage and maintenance practices.
Condition-based	Involves assessing the physical state of the assets and using this information to plan renewals. Regular inspections and assessments are necessary to implement this strategy. It is more proactive and generally more efficient than an age-based strategy, enabling the identification of assets that may require renewal before their estimated life expectancy, ensuring timely intervention to address any deterioration or performance issues.
Performance-based	Focuses on the operational performance of the assets as a trigger for renewal. If an asset is not performing as expected or required to meet the desired outcomes, or if water quality targets not being met are attributed to the asset, it may indicate the need for renewal. This strategy relies on the use of performance monitoring systems to track performance indicators. By monitoring the performance of the assets, any deviations from the desired targets can be identified, and appropriate renewal actions can be taken.

Over the next ten years, approximately 140 components across four asset types (facilities) are expected to reach the end of their useful lives, with the majority belonging to the P-locking plants. Section 3.3 of the AMP provided a detailed analysis of age information at the component level for each major asset type. It is worth noting that several the 140 components have been replaced or upgraded since the 2021 asset valuation, and so the actual figure will be lower. Some assets have also been deemed redundant. This figure will be updated following the next valuation before 30 June 2024.

As discussed in Table 15, age-based renewals can be a simple and straightforward approach, but it may not always reflect the actual condition of the asset. No quantitative condition information was available for this AMP, but condition and key issues were summarised by the Lakes Operations Manager in Section 3.3. The AMP recognises the importance of improving condition assessment processes including the recording of data, to gather accurate and up-to-date information on the assets and inform asset renewal planning. This has been identified as an improvement (9.3).

6.4 New Capital Planning

New capital works involve the creation of entirely new assets, substantial improvements to existing assets beyond their current functionality or performance, or works which dispose of an existing asset.

New capital planning for the Rotorua Lakes portfolio focuses on identifying and prioritising the investment required to address performance deficiencies and aiming to achieve agreed service levels and targets. This involves considering factors such as asset inspections, monitoring performance of water quality, changing environmental conditions, technological advancements, legislative or regulatory requirements, and community and stakeholder expectations (Table 16).

Table 16: Identification of new capital works.

Source	Description
Inspections	Regular inspections of the Rotorua Lakes asset portfolio can reveal structural issues, safety hazards, or functional deficiencies in the infrastructure. These findings could necessitate new capital works to restore the assets' usability, integrity, and safety.
Performance monitoring	By tracking the performance of the Rotorua Lakes assets and associated water quality targets, Council can identify when these assets are underperforming or failing to meet standards. This may trigger the need for new capital works, such as upgrades or replacements, to ensure the assets operate effectively and fulfill their intended functions.
Strategic objectives	Council's strategic objectives related to the Rotorua Lakes asset portfolio, such as improving water quality, enhancing ecological health, or supporting cultural values, can drive the need for new capital works. These projects aim to align the assets with the broader goals and aspirations of the Council and contribute to the overall management and sustainability of the lakes.
Technology	Advancements in technology can present opportunities for capital improvements within the Rotorua Lakes asset portfolio. For example, the adoption of advanced monitoring systems, data analytics, or remote sensing technologies can improve asset management, enhance early warning systems, and optimize operational efficiency.

Asset disposal includes any activity associated with disposal of a decommissioned asset that has reached the end of their useful life or is no longer required due to changes in demand, technology, obsolescence, or other factors. It is vital to consider the costs of asset disposal in the long-term financial forecasts for an asset. The cost of asset disposal is expected to be incorporated within the capital cost of new works, or asset renewals.

Currently council is undertaking the trial repair of the holes in the Ohau diversion wall. Due to early corrosion problems with the wall staff have been assessing the necessary additional maintenance required. Over the past three years strengthening works has been undertaken by installing a submerged waler along the length of the wall providing additional lateral stability for any future repairs. Since the accelerated corrosion problem was identified in 2014, the intermediate sheet piles have gradually formed moderate sized holes near the surface along the wall length. These have now developed to a stage where algae leakage is becoming highly visual and repairs are necessary. The trial repair will confirm the repair method and suitability. Once that is confirmed council will need to budget for the complete repair, likely to be \$1.5m-\$2.5m.

6.4.1 New Capital Projects

Our capital projects to date have been short term interventions to provide an improvement in water quality until catchment land use changes take effect. The main areas of investigation are the Council's commitment to reducing 50 tonnes of nitrogen from Lake Rotorua by engineering means. A key project to contribute to this was the Tikitere nitrogen removal. However, this project got shelved as it became too expensive and there was an ongoing high risk using a new technology. Further investigations are progressing into the use of wetlands for nitrogen removal and there are also other options for nitrogen removal at Tikitere. Table 17 outlines proposed new capital projects for 2024-34

Table 17: Proposed new capital projects for 2024-2034.

Asset	Project	Year	Cost
Constructed Wetlands	Current budget \$7.5m to build constructed wetlands in Lake Rotorua catchment for nitrogen removal – could be increased depending on Council's appetite for further investment.	24-34	~\$12million
Regional Park	Council will consider development of park in Lake Rotorua Catchment as part of LTP.	24-34	~\$15million
Total			\$27+million

Part 7: Risk Management

Council has developed an organisational Risk Management Framework, which can be found within Council’s Strategic Asset Management Plan (SAMP). The risk criteria and matrices established as the basis for risk evaluation were developed in accordance with the ISO31000:2009 risk management standard. This Rotorua Lakes AMP has tailored this approach to their activity.

