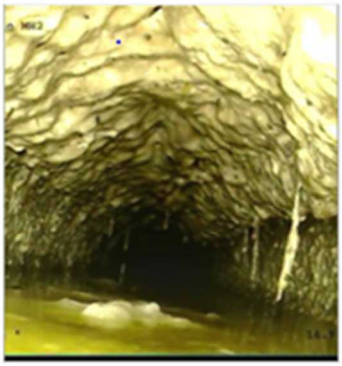
ASSET MANAGEMENT PLAN

WASTEWATER

2024






GREAT LAKE TAUPŌ
Taupō District Council

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GREAT LAKE TAUPŌ
Taupō District Council

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WASTEWATER ASSET MANAGEMENT PLAN

EXECUTIVE SUMMARY

Introduction

A Wastewater Asset Management Plan serves as a strategic document that outlines how a Council manages, operates, maintains, and plans for the improvement or replacement of its wastewater infrastructure assets. The primary purpose of this plan is to ensure the effective management of wastewater assets to provide the infrastructure to enable growth, meet regulatory requirements, and met the levels of service expected by the community.

The function of a municipal wastewater system is to protect public health though, collection and conveyance, treatment, and through the safe disposal of wastewater that is generated by homes, businesses, and industries. Appropriate treatment and disposal of treated wastewater also play a significant role in protection of receiving environments, particularly our lakes and waterways.

This Asset Management Plan provides information on:

Asset Data	A high-level inventory of all wastewater assets, including pipes, treatment facilities, pumps, and other infrastructure.
Level of Service	Ensuring the reliability of wastewater services is a key objective. WAMPs help prevent disruptions in service due to asset failures by prioritizing maintenance and replacements.
Future Demand (Planning for Growth)	Understanding growth and planning to meet the demands of growth on infrastructure.
Risk Management	Identify potential risks and vulnerabilities associated with wastewater assets, such as aging infrastructure, environmental factors, and regulatory changes. By identifying risks, the plan can help prioritize maintenance and upgrades.
Lifecycle Management (Long-Term Planning)	An asset management plan helps establish a long-term plan for the maintenance, repair, replacement, or expansion of wastewater assets. It sets priorities based on asset condition, criticality, and available resources.
Financial Planning	It aids in financial planning by estimating the costs associated with asset maintenance, repair, and replacement over the planning period. This helps ensure that adequate funding is available to support the wastewater system.
Asset Management Practices	The systems Council uses to manage assets.
Regulatory Compliance	An asset management plan helps wastewater utilities comply with environmental regulations and standards. By planning for the maintenance and upgrades of assets as needed.

Wastewater Assets Data

Council's wastewater schemes include physical assets with a depreciated asset value of $170 million and a replacement value of $327 million (June 2023).

The table below provides the high-level data for each of the wastewater networks that Council operates as of June 2023.

Scheme	No. of Rateable Properties	Depreciated Value of Assets [June 2023]	Replacement Value of Assets [June 2023]
Acacia Bay	896	$ 6,847,000	$ 14,915,000
Atiamuri	36	$ 169,000	$ 848,000
Kinloch	1,416	$ 15,681,000	$ 26,160,000
Mangakino	865	$ 6,996,000	$ 12,583,000
Motuoapa	584	$ 4,584,000	$ 7,908,000
Motutere	1	$ 1,091,000	$ 2,109,000
Omori	1,224	$ 8,885,000	$ 18,072,000
Taupo	16,460	$ 108,101,000	$ 198,972,000
Turangi	2,829	$ 14,371,000	$ 39,350,000
Whakamaru	64	$ 595,000	$ 1,675,000
Whareroa	200	$ 2,224,000	$ 4,334,000
Grand Total	**24,575**	**$ 169,543,000**	**$ 326,926,000**

A Comment on the State of the Assets

Reticulation Age and Condition

The pipe network has a total of 510 km of wastewater mains and property laterals. The average age of the network is 32 years with the average life expectancy of the pipe assets is 80 years.

Turangi has an older network with an average pipe age of 50 years, however in 2020 completed a full CCTV condition inspection and overall, the network is in good condition.

We are increasing the amount of CCTV work we do across our other networks to improve our knowledge of our asset condition. Funding for this increase in CCTV is coming from within existing budgets and through reprioritising other programmes.

Inflow and Infiltration

Inflow and infiltration (I&I) are unwanted sources of surface water or stormwater that enter the sewer system. Inflow is water from rainfall and surface sources, while infiltration is groundwater seeping through pipe defects. Both can overload sewer systems, leading to issues like overflows and higher treatment costs and consent compliance problems. Managing and reducing I&I is essential for maintaining sewer system efficiency and we have started work on an I&I Management Plan to direct our efforts to reduce I&I.

The networks where high I&I is a significant problem is Turangi and specific parts of the Taupo network. Inflows appear to be the problem (surface water getting in) rather than due to a poor condition pipe network. I&I in these cases increases overflow risk and can mean additional capital is needed to build infrastructure to take peak flows. I&I can be difficult to remove but doing so will have positive impact on wastewater operations and defer or remove the need for some future capital expenditure. A dedicated budget for I&I investigation and reduction is recommended for the 2024 LTP.

Overflow Reduction Programme

In 2018 Council increased funding to better maintain the sewer network with the aim of reducing overflows from the sewer system. This programme remains in place and is having positive results.

Treatment Plants

Our wastewater treatments are maintained by our inhouse teams and renewal of individual assets occurs at end of life. Our treatment facilities are in generally good condition. Our treatment processes are continually upgraded to meet demands of growth and regulatory changes. New capital works related to treatment plants are listed in the sections below. There are specific items within within our treatment facilities that are in poor condition and require repair/renewal and we plan as needed.

Operational Technology / SCADA

Our Operational Technology (OT) systems including our Supervisory Control and Data Acquisition (SCADA) systems are in the process of being upgraded. These systems are critical assets and enable the remote monitoring and control necessary to monitor the performance of our reticulation networks and treatment facilities.

Future Demand

There are several other factors that influence demand for new wastewater assets such as:

- Growth in population and the number of houses,
- Climate change and increased rainfall,
- Increasing standards requiring a higher level of treatment,
- Usage efficiency, tourism/events, and leisure trends etc...

In 2006 the Council adopted Taupo District 2050 (TD2050), the Growth Management Strategy for the District and this document has been updated in 2018. The growth management strategy identifies where urban growth is anticipated so that land use and infrastructure planning can be aligned. Private plan changes can also occur and are incorporated into the District Plan.

Council uses a growth model to help plan when infrastructure investment is needed. A new growth model was developed in 2023, and a ‘medium’ growth scenario has been selected as the base data for use in the 2023 LTP.

Previous growth models have consistently underestimated the actual growth that has occurred. This created meant that provision of infrastructure services to manage this growth is lagging in some areas and catchup planned.

Reticulation Capacity Constraints

There are two main areas where the sewer network is at capacity and additional capacity is needed:

- The gravity trunk sewer main that services southern Taupo is at capacity and a project is underway to provide this additional capacity. The Southern Trunk Sewer project is scheduled for construction in 2024.
- Wastewater pipework over the Control Gates Bridge is near capacity at peak times. Previous plans assumed additional pipe capacity would be added to the bridge or a new pipe bridge constructed. There have been submissions against installing new pipelines over the river, and there is also high uncertainty over developments that could occur in vicinity of the current bridge; potentially a second road bridge or other energy company projects. A peak flow balance tank project is included to allow some growth to continue term while a longer-term solution is developed.

Treatment and Disposal

Wastewater treatment plant improvements are planned for Atiamuri (LoS and growth), Kinloch WWTP Stage 2 (growth), Taupo WWTP upgrades (LoS and growth), Mangakino WWTP upgrades (LoS and growth), Turangi (LoS and growth).

Levels of Service

A key objective of this Asset Management Plan is to match the level of service provided by the asset with the expectations of customers. This requires a good understanding of customers' needs, expectations and preferences.

Council has previously adopted the follow levels of service:

Level of service	How we measure performance
We comply with the resource consents conditions relating to our sewerage systems.	We measure the number of abatement notices, infringement notices, enforcement orders and convictions.
We will maintain the reduction in nitrogen discharged from wastewater treatment plants in the Lake Taupō catchment. Targeting a 20 per cent reduction from the benchmark 2005 period.	The total nitrogen discharged from wastewater treatment plants within the Lake Taupō catchment.
Our sewerage system is maintained to prevent sewerage overflows.	The number of dry weather sewerage overflows from Council's sewerage system that expressed per 1000 connections.
We respond to faults with our sewerage system promptly.	Median attendance time: from the time that Council receives notification of a sewerage overflow resulting from a blockage or other fault in Council's sewerage system to the time that service personnel reach the site of the overflow or other fault.
We resolve faults with our sewerage system promptly.	Median resolution time: from the time that Council receives notification of a sewerage overflow resulting from a blockage or other fault in Council's sewerage system, to the time that service personnel confirm resolution of the fault or blockage.
Our customers are satisfied with the sewerage network.	The number of complaints received by Council on: a) Sewerage odour, b) Sewerage system faults, c) Sewerage system blockages; and d) Council's response to issues with its sewerage system. This is expressed per 1000 connections to the sewage system.

<u>Challenges</u>

The systems we have for recording and managing the time to respond to and resolve faults is not adequate and we therefore cannot show we meet our performance standard (or otherwise). Improvement is needed in this area.

In the most recent annual plan, we also failed to achieve the nitrogen reduction targets. We have included projects in the LTP to help improve performance in this area.

We have some networks where growth is pushing our treatment plants near or occasionally beyond consent limits and upgrade works are planned to address this e.g. the land disposal system in Taupo are at capacity with regard to nitrogen loading and upgrades are required to increase nitrogen removal and maintain consent compliance.

Risk Management

Lifelines

TDC is a member of Waikato Lifelines Utilities Group. The Waikato Lifeline Utilities Group is made up of representatives from the Waikato region's territorial authorities and major energy, telecommunications, and transportation sector organisations. At the heart of this relationship is for each lifeline utility to be able to exchange relevant information around their risk management processes and the key elements of their readiness and response arrangements, to ensure they are able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency.

Critical Assets

We have done some work to identify critical wastewater assets in our network pipes, pump stations, tanks etc... but we need to do more work in this space. We need to improve our understanding of our critical assets and develop strategies to mitigate the risk to them. This work continues to be developed and data is being captured in the AMS.

Network Overflow Risk Reduction

In 2018 Council increased funding to better maintain the sewer network with the aim of reducing overflows from the sewer system. This programme remains in place and is having positive results.

Generator Fleet

We are undertaking a review of generator fleet to make sure our fleet is well matched to a potential emergency event that causes power outage.

Lifecycle Management

Life-cycle section describes how wastewater assets are managed throughout their lifecycle including design and construction of new assets, operations and maintenance of these assets, asset renewals at end of life and asset disposals.

New Works

In total approximately $60 million of new works planned over the 10-year plan.

Project (Yrs 1 – 10)	Value	When
Acacia Bay WAS Tank 2	350,000	2024 – 25
Acacia Bay WW Connection to Taupo (Acacia Bay WWTP retained)	2,500,000	2026 - 28
Atiamuri WWTP Upgrade	600,000	2025 - 26
Kinloch WW MBR upgrade - Second reactor	1,600,000	2025 – 27
Mangakino WWTP Upgrade	7,000,000	2026 – 28
Taupo North Wastewater solution	6,300,000	2028 – 31
Taupo WW Eastern trunk main capacity upgrade	2,200,000	2028 – 30
Taupo WW Control gates bridge buffer storage tanks	2,700,000	2024 – 27
Taupo WW Southern Trunk Sewer Main	14,340,000*	2022 – 24
Taupo WWTP Building Alteration	200,000	2024 – 25
Taupo WWTP Primary Settling Tank #3	3,500,000*	2023 - 25
Taupo WWTP Side Stream - Solids Filtrate Treatment	4,600,000	2024 - 26
Taupo WWTP Transfer pump station upgrade	900,000	2024 - 26
Turangi WW Disposal Solution	6,000,000	2026 - 29
Whareroa WWTP Irrigation expansion	300,000	2029 – 34

**Multi-year project includes budget from previous annual plan.*

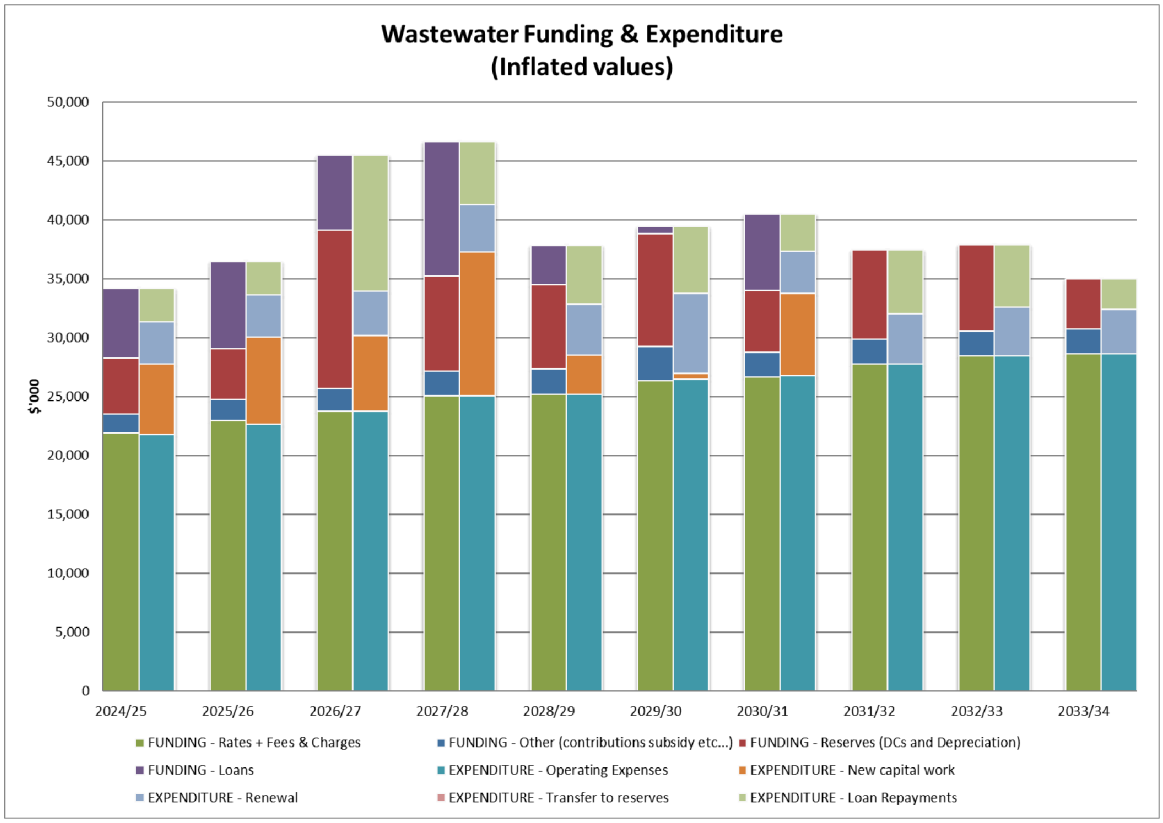
Renewals

In total approximately $34 million of new works planned over the 10-year plan across wastewater treatment plants and the reticulation network. Some the capital works projects also include minor renewals components.

Most of the sewer network is not near expected end of life so major expenditure is not planned in the near term. Improvement to wastewater pump station electrical and control system remains a work in progress and is a priority in the near term. Renewal of treatment plant equipment occurs as and when required to maintain effective treatment processes.

Financial Planning

Capital and renewals budgets have been prepared, along with the consequential opex associated with each of these projects. The operational budgets are also prepared, and the cart below shows the forecast expenditure and funding source over the next 10-years.



Asset Management Practices

Council utilizes asset management system (Asset Finda) to manage three waters assets. While reticulation networks are now fully managed within Asset Finda treatment plants and pump station are not yet fully loaded in Asset Finda. Not having this data in Asset Finda does limit the opportunity to connect maintenance expenditure to asset etc. This is an area for improvement.

Regulatory Compliance

Council holds resources consents from Waikato Regional Council for discharge of treated wastewater, biosolids and control odour. A summary of the recourse consents for wastewater discharge for each scheme and the expiry date is given below:

Scheme	Notes	Consent Expiry
Acacia Bay	Acacia Bay WWTP is near capacity, an additional sludge holding tank and instrument upgrade is planned that will improve consistency of performance but will not significantly increase capacity. Connection to Taupo is the longer-term plan.	2035
Atiamuri	A treatment plant upgrade will be required as part of new resource consent conditions and this is included in the capital works programme.	2024*

Kinloch	Major upgrade of the plant was completed in 2021 and a smaller project to provide additional capacity is required as Kinloch grows; to maintain consent compliance.	2039
Mangakino	This consenting has taken some time to complete but is now 99% complete and conditions have been agreed with iwi/hapu stake holder. We expect a new consent to be issued mid-2024.	2016*
Motuoapa	We have had some inconsistent treatment performance. An instrumentation upgrade is planned to help provide more consistent performance.	2033
Motutere	A minor upgrade has been completed in 2023 to provide capacity to connect the point community. Treatment facility is performing well.	2040
Omori	Oxidation pond effluent with irrigation to land, performing well.	2044
Taupo	The land disposal systems are near capacity from a nitrogen loading rate perspective. Nitrogen removal at the plant is being considered as a way of reducing this load.	Rakaunui Road; 2043 View Road; 2032
Turangi	Options for discharge to land and continued discharge to the wetland (with improvements) are being considered. As no land for irrigation is secured at this stage a project to enhance the current site with continued discharge is assumed. An instrumentation upgrade is planned to help provide more consistent performance.	2018*
Whakamaru	Treatment plant was upgraded in 2018 and performance is good.	2036
Whareroa	Oxidation pond effluent with irrigation to land, performing well.	2039

*Note that whilst these consents have expired, new applications have been lodged allowing for continued operation under the old consents while the new consents are determined.

Changes though Council and general LTP consultation process

[This section is a place holder and will be updated following LTP consultation periods]

2.0 INTRODUCTION

2.1 Background

2.1.1 PURPOSE OF THE PLAN

Taupo District Council is responsible for managing a range of community owned assets including the wastewater reticulation network, treatment plant and disposal systems. This Asset Management Plan (AMP) helps ensure that these assets are managed in an efficient way.

This AMP details how the wastewater infrastructure assets that are owned by the community will be managed in a conscientious manner to cost effectively meet the needs of the community.

The overall purpose of asset management planning is:

"To meet a required level of service in the most cost-effective way (through the creation, operation, maintenance, renewal and disposal of assets) to provide for existing and future customers".

This AMP is the tool for combining management, financial, engineering and technical practices to ensure that the level of service required by customers is provided at the lowest long-term cost to the community. The plan is intended to demonstrate that Council is managing the assets responsibly and that customers will be regularly consulted over the price/quality trade-offs resulting from alternative levels of service.

The main benefits derived from asset management planning are:

- Minimum lifecycle (long term) costs are identified for an agreed level of service.
- Better understanding and forecasting of asset related management options and costs.
- Managed risk of asset failure.
- Improved decision making based on costs and benefits of alternatives.
- Clear justification of forward works programmes and funding requirements.
- Improved accountability over the use of public resources.
- Improved customer satisfaction and organisational image.

A fundamental objective throughout the preparation (and future review) of this plan will be to identify potential opportunities for reductions in asset lifecycle costs.

The overall responsibility for wastewater supply asset management and the update of the Asset Management Plan at TDC, sits with the Asset Manager. The AM plans and implements the capital programme as well as renewals programmes across network assets.

Council Management and Elected Member involvement is through the review and approval of the AMP document, LTP and annual plan process. All AMPs are formally updated on a 3-yearly basis, which coincides with the LTP review cycle.

This Asset Management Plan has been updated internally by the Asset Manager Wastewater, building on the existing 2021 AMP document. Data has been collated and updated using the AMS and recent asset valuation data. Financial updates have been provided by TDCs finance team.

2.2 Legislative Requirements for Asset Management Planning

The recent focus on asset management planning, results from the Local Government Amendment Act 2002, November 2013 amendment and subsequent amendments.

This Act places an emphasis on strategic financial planning and requires local authorities to:

a. Prepare and adopt a LTP with a 10-year planning horizon every three years, taking into account asset creation, realisation, and loss of asset service potential.

b. In determining their long-term financial strategy, consider all relevant information and assess the cost/benefit of options.

c. Manage assets prudently, in the interests of the district and its inhabitants and ratepayers.

d. Clearly identify significant forecasting assumptions and risks underlying financial estimates.

e. Identify 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.

The preparation and implementation of an AMP from which long-term financial strategies will be developed, is a means of TDC complying with these requirements.

2.2.1 LEGISLATIVE DOCUMENTS

The key legislative documents relating to the management of wastewater service assets are listed in the following table.

Table 2-1: Relevant Legislation

Local Government Act 2002 (and Amendments)	The LGA empowers local authorities to carry out various wastewater works but does not require them to do so. The Act requires public consultation.
Health Act 1956	Requires Council to: • provide 'sanitary works', the definition of which includes wastewater disposal and includes all lands, buildings, machinery, reservoirs, dams, tanks, pipes and appliances used in connection with any such works. • ensure the provision in any dwelling house of an adequate and convenient method for the disposal of wastewater.
Resource Management	Requires Councils to: ▪ sustain the potential of natural and physical resources to meet

Act 1991	the reasonably foreseeable needs of future generations. ▪ comply with District and Regional Plans ▪ avoid, remedy or mitigate any adverse effect on the environment. ▪ take into account the principles of the Treaty of Waitangi in exercising functions and powers under the Act relating to the use, development, and protection of natural and physical resources. ▪ comply with resource consents issued by the Waikato Regional Council for disposal of wastewater and land use (designations for activities such as treatment plants).
Other Acts and Regulations	Hazardous Substances and New Organisms Act 1996 Building Act 2004 Public Works Act 1981 Health & Safety in Employment Act 1999 Civil Defence Emergency Act 2002 Public Bodies Contracts Act 1959 TDC Trade Wastewater Disposal Bylaw 2015
Government Water Reforms	The Three Waters Reform Programme was launched by the Government in July 2020 to improve the regulation and delivery of the three water services, drinking water, wastewater and stormwater, across New Zealand. These included the: ▪ Water Services Act 2021 ▪ Water Services Entities Act 2022 [now repealed] ▪ Water Services Economic Efficiency and Consumer Protection Act 2023 [now repealed]. The change of government in 2023 led to a change in direction for the future of the Three Waters industry and some of the recently enacted legislation was repealed (noted above). A new policy of 'Local Water Done Well' is set to be developed however details of this policy are not yet available.
WRC Plan Variation 5 - Lake Taupō catchment (Protecting Lake Taupo)	"Variation No. 5 - Lake Taupō Catchment" to the Waikato Regional Plan was proposed in 2005, and became operative on Thursday, 7 July 2011 - refer chapter 3.10 of the Waikato Regional Plan. The variation contains policy and rules to manage land use in the catchment, with some farming practices controlled or requiring consents. It also contains tighter controls for new urban development in the Lake Taupō catchment and impact Resource Consents for wastewater discharge into the catchment.

2.2.2 RELATIONSHIP WITH PLANNING AND STRATEGIC DOCUMENTS

The way in which Asset Management planning links the strategic planning process with operations and annual plans is illustrated below.

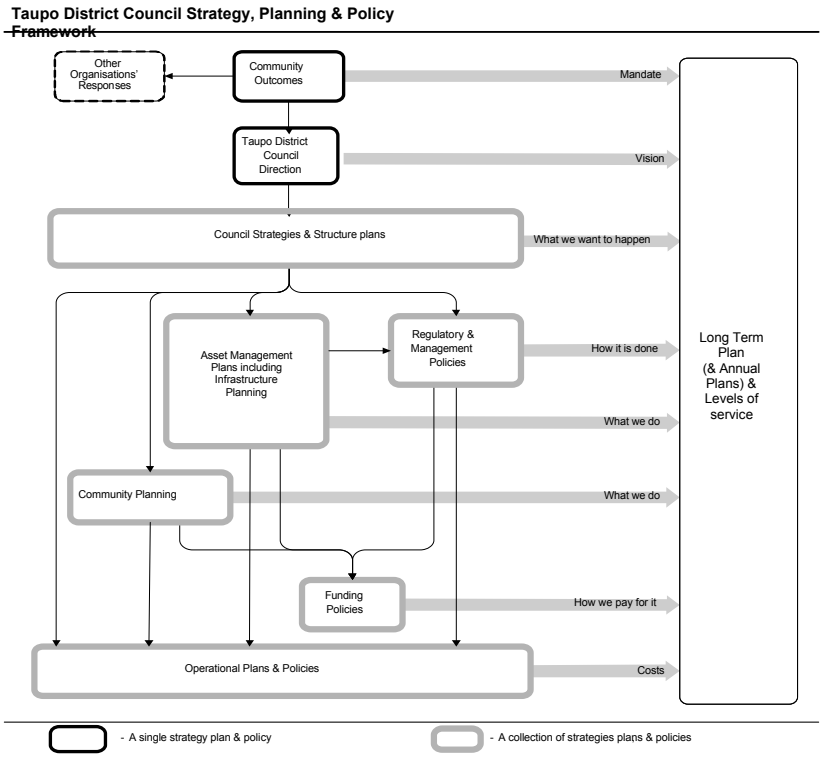


Figure 2-1: Council Planning

AMP's are a key component of the council planning process linking with the following documents.

Long Term Plan
The LTP sets the strategic direction for the Council and is the overarching planning tool which describes the activities the Council will undertake to deliver. It identifies the outcomes the community would like to achieve. It also contains the financial forecast for the next 10 years. This financial forecast is drawn from the AMP.

The Infrastructure Strategy is delivered as part of the LTP and is used to identify issues that will face Council's infrastructure over the next 30 years, and to identify the options available for addressing the issues.

The Financial strategy is also delivered as part of the LTP and outlines the Council's financial vision for the next 10 years and the approach for achieving the balance between investing in the assets and services for the district's progress and ensuring that the impacts on rates, debt, levels of service and investments are acceptable to the community.

It will guide the Council's future funding decisions and, along with the Infrastructure Strategy, informs the capital and operational spending for the Long-term Plan 2021-31. The strategy identifies the challenges that we will face over the next ten years, and how we plan to respond financially.

District Plan

The District Plan is an implementation tool used to protect values and outcomes important to the community.

Waikato Regional Plan
This reference gives the policy framework and give effect to the preferred strategic direction for Wastewater disposal from Waikato Regional Council.

TDC Bylaws and Policies
A full set of current Bylaws and Policies are available on the TDC website.

Growth Model and Growth Management Strategy TD2050
The growth model was updated in 2023 and this provides important information for infrastructure investment. The Taupo District 2050 - Growth Management Strategy outlines where Council prefers future urban growth to occur and the nature and scale of such growth. The first version of the strategy was adopted in 2006 and was subsequently reviewed in 2018 and replaced by the version below.

Structure Plans
Adopted and proposed structure plans outline how growth is to be managed within areas - Taupo Urban Structure Plan (TUSP), Taupo Town Centre Structure Plan (TTCSP), Kinloch Community Structure Plan (KCSP), Mapara Valley Structure Plan, and Southern Structure Plan (SSP).

2.3 Key Stakeholders

This AMP recognises the following as key stakeholders:

Table 2-2: Key Stakeholders

External	Internal
• The community, including citizens, ratepayers and Iwi • Residential, commercial and industrial wastewater service users • Septage collection contractors • Waikato Regional Council • District Health Board (Health Protection Officer) • Government agencies (e.g. Ministry for the Environment, Audit NZ, Department of Conservation) • Tangata Whenua, Tuwharetoa Maori Trust Board, Taupo Nui-a-Tia Management Board • Lakes and Waterways Group	• Councillors and community boards • Senior leadership Group • Asset Management staff • Maintenance contractors • Treatment plant Operations staff • Development Engineer • Finance Manager & team • Information Technology Manager • Strategic Relationships Manager • Corporate Communication Manager • Internal auditor • Council consultants

2.4 TDC Organisations Vision, Mission, Objectives, Goals

The mayor and Councillors have developed the follow vision for the district. This vision should be considered though our decision-making when it comes to the services and activities we carry out as a Council.

Vision

We will be a district of connected communities who thrive and embrace opportunities.

Community Outcomes

Our community outcomes describe what we aim to achieve for our community, to promote the present and future social, economic, cultural and environmental wellbeing of our district. They are part of the rationale for the delivery of our activities.

Tangata whenua are acknowledged and respected

We Contribute to this outcome when:

- We acknowledge tangata whenua and their ancestral connection to the whenua, ngā maunga and ngā wai.
- Hapū and iwi are acknowledged as distinct communities with their own needs and aspirations.
- We actively listen to the views of tangata whenua and engage early in our decision-making, supported by a strong understanding of tikanga and te reo.

Vibrant places and connected communities

We Contribute to this outcome when:

- We provide vibrant, safe places and facilities like halls, reserves and libraires that support social connections.
- We celebrate the rich history of iwi throughout our public spaces and facilities.
- We provide choices for safe and effective transport connections.
- We connect people with nature through our reserves and public places.
- We provide venues, infrastructure and support for events that bring us together.
- We support arts and culture adding to the quality of life.

Resilient communities working in partnership

We Contribute to this outcome when:

- We provide resilient infrastructure that meets our community's intergenerational needs in good times and bad.
- We partner and collaborate with others to find shared solutions.
- Our community is empowered to lead initiatives, build connections and increasing participation.
- We facilitate access to affordable, good quality and resilient homes.

Innovative, thriving economy

We Contribute to this outcome when:

- We welcome visitors and create inviting public places.
- We activate our town centres, filling them with activity and excitement.
- Our infrastructure helps us connect physically and digitally with the rest of the world.
- We build on our strengths and are open to new ideas.
- We think boldly and drive economic growth through innovation.

Flourishing environment

We Contribute to this outcome when:

- We think and act with an intergenerational view and embrace our role as kaitiaki.
- Our drive for reuse and regeneration helps build a circular economy.
- Our climate response remains agile as we work to reduce our carbon emissions.
- We manage wastewater and stormwater discharges to protect our water quality.
- We encourage and protect flourishing natural ecosystems in our district.

2.5 Assumptions

2.5.1 FINANCIAL

The following financial assumptions have been made. Further information can be found in the LTP document.

#	Assumptions	Potential risk	Mitigation measure
1.	Asset valuations completed in 2023 have been used as the basis for asset values.	Time between AMP completion and last revaluation	Council undertakes an annual price variance assumption report
2.	Sufficient financial capacity is available to deliver the programme outlined in this AMP.	Not the required funds to undertake capital works.	Councils Financial Strategy should identify any funding constraints so the programme can be managed.
3.	No allowance has been made for inflation adjustment within this AMP (unless specifically stated). The source of funds for the future replacement of significant assets is stated in the revenue and financing Policy.	Under funding of cost centre	Finance team make allowances for GST and inflation in funding plan and policy
4.	The useful lives of significant assets are as expected.	Asset lives have been incorrectly calculated meaning a funding shortfall.	Council has asset valuation and expected life depreciation checked externally. Asset lives are compared to the latest asset information nationally.
5.	Levels of Service remain unchanged.	The community desires changes to level of service which are not reflected in this document.	Complaints around LoS can be analysed to see if any trends exist.
6.	Allowance has been made for vested assets.	The level of allowance for vested assets is incorrect.	Councils LTP and annual plan can be adjusted as required.
7.	Development Contributions will continue to be collected.	Challenge from Developers results in lower DC collection.	Updated DC Policy is adopted as part of LTP.

2.5.2 NON-FINANCIAL

#	Assumption	Potential risk	Mitigation measure
1	Assume that growth is going to occur (creation of dwellings) as per the Growth Model predictions.	Faster than expected growth can lead to reduced LoS and late project delivery.	Growth model is reviewed every three years.
2	The Wastewater discharge quality requirements will remain within the	Changes to discharge quality through the resource consent will require an	Councils LTP and annual plan spend can be adjusted annually.

#	Assumption	Potential risk	Mitigation measure
	framework of the discharge consent conditions.	increase in operational and capital expenditure	
3	Contractors will be available for the development and construction of projects.	A shortage on contractors for project completion will mean an increase in project cost	Council can extend tender periods to enable contractors more time to schedule in works.
5	There will be no unforeseen legislative changes or central government policy changes that will affect this asset.	Changes in legislation could impact on the funding levels	Changes in legislation have an implementation period to enable Councils to plan.
6	Economic and labour market constraints may have a direct effect on recruitment.	If Council is unable to recruit to the required level to complete the works program for the year this could have impact on Councils credibility	Council may have to hire consultants to provide support; this could increase the cost-of-service delivery which will need to be funded through the annual plan process.
7	That Councils resource consents for its activities will be renewed as required.	The renewal of resource consents will depend on Councils prior performance in meeting the conditions of the existing consent and any changes in legislation	Council works closely with the regional council to achieve consent compliance. Compliance is also a staff performance criterion, so Council is focused on consent compliance, and it is considered that any consent related issues can be resolved.

2.6 Negative Impacts of Providing the Wastewater Service

In general, providing wastewater services to the community has both public health and environmental benefits.

There are however negative effects in providing this service, these include:

- The risk of wastewater overflows
- The cost of providing the service on rate payers, especially smaller communities.
- The cost of keeping up with ever increasing environmental standards requiring significant capital investment and increased operating cost.

2.7 Asset Management Plan Complexity

2.7.1 OUTLINE OF APPROACH

Basic asset management functions are those which produce an AMP based on providing current levels of service and meet minimum legislative requirements by supporting a long term (10 year plus) cash flow forecast and accounting for changes in the service potential of assets. Basic AMPs define existing levels of service and identify costs based on renewal accounting principles.

Advanced AMP's identify processes to optimise lifecycle AM strategies and provide a greater degree of confidence in the resulting cash flow predictions. Advanced AM functions include predictive modelling, risk management, optimised renewal decision making (ORDM) and service level reviews.

This asset management plan is considered to reflect an "Intermediate" level of development.

2.7.2 AMP REVIEW BY COUNCIL

Workshops are held with the Council for group of activities including AMPs which gives them following information:

- What we do:
- Key issues
- The service(s) we provide
- Key projects over the next three years
- Who pays? Fees and charges / development contributions rates etc…
- Financials
    - Capital expenditure (including renewals)
    - Operating expenditure

Draft AMPs are provided to councillors to view before adoption.

2.7.3 LIMITATIONS OF THIS AMP

As it currently stands, this AMP has limitations in the following areas:

- Not all assets are included in Asset Finda therefore asset data may not be complete.
- Asset condition and performance assessment is not as comprehensive as it could be.
- A Levels of Service remain unchanged as review of these has not occurred recently.
- Criticality Assessment is developing but is not complete.

2.8 Organisational Structure

The wastewater services in the district are managed as follows:

- The Three Waters Manager has overall responsibility of the Three Waters Manager Management in the District and reports to the Group Manager Operational Services.

- The Asset Manager is responsible for the technical support, strategic planning, asset management, policy planning, gaining of resource consents, consultation with stakeholders, development and delivery (procurement) of the capital works programme, review and improvement planning for meeting the compliance with legislation.

- The Manager-Water and Wastewater Treatment has responsibility for operation and maintenance of treatment plants and disposal of treated effluents in the district as per consent requirements.

- The Network Engineer(s) are responsible for the monitoring of maintenance contractor(s) and responding to service requests and maintenance queries. Responsibility extends from the sewer connection point (council owned asset) to the treatment plant inlet.

- Development Engineer manages approval process for all connections to the Three Water's asset network and ensures all vested asset including pump station conforms to TDC's Code of Practice. Development Engineer also manages the delivery of engineering advice information to internal and external customers.

- The Senior Monitoring and Compliance officer is responsible for reporting compliance for three waters.

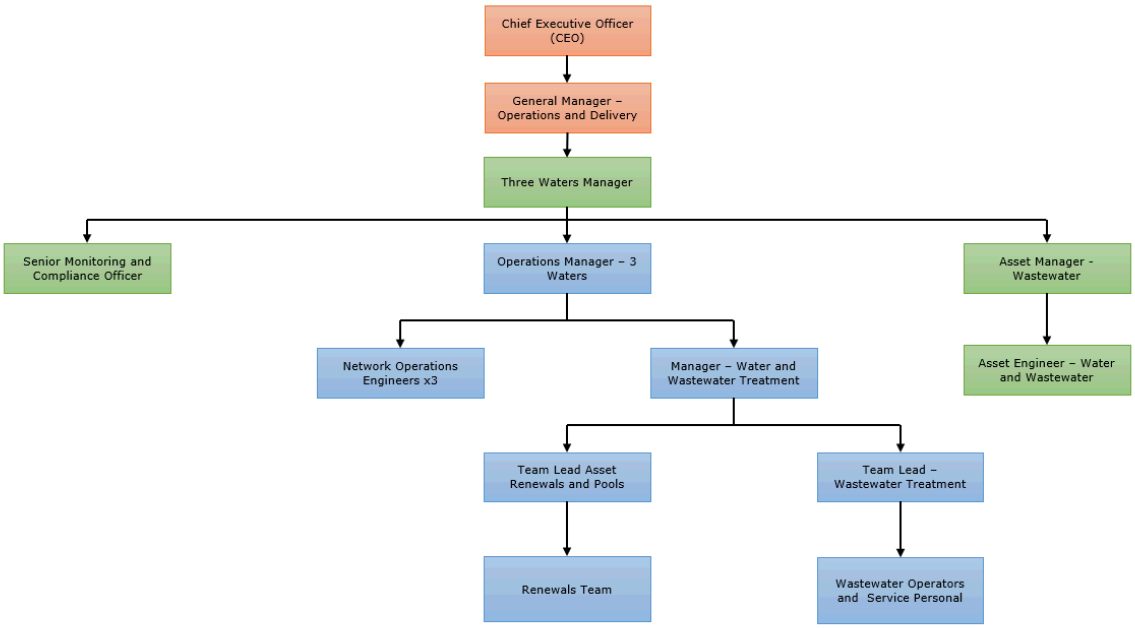


Figure 1: The Wastewater Services team Organisational Structure

2.0 ACRONYMS / ABBREVIATIONS

AM	Asset Manager
AMP	Asset Management Plan
AMS	Asset Management System
CAPEX	Capital Expenditure
CCTV	Closed circuit television – common method of inspecting pipes
CEO	Chief Executive Officer
Council	Taupo District Council
CISP	Commercial & Industrial Structure Plan
DC	Development Contribution
GIS	Geographical Information System
LGA	Local Government Act
LoS	Level of Service
LTP	Long Term Plan (Council's ten-year planning document formerly the Long-Term Council Community Plan – LTP)
OPEX	Operational Expenditure
RMA	Resource Management Act
SL-RAT	Sewer Line Rapid Assessment Tool
TDC	Taupo District Council
WW	Wastewater
WWAMP	Wastewater Asset Management Plan
WWTP	Wastewater Treatment Plant
WRC	Waikato Regional Council

4.0 ASSET DATA

4.1 Asset Summary and Valuation

Taupō District Council (TDC) is responsible for the management of wastewater assets including network reticulation (sewer pipes, manholes, pump stations, septic tanks etc.) as well as treatment plants and including land disposal sites.

Specific assets are managed in different ways. Reticulation assets are being managed through *Asset Finda* asset management software; with pump station, treatment plant assets being managed by spreadsheet. In the future the intent is to use *Asset Finda* as the sole source of asset data and management for the three waters: including asset valuation.

A high-level asset valuation record is currently maintained in spreadsheet format and summarised in "***Revaluation of Utility (3 Waters) Assets***", prepared by Aecom.

The following table gives a summary of the asset valuation as of June 2023.

	Optimised Replacement Cost 30 June 2023	Optimised Depreciated Replacement Cost 30 June 2023
Treatment	$127,864,690	$56,413,228
Reticulation	$199,061,334	$113,130,222
TOTAL	$326,926,024	$169,543,450

Table 4-1: Wastewater Asset Valuation Summary

4.1.1 VALUATION PROCESS

All recorded components have been valued in terms of their replacement and depreciated replacement value. The valuation process is undertaken by an external valuer (AECOM) and has been performed in accordance with generally accepting accounting standards (PBE IPSAS 17 Property, Plant and Equipment) and with New Zealand Infrastructure Valuation and Depreciation Guidelines issued by the New Zealand Asset Management Support Group (NAMS) of IPWEA.

The basic approach has involved:

a) Preparation of the valuation databases from the various sources of information supplied by TDC to an external valuer.
b) Adjustment of asset quantities, materials and techniques to reflect an optimum (least cost) modern equivalent replacement that offers the same level of service as that currently provided.
c) Calculation of Optimum Replacement Cost (ORC) by multiplying asset quantities by appropriate unit construction cost rates and including an allowance for other costs (site establishment, professional fees, and financial charges).
d) Prediction and assignment of economic and remaining lives.
e) Calculation of Optimised Depreciated Replacement Costs (ODRC) by deducting an allowance for depreciation, taking into account age, remaining life and residual value.

Note that assets with zero remaining life have been excluded from revaluation. These assets make up only a small proportion of the overall asset base. Removal of zero life assets will result in a slightly reduced Replacement Cost but should not affect the calculation of Depreciated Replacement Cost. When the next valuation occurs these assets should be included.

The revaluation of these assets is done by external consultants every three years.

4.1.2 CHANGE IN VALUATION

	Optimised Replacement	Optimised Depreciated Replacement Cost
2021 Valuation	$ 263,774,162	$ 160,691,179
2023 Valuation	$ 326,926,024	$ 169,543,450
	+23.9%	+5.5%

4.2 Asset Component

4.2.1 TREATMENT PLANTS

4.2.1.1 Description

Taupo District Council manages 11 treatment plants, and the valuation data is provided below. The data source for this data is spreadsheet. There is a risk that these sheets do not capture all the assets and there full value. Asset data is verified and transferred to Asset Finda the accuracy of this valuation data will improve and be more reliable.

Wastewater Treatment Plant	Optimised Replacement Cost 30 June 2023	Optimised Depreciated Replacement Cost 30 June 2023
Acacia Bay	$5,073,888	$1,144,463
Atiamuri	$433,782	$95,659
Kinloch	$6,981,536	$1,636,170
Mangakino	$6,598,545	$3,556,320
Motuoapa	$2,063,579	$964,683
Motutere	$1,736,004	$871,941
Omori	$5,524,541	$1,861,117
Taupo	$81,328,942	$39,797,753
Turangi	$15,504,325	$5,563,365
Whakamaru	$842,933	$246,504
Whareroa	$1,776,615	$675,253
TOTAL	**$127,864,690**	**$56,413,228**

Table 4-2: Treatment Plant Replacement Value

4.2.1.2 Condition

The conditions assessment of the wastewater treatment plants is recorded in an excel spreadsheet and the document is continually being updated. Treatment plant assets and condition information will ultimately be recorded in *Asset Finda* once the assets information is loaded into the system.

4.2.1.3 Capacity/Performance

The performance of the wastewater treatment plants is generally assessed via resource consent compliance. Annual Reports are prepared for Waikato Regional Council (WRC) on each plant detailing the performance of the plant for that year, effluent quality, volume records and environmental monitoring results.

4.2.1.4 Treatment Plant Age

The wastewater treatment plants have been constructed at different times as required. In some cases, upgrades have occurred. This information is shown in the table below. The age and useful lives of the WWTP components are given in the condition assessment sheets contained in the appendices.

Table 4-3: Treatment Plant Type and Ages

Treatment Plant	Plant Type	Construction Year	Upgrade Year	Upgrade Type
Acacia Bay	SBR	1986	-	-
Atiamuri	Imhoff Tank		-	-
Kinloch	MBR	1988	2003 2009 2020 2021	Inlet works. Decant system improvements. Irrigation to public golf course Conversion to MBR (from SBR)
Mangakino	SAF	2006	2007-08 2013-14	WWTP upgrade (SAF) Tertiary filter upgrade
Motuoapa	SBR	1987	2002 2016	Addition of second SBR tank Inlet Balance Tank
Motutere	SAF	1992	2006	SAF tanks
Omori	Oxidation Ponds	1970's	-	-
Taupo	Trickling Filters / Anaerobic Digesters	1975	1993 2009 2010-11	Rakaunui Road land disposal View Rd Land disposal site. Additional trickling filter and digester
Turangi	MBR	2006	-	
Whakamaru	Textile Bed		2009 2019	Disposal Field New Textile Bed Reactor
Whareroa	Oxidation Ponds	1986	2008-09	Aeration and step screen

4.2.2 RETICULATION

4.2.2.1 Reticulation Description

Reticulation includes network pipes, manholes pump stations and lampholes. An inventory of all reticulation is contained within the Asset Finda system and valuation spreadsheets.

Table 4-4: Scheme Reticulation Value

Scheme	Optimised Replacement Cost 30 June 2023	Optimised Depreciated Replacement Cost 30 June 2023
Acacia Bay	$9,841,306	$5,702,203
Atiamuri	$414,206	$73,337
Kinloch	$19,178,196	$14,045,031
Mangakino	$5,984,583	$3,439,980
Motuoapa	$5,844,410	$3,619,340
Motutere	$372,838	$219,111
Omori	$12,547,444	$7,023,574
Taupō	$117,642,655	$68,302,860
Tūrangi	$23,846,164	$8,807,517
Whakamaru	$831,801	$348,261
Whareroa	$2,557,731	$1,549,009
Total	**$199,061,334**	**$113,130,222**

4.2.2.2 Reticulation Condition

Condition assessments on the pump stations occur as part of the current maintenance contract and are completed every six months. From these assessments renewals works can be identified.

CCTV investigation has been completed on some sections of pipe work where we know there are issues. We have completed extensive CCTV condition assessment in Mangakino, Whakamaru and parts of Taupō and Tūrangi. We have undertaken significant renewal work in Whakamaru and Mangakino in recent years.

Further condition assessment is required to better understand the condition of the network and enable better renewals planning.

Some areas of our networks experience elevated inflow and infiltration; primarily in the Taupō industrial area and in Turangi generally.

4.2.2.3 Reticulation Performance

Reticulation performance is assessed through the number of services requests received on the particular asset, how many failures that occur and if any overflows occur.

The main problems within the reticulation are generally due to fat blockages, root intrusion, or through blockage caused by wet wipes. TDC is working to reduce the number of overflows caused by blockages and is using SL-RAT technology (Sewer Line-Rapid Assessment Tool) to identify potential problems before they result in overflow.

4.2.3 PUMP STATIONS

4.2.3.1 Pump Station Condition

Each pump station condition is assessed formally every six months by the maintenance contractors. This includes looking at the condition of the following: pumps, valves, structural condition, ladder, platform, electrical and telemetry.

A significant programme of work has been undertaken to modernize old electrical and telemetry hardware at WWPS sites. This programme is partially complete.

4.2.3.2 Pump Station Performance

Overall, the pump stations are performing as expected. Pumps are generally replaced upon failure. As electrical and telemetry upgrades occur, we envisage that smarter control systems will be able to better manage how pump station operate.

4.3 Asset Confidence Rating

The asset valuation assigns confidence ratings to the source data and unit cost rates and to other items as appropriate. The overall confidence rating for the wastewater asset is **B-,** it is regarding to the pipe size, materials, age data that we collected in recently validation.

Table 4-5: Key to Asset Confidence Rating

Grade Score	Grade	Description	Accuracy
1-2	A	High Accuracies, data based on reliable documents	±5%
2-3	B	Data based on some supporting documentation	±10%
3-4	C	50% Estimated, data based on local knowledge	±15%
4-5	D	Significant Data Estimated / No Data, data based on best estimate of experienced person	±30%

Table 4-6: Summary of Asset Confidence Ratings

Attribute	Confidence Grade				Notes
	D ±30%	C ±15%	B ±10%	A ±5%	
Asset data					
Physical properties					Generally, our network asset data is held within Asset Finda and data is maintained. Treatment plant data is yet to transition to Asset Finda and therefore completeness of this data has not well know.
Location					
Age					
Condition					
Performance					
Deterioration rate					
Financial data					
Opex					
Operation costs					
Maintenance costs					
Asset management costs					
Interest rates					
Depreciation					The accuracy of asset valuations impacts depreciation expense. See comment above.
Renewals					
Unit rates					

Project scope									
Cost estimates									
Capital works									
Demand forecast									Historically growth models have underestimated growth and therefore timing of some projects has been late.
Project timing									
Project scope									
Project costs									
Project prioritisation									

5.0 LEVELS OF SERVICE

5.1 Introduction

A key objective of this Asset Management plan is to match the level of service provided by the asset with the expectations of customers. This requires a clear understanding of customers' needs, expectations, and preferences.

The Levels of Service defined in this section will be used:

- to inform customers of the proposed type and level of service to be offered
- as a focus for the Asset Management tactics proposed to deliver the required level of service
- to measure the effectiveness service delivery against the defined LoS.

Most of the Levels of Service defined are based on 'Local Government Mandatory Performance Measures', and on the feedback from consultation with customers.

Reference: https://www.dia.govt.nz/Resource-material-Our-Policy-Advice-Areas-Local-Government-Policy#performance-measures

The targeted levels of service are based on:

Customer Expectations: Information gained from customers on expected quality of services.

Statutory Requirements: Legislation, regulations, environmental standards and Council By-laws that impact on the way assets are managed (i.e.: resource consents, building regulations, health and safety legislation). These requirements set the minimum level of service to be provided.

Strategic and Corporate Goals: Provide guidelines for the scope of current and future services offered and manner of service delivery and define specific levels of service which the organisation wishes to achieve.

5.2 Types of Levels of Service

5.2.1 OPERATIONAL

Desired Levels of Service

The targets currently set are those carried over from the previous version WWAMP. These have been broadly developed as:

- Compliance to wastewater regulations; these are the minimum targets set by Regional Council Policy and through Resource Consents.
- Fault response times, which are set at levels achievable through available resources whilst maintaining as prompt a response as is reasonable.
- Customer satisfaction, these are the minimum targets set and reflect maintaining the current level of service through existing collection, transmission, and treatment systems.

Current operational levels of service for wastewater are scheduled in Table 2.

5.2.2 TACTICAL

The levels of service stated within Table 5-1 are "why we build new assets". These are thresholds which warrant the creation of a new asset to maintain an optimum level of service for the asset.

5.2.3 IMPLEMENTATION

The implementation levels of service stated within Table 5-2 are "the standard we build a wastewater asset to" and "how we maintain assets".

The Department of Internal Affairs (DIA) has notified in Gazette: 21 November 2013 non-financial performance measure rules on key aspects of sewerage and the treatment and disposal of sewage to receiving environment. Council will be required to report on these performance measures for the level of service provided to community. These Level of Service (LoS) also form part of Table 5-2.

5.3 Current Levels of Service

Objective: To protect the environment and public health by providing appropriate collections, treatment and disposal of wastewater for all users connected to council's sewerage scheme.