Risks are recorded and tracked through risk registers and actions plans. Risks that have the highest residual score after mitigating actions have been applied, are escalated on to the organisational ‘Key Risk Register’ and are reported to the Executive Leadership Team and Audit and Risk committee, at intervals dependent on their risk velocity. Risk velocity is the time to impact; it is an estimate of the time frame within which a risk may occur.

There are currently **0 risks** recorded on the Key Risk Register that relate to the Lakes activity. However, Council has highlighted the following as a key risk area across the Rotorua Lakes activity:

Extreme Natural Hazards Damage – (earthquake/volcanic/major storm event/over design event) causing damage to assets and or hindering development.

7.1 Rotorua Lakes Risk Assessment

For the Rotorua Lakes activity, risk is defined as the product of two factors: the **probability** (or likelihood) of an undesired incident occurring (such as asset failure); and the **consequences** if the event does occur. There are three steps to the Rotorua Lakes risk assessment process (Table 18), which are aligned to Council’s organisational risk management framework.

It is important to note that there is not a ‘one size fits all’ method to undertaking a risk assessment. It is more often that risks are to be assessed on a case-by-case basis and largely depends on the nature of the case to be assessed, the availability and reliability of information, and the financial and human resources. However, each risk assessment will be based on factual data, as far as available.

Table 18: Rotorua Lakes risk assessment process.

Step	Name	Key question		Outputs
1	Hazard identification	What might go wrong?		A list of all relevant potential accident scenarios with potential causes and consequences.
2	Risk analysis	How likely is the risk to occur? How severe would be the consequence?		Estimation of likelihood and consequences of the potential accident scenarios, ranking of these scenarios.
3	Risk control options	Can matters be improved?		Potential measures to reduce the likelihood of occurrence of the identified risks or limit their consequences should they occur.

1 Hazard identification

All practically possible hazards affecting the Rotorua Lakes activity and assets will be identified. Hazards are grouped into the following categories: health and safety, operational, organisational, environmental, **legislative**, financial. The identification of hazards will, where available, be based on available information such as environmental data, lake levels, remote monitoring, and other factors.

Hazards are identified for the Rotorua Lakes asset portfolio and activity through the following:

- Risk review workshops.
- Daily operations, routine visual inspections, and condition assessments.
- Public/staff notification.

Once identified, hazards are entered into the Rotorua Lakes risk register. Then, based on the identified hazards, a number of possible incidents or scenarios are identified by the Rotorua Lakes group. As the hazards identified may lead to several different undesired incidents or scenarios, each hazard is carefully considered, and the possible scenarios it may cause are identified and recorded during risk review workshops and other hazard identification exercises.

2 Risk analysis

For each risk, the likelihood of occurrence (Table 19), the consequence rating (Table 20), risk score (Table 21) and risk level (Table 22) are assessed and entered into the risk register.

There are five levels for both probability and consequence that each type of undesired incident or scenario would create. Each is allocated a score from which a risk value is calculated from the product of probability and impact. This initial assessment is based on the “gross” risk, that is, the risk without any effective measures in place. These scores will be based on as much evidence as possible but will be assessed on a case-by-case basis and be dependent on available information.

In determining likelihood of occurrence there are a range of possible methods, depending on the situation, location, service, asset age, material, etc. For example, for some asset-related risks, asset physical condition can be used as proxy for risk likelihood.

Where a quantitative assessment of the likelihood or consequence of failure cannot take place, scores will be assigned by the Rotorua Lakes group during risk review workshops and will be based all information available, such as similar events, historical events, and sound knowledge. This may initiate processes of collecting data that will inform a quantitative assessment.

Table 19: Likelihood of occurrence scoring system.

Likelihood	Likelihood description	Scoring	Condition	Probability %
Frequent	Will almost certainly occur, and at least once in a month.	5	Very Poor	91-100
Often	Will probably occur 6–12 times per year.	4	Poor	71-90
Likely	1–5 times per year; likely to occur as least once in the next two–three months.	3	Average	51-70
Possible	May occur at least once in the next year. Little chance of occurrence in foreseeable future.	2	Good	21-50
Rare	Not expected to occur this year but may occur in a future period - unlikely in the foreseeable future.	1	Very Good	1-20

Table 20: Risk consequence scoring system.

Rating Level	Consequence description	Score
Catastrophic	<ul style="list-style-type: none"> • Catastrophic loss of public or stakeholder confidence, or breakdown in standards, which requires major recovery action to restore reputation or effectiveness. • Significant negative economic, social or cultural impact on a large proportion of the Bay of Plenty community. • Clearly threatens operations or ability of organisation to achieve its objectives. • Major unexpected financial overspend or loss. • Loss of life. • Prolonged national media and political attention. 	5
Major	<ul style="list-style-type: none"> • Major unexpected financial overspend or loss. • Significant dissatisfaction expressed by stakeholders. • Moderate negative economic, social or cultural impact on a large proportion of the Bay of Plenty community. • Serious harm. • National media attention. • Unexpected failure to meet a standard. 	4
Moderate	<ul style="list-style-type: none"> • Failure leading to review of project or operation that will require changes to processes or goals. • Likely to cause some damage or, disruption or breach of controls. • Significant negative economic, social or cultural impact on a small proportion of the Bay of Plenty community. • Moderate financial overspend or loss. • Regional media attention, loss of image. • Injury to staff or contractor. 	3

Minor	<ul style="list-style-type: none"> Localised or isolated failure to meet stakeholder requirements or standards. Moderate negative economic, social or cultural impact on a small proportion of the Bay of Plenty community. Unlikely to cause damage or threaten the effectiveness of the project. Minor financial impact, involves management time. 	2
Insignificant	<ul style="list-style-type: none"> Very low impact that will not be visible, negligible. Minor negative economic, social or cultural impact on the Bay of Plenty community. 	1

A risk score is then determined by multiplying the likelihood and consequence scores (Table 21). Having then established the risk score applicable to individual risks, the risks are grouped into comparative levels of risk (Table 22). Four risk categories have been used: Extreme, Significant, Moderate, and Low.