Table Error! No text of specified style in document.**-1: Tactical Levels of Service**

Number	Community Outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
System and adequacy **T1**	Economy	Sufficient capacity to meet the demands of today and future growth	If a connection is immediately possible	Capacity of pipe work relative to capacity required. That all new development is able to be connected immediately if previously identified in the District Plan and in the Growth Model.	The Nukuhau Plan Change area cannot develop at present due to limited capacity over the Waikato River. Projects are being developed to address this.	Through the ability to allow subdivisions to occur.	All developments that occur within already specified development areas, in accordance with revised growth model are not held up by infrastructure capacity issues.	All developments that occur within already specified development areas, in accordance with growth areas are not held up by infrastructure capacity issues.

Note: An asterisk* identifies the performance measure in LTP

Table Error! No text of specified style in document.**-2: Operational Levels of Service**

Number	Community Outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
Discharge Compliance **O1**	Environment	We manage the environmental impacts of our wastewater treatment and discharges. THIS IS A DIA MANDITORY MEASURE.	No successful prosecutions to council or its staff.	Number of abatement notices ≤ 1 Number of infringement notices = 0 Number of enforcement orders = 0 Number of convictions = 0 If there are significant breaches, we need to provide further commentary.	Number of abatement notices =0 Number of infringement notices = 0 Number of enforcement orders = 0 Number of convictions = 0	Record and report and notices, orders, or convictions.	Number of abatement notices ≤ 1 Number of infringement notices = 0 Number of enforcement orders = 0 Number of convictions = 0	Number of abatement notices ≤ 1 Number of infringement notices = 0 Number of enforcement orders = 0 Number of convictions = 0
Discharge Compliance **O2**		Quality of effluent discharge from Treatment facilities is acceptable	Nitrogen reduction to the lake in Effluent after the treatment process	Reduce by at least 20 % of total nitrogen discharge from WWTP within Lake catchment by 2020.	2021/22 – Achieved (29.2 per cent). 2022/23 – Not Achieved (2.2 per cent reduction). Turangi WWTP during the year have caused the total discharge to the lake catchment in increase compared to the previous period. These issues have now been resolved.	Routine testing of effluent from treatment plants within lake catchment	Reduce the total nitrogen discharged from WWTP within the Lake catchment by at least 20 % of the benchmark average (10,310 kg/year) by 2020.	Reduce the total nitrogen discharged from WWTP within the Lake catchment by at least 20 % of the benchmark average (10,310 kg/year) by 2020. From 2020 onwards maintain this reduction.

Number	Community Outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
System & adequacy **O3**	Economy Environment	Sewerage systems are maintained to an adequate standard to minimise overflows and minimise harm to the community. THIS IS A DIA MANDITORY MEASURE	Number of dry weather overflows from the sewerage system	Number of dry weather[1] overflows from the sewerage system expressed per 1000 sewerage connections the sewerage system. Where one event results in multiple dry weather overflows (points of discharge) each point of discharge must be counted in this measure.	2021/22 – Achieved (1.47 dry weather overflows per thousand connections) 2022/23 – Achieved (1.4 dry weather overflows per thousand connections)	Analysis of contract reports and complaint records and Asset Finda.	Target number of dry weather sewerage overflows ≤ 3 per thousand connections.	Target number of dry weather sewerage overflows ≤ 3 per thousand connections.
Response times **O4**	Economy	<u>Fault response time</u> Response time from Council receiving notification of a fault to the time that service personnel reach the site of overflow or other fault is ≤1hr. <u>Fault resolution time</u> Resolution time from Council receiving notification of a fault to the time that service personnel confirm resolution of the blockage or other fault is within 4 hrs.	Percentage of failure responded within the specified time	Response time from Council receiving notification of the fault to the time that service personnel reach the site of the sewerage overflow resulting from a blockage.	Current data accuracy is not great however the data available shows 40/52 (76%) blockages and overflows were attended within 1 hour and 30/52 were resolved with 4 hours (58%). Current LoS is not meet.	Analysis of service requests and response data.	Response time to get to site with sewerage overflow is ≤ 1 hr (90% of times) Time to resolve the problem is ≤ 4 hrs (85% of times).	Time to get to site with sewerage overflow. • ≤1hr (95% of times) Time to resolve the problem. • Within 4 hrs (90% of times)
		<u>Fault response time (median)</u> The <u>median</u> response time from Council receiving notification of a fault to the time that service personnel reach the site of the overflow or other fault. <u>Fault resolution time (median)</u> The <u>median</u> resolution time from Council receiving notification of a fault to the time that service personnel confirm resolution of the blockage or other fault. THIS IS A DIA MANDITORY MEASURE.	Median response time for attendance and resolution	Response time from Council receiving notification of the fault to the time that service personnel reach the site of the sewerage overflow resulting from a blockage.	The median response time in 2022/23 is 0.18. The median resolution time in 2022/23 is 4.14. Issues with the data recording system mean we are unable to accurately verify all fault resolution times. This result is based on the best available information.	Analysis of service requests and contactors KPI. This measure has not been able to be recorded because of issues relating to the recording of after-hours call outs. We are putting systems in place to ensure that this issue is rectified for the future.	Less than 1 hour. Less than 4 hours.	Less than 1 hour. Less than 4 hours.

[1] Dry weather is a day when less than 1mm of rain has fallen during a continuous 24-hour period.

Number	Community Outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
Customer satisfaction **O5**	Environment + Economy	The number of complaints received by Council on: a) Sewerage odour b) Sewerage system faults c) Sewerage system blockages; and d) Council's response to issues with the sewerage system (expressed per 1000) Target number of complaints per 1000 connections ≤ 8. THIS IS A DIA MANDITORY MEASURE.	The sewerage system related issues resolved on time.	Number of complaints received on: a) Sewage odour b) sewerage system faults c) Sewerage system blockages d) The Council's response to issues with the sewerage system, expressed per 1000 connections to the Council sewerage system. Complaints taken from the request for service system. If there is more than one complaint about a single event, each complaint must be counted separately (not each event or occurrence).	2021/22 – Not Achieved (9.16 per 1000 connections) 2021/22 – Not Achieved (10.54 per 1000 connections)	Total number of complaints / (total rated properties/1000)	Target number of complaints per 1000 connections ≤ 8	Target number of complaints per 1000 connections ≤ 5

*** Emergency: It is an event which interrupts the reticulation of wastewater to treatment plant and can cause damage to environment and health to the community.**

5.4 Consultation

The most recent level of service consultation was undertaken as part of the preparation of the 2018-28 LTP. The most recent Levels of Service Survey conducted by TDC was in November 2016 and the survey asked for satisfaction. Ratepayers from the district were highly satisfied with the Council's provision of water services. Overall, 79% were satisfied, while only 5% were dissatisfied. It has been some time since this engagement has occurred.

5.5 Changes to Level of Service

There are no proposed changes to levels of service.

The main issue currently is that response times are not accurately measured. Work is being done to address this shortcoming.

6.0 FUTURE DEMAND

6.1 Factors Affecting Demand

There are a number of other factors that influence demand on the wastewater asset within the Taupo District such as:

- Growth in population and the number of houses.
- Climate change and increase rainfall.
- Increasing standards requiring a higher level of treatment.

6.2 Growth

GROWTH MANAGEMENT STRATEGY – TD2050

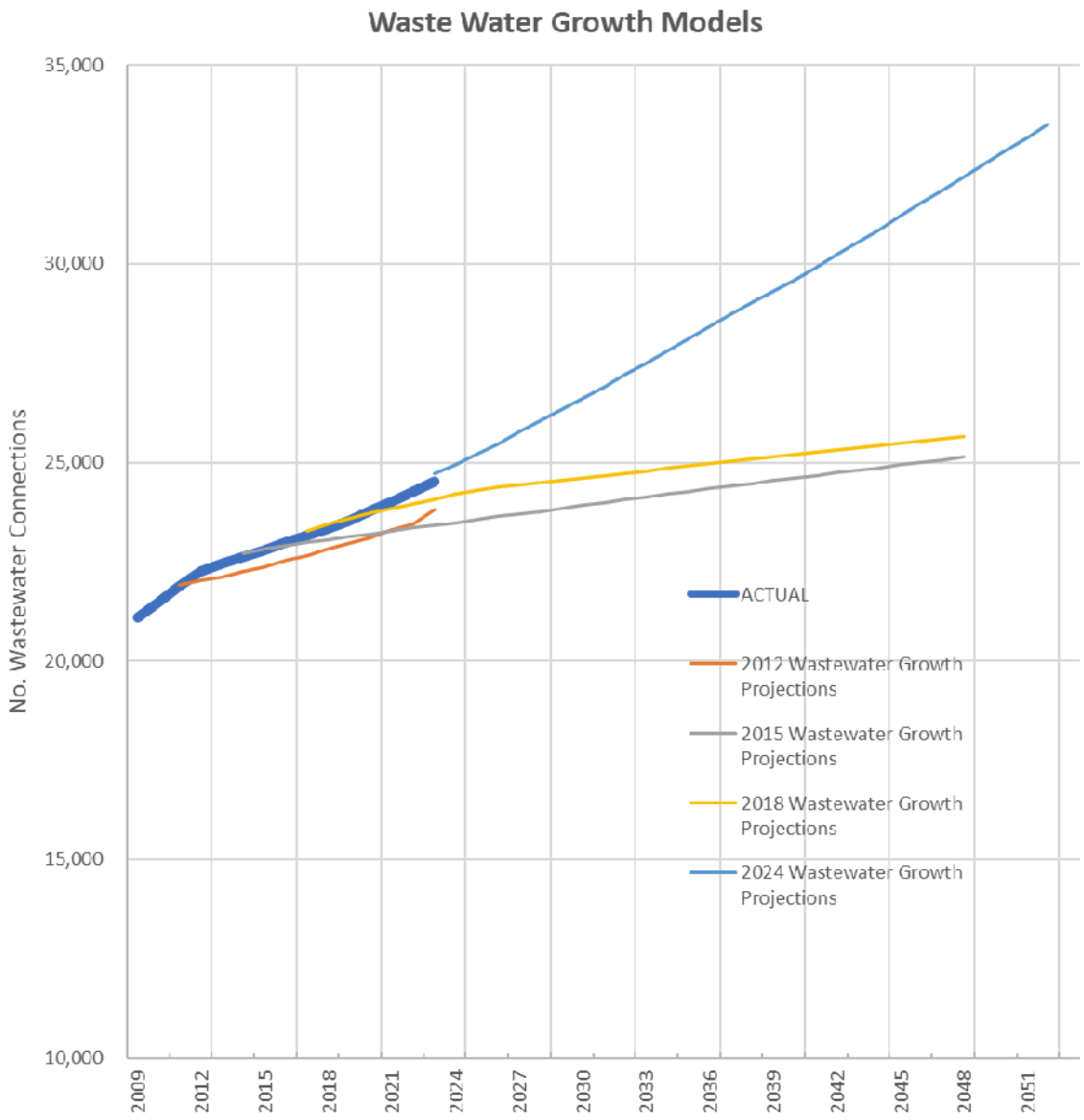
In June 2006 the Council adopted Taupo District 2050 (TD2050), the Growth Management Strategy for the District and this document has been updated in 2018. The growth management strategy identifies where urban growth is anticipated so that land use and infrastructure planning can be aligned. TD2050 has been incorporated into the District Plan by way of plan changes, particularly Plan Change 21 which identifies the future urban growth areas. Private plan changes can also occur and are incorporated into the District Plan.

6.2.1 GROWTH MODEL REVIEW (2023)

A *Taupō District Growth Model* has been in place since 1 July 2004 and was initially developed with the projected growth identified in TD2050.

In previous growth models, population projections for the medium and long terms were reliant on Stats NZ's projections, which were consistently shown to be on the low side to what was observed.

The underlying drivers of population growth were not part of the model and the reason(s) for the discrepancy between projected and actual population was unknown. The previous AMP (2021) used an older growth model (2018) as the new version was not available. This created uncertainty for TDC regarding the timing for provision of infrastructure services to the growth areas. Therefore, infrastructure provision is lagging in some areas.



The new 2022 growth model takes a more detailed approach, and this is set out in 'GROWTH MODEL 2022-2060 Technical Paper' [A3225289]. Both supply side and demand side factors have been considered in the development of the growth model forecasts. A 'medium' growth scenario has been selected as the base data for use in the 2023 LTP.

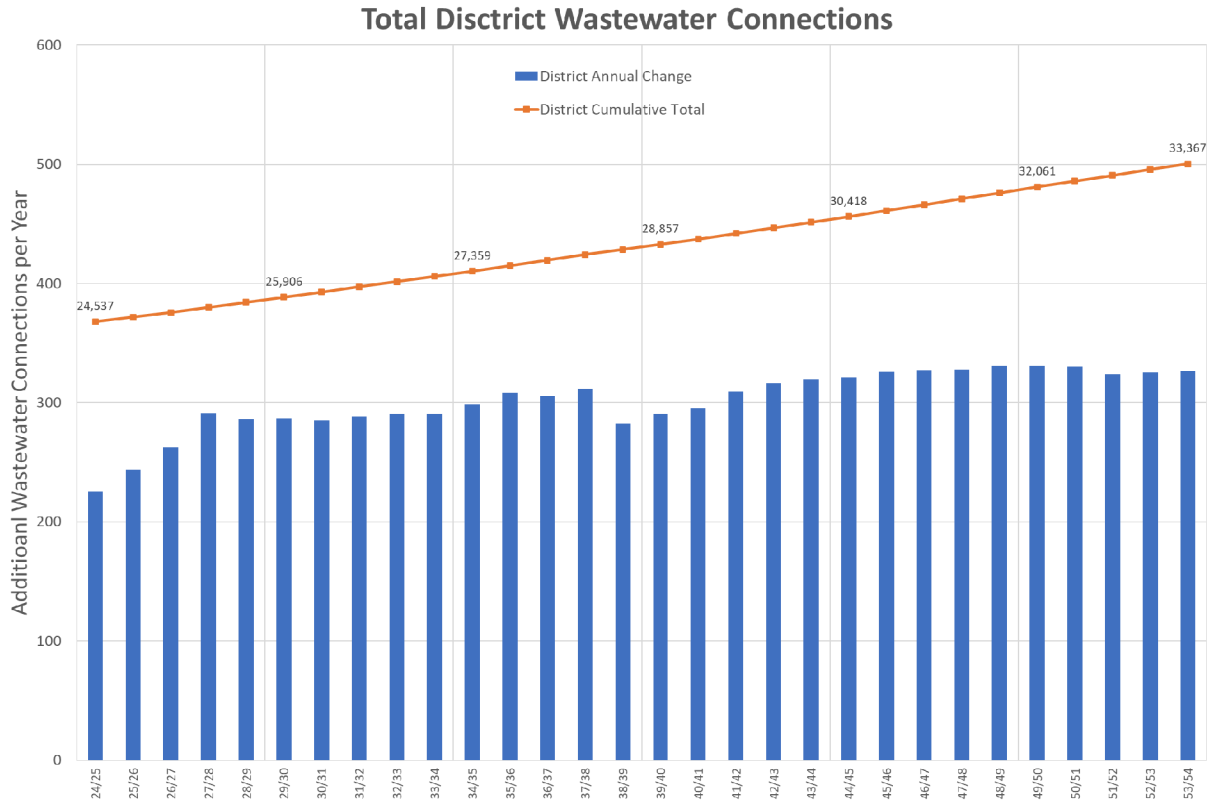
A scheme specific growth model has been developed for those schemes where growth exists, to assess treatment capacity, disposal capacity and consent capacity vs demand. These models are held in the Council filing system under each scheme.

The table below provides the forecast growth units for each of the wastewater networks. If the wastewater scheme is not included in the table below, then the scheme is not expected to have any (or significant growth) and no projects are needed to support growth.

Projected New Wastewater Connections 2024-2054
New lots per year for each wastewater catchment area (in HUE)

Year	24/25	25/26	26/27	27/28	28/29	29/30	30/31	31/32	32/33	33/34	34/35	35/36	36/37	37/38	38/39
Acacia Bay	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Mangakino	8	8	8	7	6	6	6	6	6	5	5	5	5	5	5
Kinloch	27	26	25	29	29	30	30	31	31	32	33	34	35	36	0
Taupō South	135	145	156	172	173	173	172	174	175	176	181	183	187	191	196
Taupō North	24	25	27	30	30	30	30	30	31	31	32	32	33	33	34
Taupō Town	16	18	19	22	22	22	22	22	22	22	23	23	23	24	24
Taupo Total	175	189	202	223	225	225	224	226	227	229	235	238	244	249	254
Tūrangi	6	11	16	21	16	15	15	15	16	14	14	14	15	16	17
Pukawa/ Omori/ Kuratau	3	4	5	5	5	5	5	5	5	5	5	10	0	0	0
Whareroa	0	1	1	1	2	2	2	2	2	2	2	2	2	2	2

Year	39/40	40/41	41/42	42/43	43/44	44/45	45/46	46/47	47/48	48/49	49/50	50/51	51/52	52/53	53/54
Acacia Bay	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Mangakino	5	5	6	6	6	6	6	6	6	6	5	5	4	4	4
Kinloch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taupō South	201	205	214	219	221	223	226	227	228	231	231	231	227	229	230
Taupō North	35	36	37	38	39	39	40	40	40	40	40	40	40	40	40
Taupō Town	25	26	27	27	28	28	28	28	29	29	29	29	28	29	29
Taupo Total	262	266	279	285	287	289	294	295	296	300	300	301	296	297	299
Tūrangi	17	18	19	20	21	20	20	20	20	19	19	19	18	18	18
Pukawa/ Omori/ Kuratau	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whareroa	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2



DEVELOPMENT CONTRIBUTIONS POLICY

Council's method for collecting funding for growth projects is outlined in detail in the Development Contributions Policy (DC). The DC policy defines how much developers will contribute to new infrastructure for each development. The cost of growth-related infrastructure is generally charged to the developers.

OCCUPANCY

The long-term trend for more than fifty years has been for a decrease in the number of people per dwelling however this has reversed slightly as shown by the 2018 census data.

The occupancy level changes will change the demand on services. The Taupo District has a significant number of holiday homes and seasonal occupancy also varies significantly.

Some schemes have experienced significant increases in flows and loads without a significant number of new dwellings being added. This is very pronounced in Acacia Bay where presumably a high occupancy is contributing to higher wastewater flows and nitrogen loads.

Growth modelling considers changes in occupancy over holiday periods however the changes in occupancy per dwelling over time is generally not considered at this stage.

6.3 Meeting increased/changing demand

6.3.1 CAPITAL EXPENDITURE DUE TO CHANGES IN DEMAND

The development of new connections in the district in the coming ten years will require new infrastructure as well as necessitating the upgrading of the treatment plants. The following is a description of the recently completed and upcoming major growth projects.

Growth in Kinloch exceeded expectations and treatment capacity was lagging resulting in poor treatment performance and compliance issues. A major treatment plant upgrade was undertaken in 2021 and capacity and performance are now acceptable.
Expansion of the Taupo wastewater irrigation system is near completion, expected in April 2024, and a combination of growth and more stringent regulation has been the driver for this project.

The Southern Trunk Sewer Main and pump station is a major project that will provide capacity for continued growth in the Southern part of Taupo. This project will increase reticulation capacity and is scheduled for construction in 2024.

A significant project is underway to provide additional increase solids removal capacity at the Taupo WWTP, 'Primary Settling Tank #3' and this is due for completion within the first three years of the new LTP.

Growth on the northern side of the Control Gates Bridge is somewhat constrained by a lack of capacity over the bridge. The 'Taupo North Wastewater Solution' project is proposed to provide this capacity. The project is expected to be a pipe-bridge or similar over the Waikato River however there remains significant uncertainty in the timing and scope of this project. In the interim buffer storage tanks are proposed to allow some further growth though they are not the long-term solution to provide the extra capacity needed.

A constraint in the Taupo wastewater system is nitrogen removal capacity. The current mode of nitrogen removal is by the expansion of irrigation areas where nitrogen is removed via crop growth. As growth in the catchment more land is required to provide additional nitrogen removal capacity. Despite have over 310 Ha of irrigation capacity we are currently near the limits of how much nitrogen can be applied. Increasing land

disposal capacity is expensive, and implementation timeframes are long. An alternative being explored is development of a 'Side Stream Treatment Plant' which will target nitrogen removal at the treatment plant reducing the load on land disposal systems. This is a key growth enabling project to be developed over the next few years.

Mangakino has experienced some growth and continued growth is expected. A treatment plant and disposal system upgrade will be required to enable this growth to continue. Some of this growth is contingent on additional land being zoned for further residential development.

While the above-mentioned projects are the major projects there are a series of other growth-related projects and theses are included in the table below.

Table 6-1: Capital Projects Required to Service Taupo District Growth

Growth Project (Yrs 1 – 10)	**Value**	**When**
Acacia Bay WAS Tank 2 [Growth]	350,000	2024 – 25
Atiamuri WWTP Upgrade	600,000	2025 – 26
Acacia Bay WW Connection to Taupo (Acacia Bay WWTP retained) [Growth]	2,500,000	2026 - 28
Kinloch WW MBR upgrade - Second reactor [Growth]	1,600,000	2025 – 27
Mangakino WWTP Upgrade [Growth]	7,000,000	2026 – 28
Taupo North Wastewater solution [Growth]	6,300,000	2028 – 31
Taupo WW Eastern trunk main capacity upgrade [Growth]	2,200,000	2028 – 30
Taupo WW Control gates bridge buffer storage tanks	2,700,000	2024 – 27
Taupo WW Southern Trunk Sewer Main [Growth]	14,340,000*	2022 – 24
Taupo WWTP Building Alteration	200,000	2024 – 25
Taupo WWTP Primary Settling Tank #3 [Growth]	3,500,000*	2023 - 25
Taupo WWTP Side Stream - Solids Filtrate Treatment [Growth]	4,600,000	2024 - 26
Taupo WWTP Transfer pump station upgrade [Growth]	900,000	2024 - 26
Turangi WW Disposal Solution	6,000,000	2026 - 29
Whareroa WWTP Irrigation expansion [Growth]	300,000	2029 - 34

**Multi-year project includes budget from previous annual plan.*

6.3.2 OPERATIONAL EXPENDITURE

Operational budgets are increased to allow for inflation, and to allow for increase cost of operating new infrastructure. These costs are included when developing the financials for the long-term plan.

7.0 RISK MANAGEMENT

7.1 Introduction

Risk management is an important element in the development and management of assets. For asset management planning to be robust it must be integrated with other corporate risk management processes and that this encompasses strategies for Council's most critical assets, provide for the effects of asset failure and be integrated with disaster recovery plans and business continuity plans.

7.1.1 BACKGROUND

Council adopted a new Risk Management Policy in February 2024. The policy outlines Councils risk management objectives, principles, and provides a risk management framework.

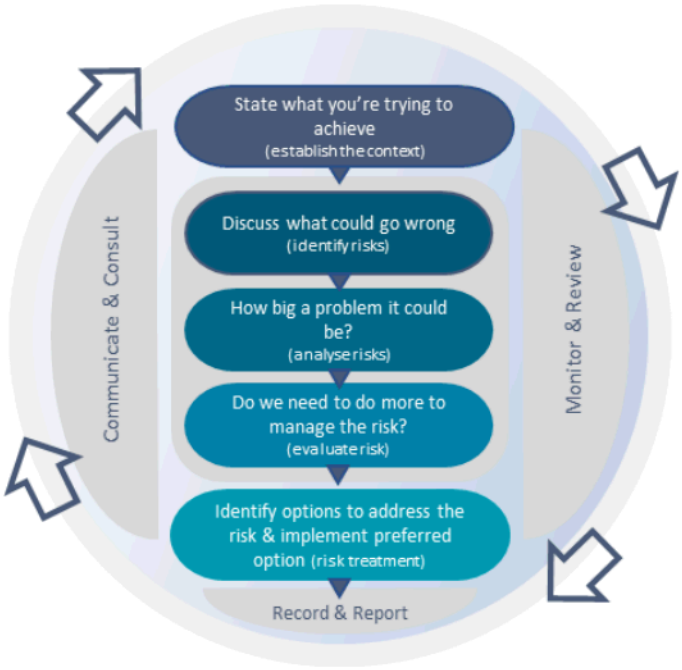
Overall responsibility and accountability for ensuring risks are mitigated resides with the Council as the governing body. It has however delegated some activities to the Risk and Assurance Committee and delegated power to act on matters relating to audit, risk management and internal control practices. All staff within Council have a responsibility for risk management.

Alongside, the Risk Management Policy is the Risk Management Framework. The purpose of the Risk Management Framework is to help staff manage significant risks that may affect successful achievement of our objectives by providing:

- Direction for consistent risk management at TDC including how risks are identified, analysed and evaluated.
- Guidance on how to design risk response plans; and
- Information on how risks are reported, escalated, and communicated.

7.2 Risk Management Process

The Taupo District Council will use a multi-stage risk management cycle as illustrated in the diagram below. Applying the risk management process outlined in allows us to focus our attention on our biggest risks, and helps ensure we proactively control these by either mitigating their impacts, completely avoiding them, or reduce their likelihood and/or impacts. While it may appear to be a sequential process with start and finish it is in fact iterative in practice, with the process repeating itself in a constant cycle of improvement.



7.3 Business Continuity Plans

Business Continuity Plans (BCP) have been developed to maintain continuity of operations It is envisaged that BCPs will assist council in the following advantages:

- To reduce the cost of disruptions
- To be more resilient
- To mitigate business risks and financial exposures
- To meet compliance
- To enhance health and safety
- To benefit from insurance premium discounts, reduced excesses and doors opening to new insurance markets.

7.4 Lifelines Risk Assessment

TDC is a member of Waikato utility Lifelines Group. This process aims to identify components within the TDC wastewater network that may be vulnerable to seismic, flood or volcanic events and the impact of failure of these assets.

7.5 Dangerous and Insanitary Buildings Policy

Section 131 of the Building Act 2004 requires territorial authorities to adopt a policy on dangerous buildings and of insanitary buildings. The definition of insanitary buildings is included in the Building Act. A building is considered dangerous if:

- in the ordinary course of events (excluding the occurrence of an earthquake), the building is likely to cause injury or death (whether by collapse or otherwise) to any persons in it or to persons on other property; or damage to other property; or

- in the event of fire, injury or death to any person in the building or to persons on other property is likely because of fire hazard or the occupancy of the building.

The Council Policy applies equally to water facilities and buildings as it does to other buildings around the district.

7.6 Funding for Risk

Council looks to provide funding for disaster recovery through a separate reserve. It appropriates funding each year to a Disaster Recovery Fund reserve to enable access to ready cash in the event of a natural disaster. This is intended to assist reinstatement and to finance any short term needs in the time between any disaster and the recommencement of services. Council has chosen not to insure below ground assets given the position of its reserves.

Secondly the TEL Fund was established in September 1995 when TDC sold its investments in Taupō Electricity Ltd and Taupō Generation Ltd. The use of that sale capital and subsequent investment income generated each year are included in Council's Treasury Management Policy. One requirement of that policy is that the portfolio and funds are managed in a manner that reflects their potential utilisation as a disaster recovery fund in the event of a natural disaster within the Taupō district. The TEL Fund value is $65.1m at 30 June 2023.

7.7 Insurance

Council only insures above ground infrastructure assets as specifically identified by the finance team. Underground assets are not insured as Council self-insure for these on the basis that in the event of damage caused by a natural event, essential infrastructure recovery programme funding will be utilised, see Section 7.3 above.

7.8 Risk Register

The specific asset risk register (see following) identifies risks, the consequence of the risk, the existing controls in place, treatment options and the level of risk to the asset as assessed and updated by Council Officers.

The following assessment has not yet been updated to align with the newly adopted framework. A review of risk across the wastewater business is due and this review will be carryout utilizing the Framework.

7.9 Risk Classification Matrices

7.9.1 LIKELIHOOD

Likelihood scale for consideration based on **ANZS 4360** is as follows.

Table 7-1: Risk Likelihood

Level	Descriptor	Damage / Failure Indicative Frequency
A	Almost Certain	Once per year or more frequently
B	Likely	Once every three years
C	Possible	Once every ten years
D	Unlikely	Once every thirty years
E	Rare	Once every 100 years
N	Almost Impossible	Once in 10,000 years

7.9.2 CCONSEQUENCE

A consequence scale as a result of a risk event occurring based on **ANZS 3460** is shown for consideration as follows.

Level	Descriptor	Description
5	Catastrophic	Extreme Impact of damage or failure
4	Major	High impact of damage or failure
3	Moderate	Medium impact of damage or failure
2	Minor	Low impact of damage or failure
1	Insignificant	Very little impact of damage or failure
N	Negligible / Nil	Assessment is Nil

Table 7-2: Risk Consequence

7.9.3 RISK RATING MATRIX

With both likelihood and consequence scales in place a qualitative risk analysis matrix/level of risk can be determined.

	Consequences					
Likelihood	**N**	**1**	**2**	**3**	**4**	**5**
A	N	L	M	H	E	E
B	N	L	M	M	H	E
C	N	L	L	M	M	H
D	N	L	L	L	M	H
E	N	L	L	L	L	M
N	N	N	N	N	N	N

Table 7-3: Risk Matrix

The rating legend for the matrix, in this example, can be summarized as follows.
E = Extreme risk
H = High risk
M = Moderate risk
L = Low risk
N = Negligible risk approaching nil / no risk

7.9.4 RISK MITIGATION MEASURES

High to Extreme risk would normally involve more detailed studies, action plans and management responsibility specifically assigned.

Moderate risk would be managed by monitoring or response procedures and management responsibility specified.

7.9.4.1 Summary of Identified High Risks

This is a summary of the high risks; the complete list is included as Table 7-5.

Table 7-4: Identified High Risks

Asset Risk	The Risk	Mitigation Measures
Fire	Damage to the Reticulation or Treatment system due to structural/electrical system damage of the WWTP or control systems.	Generators, operating procedures, and a list of known local contractors.
Earthquake	Damage to treatment system due to: - Electrical system failure - Earth slip failure - Mechanical failure - Structural failure (e.g., Building, Control Room, settling tanks, clarifiers, trickling filters, digester, belt press, etc.) - Pipe fracture	Built-in generators, staff trained for servicing, list of local Contractors' details available when needed.
Tomo's	Damage to the reticulation system due to pipe fracture, disconnection of joints and/or pump failure	List of local contractors' details for easy assess to a work force

Asset Risk	The Risk	Mitigation Measures
Contractual Obligations not fulfilled by external parties	Failure in the reticulation system due to sewer overflows for failure to address capacity and maintenance issues.	Contract monitoring, performance measures.
Contractual Obligations not fulfilled external by parties	Failure to comply with resource consents	Contract monitoring, performance measures.
Excessive costs to maintain, renew or create assets	Increased failure rates and reactive costs.	Improved planning, timely renewals.
Public safety non-compliance / occupational health and safety non-compliance	Public safety and workers' safety are put at risk due to, Exposure to open manholes, Leaking pipes, Inadequate wastewater treatment, Contaminant discharges to the environment (immediate environs and the Lake), Inadequate training on operation of machines and other devices or Inadequate occupational health and safety trainings.	Public Health Risk Mgt Plans, appropriate signage on hazard areas, upgrade of the WWTP and LDS, spill to environment procedure in place for both river and lake, adequate training provided, adequate PPE for staff)

Table 7-5: Wastewater Risk Register

Asset Management Plan

Risk Register

Division:	Infrastructure	Compiled by:		Date:	
Asset:	Wastewater	Reviewed by:		Date:	

NATURAL RISKS

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Earthquake	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure - Earth slip - Land subsidence causing changes of grade in pipe network.	Major	Unlikely	E (List of local Contractors' details available when needed)	4	D	M	
	Damage to treatment system due to: - Electrical system failure - Earth slip failure - Mechanical failure - Structural failure (e.g., Building, Control Room, settling tanks, clarifiers, trickling filters, digester, belt press, etc.) - Pipe fracture	Catastrophic	Unlikely	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	5	D	**H**	
	Groundwater contamination due to: - Earth slips in LDS.	Major	Unlikely	NC	4	D	M	
	Inaccessibility to network due to footpath/road system failure.	Minor	Unlikely	E (Emergency road repair)	2	D	L	
Volcanic Eruption/ Ash fall	Damage to treatment system due to: - Clogging of open pipes with ash in the WWTPs - Increased solid biomass on the tanks due to ash fall. - Corrosion of equipment due to acid content of the ash	Moderate	Unlikely	E (Water blasting, vacuum trucks, adequate capacity of the grit chamber in the WWTP,	3	D	L	
	Inaccessibility of the WWTP and inability to operate the plant.	Minor	Unlikely	E (Water blasting of access way)	2	D	L	

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Lahar	Damage to the treatment system due to: - Increased solid biomass on the tanks. - Potential corrosion of pipes and machines	Moderate	Rare	E (Water blasting, vacuum trucks)	3	E	L	
	Inaccessibility of the WWTP and inability to operate the plant	Minor	Rare	E (Water blasting of access way)	2	E	L	
Flooding	Inaccessibility of the WWTP and inability to operate the plant.	Minor	Unlikely	E (Use of big trucks)	2	D	L	
	Damage to the treatment system due to: - Silting of tanks - Tank overflow	Moderate	Unlikely	E (Vacuum truck, WWTP has 1-day storage capacity for dry-weather flow, pump out to the LDS which has max of 2-day irrigation capacity)	3	D	L	
	Reticulation system overflow due to: - Stormwater finding its way through to sewer pipes. Silting of pipes	Major	Unlikely	NC	4	D	M	
Tsunami	Damage to reticulation network due to: - Scouring and damage to footpath/road system - Destruction of pump stations and other structures	Major	Rare	E (Pond the area and suck with vacuum truck)	4	E	L	
	Inaccessibility of the WWTP and inability to operate the plant	Minor	Rare	E (Water blasting of access way)	2	E	L	
Fire	Damage to the reticulation network due to: - Structural/electrical system damage of pump station -	Catastrophic	Possible	E (List of local Contractors' details available when needed)	5	C	H	
	Damage to the treatment system due to: - Structural/electrical system damage of the WWTP - Computer system damage	Catastrophic	Possible	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	5	C	H	
Lightning	Damage to the reticulation network due to: - Structural/electrical system damage of pump station	Major	Rare	E (List of local Contractors' details available when needed)	4	E	L	
	Damage to the treatment system due to: - Structural/electrical system damage of the WWTP	Major	Rare	E (built-in generators, staff trained for servicing, list of local Contractors' details	4	E	L	

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
	- Computer system damage			available when needed)				
High winds	Damage to the reticulation network due to: - Structural/electrical system damage of pump station	Major	Unlikely	E (List of local Contractors' details available when needed)	4	D	M	
	Damage to the treatment system due to: - Structural/electrical system damage of the WWTP - Computer system damage	Major	Unlikely	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	4	D	M	
Landslide/Slip	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure - Earth slip - Land subsidence causing changes of grade in pipe network.	Major	Possible	E (List of local Contractors' details available when needed)	4	C	M	
	Damage to treatment system due to: - Electrical system failure - Earth slip failure - Mechanical failure - Structural failure (e.g., Building, Control Room, settling tanks, clarifiers, trickling filters, digester, belt press, etc.) - Pipe fracture	Major	Unlikely	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	4	D	M	
	Groundwater contamination due to: - Earth slips in LDS.	Major	Possible	NC	4	C	M	
	Inaccessibility to network due to footpath/road system failure.	Minor	Possible	E (Emergency road repair)	2	C	L	
Tomos	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure - Land subsidence causing changes of grade in pipe network and loss of support for pipe system.	Major	Likely	E (List of local Contractors' details available when needed)	4	B	H	
	Damage to treatment system due to: - Structural failure (e.g., Building, Control Room, settling tanks, clarifiers, trickling filters, digester, belt press, etc.) - Pipe fracture	Major	Possible	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	4	C	M	

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
	Groundwater contamination due to: - Land subsidence in LDS	Major	Possible	NC	4	C	M	
	Inaccessibility to network due to footpath/road system failure.	Minor	Possible	E (Emergency road repair)	2	C	L	
Geothermal activity	Damage to the reticulation system due to: - Potential corrosion of pipes	Major	Possible	E (Water blasting, ceramic pipes are used in high-risk areas)	4	C	M	
	Damage to the treatment system due to: - Potential corrosion of pipes and machines	Moderate	Possible	E (Immediate water blasting on-site for surfaces and engage Contractors for water blasting of pipes every 3 months)	3	C	M	
	Inaccessibility of the WWTP and inability to operate the plant	Minor	Unlikely	E	2	D	L	

EXTERNAL RISKS

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
War	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure	Major	Almost impossible	NC	4	N	N	
	Damage to treatment system due to: - Electrical system failure - Mechanical failure - Structural failure (e.g., Building, Control Room, settling tanks, clarifiers, trickling filters, digester, belt press, etc.) - Pipe fracture - Inability to operate the WWTP.	Major	Almost impossible	NC	4	N	N	
	Inaccessibility to the network	Minor	Almost impossible	NC	2	N	N	
Terrorism	Damage to reticulation system due to: - Destruction by terrorists	Major	Rare	E (List of local Contractors' details available when needed)	4	E	L	
	Damage to treatment system due to: - Destruction by terrorists - Inaccessibility of the WWTP and inability to operate the plant.	Major	Rare	E (List of local Contractors' details available when needed, staff trained for servicing)	4	E	L	
	Inaccessibility to the network	Minor	Rare	NC	2	E	L	
Protests/Riots	Damage to reticulation system due to: - Destruction by protesters	Major	Unlikely	E (List of local Contractors' details available when needed)	4	D	M	
	Damage to treatment system due to: - Destruction by protesters - Inaccessibility of the WWTP and inability to operate the plant.	Major	Unlikely	E (List of local Contractors' details available when needed, staff trained for servicing)	4	D	M	
	Inaccessibility to the network	Minor	Unlikely	NC	2	D	L	
Vehicle Accident	Damage to reticulation system due to: - Ramming into the pipes, manholes and pump stations	Moderate	Possible	E	3	C	M	

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
	Inaccessibility of the network along the footpath/road after an accident	Minor	Possible	E (Immediate clearing)	2	C	L	
	Inability to address operational issues in the network and WWTP if accident involves staff.	Moderate	Possible	E (Enough staff to cover operations)	3	C	M	
	Damage to treatment system due to: - Ramming of buildings and other structures - Inability to operate the WWTP.	Moderate	Possible	E (List of local Contractors' details available when needed, staff trained for servicing)	3	C	M	
Contractual obligations not fulfilled by external parties	Failure in the reticulation system due to: - Sewer overflows for failure to address capacity and maintenance issues.	Major	Likely	E (Scoring system monitored closely, termination of contract for non-compliance and tendering new one)	4	B	H	
	Failure to undertake network maintenance and maintain the required network performance standard.	Moderate	Likely	E (Scoring system monitored closely, termination of contract for non-compliance and tendering new one)	3	B	M	
	Failure to comply with Resource Consents	Major	Likely	E (Scoring system monitored closely, termination of contract for non-compliance and tendering new one)	4	B	H	
	Failure to implement required works due to lack of feasibility and design works.	Minor	Likely	E (Scoring system monitored closely, termination of contract for non-compliance and tendering new one)	2	B	M	
Excessive costs to maintain, renew or create assets	Failure to maintain the required network performance standard.	Moderate	Likely	E (Will allow for unplanned costs)	3	B	M	
	Failure to comply with Resource Consents	Major	Likely	E (Will allow for unplanned costs)	4	B	H	
	Failure to address service demand.	Moderate	Likely	E (Will allow for unplanned costs)	3	B	M	
Lack of contractors to carry out works	Failure in the reticulation system due to: - Sewer overflows for failure to address capacity and maintenance issues.	Major	Possible	NE	4	C	M	

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
	Failure to undertake network maintenance and maintain the required network performance standard.	Moderate	Possible	NE	3	C	M	
	Failure to comply with Resource Consents	Major	Possible	NE	4	C	M	
	Failure to implement required works.	Moderate	Possible	NE	3	C	M	

OPERATIONAL RISKS

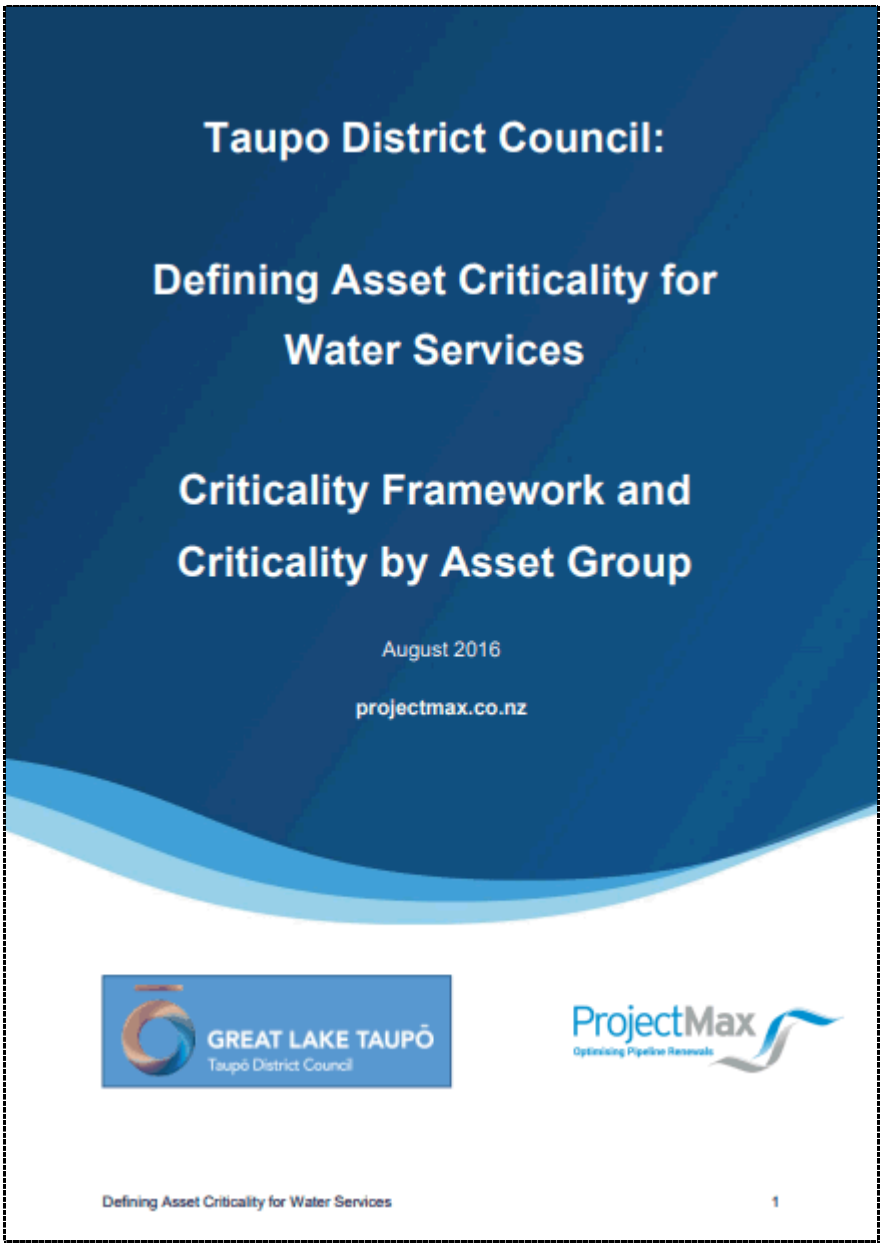
Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Legislative non-compliance	Failure to achieve Levels of Service due to: - Non-compliance to Resource Consents - Unlawful discharges to the environment	Major	Possible	E (capital/renewal/maintenance works programmed)	4	C	M	
	Court subpoena for unlawful acts; specifically, violation to RMA	Major	Possible	E (To be addressed accordingly)	4	C	M	
Lack of asset condition assessment and valuation	Failures in the reticulation system due to: - Sewer overflows - Pipe fracture	Major	Possible	E (Development of an in-house Asset Management System for proper planning)	4	C	M	
	Failure in the treatment system due to: - Electrical system failure - Mechanical failure - Structural failure (e.g., Building, Control Room, settling tanks, clarifiers, trickling filters, digester, belt press, etc.) - Pipe fracture	Major	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning)	4	C	M	
	Failure in the disposal system due to: - Saturation of the field as a result of insufficient capacity	Major	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning	4	C	M	
	Failure to come up with robust capital works, renewal and operational programmes.	Moderate	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning	3	C	M	
	Expenditures are not optimised	Minor	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning	2	C	L	

Asset Risks	The risk: What can happen and how it can happen?	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Incorrect financial projections to create, renew or maintain assets	Delayed project completion	Moderate	Possible	E (Plan Improvement)	3	C	M	
	Over- or under spent budget creating impact on rates and development contributions.	Moderate	Possible	E (Plan Improvement)	3	C	M	
Not meeting community expectations	Loss of ratepayers' faith and trust to Council due to: - Failure to maintain network performance standard. - Failure to deliver the target levels of service.	Major	Possible	E (Plan Improvement)	4	C	M	
Public safety non-compliance/ Occupational Health and safety non-compliance	Public safety and workers' safety are put at risk due to: - Exposure to open manholes - Leaking pipes - Inadequate wastewater treatment - Contaminant discharges to the environment (immediate environs and the Lake) - Inadequate training on operation of machines and other devices - Inadequate occupational health and safety trainings	Major	Likely	E (Public Health Risk Mgt Plans, appropriate signage on hazard areas, upgrade of the WWTP and LDS, spill to environment procedure in place for both river and lake, adequate training provided, adequate PPE gears for staff)	4	B	H	
Loss of asset data/information on assets	Failure to maintain network performance standard due to: - Potential delay in work programmes - Unreliable asset management planning Increased expenditure to recollect the data.	Moderate	Unlikely	E (Robust database and Asset Mgt. System)	3	D	L	
	Failure of in-house AMS	Minor	Unlikely	E (Robust database and Asset Mgt. System)	2	D	L	
High staff turnover and absence of staff to undertake wastewater asset management	Failure to maintain network performance standard due to: - Loss of historical and current knowledge base - Planned programmes tend not to be sustainable. - Learning periods consume significant work time as new staff comes in. - Institutional/Organisational development is not sustained.	Moderate	Likely	E (Organisation restructured to ensure Network Engineers have the capability to address issues across disciplines)	3	B	M	
Lack of management support to the required work programmes	Failure to maintain network performance standard due to: - Disapproval of required work programmes - Insufficient justification to support the program proposals.	Moderate	Likely	E (Proper investigations and scoping to justify the planned works)	3	B	M	

7.10 Critical Assets

A 'critical asset' refers to a key component or element within the wastewater system that is essential for the functioning of the system i.e. where failure of the critical assets would have a significant negative effect. Critical infrastructure assets are vital because their disruption, damage, or destruction could have significant, significant consequences, including economic, public safety, environmental. Therefore, critical assets get extra attention, to ensure they are operating effectively and to reduce the risk of failure. A critical asset may also be renewed sooner that a non-critical asset to failure risk is minimized.

A framework for defining critical assets was completed in 2016 and this framework is the basis for classify criticality of each asset.



The framework has been used to apply criticality scores to reticulation assets and this helps with maintenance (inspections etc) and renewals planning. A GIS based tool is also in the process of being developed that will help with visualization of data and aid with ranking of pipes for

replacement based on a number of factors such as, age, material, condition, criticality etc… This tool is expected to be available for use in mid-2024. Some refinement of the criticality data is required.

The gravity sewer main crosses multiple gullies and is supported by pipe supports and supports in gully banks. These assets are currently undergoing geotechnical and structural assessment to determine if standards are met and if any improvements need to be made.

Criticality assessment at our WWTPs has not been formally completed. Update of our asset data in Asset Finda (AMS) is needed as a first step followed by criticality assessment.

8.0 LIFECYCLE MANAGEMENT PLAN

8.1 Stages of the Asset Lifecycle

This section describes how wastewater assets are managed throughout their lifecycle.

The stages of asset lifecycle are:

1. Identify the need for and construction of NEW ASSETS,
2. OPERATION and MAINTENACE of these assets,
3. Asset RENEWAL and DISPOSAL.

8.1.1 NEW ASSETS

Creation of new assets works fall into two separate categories as follows:

- Council funded works.
- Developer provided assets than are vested in Council i.e. generally reticulation assets constructed as part of new subdivisions etc.

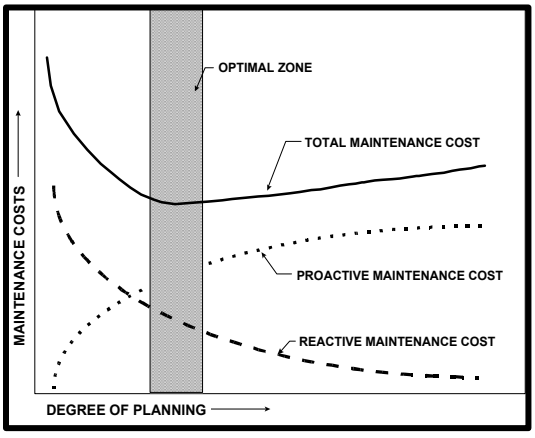
8.1.2 OPERATION AND MAINTENANCE

Routine maintenance falls into two broad categories as follows:

- Planned (Proactive) Maintenance: Proactive inspection and maintenance works planned to prevent asset failure.

- Unplanned (Reactive) Maintenance: Reactive action to correct asset malfunctions and failures on an as required basis i.e. emergency repairs.

A key element of asset management planning is determining the most cost-effective blend of planned and unplanned maintenance as illustrated in the following figure.



To optimize operations and maintenance costs we need good data to track maintenance costs. Councils database for waste and wastewater data is Asset Finda, however not all assets (primarily treatment assets) are in the database yet. Therefore, the optimization of reactive vs pro-active maintenance is made by operation and maintenance staff based on their experience.

8.1.3 RENEWALS AND DISPOAL

Asset renewal is the replacement and/or rehabilitation of existing assets to their original condition and capacity and is done when assets are at end of life. When an asset in no longer required it is disposed of in the asset and financial system.

8.2 Service Delivery & Rationale

The wastewater services are carried out by several providers.

Service	Delivered by	Rationale
Asset Management	Council	We retain in-house knowledge
Project Management (project delivery)	Mix of Council and external Project Managers	Council uses internal staff in the first instance and external PMs when needed.
Construction Projects (generally renewals and new capital works)	Design development (external consultants), planning consents (external consultants), construction contracts (external contractors).	We do not have sufficient scale or capability to have these resources in-house.
Wastewater Treatment Operations and Maintenance	Council with speciality external support where required.	The core role of operation and maintenance of treatment facilities is retained in-house to retain knowledge deliver the service more cost effectively. We engage external support when needed [see table below].
Wastewater Network Operations and Maintenance	Contracted out	Larger contracting companies can provide cost-efficiency through scale that could not be achieved through Council delivery. Larger companies also have a larger capacity outside of the district that can be called upon when needed [see table below].