Table 21: Risk matrix.

Likelihood	Consequence				
	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Frequent (5)	5	10	15	20	25
Often (4)	4	8	12	16	20
Likely (3)	3	6	9	12	15
Possible (2)	2	4	6	8	10
Rare (1)	1	2	3	4	5

Table 22: Comparative levels of risk.

Risk score	Level of risk	Action required	Attention of/Assigned to
15-25	Extreme risk	Requires immediate assessment of actions.	ELT/Council (as required), Statutory Bodies.
8-12	Significant risk	Requires remedial assessment and action via the annual planning process.	GM, Programme Sponsor, Programme Steering Group.
4-6	Moderate risk	Address via new procedures and/or modify existing practices and training.	Programme Manager, Workstream Leaders.
1-3	Low risk	No formal requirement for further action, unless escalation of risk is possible.	Workstream Leads, Project Mangers.

Once the initial (gross) risk score has been determined, it is then possible to investigate the current systems and processes to identify the residual risk. The residual risk is the actual risk that exists considering the effective measures currently in place. The measures in place reduce either/both the likelihood and consequence of risk occurrence, therefore risk scores need to be revised and recalculated using the same risk matrix above to obtain the residual risk score, and then confirm whether any further action is required.

1 Risk control options

The objective of this phase of the risk assessment is to identify risk mitigation options for each undesired incident that would reduce the risk to an acceptable level if implemented. For risks that are deemed unacceptable, or where further risk reduction can be achieved with little cost, risk control options are considered by the Rotorua Lakes Operations Team.

Due to the nature of this process, the outcome is initially qualitative or subjective, but the aim is to reach a consensus on each risk control option so that preferred options can be investigated further and scoped more fully so the necessary evidence can be put forward to decision makers for approval and funding.

7.2 Risk Action Plan

The Risk Action Plan is compiled from the Risk Register and features the highest residual risks faced by the Rotorua Lakes activity. There is **one risk** that remains as a 'high' residual risk and requires further actions. The actions listed will be reported, monitored, and reviewed regularly at the OAMSG meetings. As necessary, this group will need to review timeframes, responsibilities, and proposed action(s), recommending adjustments where appropriate.

Table 23: Rotorua Lakes risk action plan.

Risk Ref.	Risk Descriptor	Risk Score	Action	Owner	Monitoring/ Reporting	Timeframe
07	Extreme Natural Hazards Damage – (earthquake/tsunami/ volcanic/major storm event/over design event) causing damage to assets and or hindering development.	8	<ul style="list-style-type: none"> ▪ Identify hazards in emergency documentation and ensure site users know the hazards and the mitigation measures. ▪ Leaseholders are communicated with so they are aware of what is needed and what they need to do. ▪ Staff training, awareness of roles ▪ Implementation of policies and Emergency Civil Defence Management Plan ▪ Emergency management training and exercises 	Lakes Operations Manager	On-going monitoring (Quarterly OAMSG meetings).	Quarterly

7.3 Critical Assets

The International Infrastructure Management Manual (IIMM) defines critical assets as “those assets that have a high consequence of failure, but not necessarily a high probability of failure”. Therefore, assessing consequence of failure is a key element in determining critical assets. The consequence criteria that qualifies a Rotorua Lakes asset as 'critical' is based on the failure or incident being assessed as 'Major' or 'Catastrophic' (Table 24), as per Council's risk management framework.

There are currently **0** critical assets associated with the Rotorua Lakes activity.

Table 24: Criticality ratings and descriptions.

Rating	Consequence description	Score
Catastrophic	<ul style="list-style-type: none"> • Catastrophic loss of public or stakeholder confidence, or breakdown in standards, which requires major recovery action to restore reputation or effectiveness. • Significant negative economic, social or cultural impact on a large proportion of the Bay of Plenty community. • Clearly threatens operations or ability of organisation to achieve its objectives. • Major unexpected financial overspend or loss. • Loss of life. • Prolonged national media and political attention. 	5
Major	<ul style="list-style-type: none"> • Major unexpected financial overspend or loss. • Significant dissatisfaction expressed by stakeholders. • Moderate negative economic, social or cultural impact on a large proportion of the Bay of Plenty community. • Serious harm. • National media attention. • Unexpected failure to meet a standard. 	4

7.4 Resilience

7.4.1 Business Continuity

Business continuity plans (BCP) encompass planning, preparedness, and response activities to ensure that Council's critical business functions will either continue to operate despite serious incidents or disasters or will be recovered to an operational state within a reasonably short period.

The Rotorua Lakes group maintain their own BCP that accounts for the management of Rotorua Lakes assets in Civil Defence emergency situations. The BCP was last reviewed 3 February 2022. The BCP states priority levels for various activities undertaken by the Rotorua Lakes operations, which are outlined below (Table 25) and described further on the next page.

Table 25: Priority actions in the Rotorua Lakes business continuity plan.

Essential Activity	Task Description	Priority (1-5)	Timeframe
Lake level control	Lake levels are controlled to safeguard human life and property against high water levels. This includes inspection of Lake Rotomahana outlet should a seismic event occur during the response phase.	1	24-hour response
Alum dosing	Alum dosing plant operation is maintained to prevent algal blooms in Lake Rotorua and Lake Rotoehu.	4	Up to 4 weeks

Essential Activity – Lake level control

It is essential that lake levels are controlled to safeguard human life and property against high water levels.