The following table shows a summary of all TDC operation, maintenance contracts:

Contract Name	Contract No.	Contractor	Approx. Value ($)	Term (Yrs)	Maintenance / Renewal / Asset Creation
Three Waters Network Maintenance Contract	CN000499	Downer	Approximately $6.5 million p.a.	Start date: June 2023. Term: 2 + 2	Mostly reactional electrical and mechanical maintenance but includes some renewal and new works. Includes water wastewater and stormwater.
Vermicomposting Operations	TDC/1617/183	MyNoke	Approximately $300,000 p.a.	Start date: 15 Dec 2016 Term: 5 +5	Operational

Contract Name	Contract No.	Contractor	Approx. Value ($)	Term (Yrs)	Maintenance / Renewal / Asset Creation
Sludge cartage Contract	TDC/1819/265	Site Care	Approximately $400,000 p.a.	Start date: 1 July 2019 Term: 6	Operational
Effluent Disposal Farms Crop Harvesting	TDC/1819/264	Contractor: Pritchard Agricultural Contractors	Approximately $80,000 p.a. Plus, bale ownership is the Contractors	Start date: 1 Oct 2019 Term: 6 +3	Operational and maintenance
Laboratory Testing Services	TDC/1920/300	Eurofins	Approximately $550,000 p.a.	Start date: 8 Jun 2020 Term: 5 +2 +2	Operational Water and Wastewater
Trade Waste Services	-	CoLab (WLASS)	$126k p.a.	Start Date 3 Years 31 May 2021 to 30 June 2024.	Operational

Table 8-1: TDC Operations Maintenance and Renewal Contracts

8.3 Issues and Outlook by Scheme and Asset Type

8.3.1 RETICULATION

SLRAT (Sewer Line Rapid Assessment Tool) is used across our schemes as a performance tracking tool (degree of blockage), and CCTV is used to assess pipe condition and used in a more targeted manner.

Monitoring of 'Inflow and Infiltration' is also an important measure when considering the performance of a wastewater reticulation system. A programme of monitoring and improvement has been proposed for implementation over the next 10-years. While some work has been done in this area in the past it has been short duration projects rather than a sustained programme of work.

An overview of reticulation information and performance is given below.

Scheme	WW main (kms)	Average Installation date (age)	Condition / Performance
Acacia Bay	29	1990 [34 years]	Some I&I issues.
Atiamuri	1	1963 [61 years]	The network is old but is performing well with few blockages. I&I has not been assessed due to a lack of flow monitoring on this scheme. A flow meter will be installed as part of an upcoming WWTP plant upgrade.
Kinloch	44	2002 [21 years]	Some I&I issues.
Mangakino	19	1987 [37 years]	A significant portion of the network has been relined. Significant I&I issues seem to be related to surface features rather than poor pipe condition though more work is required to confirm this.
Motuoapa	13	1993 [31 years]	Some I&I issues seem to be related to lower Motuoapa and tied to lake level rather than due to high rain fall.
Motutere	1	1990 [34 years]	Much of this network is private and managed by the campground operator. Some I&I issues.
Omori	27	1990 [34 years]	Some I&I issues.
Taupo	241	1992 [32 years]	The network has developed overtime and is over mixed age and performance. Some I&I issues in specific areas.
Turangi	56	1976 [48 years]	Despite being one of the older networks conditions is good. Significant I&I issues seem to be related to surface features rather than poor pipe condition.
Whakamaru	2	1985 [39 years]	Some I&I issues.
Whareroa	6	1991 [33 years]	Some I&I issues.

8.3.2 WASTEWATER TREATMENT PLANTS AND DISPOSAL SYSTEMS

Scheme	Treatment Type	Disposal System	Condition / Performance
Acacia Bay	SBR	Rapid Infiltration trenches	Near/at capacity. A nitrogen analyser is to be installed to help performance optimisation. Intention is to connect the scheme to the Taupo WW network.
Atiamuri	Imhoff Tank	Rapid Infiltration trenches	A new WWTP is to be installed in the near term.
Kinloch	MBR	Sub surface drip irrigation and Rapid Infiltration trenches	Has recently had a major upgrade and is performing very well. A further capacity upgrade is scheduled.
Mangakino	SAF	Rapid Infiltration trenches	A new discharge consent requires upgrade of the treatment plant to provide improved nitrogen removal and will also provide increased capacity. Disposal system capacity will also be increased.
Motuoapa	SBR	Rapid Infiltration trenches	The site generally performs well as has sufficient capacity. A nitrogen analyser is to be installed to help performance optimisation.
Motutere	SAF	Surface Spray to trees / grass	An additional SAF tank has recently been added. The carbon bed will require media renewal at some stage in the near future. An additional carbon bed maybe required.
Omori	Oxidation Ponds	Irrigation to pasture	Performing well.
Taupo	Trickling Filters / Anaerobic Digesters	Irrigation to pasture	Some units within the plant are at capacity and upgrades are scheduled. Nitrogen removal at the plant is proposed as an alternative to further expansion of irrigation areas. Recently we have received odour complaints from the plant.
Turangi	MBR	Wetland discharge	Resource consent for discharge has expired and the future state of discharge remains uncertain. A steering group has been established and is looking into land disposal options. A Council decision on future direction is yet to be confirmed. A nitrogen analyser is to be installed to help performance optimisation.
Whakamaru	Textile Bed	Rapid Infiltration trenches	Performing well.
Whareroa	Oxidation Ponds	Irrigation to pasture	Performing well.

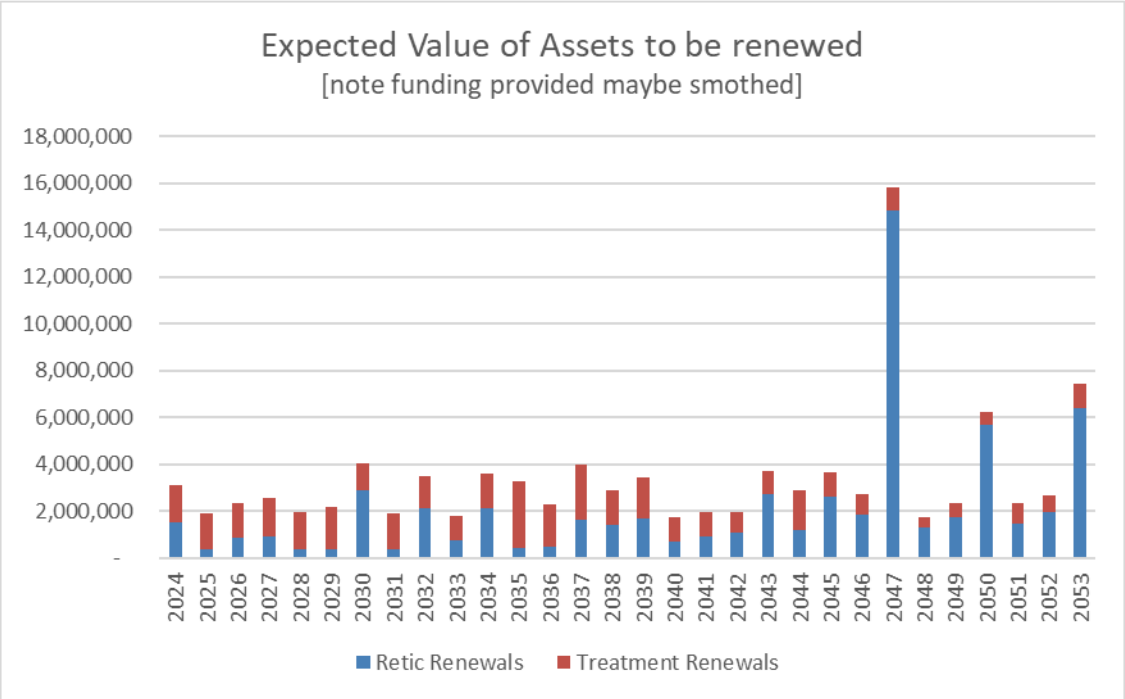
8.3.3 SUMMARY OF NEW CAPITAL WORKS

Growth Project (Yrs 1 – 10)	Value	When
Acacia Bay WAS Tank 2 [Growth]	350,000	2024 – 25

Acacia Bay WW Connection to Taupo (Acacia Bay WWTP retained) **[Growth]**	2,500,000	2026 - 28
Kinloch WW MBR upgrade - Second reactor **[Growth]**	1,600,000	2025 – 27
Mangakino WWTP Upgrade **[Growth]**	7,000,000	2026 – 28
Taupo North Wastewater solution **[Growth]**	6,300,000	2028 – 31
Taupo WW Eastern trunk main capacity upgrade **[Growth]**	2,200,000	2028 – 30
Taupo WW Control gates bridge buffer storage tanks	2,700,000	2024 – 27
Taupo WW Southern Trunk Sewer Main **[Growth]**	6,700,000	2022 – 24
Taupo WWTP Building Alteration	200,000	2024 – 25
Taupo WWTP Primary Settling Tank #3 **[Growth]**	3,500,000	2023 - 25
Taupo WWTP Side Stream - Solids Filtrate Treatment **[Growth]**	4,600,000	2024 - 26
Taupo WWTP Transfer pump station upgrade **[Growth]**	900,000	2024 - 26
Turangi WW Disposal Solution **[LoS]**	17,000,000	2024 - 29
Whareroa WWTP Irrigation expansion **[Growth]**	300,000	2029 - 34

8.3.4 RENEWAL FORECAST

The chart below shows the expected value of renewal work needed in each year for the next 30 years. The significant spike in cost in 2047 is due to large portions of the Turangi reticulation system reaching end of life.



8.3.5 RESOURCE CONSENTS

TDC have acquired numerous resource consents for the wastewater reticulation and treatment and disposal systems. The table below summarises the consented wastewater discharges for each scheme, along with the date that the consent expires.

Table 8-10: Summary of Wastewater Resource Consents

Resource Consent	EW File Number	Location	Purpose	Granted Date	Expiry Date	Status
951023	60 55 12A	Mangakino Sewage	Discharge up to 1000 m^3/day of treated domestic effluent into the ground per day in the vicinity of Mangakino Reserve, Lake Maraetai.	28/01/1997	30/12/2016	Exipred, new consent application lodged.
102927	60 55 18A	(Turangi Sewage) Awamate Rd - Turangi	Discharge treated domestic effluent to the Hangarito Stream & Taupo South wetland	23/06/2003	23/06/2018	Exipred, new consent application lodged.
109488	60 01 86A	(Atiamuri Village) SH1 - Atiamuri	Discharge up to 64 cubic metres per day of treated municipal sewage effluent into the ground	6/05/2004	1/03/2024	Exipred, new consent application lodged.
116596	60 55 42A	View Road, Taupo	Discharge up to 15,000 cubic metres per day of treated wastewater from the Taupo Pollution Control Plant to land via surface irrigation, and associated discharges to air	11/03/2008	31/12/2032	Current
121289	60 55 42B	Rickit Street, Taupo	Discharge contaminants to air (odour) arising from the storage, transfer, treatment and disposal of liquid and solid waste, the production and collection of biogas, and operation of a standby diesel generator in the vicinity of the Taupo Wastewater Treatment Plant	8/11/2010	31/12/2032	Current
122515	60 55 30A	Parekawa Drive - Motouapa	Discharge up to 500 cubic metres per day of treated wastewater to ground from the Motuoapa SBR wastewater plant.	13/11/2013	13/11/2033	Current
122517	60 55 30A	Parekawa Drive - Motouapa	Discharge contaminants to air in association with the operation of an SBR wastewater plant Treatment Plant	13/11/2013	13/11/2033	Current
122518	60 55 06A	Acacia Bay Road, Taupō	Discharge up to 920 m^3/day of treated wastewater to land	15/10/2015	25/10/2035	Current
122519	60 55 06A	Acacia Bay Road, Taupō	Discharge contaminants to air from a wastewater treatment plant	15/10/2015	25/10/2035	Current
130354	60 01 88A	Whakamaru Village Pokuru Road Whakamaru	Discharge treated municipal wastewater to land and contaminants to air from the Whakamaru WWTP	24/05/2016	31/05/2036	Current
113402.01	60 55 10A	(Kinloch Sewage) Kinloch	Discharge up to 1500 m^3/day of treated wastewater from the Kinloch WWTP to various disposal sites in the Kinloch are	22/01/2014	31/01/2039	Current
113402.02	60 55 10A	(Kinloch Sewage) Kinloch	Discharge contaminants to air in association with the operation of the Kinloch WWTP	22/01/2014	31/01/2039	Current
138347	60 54 64A	Whareroa Road - Whareroa	Discharge treated municipal wastewater to land and contaminants to air from the Whareroa WWTP	24/01/2019	31/01/2039	Current
135813.01.01	60 55 28A	Motutere	Discharge treated domestic wastewater from the Motutere community on to land	2/07/2020	30/06/2040	Current
135813.02.01	60 55 28A	Motutere	Discharge contaminants to air from Motutere WWTP	2/07/2020	30/06/2040	Current
135630.01.01	60 55 42A	Rakaunui Road - Taupō	Discharge treated municipal wastewater from the Taupō WWTP to land, and associated discharges to air at Rakaunui Road	18/04/2023	17/04/2043	Current
135810	60 54 69A	Morunga Street - Omori	Discharge treated domestic wastewater from the Omori, Kurutau and Pukawa communities to land	11/03/2019	31/03/2044	Current

9.0 FINANCIAL SUMMARY

9.1 Process of Determining Financial Forecast

The 30-year financial forecast for the wastewater activity has been determined by identifying the need for new capital works, renewal of end-of-life assets, and the associated ongoing operation and maintenance costs.

9.1.1 CHANGES BETWEEN DRAFT AND FINAL BUDGETS

The following changes have been made from draft to final budgets:

[TBC]

[TBC]

[TBC]

9.2 Funding of Expenditure

Revenue and Financing Policy 2021 sets out who pays for the activities that Council undertakes on behalf of the community and how these activities will be funded.

9.2.1 FUNDING STRATEGY

Current funding sources available for wastewater include:

- Targeted Wastewater Rates (~95%)
- Development Contributions (by developers under the Local Government Act 2002)
- One off capital contribution made by developers for projects that are of particular benefit to them that are being constructed by TDC.
- Developer funded works projects where ownership is vested to TDC on completion.
- New connection Fees
- Tradewaste charges fees and charges.

9.2.2 ALLOCATION OF FUNDS

- New Works – largely funded by development contributions and loans.
- Renewal works – largely funded by depreciation that is collected over the life of asset, or by new loans if no depreciation reserve is available.
- Maintenance and operations are funded from general rates.

9.3 Forecast Expenditure [to be updated]

Budgeted wastewater expenditure for the next 10 years is summarised on the following pages. The capital expenditure due to changes in demand is documented in section 6.5.2.

9.3.1 CAPITAL WORKS AND RENEWALS FORECAST

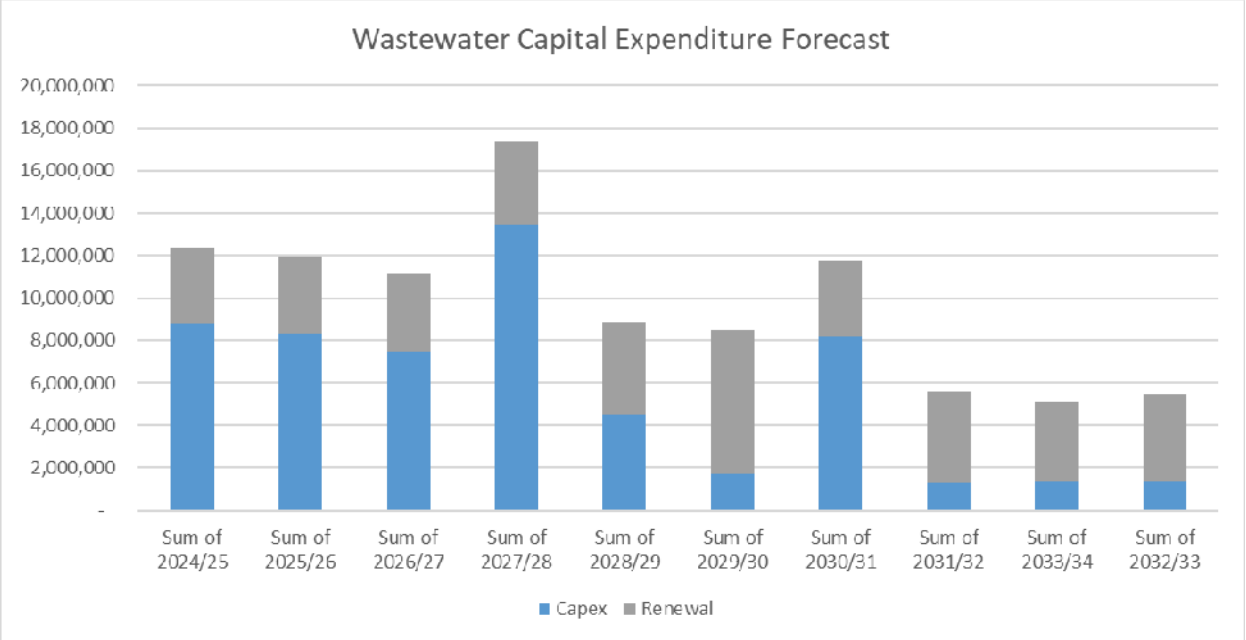


Figure 9-1: New Works Expenditure and Renewals Expenditure

The timing of renewal for an asset is based on assessment as the asset is nearing the end of its useful life. Assets are depreciated using straight-line depreciation; except for land which is not depreciated. The depreciation rates are applied at a component level and are dependent on the remaining useful life of each component. The useful lives for each asset type are assigned in *Asset Finda*.

9.3.2 OPERATING AND MAINTENANCE COST FORECAST

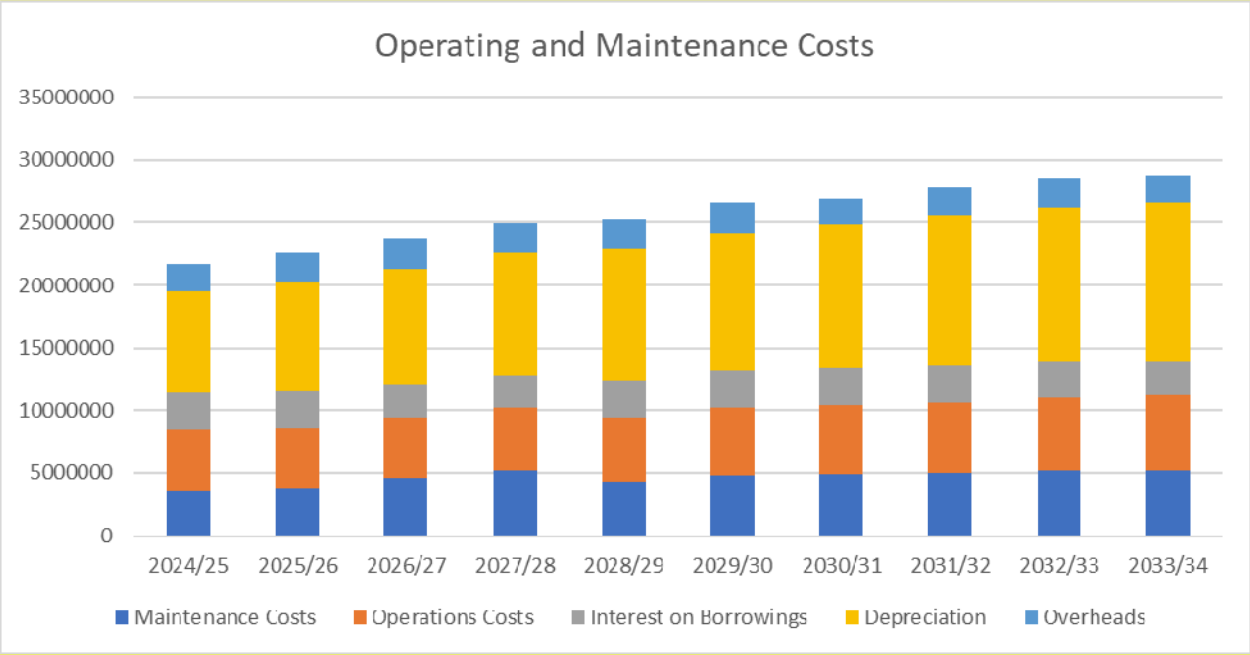


Figure 9-2: Operating and Maintenance Expenditure

9.3.3 CAPEX: DISPOSAL

No significant asset disposals are expected in the next 10-years.

9.3.4 TOTAL EXPENDITURE AND FUNDING

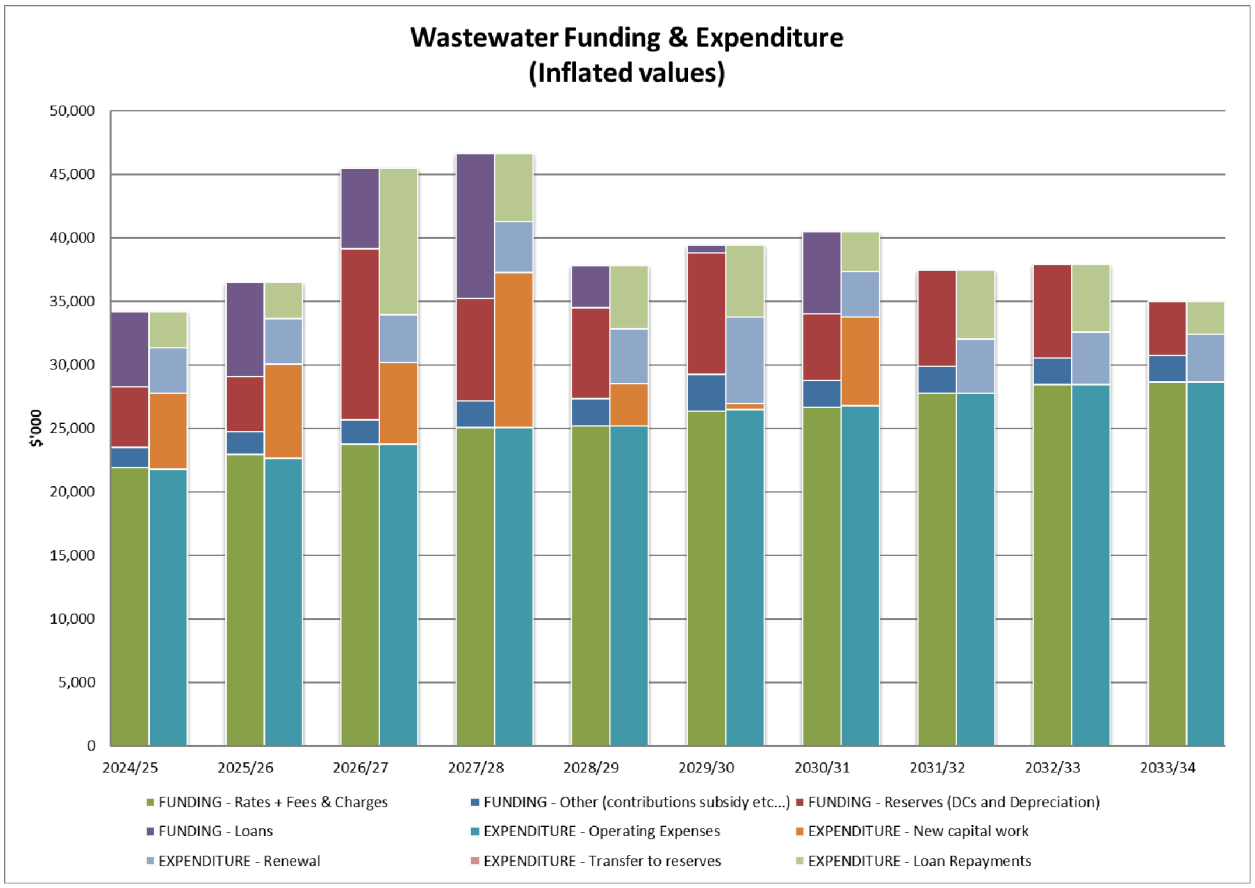


Figure 9-3: Wastewater Funding and Expenditure

9.4 Valuation of Wastewater Assets

Wastewater assets provide a continuing service to the community and are not generally regarded as tradable. The cost to replace an asset with the Modern Equivalent Asset (MEA) is used as a basis to determine replacement value. This AMP is being updated with the latest Asset valuations of 2023.

Refer to Section 4 (Asset Data), for a summary of the valuation of wastewater assets. A full valuation report is available on request.

9.5 Financial Confidence Levels

The confidence in the asset data used as a basis for the financial forecasts has been assessed using the following grading system from the International Infrastructure Management Manual – Australia/New Zealand Edition, April 2000.

Table 9-1: Confidence Grading Table

Confidence Grade	General Meaning
A	Highly reliable. Data based on sound records, procedure, investigation and analysis, documented properly and recognised as the best method of assessment
B	Reliable. Data based on sound records, procedures, investigation and analysis, documented properly but has minor shortcomings, for example the data are old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.
C	Uncertain Data based on sound records, procedure, investigation and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available
D	Very Uncertain. Data based on unconfirmed verbal reports and/or cursory inspection and analysis.

The confidence level is B+ overall. The financial cost within the first 3 years is seen as reliable with reliability decreasing with time. Also, reliability depends on the phase of project with reliability increasing as project moves from scoping to construction. Financial confidence will improve as *Asset Finda* is more broadly used and asset data knowledge improves.

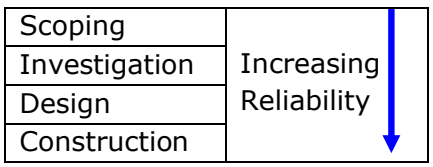


Table 9-2: Financial Table (inflated) for the 10 Year 2024-2034 ($,000)

Wastewater										
Financial Summary										
For the 2025-34 Asset Management Plan										
	2024/25	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2032/33**	**2033/34**
Revenue										
General Rates	-	-	-	-	-	-	-	-	-	-
Targeted Rates	(21,507)	(22,543)	(23,373)	(24,655)	(24,785)	(25,922)	(26,239)	(27,315)	(27,973)	(28,153)
Operating subsidies & Other	(1,623)	(1,798)	(1,890)	(2,098)	(2,073)	(2,083)	(2,079)	(2,109)	(2,123)	(2,137)
Fees and charges	(380)	(390)	(400)	(410)	(421)	(430)	(440)	(450)	(459)	(469)
Total Revenue	**(23,511)**	**(24,731)**	**(25,663)**	**(27,163)**	**(27,279)**	**(28,435)**	**(28,758)**	**(29,874)**	**(30,555)**	**(30,759)**
Operating Expenses										
Maintenance Costs	3,566	3,783	4,563	5,221	4,339	4,773	4,895	5,002	5,227	5,220
Operations Costs	4,892	4,855	4,825	4,980	5,137	5,435	5,573	5,624	5,795	5,974
Interest on Borrowings	3,113	2,956	2,731	2,745	2,938	2,857	2,895	2,915	2,731	2,585
Depreciation	8,087	8,706	9,191	9,781	10,401	10,941	11,395	11,948	12,373	12,810
Overheads	2,155	2,358	2,462	2,339	2,391	2,459	2,037	2,276	2,306	2,032
Total Operating Expenditure	**21,813**	**22,658**	**23,772**	**25,066**	**25,206**	**26,465**	**26,795**	**27,765**	**28,432**	**28,621**
Net Deficit (Surplus) of Operations	**(1,698)**	**(2,073)**	**(1,891)**	**(2,097)**	**(2,073)**	**(1,970)**	**(1,963)**	**(2,109)**	**(2,123)**	**(2,138)**
Funded by:										
Transfers to/from Reserves	1,698	2,073	1,891	2,097	2,073	1,970	1,963	2,109	2,123	2,138
Check balance	-	-	-	-	-	-	-	-	-	-
Capital Expenditure										
Renewals	3,625	3,591	3,730	3,987	4,323	6,808	3,557	4,276	4,154	3,777
New Capital Expenditure	**2024/25**	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2032/33**	**2033/34**
Kinloch WW MBR upgrade - Second reactor	-	103	1,579	-	-	-	-	-	-	-
Taupo North Wastewater solution	-	-	-	-	166	170	6,952	-	-	-
Taupō WW Control gates bridge buffer storage tanks	200	2,563	-	-	-	-	-	-	-	-
Taupō WW Southern Trunk Sewer Main	3,911	-	-	-	-	-	-	-	-	-
Taupō WWTP Primary Settling Tank #3	1,250	1,281	-	-	-	-	-	-	-	-
Taupō WWTP Side Stream - Solids Filtrate Treatment	100	1,538	3,158	-	-	-	-	-	-	-
Taupō WWTP Transfer pump station upgrade	-	922	-	-	-	-	-	-	-	-
Whereroa WWTP Irrigation expansion	-	-	-	-	-	340	-	-	-	-
Acacia Bay WAS Tank 2	-	359	-	-	-	-	-	-	-	-
Acacia Bay WW Connection to Taupō (Acacia Aby WWTP retained)	-	-	526	2,160	-	-	-	-	-	-
Atiamuri WWTP Upgrade	-	615	-	-	-	-	-	-	-	-
Mangakino WWTP Upgrade	-	-	526	7,020	-	-	-	-	-	-
Taupo Wastewater - WWTP Primary Clarifier #3 2024 projects	270	-	-	-	-	-	-	-	-	-
Taupō WWTP Building Alteration	200	-	-	-	-	-	-	-	-	-
Tūrangi WW Discharge Improvements	-	-	372	3,049	3,126	-	-	-	-	-
Water and Wastewater Portable Generator and storage shed	-	-	263	-	-	-	-	-	-	-
Total New Capital Expenditure	**5,931**	**7,381**	**6,424**	**12,229**	**3,292**	**510**	**6,952**	**-**	**-**	**-**
Total Capital Expenditure	**9,556**	**10,972**	**10,154**	**16,216**	**7,615**	**7,318**	**10,509**	**4,276**	**4,154**	**3,777**

10.0 ASSET MANAGEMENT PRACTICES

10.1 Current Asset Management Practices

Asset management practices for three water infrastructure involve strategies and methodologies aimed at efficiently managing, maintaining, and optimizing assets such as treatment plants, distribution networks, storage facilities, and wastewater systems. Key aspects include:

Asset Register and Asset Data Management

Reticulation assets are currently being recorded in *Asset Finda* asset management software; with pump station, treatment plant assets being managed by spreadsheet. In the future the intent is to use *Asset Finda* as the sole source of asset data and management for the three-waters; including condition data, maintenance records, performance data and asset valuation. Asset data comes from a variety of sources and the graphic below provides an overview of the data flow.

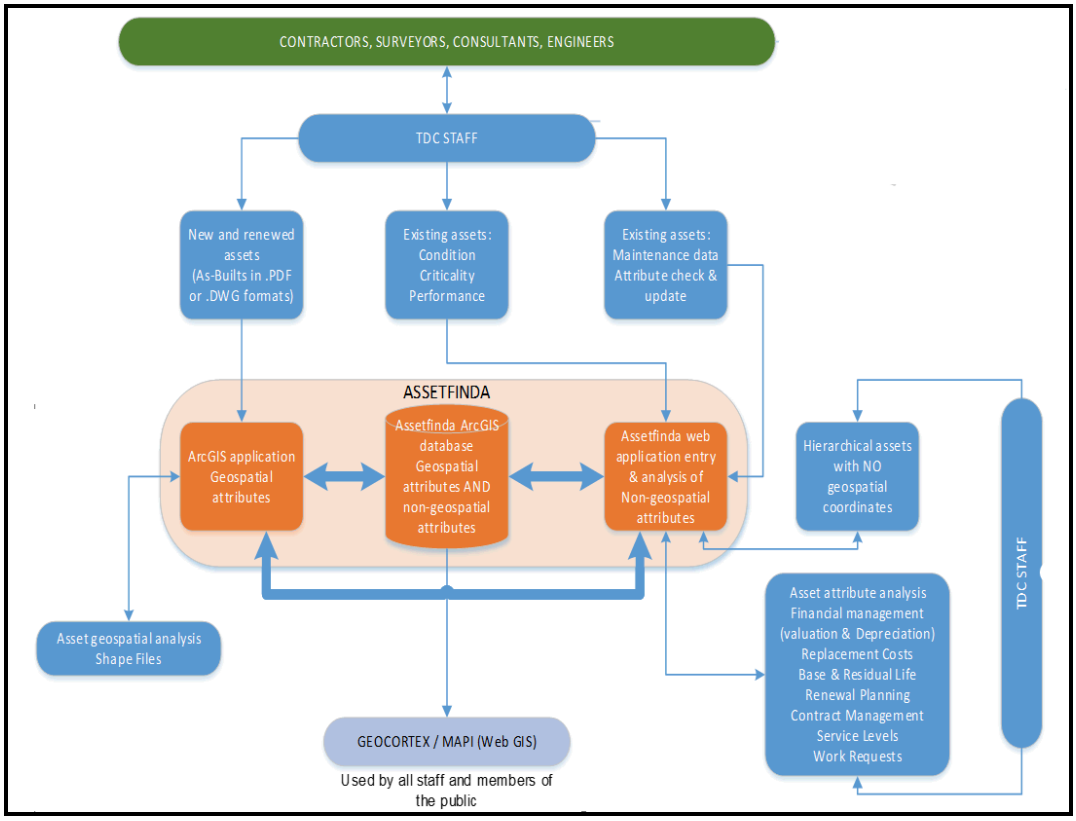


Figure 10-2: Asset Data Management

The asset re-valuation for the three-waters assets is undertaken every three years. New assets or disposal of assets are taken into account at this time. The valuation process is performed in accordance with generally accepted accounting standards and with NZ local authority asset management practice (NAMS). The process also takes into account reviewing the useful lives of each asset type. This work is done by an external party.

Levels of Service (including Stakeholder Engagement)

Most of the Levels of Service defined are based on, 'Local Government Mandatory Performance Measures', and on the feedback from consultation with customers. We solicit feedback to align asset management and service delivery with stakeholder needs and priorities. Consultation on customer satisfaction on three waters was last undertaken in 2016.

Risk Management

Implement risk management techniques to prioritize maintenance and rehabilitation efforts based on factors such as asset criticality, likelihood of failure, consequences of failure, and regulatory compliance requirements.

Lifecycle Planning

Develop long-term lifecycle plans for water assets, considering factors such as asset deterioration, technological advancements, population growth, and regulatory changes. This involves forecasting asset performance over time and planning for necessary upgrades or replacements.

A growth model is typically updated on a three-year basis to reflect changes in development patterns. This model predicts the spread and level of growth within the Taupō District Council Area. This model assists Asset Managers in planning forward works for their respective assets.

Creation of New Assets

The drivers for new works are generally to meet a changing Level of Service or to accommodate growth. Changing regulation can also often drivers the need for a higher level of service to be provided.

New works expenditure projects displaying one or more of the following characteristics:

- Construction works which create a new asset that did not previously exist in any shape or form,
- Expenditure which purchases or creates a new asset (not a replacement) or in any way improves an asset beyond its original design capacity,
- Upgrade works which increase the capacity of the asset,
- Construction works designed to produce an improvement in the standard and operation of the asset beyond its current capacity.

To the extent that a project results in replacement of an asset caused by physical deterioration, and also provides capacity for increased demand, proportions should be allocated to both creation and renewals on the basis of marginal cost.

Maintenance and Renewal

Maintenance is a combination of planned and reactive maintenance. Proactive maintenance programs are used to address routine maintenance tasks, preventive maintenance activities, and rehabilitation needs.

Routine maintenance projects can be expected to display some or all the following characteristics:

- regular and ongoing annual expenditure necessary to keep the assets at their required service potential,
- day to day and/or general upkeep works designed to keep the assets operating at required levels of service,
- works which provide for the normal care and attention of the asset including repairs and minor replacements,
- minor response type remedial works i.e., isolated failures requiring immediate repair to make the asset operational again.

While some renewals are reactive most of renewal expenditure are planned projects. Prioritization and timing of renewal projects is dependent on age, condition assessment, asset criticality among other factors. There is no formal process for determining when a renewal should be undertaken as opposed to continuing to maintain. These decisions are largely based on judgement but with the aim to minimise long-term cost and maintain a high level of reliability.

Work displaying one or more of the following attributes, can be classified as renewal expenditure:

- works which do not increase the capacity or service potential of the asset, i.e. works which upgrade and enhance the assets restoring them to their original size, condition, capacity etc,
- the replacement component of augmentation works which increase the capacity of the asset, i.e., that portion of the work which restores the assets to their original size, condition, capacity etc.,
- the replacement component of a new work which replaces the redundant element of an existing asset,
- reconstruction or rehabilitation components of works involving improvements, realignment and re-grading,
- renewal and/or renovation of existing assets, i.e., restoring the assets to a new or fresh condition.

Asset Performance Monitoring

A variety of tools are used in the wastewater space for asset monitoring. Systems include SLRAT (sewer-line rapid assessment tool) and CCTV inspections for pipe reticulation systems, real-time monitoring via SCADA (Supervisory Control and Data Acquisition) systems and throw physical inspection and observation.

Financial Planning and Management

The LTP contains an action plan that sets out how Council will deliver services in the short term (3 years) and long term (10 years). During the LTP financial plans are prepared to enable funding of the asset management activities, including capital investment, operation and maintenance costs, etc. The LTP draws on information from other documents including the Asset Management Plans and models it in financial terms over a ten-year horizon. An Annual Plan can be used if a significant change is needed between LTP periods.

The work category type, and funding sources are identified. Cost data for the asset groups are identified in the accounting records.

Council uses a renewal accounting system. The asset management renewal and capital expenditure policy are included as Appendix A.

Continuous Improvement

By implementing these asset management practices, water utilities can enhance operational efficiency, prolong the lifespan of assets, minimize risks, and ensure the reliable delivery of water services to communities.

Asset Management Plans are reviewed alongside each LTP. External review of the AMPs is also undertaken on a three yearly cycle following adoption of the LTP.Recommendations for improvement are provided.

The outputs from this review process and any other improvements that are identified have been placed into the improvement section of the AMP.

11.0 IMPROVEMENT PLAN AND MONITORING

11.1 Improvement Plan

Improving the management of Taupo District Council's water assets is a continual and on-going process. During the course of updating this plan, asset management improvement tasks have been noted for follow-up over the next three years in conjunction with reviewing and improving this plan. This programme reflects the overall aim of improving asset management practices, which is to deliver the right level of service at the lowest long-term cost to TDC's customers.

The Water, Wastewater and Stormwater AMPs were independently peer reviewed in 2022 by Waugh consultants. A number of improvements were identified. While some improvements have been implemented any other recommendations not completed during the updated AMP process cycle are added to the Improvement plan (section 11.2) with dates which can be monitored.

Any feedback from Audit NZ on this AMP or AMPs in general is also considered when updating these plans.

Resources (cost and time) have yet to be approved and are only estimates at the time of updating AMP. These may need to be reviewed when task is in progress to judge if timeframe and cost is realistic

Area	AMP Level	External ref.	Reference Area	Improvement Element	Action/task description / comment	Rank / Score (lower score need more focus)	Status / comment
ASSET DATA	Core	Waugh review 2022	1.2	Adequate Financial Description	b. Significant acquisitions or replacements of assets undertaken shown and reasons why acquired or replaced	**3**	
ASSET DATA	Core	Waugh review 2022	1.4	Asset Register Functionality	a. Single asset register for storage of primary asset attributes (data, criticality, condition, performance and Mtce records)	**3**	Asset Finda use to be expanded.
ASSET DATA	Core	Waugh review 2022	1.4	Asset Register Functionality	d. Ability to aggregate or dis-aggregate to readily use information/data	**3**	Asset Finda use to be expanded.
ASSET DATA	Core	Waugh review 2022	1.4	Asset Register Functionality	e. The aggregate/dis-aggregate process explained and how used in maintenance planning i.e. Work orders applied at asset component level but aggregated for AM reporting	**3**	
ASSET DATA	Core	Waugh review 2022	1.4	Asset Register Functionality	h. Asset register records/ reports can support mandatory performance measure reporting	**3**	
ASSET DATA	Intermediate	Waugh review 2022	1.6	Physical attributes (Material, age, location)	a. Shows knowledge of the parameters for Material, size, age install date, location, Data reliability etc.	**3**	
ASSET DATA	Intermediate	Waugh review 2022	1.7	Systematic monitoring of condition	a. A good understanding of remaining life of all critical assets compared to their design and types of asset failure	**3**	
ASSET DATA	Intermediate	Waugh review 2022	1.8	Systematic measurement performance - Utilisation/capacity	c. Processes are in place (and documented) to capture, update and report on asset performance, including mandatory performance measures	**3**	
ASSET DATA	Intermediate	Waugh review 2022	1.8	Systematic measurement performance - Utilisation/capacity	d. Link KPI's with performance monitoring where applicable	**3**	
ASSET DATA	Core	Waugh review 2022	7.2	Accuracy of asset inventory	a. Documented process exists for updating maintenance data and used on an on-going basis	**3**	
ASSET DATA	Intermediate	Waugh review 2022	7.8	High level of confidence in critical asset data	a. High level of confidence in critical asset data (for valuations)	**3**	
ASSET DATA		Internal			Asset inventories for all wastewater pump stations to be included in Asset Management System.	High	Part complete
ASSET DATA		Internal			Asset inventories for all wastewater treatment plants to be included in Asset Management System.	High	Minimal progress
ASSET DATA		Internal			Continue to update valuation data in the AMS with the intention of being able to undertake full valuations through AMS.	High	Part complete, more work needed on WWTPS and PSs.
ASSET DATA		Internal			Improve asset condition and asset performance data for underground assets (manholes and pipes) in addition to asset age and physical description; to enable better end of life and financial forecasting.	Med	Network data being updated with CCTV inspection reports.

ASSET DATA		Internal			Update of management plans for wastewater treatment plants (on-going in line with RC applications).	High	Some recently complete.
ASSET DATA		Internal			Review operation and maintenance manuals for wastewater treatment facilities, including P&IDs etc…	High	Some plants have existing O&Ms, some do not.
ASSET DATA		Internal			Include section in the AMP on new subdivisions/assets gained	Low	
ASSET MANAGEMENT PRACTICES		AUDIT NZ Refer section 4.3 & 10.4.6			The AMPs detail regarding the Council's asset management quality assurance processes to ensure integrity of asset data is too brief in the AMPs.	Med	
ASSET MANAGEMENT PRACTICES		AUDIT NZ Refer section 10.4.4			Condition assessments are performed, however the condition grading model as per the NAMS IIMM manual is not detailed in the AMPs.	Med	
ASSET MANAGEMENT PRACTICES		AUDIT NZ Refer section 1.6.2			Detailing in the AMPs involvement by councillors, including the reviewing and approving of the AMPs.	Low	
ASSET MANAGEMENT PRACTICES		Internal			Asset maintenance activities within AMPs are at a very high level and would benefit from greater granularity.	Low	
FINANCIAL SUMMARY	Core	Waugh review 2022	6.2	Validate Depreciation or decline in Service Potential	c. A processes for determining asset useful lives, renewal costs and rates enables a valid depreciation calculation	**3**	
FINANCIAL SUMMARY	Core	Waugh review 2022	6.2	Validate Depreciation or decline in Service Potential	d. Analysis of differences between depreciation and asset renewal programme costs described with description of gaps or issues	**3**	
FINANCIAL SUMMARY	Intermediate	Waugh review 2022	6.5	Translate operational, planned maint, renewal & new work into financial terms over period of strategic plan/asset lifecycle	a. There is a clear link between the asset strategies and expenditure forecasts	**3**	
FINANCIAL SUMMARY			4.1		Though the Council has valuations performed and use the data to inform asset planning, the AMPs do not detail the valuation process.	Med	
FINANCIAL SUMMARY		Internal			Sensitivity analysis on financial forecasts	Low	
FUTURE DEMAND	Core	Waugh review 2022	3.2	Demand Management drivers documented	d. Processes are in place (and documented) to capture, update and report on utilisation. This in utilities will be network models for medium sized communities and larger or where higher levels of risk and growth requires this	**3**	
FUTURE DEMAND	Core	Waugh review 2022	3.2	Demand Management drivers documented	e. Service capacity modelling directly reflects growth and demand strategies to confirm and established position on future upgrades	**3**	
FUTURE DEMAND	Core	Waugh review 2022	3.3	Demand Management strategies documented	b. Efficiency of service is known with defined targets (as an example in water supplies: unaccounted of water known and cost to community and WW about I &I)	**3**	

FUTURE DEMAND	Core	Waugh review 2022	3.3	Demand Management strategies documented	c. Future predictions of development and asset creation are made based on analysis of all factors to reduce risk of under- or over-investment. The NPS and other national requirements are included in the analysis	**3**	
FUTURE DEMAND	Intermediate	Waugh review 2022	3.7	Sensitivity of asset development (Capital works) to demand changes	b. Capacity/demand forecasts are based on knowledge of all components that make up demand (e.g. population changes, customer types), and changing trends (e.g. changes in service standards)	**3**	
FUTURE DEMAND	Intermediate	Waugh review 2022	3.7	Sensitivity of asset development (Capital works) to demand changes	c. Processes in place to monitor current asset capacity against demand predictions and use this data to plan future asset needs at an asset level	**3**	
FUTURE DEMAND		Internal			Update growth projections to resolve uncertainties in current data and forecasts.	High	Growth model has not been updated since 2017 and is not likely out of date. Growth over the past few years exceeded forecasts.
FUTURE DEMAND		Internal			Link growth model to the assets that are required with supporting information.	Med	
INFRASTRUCTURE STRATEGY	Core	Waugh review 2022	13.3	Infrastructure Strategy Assumptions	a. Assumptions about lifecycle of significant infrastructure assets are documented	**2**	
INFRASTRUCTURE STRATEGY	Core	Waugh review 2022	13.3	Infrastructure Strategy Assumptions	b. Assumptions about growth or decline in demand for relevant services are documented	**2**	
INFRASTRUCTURE STRATEGY	Core	Waugh review 2022	13.3	Infrastructure Strategy Assumptions	c. Assumptions about increases or decreases in relevant levels of services are documented	**2**	
INFRASTRUCTURE STRATEGY	Core	Waugh review 2022	13.3	Infrastructure Strategy Assumptions	d. Where assumptions involve a high level of uncertainty - the nature of the uncertainty and potential effects of the uncertainty are documented	**0**	
INFRASTRUCTURE STRATEGY	Core	Waugh review 2022	13.4	Infrastructure issues and actions discussed	b. AM Strategy discussed	2	
LEVEL OF SERVICE		Internal			Gauge customer opinion more thoroughly as part of increased consultation.	Med	
LEVEL OF SERVICE		Internal			Expanding the capital expenditure linkage detail within the AMPs to include linking capital expenditure to demand, maintenance or renewal, in addition to Levels of Service.	Low	
LIFECYCLE MANAGEMENT	Core	Waugh review 2022	5.1	Lifecycle and Asset Management Practices	l. Deferred maintenance and renewals are identified and reason for deferral shown	1	
LIFECYCLE MANAGEMENT	Core	Waugh review 2022	5.1	Lifecycle and Asset Management Practices	p. Developer created assets are well managed and controlled to ensure vested assets are to council standards	3	
LIFECYCLE MANAGEMENT	Core	Waugh review 2022	5.3	Evaluation and ranking based on criteria of options for capital invest decisions	a. Long term consideration of $ and that includes mtce and other costs	3	

LIFECYCLE MANAGEMENT	Core	Waugh review 2022	5.4	Maintenance Outcomes, Strategies, Standards and Plan documented	a. Maintenance Outcomes, Strategies, Programmes, Standards and Plans are known and documented for critical assets and effects of critically are reflected in the maintenance plan	3	
LIFECYCLE MANAGEMENT	Core	Waugh review 2022	5.4	Maintenance Outcomes, Strategies, Standards and Plan documented	b. Asset register contains sufficient and accurate maintenance data appropriate to asset size/value	3	
LIFECYCLE MANAGEMENT	Intermediate	Waugh review 2022	5.6	Lifecycle Optimisation - Asset renewal optimisation	b. Renewal planning is detailed for short term (3 years) and known/documented for long term	3	
LIFECYCLE MANAGEMENT	Intermediate	Waugh review 2022	5.6	Lifecycle Optimisation - Asset renewal optimisation	e. Condition and performance is incorporated in overall reporting and assessment umbrella with linkage with asset register	3	
LIFECYCLE MANAGEMENT	Intermediate	Waugh review 2022	5.8	Lifecycle Optimisation - Apply agreed evaluation tools to prioritise work programmes	c. Processes ensure that projects are carried out at optimal timings and to maintain service level targets	3	
LIFECYCLE MANAGEMENT	Intermediate	Waugh review 2022	5.8	Lifecycle Optimisation - Apply agreed evaluation tools to prioritise work programmes	d. Critical assumptions and estimates are tested for sensitivity of results	1	
LIFECYCLE MANAGEMENT		Internal			Develop a reticulation renewals programme that uses condition inspection information rather than age and material only.	High	In progress as more condition data is collected.
LIFECYCLE MANAGEMENT		Internal			Optimize renewals programmes based on Asset Management principles for reticulation and treatment facilities.	Med	
RISK MANAGEMENT	Core	Waugh review 2022	4.1	Identify critical Assets	a. All assets assessed for criticality (including facilities assets)	3	
RISK MANAGEMENT	Core	Waugh review 2022	4.2	Identify significant negative effects	b. Procedure in place to mitigate significant negative effects	0	
RISK MANAGEMENT	Core	Waugh review 2022	4.4	Identify associated risks and Risk Management strategies for critical assets	c. Documented risk management strategies and mitigation considered and used where necessary for critical assets	3	
RISK MANAGEMENT	Intermediate	Waugh review 2022	4.5	Recognition & application of principles of integrated Risk Management to assets demonstrated	a. Understand and implement risk management across all areas of that service that includes documented options to manage the assessed risk and systems and process in place to support risk management	3	
RISK MANAGEMENT	Intermediate	Waugh review 2022	4.5	Recognition & application of principles of integrated Risk Management to assets demonstrated	b. The risk management process is applied to all significant/critical assets at an individual level, and to less critical assets at a group or facility level	3	
RISK MANAGEMENT		Internal			Continue work to better define critical assets in AMS	High	
RISK MANAGEMENT		Internal			The Wastewater AMP does not show or refer to any contingency plans		BCPs have been developed and need linking into the AMP.