Operational resilience has been catered for on Lake Ōkāreka by modelling potential lake levels because of climate change through to 2090, obtaining long term consent to enable the outlet flows to be managed, and upgrading the outlet pipeline and stream erosion protection.

The outlet levels on Lakes Rerewhakaaitu and Rotomahana are managed more passively where Council undertakes regular inspections of the lake level and outlets to ensure during potential high lake levels the outflows are not obstructed and avoid any potential erosion failure. This includes inspection should a seismic event occur.

Essential Activity – Alum dosing

It is also essential that alum dosing plant operation is maintained to prevent algal blooms in Lakes Rotorua and Rotoehu.

Alum dosing plants can be affected by faults at time. For safety reasons they are programmed to shut down automatically and alarm the operator who can programme an inspection and fault response. These assets are not hour critical and if they are inspected, and any faults resolved within two or three days, then the impact of a short-term shutdown will not be reflected in water quality decline.

Bulk alum is delivered by IXOM, and they have direct access to our storage data so that they can programme deliveries in advance of tanks getting to critical low points.

7.4.2 Emergency Management

The Bay of Plenty has a wide range of hazards, including flooding, earthquakes, volcanic eruption, fire, and a range of technological hazards. These hazards can cause disruption and death in communities, and we need to be ready to meet the challenges that hazard events create.

The main events that can impact the Lake Operations projects are climate events that bring either additional rainfall or periods of dry weather. Lake Operations are responsible for managing lake levels on Lake Ōkāreka and for managing the outlet levels on Lakes Rerewhakaaitu and Rotomahana.

Rerewhakaaitu water level management requires Lake Operations staff to undertake regular programmed inspections of the lake outlet and channel down to Lake Tarawera. This is to ensure that there is no apparent failure of the outlet or natural channel.

Operations staff are aware of the requirement to pass any critical information on to the Regional Council Engineer if any problem is identified. A full management plan on the details of inspection and reporting process is available.

During high rainfall events operations staff will be called upon to ensure Lake Ōkāreka is managed in advance of reaching critical levels to protect property surrounding the lake. A management plan is available for guidance, and outlet structures have been recently upgraded to ensure 1:100 year event is catered for.

Part 8: Financial planning

To undertake a sustainable, long-term approach to asset management, it is essential to prepare long-term financial forecasts. This allows a long term view of how the asset will be managed, how much this will cost and when additional funding may be required to meet expected service levels. These financial forecasts are a culmination of the previously discussed aspects of the AMP such as:

- Asset condition and performance
- Levels of service
- Demand management
- Lifecycle management
- Risk management
- Asset valuation

This section contains the financial requirements resulting from all the information presented in the previous sections of this AMP. This includes the lifecycle management strategies and work programmes for the operation, maintenance, renewal and new capital works required to deliver the agreed levels of service and projected future demand on the Rotorua Lakes activity and asset portfolio, whilst also managing any unacceptable risks. Financial policies and strategies are presented alongside financial forecasts, accompanied by key assumptions and data confidence.

8.1 Financial forecasts

The Rotorua Lakes financial estimates 2024-2034 (uninflated) are provided below, which incorporates the projected income and funding sources to fund operational and capital expenditure for the next 10 years. This includes both operations and maintenance funding as well as capital funding. The funding strategy for the Rotorua Lakes activity is discussed in 8.2.

The financial projections will be improved as further information becomes available on asset data, desired levels of service, future demand, and risk management. Refer to 8.4 for key assumptions and data confidence related to the financial forecasts.

Draft Long Term Plan 2024-2034

Activity: Rotorua Lakes

Run: 07-Jun-2024 - Long Term Plan Ledger: 25PJL.10

Version: 10

UNINFLATED	2024/25 \$000	2025/26 \$000	2026/27 \$000	2027/28 \$000	2028/29 \$000	2029/30 \$000	2030/31 \$000	2031/32 \$000	2032/33 \$000	2033/34 \$000
Operating revenue										
Targeted rates	4,320	6,776	1,414	-	-	-	-	-	-	-
General funding	4,310	3,353	7,421	8,779	8,856	8,914	8,040	8,107	8,230	8,207
Operating grants and subsidies	800	800	800	1,750	1,750	1,750	1,750	2,289	-	-
Fees and charges	-	-	-	-	-	-	-	-	-	-
Other revenue	32	29	21	19	20	21	21	22	22	23
Total operating revenue	9,462	10,958	9,657	10,549	10,626	10,685	9,811	10,417	8,252	8,230
Operating expenditure										
Catchment General	1,606	1,606	1,605	1,605	1,604	1,604	1,602	1,601	1,601	1,599
Rotorua Lakes Sustainable Water	6,562	7,933	6,569	8,387	8,392	8,172	7,764	8,831	4,307	4,241
Sub total expenditure	8,168	9,539	8,175	9,992	9,996	9,776	9,366	10,432	5,908	5,840
Overhead and corporate charges										
Corporate Costs	1,495	1,530	1,568	1,539	1,537	1,545	1,516	1,519	1,524	1,509
Total expenditure	9,664	11,069	9,742	11,531	11,534	11,321	10,882	11,951	7,432	7,349
Net deficit (surplus) to fund	202	111	85	982	908	636	1,071	1,534	(820)	(881)
Funding required										
(Increase) / decrease in reserves	202	111	85	982	908	636	1,071	1,534	(820)	(881)
Total operating funding	202	111	85	982	908	636	1,071	1,534	(820)	(881)
Capital										
Rotorua Lakes Sustainable Water	2,000	2,051	2,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total capital expenditure	2,000	2,051	2,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Capital funding										
Grants, subsidies and insurance revenue	1,000	1,000	1,000	-	-	-	-	-	-	-
Increase in debt	1,000	1,051	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total capital funding applied	2,000	2,051	2,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

8.2 Funding Strategy

Section 101(1) of the Local Government Act requires us to manage our revenue, expenses, assets, liabilities, investments and general financial dealings prudently, and in a manner that promotes the current and future interests of the community. Council must determine the appropriate sources of funding that will meet the funding needs of each activity.

The Revenue and Financing Policy describes how Council will use revenue and financing sources to fund its activities. Council has assessed the sources of revenue and finance for each activity using specific criteria. The legislative assessment of funding considerations for operating and capital expenditure for the Rotorua Lakes activity, taken from Council's Funding Needs Analysis⁴, is summarised below.

This activity provides a mix of national, regional, local and individual benefits. National and regional benefits arise where a nationally significant water body is protected or restored. Local and individual benefits arise for those who live near or adjacent to lakes protected or restored. The activity also provides benefits to individual landowners, Māori, rural industry sectors and communities across the region. The wider community and future generations will get enhanced economic, environmental, social and cultural value from these improvements. Since the activity benefits a range of sectors, a combination of sources is required to fund the costs of services provided by the activity.

The Lakes Programme is financed by Deed and Non-Deed funding. Deed-funded lakes are those out of the twelve lakes that have been identified as the most in need of action (Rotorua, Rotoehu, Rotoiti, and Ōkāreka) and has Crown funding towards improving their water quality.

Deed funded lakes

Operational expenditure funding for the Rotorua Lakes activity for deed-funded lakes is currently sourced from the following:

- 25% from general funds,
- 25% from targeted rates, and
- 50% from Central Government (through the Ministry for the Environment).

Capital expenditure funding for the Rotorua Lakes activity for deed-funded lakes is currently sourced from the following:

- 50% from Central Government (through the Ministry for the Environment), and
- 50% from existing reserves.

Non-Deed funded lakes

Operational expenditure funding for the Rotorua Lakes activity for non-deed funded lakes is currently sourced from the following:

- 50% from general funds, and
- 50% from targeted rates (from the Rotorua District differentiated by land area).

Capital expenditure funding for the Rotorua Lakes activity for deed-funded lakes is currently sourced from the following:

- 100% from existing reserves.

Council is currently considering the funding mix for the Rotorua Catchments activity as part of its long-term plan process, with a proposal that a greater portion of the activity is General Rate funded. The funding mix will recognise the benefit of the Lakes activity to those in the Rotorua district (local and individual) and those outside (regional and national). Benefits accrue to the regional community from sustainable land use. At the same time, it also recognises that, while those within the district contribute more to the need for the activity, some of the adverse effects have been caused over many years in the past, or by geothermal influences.

⁴ <https://atlas.boprc.govt.nz/api/v1/edms/document/A3286606/content>

8.3 Asset valuation

Statutory financial reporting requires the Bay of Plenty Regional Council (Council) to revalue its fixed assets at least every five years. Council undertakes to value the Rotorua Lakes assets covered by this AMP every three years. An asset valuation is to be used for asset management (calculating long-term asset renewal projections, where projects are on-going), identifying loss of service potential (depreciation), and for financial reporting purposes.

New Zealand International Financial Reporting Standard (NZIAS16) applies to all Rotorua Lakes assets considered in the scope of this valuation for the general purpose of financial reports.

All infrastructure assets valued have been done so in accordance with the methodology prescribed in the New Zealand Infrastructure Asset Valuation and Depreciation Guidelines 2006.

The last valuation was undertaken for Bay of Plenty Regional Council on 30 June 2024, and builds on valuations undertaken previously.

8.3.1 Process and method

Public Benefit Entity and International Public Sector Accounting Standard 17, Property, Plant and Equipment (PBE IPSAS 17) requires the valuation of property, plant and equipment to be of the 'fair value' of the asset. Fair value is defined as: "the amount for which an asset could be exchanged between knowledgeable, willing parties in an arm's length transaction". Further clarifications on 'fair value' can be found within the Valuation report⁵. If the assets are not specialised, they are to be valued using market-based evidence and methodology, and if they are specialised they are to be valued using the cost approach.

Specialised assets are those that due to some specialised physical or geographical factor, offer very little utility for any other purpose other than that for which they were originally designed. In determining whether assets are specialised, the Valuers considered several factors:

- The availability of market-based evidence that enables the value of the asset to be reliably determined,
- Evidence that there is/would be demand for the asset in its current use in the absence of Council's operations,
- The materiality of the particular asset in the context of the overall assets', and
- The use, configuration and floor layout of owned buildings.

In applying this methodology to the Rotorua Lakes asset portfolio, the Valuers informed that the majority of the assets are specialised, and therefore valued the assets by the optimised depreciated replacement cost (ODRC) method, utilising the straight line method of depreciation.

The valuation approach established the optimised replacement cost (ORC) of each asset component based on a 'modern equivalent asset' (MEA). The MEA cost was determined by analysing the actual replacement cost of the component or similar asset (with inflation adjustments where applicable). Replacement costs include research, design, consents, fees, installation and commissioning.

In order to assess the life of each component, information has been derived from consultation with suppliers and supplemented by physical inspections. Adjustments to the lives of some components has occurred since the previous valuation (2018) due to changes in quality, utilisation, physical life, economic life, obsolescence and legislative/environmental factors.

The remaining useful life (RUL) of each component has been determined by considering utilisation, refurbishments and condition. The RUL of each component is conditional on it being regularly maintained in accordance with manufacturers specifications and/or industry standards.