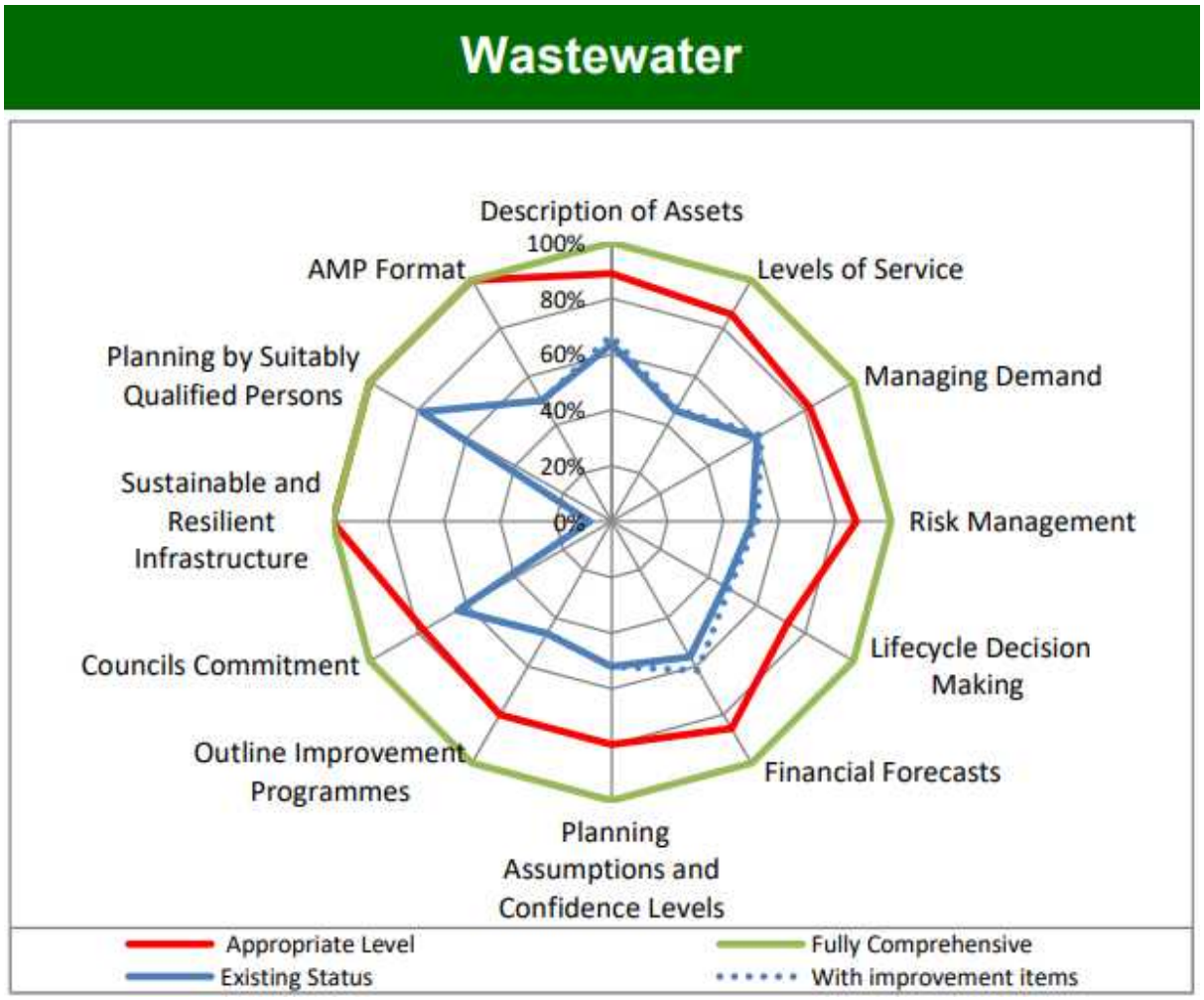
SUSTAINABILITY	Core	Waugh review 2022	10.5	Incorporation of national and regional sustainability policies and plans	a. Discuss relevant Regional or National Sustainability Directives and Targets	0	

Table 11-1: Improvement Plan

11.2 Opportunities to improve AMPs

Audit New Zealand and Waugh Consultants have provided feedback on the AMP and suggested improvements are tracked above.

Waugh Consultants has presented a spider plot that scores each section of the 2021 AMP and suggests a level that should be targeted.



11.3 Monitoring & Review Procedures

The most important review procedure is the 3-yearly review of the AMP that takes into account asset performance during the previous 3 years and identifies future trends and input into Council's strategic planning process. An example of the 3 yearly cycle of TDC strategic planning is as shown in below.

Year	2016	2017	2018	2019	2020	2021
Activity	Structure planning	Review of asset management plans	LTP amendment	Structure planning	Review of asset management plans	LTP amendment

Figure 1: TDC Three Yearly Planning Cycle

The framework for the 3-yearly review of the AMP in terms of the breadth of considerations is illustrated in the following figure.

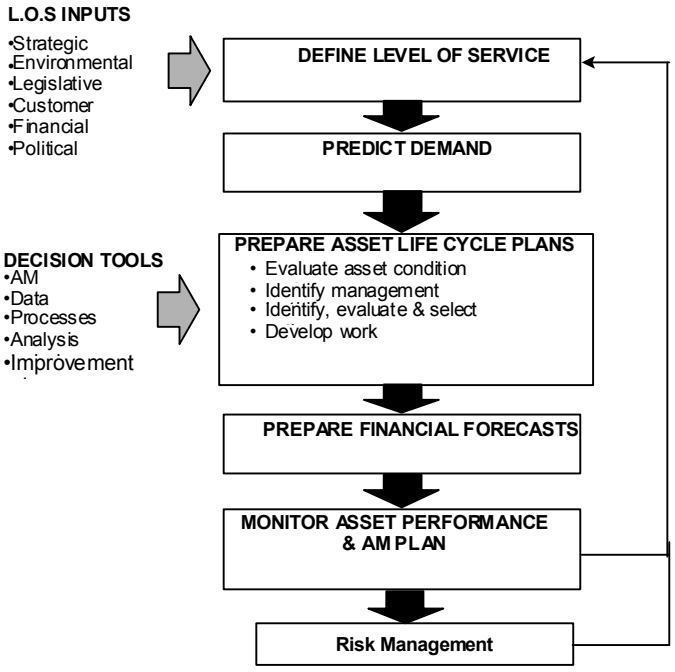


Figure 2: Asset Management Plan Review Procedure

LIFECYCLE MANAGEMENT PLANS

Contents

Acacia Bay

ASSET INFORMATION

The Acacia Bay area has been developed progressively since the early 1950's, as a residential settlement and has an increasing population of permanent residents. Up until 1986 the early 80's, septic tanks and soak holes were still in use for wastewater disposal and the nitrogen discharged from the septic tanks reached the margins of the lake. The growth in weed and algae slimes at the time, along the lake shore was largely attributed to these nutrients.

The wastewater collection network that now serves Acacia Bay includes the existing township of Acacia Bay extending from the lakeshore up to Mapara Road and Whakamoenga Point. The wastewater treatment plant is located off Acacia Bay road.

The sequential batch reactor (SBR) wastewater treatment plant was commissioned in 1986 and it processes the wastewater and provides nitrogen removal and the current method of disposal for Acacia Bay's treated effluent is by rapid infiltration trench and minor lakeshore effects are suspected.

ASSET DESCRIPTION

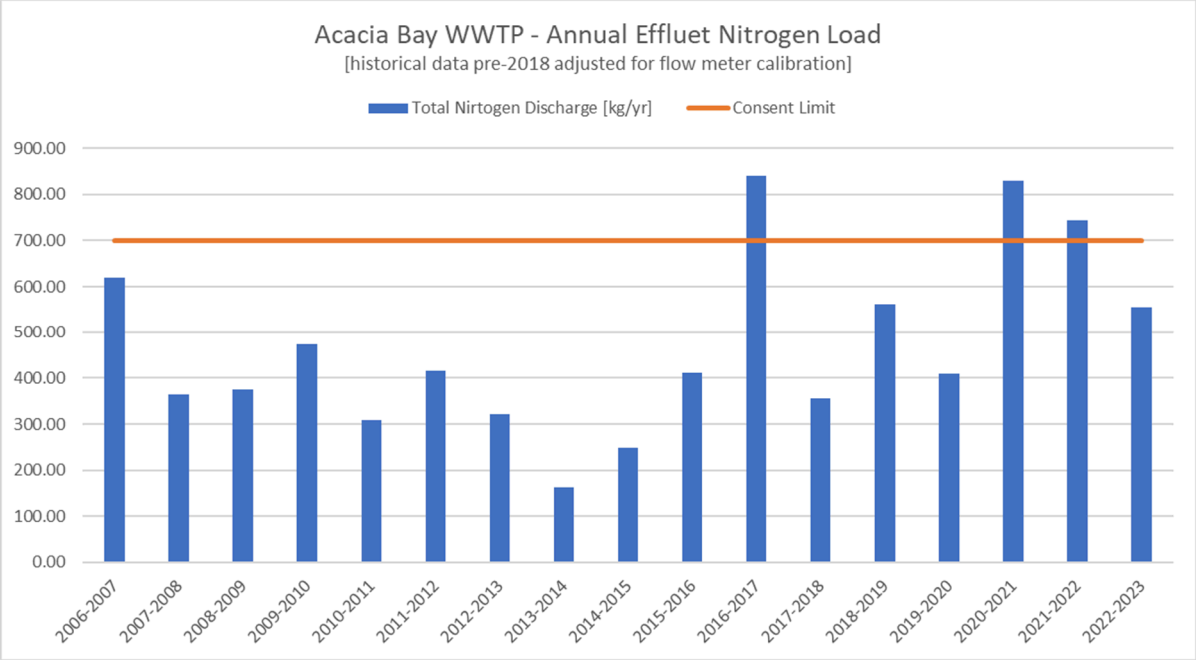
The Acacia Bay wastewater system has approximately 900 connected properties and over 28km of wastewater mains. The wastewater treatment plant is a sequential batch reactor (SBR) plant. The treated wastewater is discharged to soakage trenches adjacent to the wastewater treatment plant for disposal.

ASSET CONDITION

As the network was installed around 1986 the system is less than 40 years old and has a significant remaining life. A sample of the network undergoes CCTV inspection to monitor pipe condition.

ASSET CAPACITY/PERFORMANCE

The treatment plant generally operates well and has a good record of consent compliance, however growth in the catchment is putting pressure on compliance. Over the last 5 years however, the number of properties connected to the Acacia Bay WWTP has increased by ~6%, but the influent nitrogen load has increased by ~29%. For this to occur there must be a shift in the use of homes in the area, increasing occupancy with more holiday homes being used as permanent dwellings, and an increase in the number of people per house. This change has put significant additional load on the wastewater treatment plant. In two of the last three years the consent limit for nitrogen discharge have been exceeded. Maintaining compliance with this limit will not be possible in the coming years if the growth trend continues. The chart below shows annual nitrogen discharge vs the consent limit. Advanced instrumentation is to be installed at the facility in order to maximize the use of the capacity that is available and optimize effluent quality.



Maintaining compliance will be difficult to achieve should the rates of growth remain high.

The rapid infiltration system (soak holes) was repaired and strengthened at certain time intervals in 1996, 2000 and 2003 due to suspected tomo formation. An additional soakage area was installed in 2017 and this provided approximately a 25% increase in soakage area.

A small spring near the lake edge is monitored and the results show slightly elevated nutrients measured. As a part of the current resource consent application an ecological assessment was completed to assess the level of impact on the lake shore receiving environment. Waikato Regional Council is using this information in the assessment to establish new resource consent conditions.

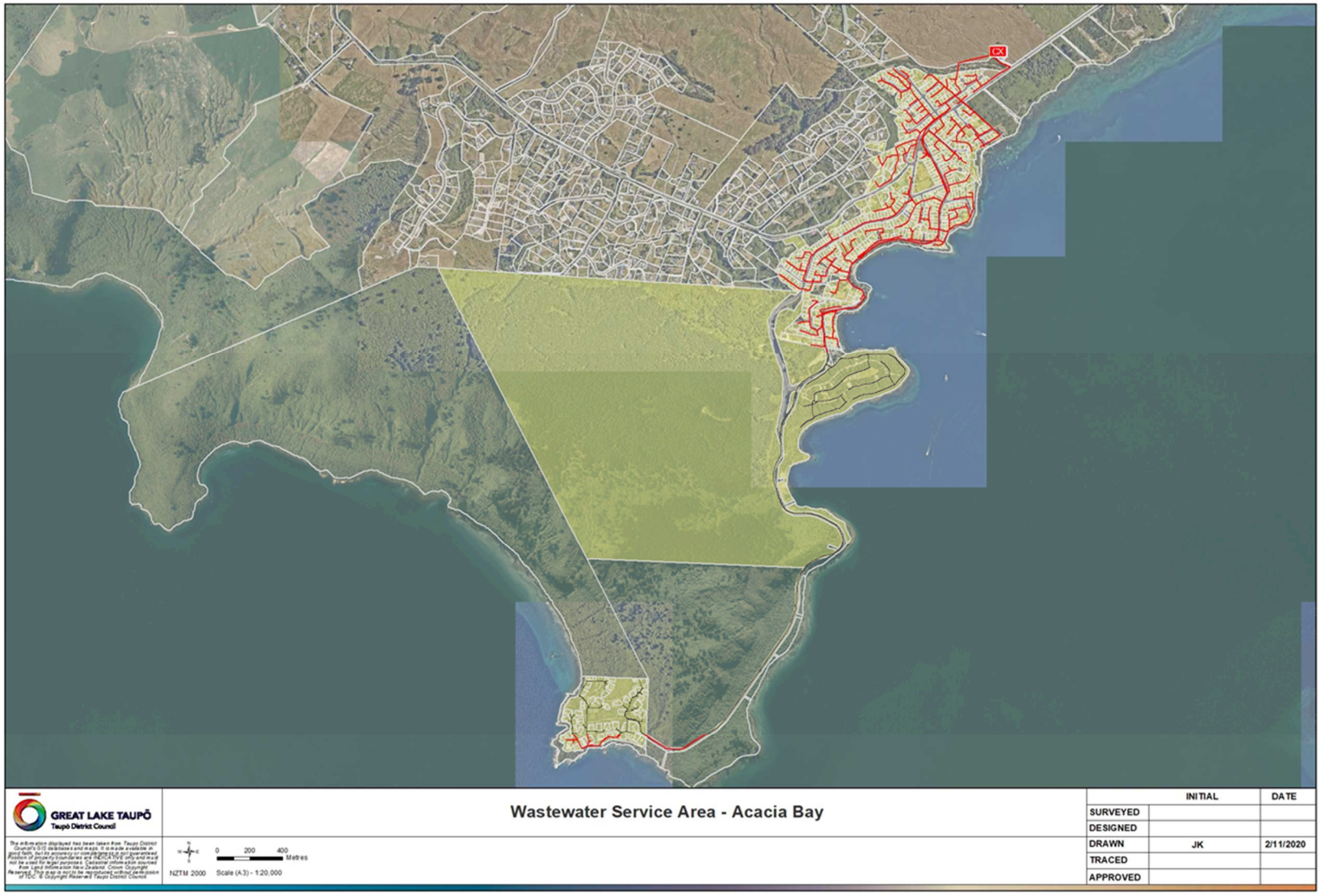
DEVELOPMENT PLAN

Provision of wastewater treatment for the Acacia Bay needs to be considered alongside the other growth areas in the area. Options include and an upgrade to the Acacia Bay WWTP, a new WWTP to service the wider area, or conversion the Acacia Bay WWTP into a pump station and pumping of wastewater back to the Taupo WWTP.

Capacity across the Control Gates Bridge is currently the limiting factor presently. The Acacia Bay WWTP discharge consent expired in 2035 and this may also be a trigger to connect Acacia Bay to the Taupō wastewater network.

The key issues in the management of the sewerage scheme are:

- Population growth (WWTP is near capacity)
- Continued monitoring of the lake shore receiving waters to measure environmental impact.
- Allow for the possible future connection of the community to the Taupo sewer network. This will be required if significant growth occurs in the area.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Taupō District Council
Wastewater Service Area - Acacia Bay
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Atiamuri

ASSET INFORMATION

The Atiamuri hydro-village was built for the Atiamuri Hydro Electric Station staff who worked at the power generating station. Only about half of the hydro-village is connected to the wastewater system with approximately 35 connected properties, with the remainder of the community on private septic tanks.

The WWTP is a basic Imhoff tank on the southern side of State Highway 1. The clarified effluent drains from the Imhoff tank and is discharged to a soakage trench system while the settled sludge is transported to Taupo.

In the long-term it is possible that Taupō District Council will develop a reticulation scheme to incorporate these lots into the existing Atiamuri WWTP.

The key issues relating to the management of the sewerage scheme are:

- No growth.
- Resource consent expired on the 01/03/2024 and a new resource consent will require a treatment plant upgrade to meet increasingly higher environmental standards.
- Continued maintenance and monitoring to ensure the treatment and service standards are maintained.

There are plans currently in place to upgrade Atiamuri WWTP. That was taken into considering during resource consent reapplication process in September 2023.

ASSET DESCRIPTION

The reticulation consists of glazed earthenware and PVC pipes. The treatment plant is an Imhoff tank and provides only basic treatment. This will likely need to be replaced with a nutrient removal plant when the new resource consent is granted. There is currently no power at the site and there is no connection to the telemetry system.

ASSET CONDITION

The system was installed in the early 1960’s. The wastewater treatment plant will need to be upgraded in the near to medium term. The reticulation is a mix of earthenware and PVC pipes, and periodic CCTV inspections are used to assess asset condition.

ASSET CAPACITY/PERFORMANCE

There is very little growth in the community other than the possible connection of the non-serviced part of the community. There are some areas that have the volume of wastewater is not directly measured however the volume of wastewater is expected to be well under consented flows. The wastewater volumes are calculated based on the number of dwellings and the amount of water consumption.

DEVELOPMENT PLAN

Half of Atiamuri Village (the "Old Village") is currently still using septic tanks. There is an option to extend the existing reticulation to incorporate the "Old Village" and send the wastewater to the existing Atiamuri Sewage Treatment plant (Imhoff tank with effluent disposal to ground through soakage). The driver for this project will likely be Regional Council requirements for the property owners in old Atiamuri to improve treatment standards. This project is not considered in the 30-year plan.

The resource consent expires in 2024, planning for the renewal of this consent will occur two years prior to the expiration date.

Flow measurement device is scheduled for installation in 2024 to enable data collection prior to the connect application. Upgrade to the wastewater treatment plant is scheduled in the first three years of the 2024 LTP.


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Taupō District Council
Wastewater Service Area - Atiamuri
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Scale (A3) - 1:3,500

Kinloch

In late 1984 Council entered into an agreement with the Kinloch developer to provide a wastewater reticulation and a treatment plant. The wastewater collection and treatment system were completed in 1988.

The community has experienced significant growth; and this has driven the need for minor upgrades at the WWTP over recent years.

The treatment capacity at the WWTP was pushed to it limits and a major upgrade to the WWTP was completed in 2021/22. This involves converting the previous two-tank sequencing batch reactor (SBR) WWTP to the current Membrane Bioreactor (MBR). This has added significant capacity and improve treatment performance. Some of the added advantages of upgrading to MBR includes small footprint, maximising reuse of existing assets, ability to achieve high levels of nutrient removal and final effluent free of suspended solids.

A subsurface dripline disposal system has been installed in the 10-hole public golf-course and in the land surrounding the WWTP; this was commissioned in November 2020.

The key issues relating to the management of the sewerage scheme are:

- The need for infrastructure expansion (MBR upgrade – Second Reactor) to accommodate growth, operational flexibility, and reliability.
- Increasing environmental standards e.g. improved buffering capacity within the plant and expanded and improved land disposal system in the Kinloch public golf course.

ASSET DESCRIPTION

The wastewater reticulation consists of pipe work ranging from 100mm to 200mm and seven pump stations at Kinloch. The wastewater is pumped to the treatment plant which is a MBR plant. The treatment plant is an activated sludge process utilizing a Simultaneous Nitrification and Denitrification (SND) process to remove Nitrogen (N) and Phosphorus (P). The existing Kinloch WWTP includes inlet pump station, screening and grit removal, bioreactors, membrane filtration, below ground storage tanks, sludge holding tanks, treated effluent storage along with other ancillary services such as chemical dosing and odour control facilities. Treated effluent from the treatment plant is pumped to nearby Kinloch public Golf Course via sub-surface drip irrigation. A total of 4.83 ha (Golf Course + Council land) is irrigated with treated effluent.

The telemetry system is used to monitor the remote pump stations and treatment plant.

ASSET CONDITION

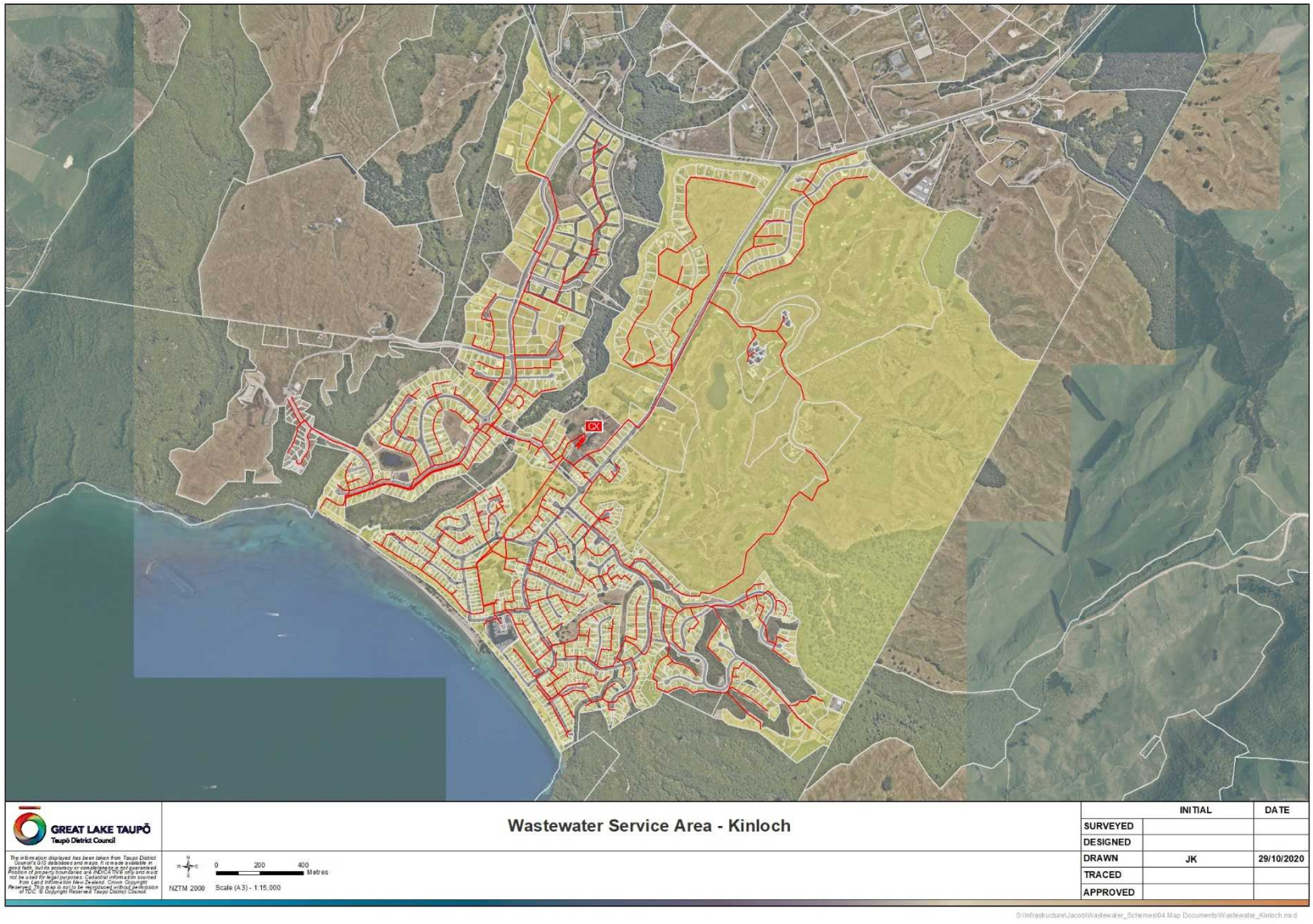
The treatment plant was commissioned in March 1988, was upgraded in 1999 and 2003 with a control system upgrade in 1999, and an upgrade to the inlet works in 2003.The subsurface dripline was commissioned in 2020 and the upgrade from a SBR plant to MBR plant was commissioned in 2021/22 and is therefore in good condition.

ASSET CAPACITY/PERFORMANCE

Treatment Plant capacity and disposal capacity have been developed in line with the Kinloch Structure Plan and performance is currently very good.

DEVELOPMENT PLAN

A minor treatment plant upgrade is scheduled to maintain adequate treatment capacity as growth occurs.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Taupō District Council
Wastewater Service Area - Kinloch
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Mangakino

ASSET INFORMATION

Mangakino township was established in the late 1940's as a Ministry of Works village to house construction workers (and their families), employed on hydro-electricity schemes on the Waikato river. It was intended that the village should be dismantled at the completion of the construction and therefore much of the infrastructure in the town was of a temporary nature, designed to last 20 - 25 years.

The original system used septic tanks in the collection system and an Imhoff tank to provide primary treatment, followed by a sand filtration system installed during the mid-1990's in an attempt to further clean the effluent prior to discharge. Treated effluent is discharged to an underground dripper soakage system that has previously failed due to the high solids and Biological Oxygen Demand (BOD) load.