Depreciation was then applied to each asset based on the age and life of the asset and adjusted for refurbishments and any detrimental factors. All assets were depreciated using the straight line method of depreciation.

The ODRC for each component was determined by deducting the asset depreciation from the ORC. This also provided the annual depreciation for each component.

8.4 Assumptions

This Rotorua Lakes AMP has been prepared based on the following assumptions:

- Currently available information,
- Condition assessments completed to date,
- Existing levels of service,
- Financial forecasts completed for ten years.

8.5 Financial assumptions

The following assumptions have been made in preparing the 10-year expenditure forecasts:

- Asset information is as complete as possible at 30 June 2024. This is based on the valuation data and report compiled by the Lake Operations Team.
- Only lake operations assets have been valued.
- The determination of asset replacement value, depreciated value, and renewal projections are based on the valuation and condition assessment data as at 30 June 2024.
- All projected expenditure is stated in dollar values as at 30 June 2024, with no allowance made for inflation.
- Operational costs are based on historical expenditure, asset maintenance requirements and assessed costs.
- Maintenance and operations allocations are largely based on maintaining current service levels.
- The depreciation has been calculated on a straight-line basis.
- Council staff have developed the AMP. Formal consultation was undertaken during the LTP process.
- It is assumed that regulations relating to lake operations will remain essentially the same over the planning period (i.e. 10 years to June 2034).

The expenditure and valuation projections in this AMP are based on best available data. Currency and accuracy of data is critical to effective asset and financial management. The estimated confidence levels and reliability of data used in this section is shown below in Table 26: Data Confidence Grading System., and were scored using the same confidence grading system used throughout the AMP (Table 26).

Table 26: Data Confidence Grading System.

Grade	Description
Highly reliable	Data based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment. Dataset is complete and estimated to be accurate $\pm 2\%$
Reliable	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate $\pm 10\%$
Uncertain	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated $\pm 25\%$

Grade	Description
Very Uncertain	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete and most data is estimated or extrapolated. Accuracy \pm 40%
Unknown	None or very little data held.

Part 9: Audit and improvement

Audit and improvement planning are important asset management (AM) practices that assist Council to develop and implement continuous improvement programmes. Improvements to AM practices can occur for several reasons, including innovation and technology, changes in governance and regulation, and meeting customer expectations.

Asset Management Steering Group (AMSG)

The AMSG, formed in 2010 and reinstated in 2019, establishes a culture of AM throughout the organisation and allows better communication, consistency and sharing of AM initiatives across the activity portfolios. With a group mission statement of: “Delivering efficient and effective infrastructure asset management practices for our communities”, the primary function of the group is to oversee the implementation and three yearly reviews of Council’s suite of asset management documents (AM Policy, SAMP, Infrastructure Strategy, and Activity AMPs). The AMSG enables the sharing of knowledge and best practice to ensure we manage our assets effectively and efficiently.

9.1 Our approach

Council is committed to applying and improving sound AM practices in alignment with industry best practice. The intention is to improve AM practices and processes towards an appropriate future state. This involves continually reviewing and identifying improvements in AM practices and processes. The approach Council takes towards audit and improvement is outlined in the Strategic Asset Management Plan (SAMP). The SAMP has adopted a continuous improvement cycle (Figure 8) where current AM performance is assessed, a desired future state is determined, and improvements are identified to close the gaps between current and target performance.

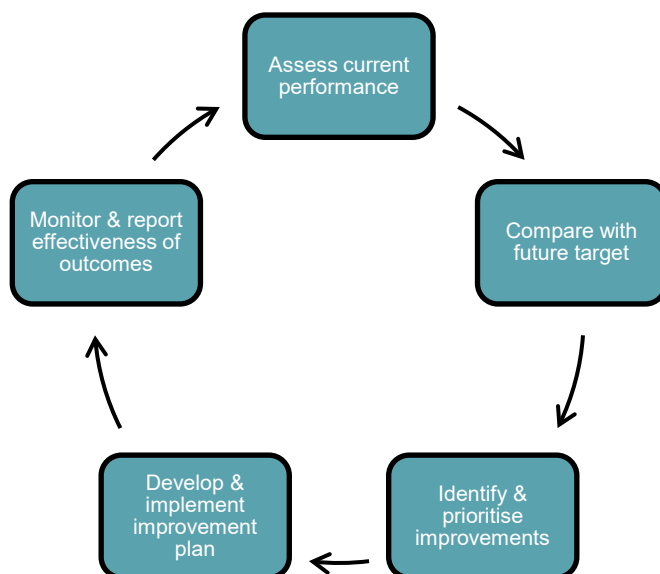


Figure 8: Council's continuous improvement lifecycle.

One of the Lake Operations approaches is to maintain all authorisations for its core activity in one place. Each authorisation is supported by operational management plans that show how statutory conditions will be achieved and monitored as well as addressing other non-statutory requirements necessary to ensure appropriate management of each asset and maintain necessary data for decision-making and operations. These are recorded in Appendix 2.

Internal processes such as documented reviews, self-assessments, communication with Council, and liaison with the AMSG are further methods for ensuring transparency and accuracy. In addition to the past audits outlined below, the Rotorua Lakes group undertakes informal continuous improvement audits of management processes on an ad-hoc basis.

9.2 Past audits

External Audit of Rotorua Lakes AM Maturity (2011)

In 2011, Babbage Consultants Ltd undertook an activity gap analysis of AM practices for the Rotorua Lakes group. The review employed the Asset Management Capability Assessment Framework (AMCAF). At that time, the review deemed the Rotorua Lakes activity to be in the “Aware” stage of AM practice and delivery. This stage is defined as “is actively starting to change and has basic systems in place to manage critical assets but is formulating an overall strategy”.

Following this gap analysis, a significant number of improvements were identified to advance AM practices within the Rotorua Lakes activity. The improvements were compiled into a comprehensive, electronic improvement plan (MS Excel format), with customisable fields such as ‘Project Owner’, ‘Estimated Cost’, ‘Estimated Time’, ‘Priority’, etc. It was noted at the time that the Rotorua Lakes group did not have the capacity in AM to implement most of the AM improvement and that current resourcing issues will need to be addressed.

External Audit of Rotorua Lakes AMP (2022)

A high-level review of Council’s 2021 Rotorua Lakes AMP was undertaken by in 2022, which assessed the maturity of Council’s AMP against international best practice guidance. An AM maturity tool, originally developed for NZ Treasury in 2011, was used for this AMP review. The tool was modified and tailored towards assessing the maturity of AMPs.

In general, the review found positive areas within the 2021 AMP, particularly around the activity and asset portfolio summaries, but noted there were several areas for improvement. The Rotorua Lakes AMP was deemed to be at the ‘Basic’ maturity level. Strengths and opportunities were identified against each section of the AMP. Thirteen improvement items were established to advance the AMP to meet the ‘Core’ level of maturity, as stipulated within Council’s 2021 SAMP. Following a workshop, the Lakes group decided to revise and simplify over half of the improvement items, leaving the remaining improvements as proposed. These were mostly progressed in 2023 as part of this latest AMP update, with any remaining items forming part of the current improvement plan.

9.3 Improvement Plan

The purpose of this improvement plan is to document the key improvement items and actions that Lakes Operations can undertake to maintain and improve the AM practices that assist in optimising service provision to our communities and stakeholders.

In collaboration with Council’s Asset Management Specialist (Hemi Barsdell), the previous improvement plan (2011) was reviewed to confirm what items had been progressed, which were to be carried over, and which were to be removed. There are thirteen improvement items in total, each assigned an owner, a timeframe for completion, and an estimated time for completion (Table 27). We intend to progress all of the improvements over the next three years.

Ongoing implementation of each improvement item and any associated improvement project(s) will be the responsibility of the identified Project Manager (owner). The overall improvement plan will be monitored by the Lakes Operations Manager on an ongoing basis. Monitoring the improvement plan ensures that performance and progress, as well as the effectiveness of the outcomes, are tracked and reported at specific periods throughout the year.

The improvement plan will be formally reviewed annually ahead of Council’s Annual Plan submission, and comprehensively reviewed at three-yearly intervals, aligning with Council’s LTP planning schedule.

The improvement plan will be updated, and changes recorded, to reflect:

- Progress made on each improvement item,
- New information that is made available,
- Additional improvement items identified throughout the year.

Improvement plan performance and progress will be reported to the OAMSG at the end of each quarter. This will include any risks relating to delivering improvement items. The OAMSG oversees progress of the improvement plan, and ensures the necessary resources are allocated to the improvement items.

Table 27: Rotorua Lakes AM Improvement Plan.

AM Element	Current Practice and Planned Improvements		Score	Goal	Gap	Status	Timeframe	Hours	Owner		
	Current Practice	Planned Improvement									
Corporate Strategy & Governance											
1	Asset Management Plan	Improve the quality of the 2021 Lakes Risk Plan and Improvement Plan	1	Develop Risk and Improvement Plans to 'core' level for implementation into the 2024 Lakes AMP.	20	50	30	Progressing	2022 Q4	40	Hemi Barsdell & Andy Bruere
2	Maintenance Plan	There is some maintenance planning in place in the individual asset maintenance plans, but these need to be completed and some additional maintenance plans completed.	1	Next AMP will include appropriate reference to maintenance plans for each asset.	30	50	20	Progressing	2024 Q1	20	Andy Bruere
3	Resourcing Plan	Annual review of labour hours and ensure that contracts reflect that. Currently resources are fine.	1	Agree the required budget and human resources required to appropriately manage the asset portfolio through the LTP and annual planning processes.	70	80	10	Progressing	Annually	20	Helen Creagh / Andy Bruere
Data and Information Management Processes											
4	Asset Register	Asset register is contained in a spreadsheet.	1	Complete audit of asset register and work towards integration with GIS system and Tech 1.	30	50	20	Progressing	2027	200	Stacey Brooks, Andy Bruere's replacement
5	Asset Condition Data	Asset condition surveying has been completed.	1	Establish a cyclical condition assessment programme, including recording of information and document the process.	45	60	15	Progressing	2027	60	Andy Bruere
			2	Develop a process for entering condition data into Tech 1.	45	60	15	Progressing	2027	100	Stacey Brooks, Andy Bruere
6	Financial system	Finance system does not currently link with asset id's or register	1	Use Tech 1 to link invoices to asset id's to record expenditure against assets.	5	50	45	Progressing	2027	80	Management Accountant, Andy Bruere, Stacey Brooks
7	Critical assets	Critical assets are not currently designated in the AMP	1	Identify critical assets and explain management approach in the AMP	5	50	45	Progressing	2024 Q1	40	Andy Bruere, Hemi Barsdell
Systems and Processes											
8	Geographical Information Systems	Assets are not spatially defined currently.	1	Spatially define assets and link the GIS system to the Tech 1 module.	35	100	65	Progressing	2027	60	GIS Team, Stacey Brooks, Andy Bruere
9	Maintenance Management System	Included in Tech 1 module. Needs further development.	1	Undertake training to understand the maintenance management capability of the Enterprise Asset Management module.	10	30	20	Progressing	2024 Q1	40	Andy Bruere, Stacey Brooks
10	Maintenance Management System	Included in Tech 1 module. Needs further development.	2	Develop maintenance plans in the Enterprise Asset Management module of Tech1 once this is set up appropriately.	0	40	40	Progressing	2024 Q2	20	Management Accountant, Andy Bruere, Stacey Brooks.
Asset Management Planning											
11	Improvement Planning	An improvement plan has been developed with the draft AMP.	1	Quarterly monthly reporting to BOPRC Asset Management Steering Group.	70	95	25	Progressing	2022 Q3	25	Andy Bruere
12	Renewal Profiles	Develop renewal profiles for the Lakes programme	1	To provide an indication of future potential asset renewals requirements.	50	90	40	Progressing	2024 Q1	50	Andy Bruere

Appendix 1:

Action plans completed pursuant to Natural Resource Plan

Lake Ōkāreka Catchment Management Action Plan 2004

Lake Ōkaro Action Plan 2006

Lake Rotoehu Action Plan 2007

Lake Rotomā Action Plan 2009

Draft Lake Rotorua and Rotoiti Action Plan 2009

Lake Tikitapu Action Plan 2011

Lake Ōkātina Action Plan 2013

Rerewhakaaitu Catchment Plan 2013 (Completed by Rerewhakaaitu Farmers)

Tarawera Lakes Restoration Plan 2015

Appendix 2: Structure management plans/resource consents

Each document listed is linked electronically to a BOPRC file showing the location of each document.

Structure	Resource consent link
Ōhau wall	Resource Consent RM16-0527 Structural Management Plan Ōhau Channel Diversion Wall Structural Maintenance Requirements
Alum dosing Plants	Resource consent Utuhina 65321 Operations and Maintenance Manual Utuhina Resource Consent Puarenga 65559 Operations and Maintenance Manual Puarenga Resource Consent Rotoehu 65966 Operations and Maintenance Manual Rotoehu
Trout Barrier	Resource Consent 67041
Ōkaro wetland Structures	Resource Consent 62891
Rotomahana Outlet	Resource Consent 20105 Lake Rotomahana Dam Monitoring Procedure
Rerewhakaaitu Outlet	Lake Rerewhakaaitu Outlet Inspection and Maintenance Regime

Appendix 3: Rotorua Lakes Asset Portfolio summary

The below is a listing of our Lake Assets in summary including the book value as at 30 June 2021.

Asset Number	Description	Description	Location	Book value
LAK102528	Ōhau Channel Diversion	Sheet pile wall	Lake Rotoiti at Ōhau Channel	\$11,063,040
LAK102529	Utuhina Phos Lock PI	Dosing and alum store	Depot Street, Rotorua	\$421,750
LAK102530	Puarenga Phos Lock	Dosing and alum store	Te Ngae Road, at the Rotorua STP	\$270,440
LAK102531	Rotoehu Phos Locking Plant	Waitangi/Soda Springs Phosphorus Locking	Waitangi/Soda Springs Phosphorus Locking Plant	\$430,030
LAK102537	Fish Pass, Hamurana	Dam type structure on Tributary of the Hamurana Stream	Hamurana Road	\$25,480
LAK102542	Ōkaro Wetland Structures	Monitoring location at stream flowing into Lake Ōkaro monitoring weirs and intake pipe	Ōkaro Road	\$140,970
LAK104732	Outlet Structure	Lake Ōkāreka Outlet Structure	Lake Ōkāreka Outlet Structure	\$2,089,070
	Waitangi Stream, Ōkāreka stream works	Spencer Road Lake Tarawera.	Stream protection works	\$1,290,590
	Rotomahana outlet control	Culvert and head wall for placement of stoplogs	At outlet between Lakes Rotomahana and Tarawera	\$208,640
	Lake Rotomā outlet structure	Outlet sump, pipeline and channel	Manawahe Road	\$58,800
	Rerewhakaaitu outlet control	Drain and stoplogs at Lake outlet channel	Ashpit Road, Rerewhakaaitu	\$66,630
	Total			\$16,065,440

Appendix 4:

LGA 2002 Schedule 10 Requirements

LGA 2002 Schedule 10 Requirement	LGA 2002 reference	AMP Section
Identify the rationale for delivery of the group of activities (including the community outcomes to which the group of activities primarily contributes).	LGA 2002 Schedule 10 – 2(1)(b)	3.1.1
Outline any significant negative effects that any activity within the group of activities may have on the social, economic, environmental, or cultural well-being of the local community.	LGA 2002 Schedule 10 – 2(1)(c)	0
A statement of the intended levels of service provision that specifies any performance measures specified in a rule made under Section 261B of the Act.	LGA 2002 Schedule 10 – 4(a)	4.3
The performance measures that the local authority considers will enable the public to assess the level of service for major aspects of groups of activities.	LGA 2002 Schedule 10 – 4(b)	
The performance target or targets set by the local authority for each performance measure.	LGA 2002 Schedule 10 – 4(c)	
A funding impact statement in relation to each group of activities of the local authority.	LGA 2002 Schedule 10 – 5	8.2
A statement of the authority's revenue and financing policy.	LGA 2002 Schedule 10 – 10	8.2
The amount of capital expenditure that the authority has budgeted to meet additional demand for an activity.	LGA 2002 Schedule 10 – 24(2)(a)	8.1
The amount of capital expenditure that the authority has budgeted to improve levels of service.	LGA 2002 Schedule 10 – 24(2)(b)	
The amount of capital expenditure that the authority has budgeted to replace existing assets.	LGA 2002 Schedule 10 – 24(2)(c)	