In 2006 the Mangakino Wastewater Treatment Plant (WWTP) was upgraded to include a new secondary treatment stage, in the form of a new Submerged Aerated Filter (SAF) plant. The new plant includes a pumping station that conveys the primary treated wastewater into the SAF reactor tanks. The plant was fitted with a standby emergency diesel generator, to ensure uninterrupted operation of the plant in the event of a power failure. There have been instances where the installed storage volume at the plant has proven to be insufficient to prevent overflow events. An emergency generator has been installed to reduce the risk of overflow. Overflows are contained within an open bunded area formed as a depression in the surrounding land. This bunded area is open to the public and hence represents a public health risk during and for some time subsequent to an overflow event.

Excessive storm water infiltration occurred during rain events due to the reticulation network being in poor condition as well as some connection of private storm water drains to the sewer network. This contributed to the occurrence of overflow. Over the period of 2016 – 2020 significant improvements have been made to the reticulation system and the peak flows in heavy rain events have reduced significantly. The network is now is very good condition.

Rapid infiltration trenches where installed at the North side of the golf course to improve the performance of the disposal system and these have worked well and enabled the drip irrigation system to recover. There is now adequate disposal capacity to manage the peak flows as well as any growth in the community. Plans have also been developed for extension to the

The key issues relating to the management of the sewerage scheme are:

- Increasing activity in Mangakino generating more wastewater
- Improvement to the network have resulted in less leakage losses.
- Upgrade to the WWTP is required to manage the increase volumes being received and to reduce nitrogen discharges.

- Main sewer lines have been constructed across the middle of building sites and dealing with buildings over sewers is a frequent problem.
- The old network septic tanks remain in service and will require removal following upgrade of the WWTP.

ASSET DESCRIPTION

The existing township reticulation is separated into four main catchment areas. Three of the areas each drain to a communal septic tank and the fourth area drains directly to the plant. The 150 mm diameter sewer collects effluent from all of the treatment tanks and the wastewater process through a SAF prior to discharging to ground.

Properties in the industrial area have individual septic tanks which discharge to soakage. The industrial area cannot be served by an extension to the existing reticulation unless a pump system is installed, and additional treatment capacity is added.

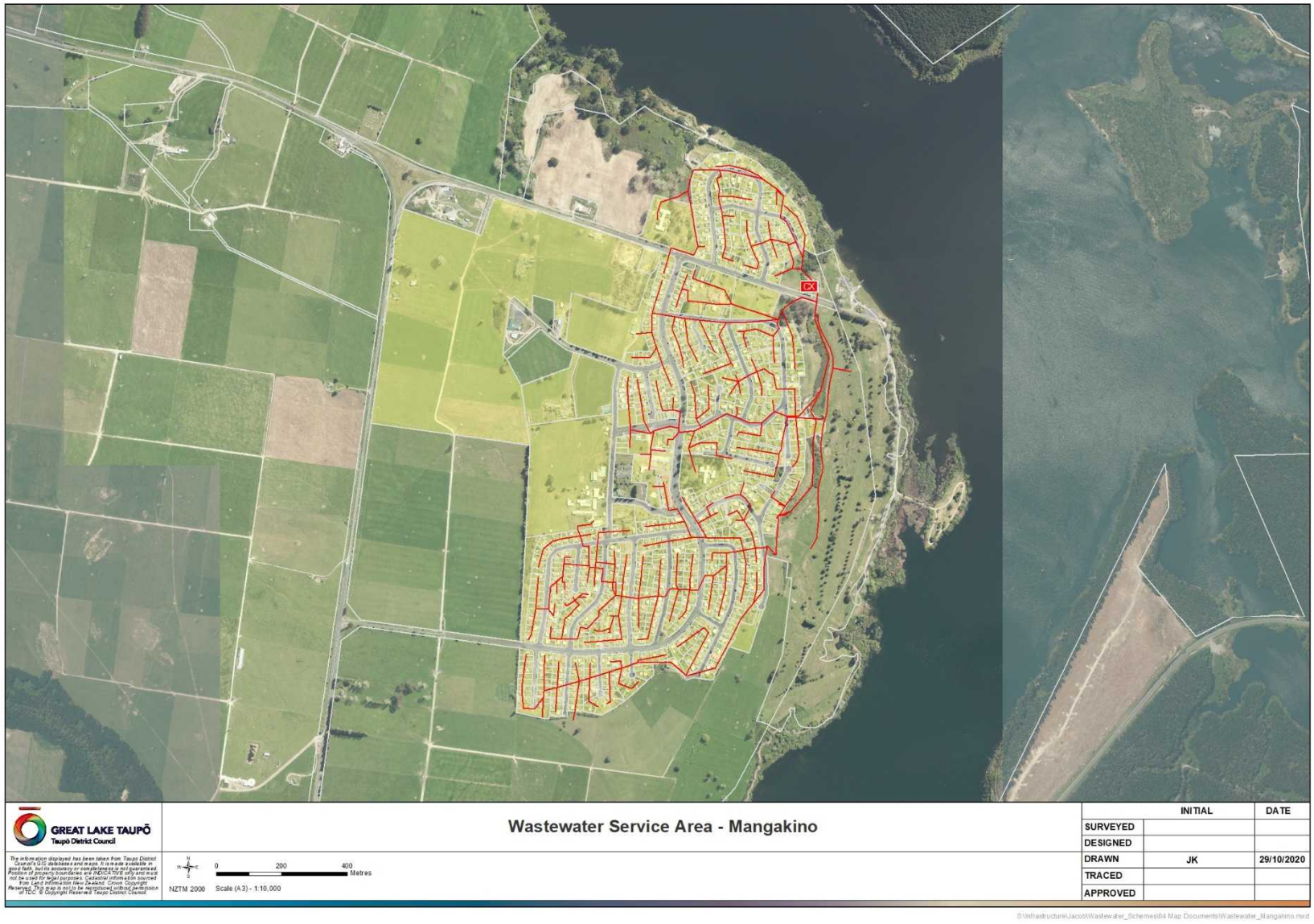
ASSET CONDITION

The reticulation is in very good condition following a significant renewal programme. Most of the reticulation pipes are covered by buildings, which makes renewal of reticulation slightly more complex. The storm water drains are also connected to sewer main in some dwellings and many of these connections have been removed as part of the renewal work.

The treatment plant is new and in good condition. The only asset class that maybe poor condition are the original network septic tanks and there is a plan to remove this following upgrade of the WWTP.

DEVELOPMENT PLAN

An upgrade to the Mangakino WWTP and extension of the irrigation scheme is planned to allow for expected growth in the Mangakino community.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Motuoapa

ASSET INFORMATION

The Motuoapa Village Urban Drainage Area was constituted in 1983 and comprises two parts: the old lakeside settlement, with the shop, garage, motel etc. and the new residential on the opposite site of the state highway.

Lots in the old settlement have on-site septic tanks and the effluent from these tanks' anaerobic effluent from the septic tanks is pumped to the wastewater treatment plant. Council maintains these septic tanks. The new lots in upper Motuoapa are connected to a conventional gravity sewer.

The treatment plant was commissioned in 1987 and designed for a peak flow of 270 m^3/d and a peak population of 1,080. In 2006 an additional SBR reactor was fitted to the existing second tank (the tank was previously used as a treated effluent holding tank), increasing the capacity to allow for development and additional aeration was added. In 2016 an influent balance tank and odour control system where installed.

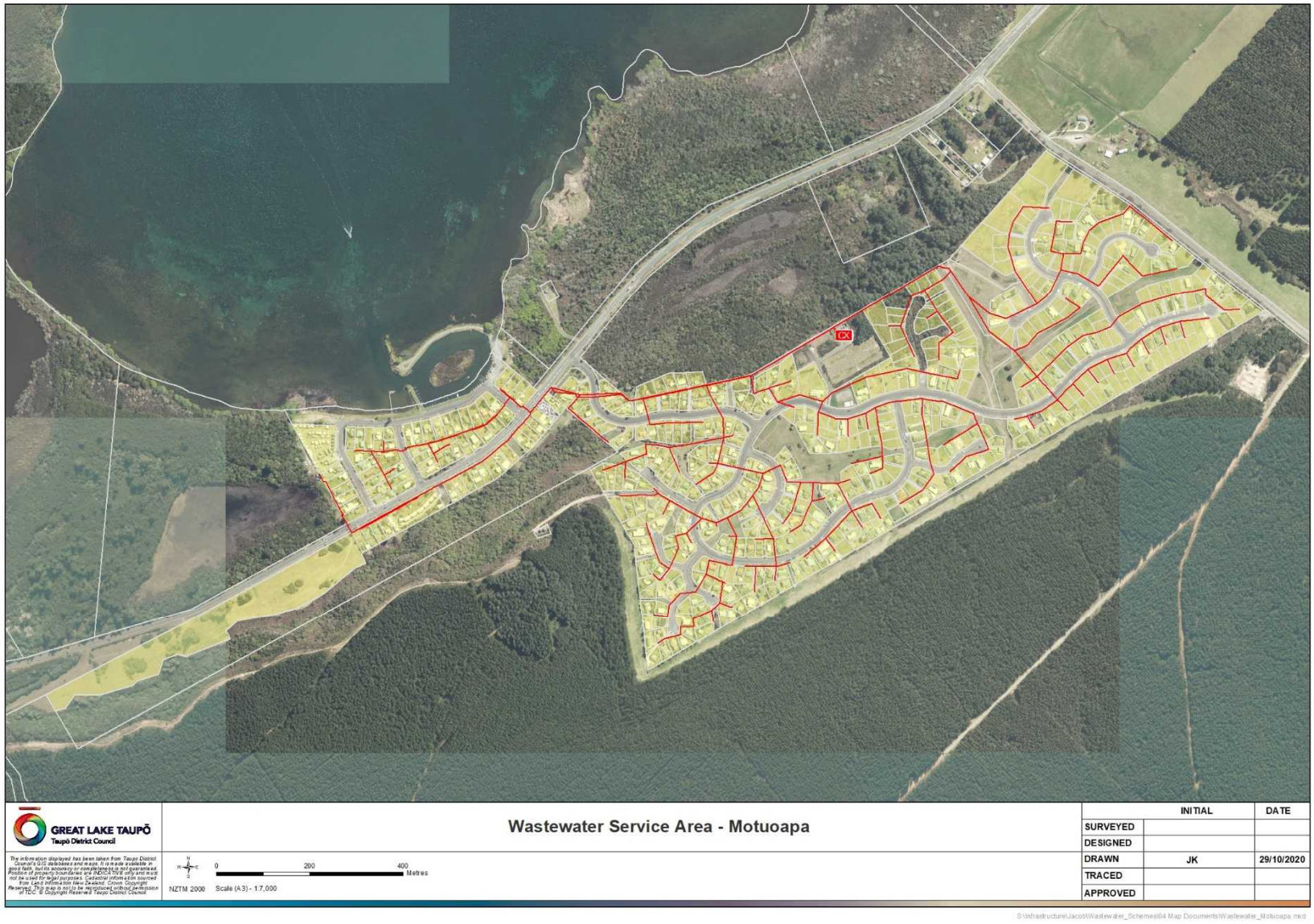
ASSET DESCRIPTION

The sequence batch reactor (SBR) treatment plant treatment plant carries out the functions of equalisation, aeration and sedimentation in a time sequence, each tank having five operating modes: fill, react, settle, decant and idle. Treated effluent is pumped to the adjacent disposal filed for disposal.

A resource consent to discharge up to 500 m^3/day of treated wastewater to land was obtained in 2013 and expires on November 2033.

ASSET CONDITION

The only known issue in condition is related to the network in the old part of Motuoapa. Under conditions of high lake level, the reticulation experiences a degree on infiltration. Condition inspection is required however it can be difficult to locate points on infiltration when it not occurring (low lake levels).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Motutere

ASSET INFORMATION

Motutere is a holiday resort, a campground located on the eastern shores of Lake Taupō. Apart from the two people at the motor camp there are no permanent residents and it is anticipated that the situation will remain as predominantly a holiday resort. There is an 18 residential community at the point that are not connected to the wastewater scheme.

Initially the wastewater disposal was by disposal to septic tanks and the soakage to ground but the impacts were being observed in Lake Taupo. In 1985 the system was upgraded to a septic tank effluent pumping system and the effluent was discharged after aeration and settlement to native bush by spray irrigation.

The treatment process was upgrade again in 2016 to further improve treatment through installation of a SAF WWTP and denitrification bed.

The key issues relating to the management of the sewerage scheme are:

- High fluctuation in population.
- Regular lake shore monitoring.
- Uncertain growth at the campground.
- Potential additional of the 18 residential lots.

ASSET DESCRIPTION

The wastewater scheme consists of seven septic tanks at the motor camp which are used for primary treatment. The septic tank effluent and flows from local dwellings then flow by a gravity pipeline to two step effluent pump stations. These then pump the effluent to the main pump station, where it is conveyed to the treatment plant. The treatment plant consists of a two-tank submerged aerated filter (SAF) plant followed by a carbon bed prior to discharge to the forest irrigation site. The system is connected to the telemetry alarm and control system.

ASSET CONDITION

The scheme was built in 1991. The treatment Plant was upgraded to improve nitrogen removal in 2006 and a minor capacity increase in 2023. The plant is basic and in generally good condition.

ASSET CAPACITY/PERFORMANCE

This area is predominately a motor camp so there is very low loading for most of the year. Christmas to mid-February provides the highest loading. The treatment plant does not remove nitrogen over the peak period but does outside of this busy period.

DEVELOPMENT PLAN

Connection of the Motutere Point community.


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Omori

ASSET INFORMATION

The Omori wastewater scheme was constructed in the early 1970's to serve the settlement of Omori and in 1983 Kuratau was added. While the reticulation was expanded to service large areas of new development the original oxidation pond and effluent disposal areas had remained unchanged until 1996/97 when new treatment and disposal works were constructed. The new works were essential as overloading was occurring especially when the effluent from Pukawa was transferred to the plant. An embargo had been placed on development until the new treatment plant was built prior to the system upgrade. The pump stations were adequate, but storage and control facilities were not and as a result overflows to the beach front occurred with increasing frequency.

The combined settlements of Pukawa, Omori and Kuratau comprises close to 1,200 residential lots with potential to grow to approximately 1,600 lots.

The key issues relating to the management of the sewerage scheme are:

- Fluctuating summer loads results in the system being heavily loaded for a short period of the year.
- Management of increase wastewater loads as the community grows.
- The old oxidation pond at Pukawa required full decommissioning and remediation.

ASSET DESCRIPTION

Wastewater is collected by gravity mains and then pumped to oxidation ponds where the final effluent is disposed of by spray irrigation to land. The Omori disposal field consist of 300 sprinklers.

The Pukawa wastewater is discharged to an oxidation pond of approximately 0.5 ha, located close to residential lots and this can result in odour complaints. From here effluent is pumped to Omori through an overland line in a bush reserve.

Resource Consent number 135810.01.01 was granted to discharge up to 800 m^3/day onto land. This Right expires on 31 April 2044.

ASSET CONDITION

The lake edge pump stations were upgraded in 2000 to provide telemetry monitoring, connectors for emergency standby power and overflow storage. All were interlinked to control overflow.

ASSET CAPACITY/PERFORMANCE

Some areas of the reticulation are fully loaded as a result of expansion of the drainage area and separate collection and pumping systems will be required for any new development.

Under normal conditions the system can cope with summer holiday loading although this part of the plant is close to its capacity. Intense storms may result in overland flow at the land disposal site. The flow meters are installed to monitor the flow from each catchment areas.

DEVELOPMENT PLAN

There are no capital projects scheduled for the Omori wastewater scheme within the 10 years plan.


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Taupō

ASSET INFORMATION

The Taupō Wastewater Treatment Plant (Taupō WWTP) was commissioned in 1975 to treat the wastewater from Taupō Township. It was designed to cater for a population of 12,500 and remove 80 % of suspended solids and 80 % of the Biological Oxygen Demand (BOD). The treatment plant is not designed for nitrogen removal as this is achieved through crop growth at the irrigation sites.

The Taupō WWTP services most of the Taupō urban area. The treatment plant consists of primary clarifiers, tricking filters, and a secondary (humus) clarifier as well as sludge conveyance, thickening, digestion, dewatering and disposal. The treated wastewater leaving the secondary clarifiers is pumped to the irrigation balancing ponds at the Rakaunui Road LDS through a 375 NB rising main, which is 4.6km long. The water is then irrigated on this site or pumped onto the View Road LDS site which was constructed in 2008.

Waitahanui and Five Mile Bay are two small settlements located in the outskirts of the Taupō urban area along the eastern lake shore. The treatment facility at Waitahanui has now been decommissioned and wastewater is pumped back to Taupo.

Waitahanui / Five Mile Bay is reticulated to a large extent by STEP systems (i.e., the Waitahanui WWTP receives septic tank effluent from individual household lots).

Most of the dwellings are holiday houses which are vacant for long periods. When the septic tanks are reactivated during the holiday periods odour problems can occur.

In 1985 the Treatment Plant was extended to double the capacity to serve a population of 27,000 people. The addition of a grit removal process was added between the bar screen and the primary sedimentation tanks. At that stage, 90% of the suspended solids and BOD was removed before discharge to the Waikato River.

Both Waikato Regional Council and the Taupō District Council wished to end the discharge of treated effluent to Waikato River. A three-stage pumping system and storage ponds was built to transfer the effluent for land disposal at a site 5 km north of Taupō. The Taupō Sewage Land Disposal Scheme was opened in September 1995 and built at a cost of $5.3 million. In December 2008 an additional LDS site started operating at View Road. This scheme uses pivot irrigators as opposed to "pop ups" like at Rakaunui Road. In 2008 the Rakaunui Road site needed to be replumbed due to the construction of the ETA (East Taupō Arterial) Road.

The key aim of these schemes is to eliminate direct discharge of effluent to the Lake and River to enhance the environment as it was considered an affront to the Tangata Whenua. In addition, the quality of the water in the lake was of national importance as Taupō is an important tourist centre.

The grass from each of these sites are harvested 4-5 times per year, this haylage is sold to supplement the cost of running these systems.

The key issues relating to the management of the sewerage scheme are:

- Changes to resource consent conditions that effect the irrigation processes by lower loading rates. Nitrogen removal or disposal field expansion is needed.
- Capacity upgrades of the WWTP as growth occurs.
- Odour discharge from the treatment plant due to the proximity of housing (constructed after the WWTP).

ASSET DESCRIPTION

The Taupō wastewater system consists of a gravity reticulation system, pump stations, a conventional wastewater treatment plant and disposal of treated effluent to an irrigation field. The telemetry system is used to monitor the various pump stations and treatment facilities.

The treatment plant consists of a bar/ step screen, grit removal, two primary and one secondary sedimentation tanks, three high rate trickling filters, sludge reception and storage for waste sludge from the other community plants, sludge drawn thickener, sludge conditioning and primary system, three sludge digesters, two balancing ponds, a wet weather inflow diversion pond,. The sludge is de-watered on a belt press before it is processed to vermicompost (worm farm) by an external contractor.

Following treatment, the average daily flow of close to 7,000 m^3/d of treated effluent is pumped to one of two sites.

The first being the Rakaunui Road irrigation site. The irrigation pump pumps the effluent into the 200 mm diameter irrigation ring main system. The irrigation site is divided into 10 blocks, 30 spray areas and pipe work for 3,300 pop-up irrigation sprinklers. A 20-metre-wide buffer zone protects the public from spray drift; however, this is under review as the site is being reconsented. The second site is at View Road and it consists of 8 pivot irrigators. This site appears slightly better at capture of nitrogen compared to the Rakaunui Road site. As of 2020, each site has approximately 120 of active irrigation area.

The original treatment plant is still in use but has been upgraded over the years and is still undergoing upgrades as required. Recently an additional digester and trickling filter have been added.

Resource Consent has been granted to discharge up to 9,000 m^3/day of municipal wastewater onto land at Rakaunui Road. This consent expired on 31 December 2015 and a replacement consent has been applied for. As for October 2020 the consent application has now been consulted on and a new consent is expected to be granted in the coming months.

ASSET CONDITION

The Taupō wastewater scheme was developed at various times and is generally good condition. Occasionally blockages are caused by tree roots, fat build up and wet wipes. Pipelines in the commercial area (CBD) are water blasted once every year.

ASSET CAPACITY/PERFORMANCE

The Taupō wastewater treatment plant has recently been expanded and a third anaerobic digester and a third trickling filter. A third primary settling tank will be required as the next upgrade to increase capacity.

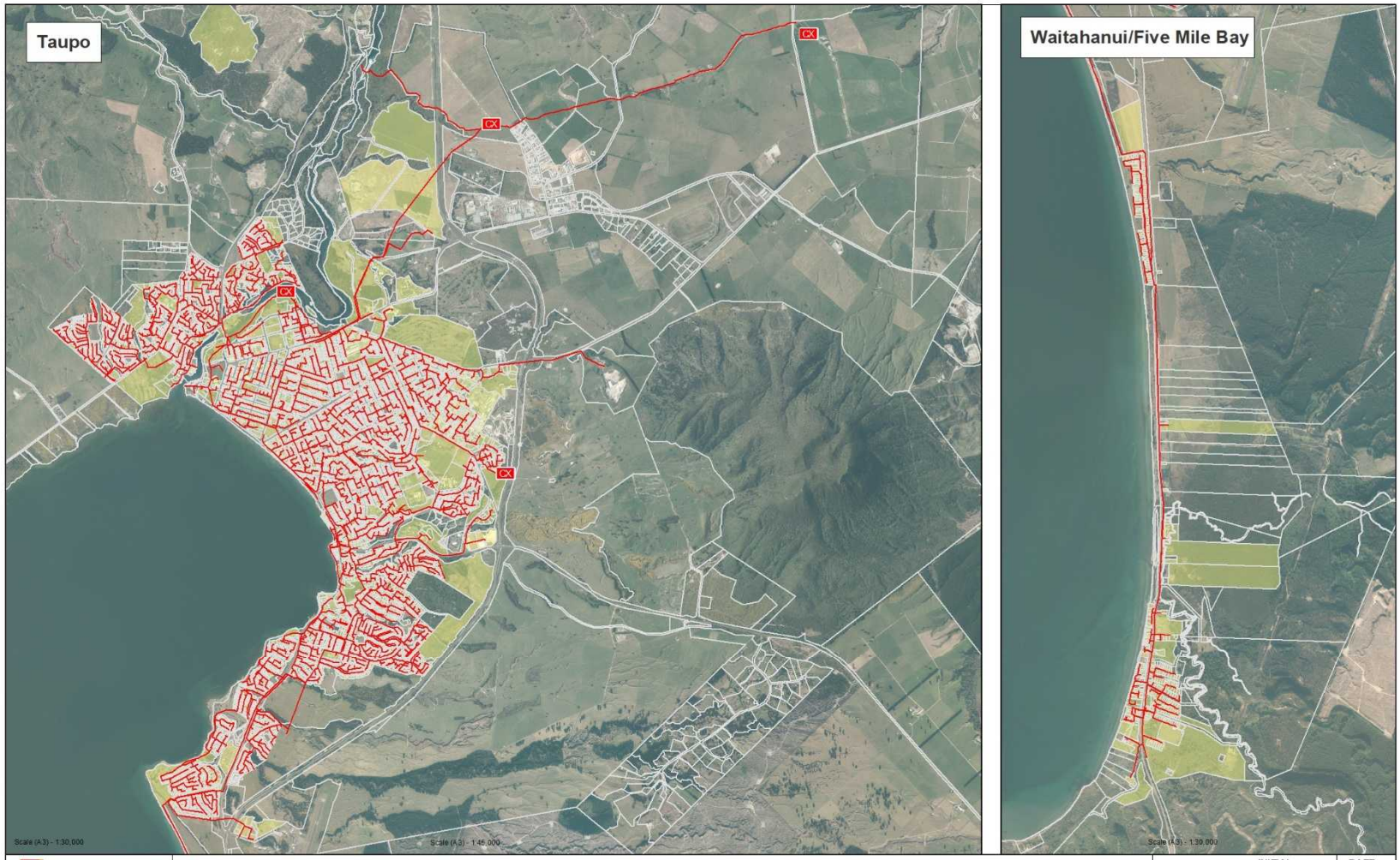
The Transfer PS within the WWTP is also at capacity in significant storm events and upgrade of the PS will be required to reduce the risk of future wastewater overflows to the rivers during extreme events.

The reticulation system trunk mains have minimal spare capacity. Progressive upgrading of the inverted siphon river crossing and the new trunk mains will allow expansion north and west of the river. Continued expansion to the South is also reliant on upgrading of the main trunk sewer.

There has been the occasional overflow of the reticulation system that has occurred including several instances of overflow to the lake shore and to private property. Most commonly these are due to roots intrusion and people putting unsuitable items down toilets or drains, including oil, grease, fat, bandages, sanitary pads, nappies, fabric wipes, or any other similar objects. Maintenance is increased in areas where repeated issues occur.

DEVELOPMENT PLAN

Project (Yrs 1 – 10)	Value	When
Taupo North Wastewater solution [Growth]	6,300,000	2028 – 31
Taupo WW Eastern trunk main capacity upgrade [Growth]	2,200,000	2028 – 30
Taupo WW Control gates bridge buffer storage tanks	2,700,000	2024 – 27
Taupo WW Southern Trunk Sewer Main [Growth]	6,700,000	2022 – 24
Taupo WWTP Building Alteration	200,000	2024 – 25
Taupo WWTP Primary Settling Tank #3 [Growth]	3,500,000	2023 - 25
Taupo WWTP Side Stream - Solids Filtrate Treatment [Growth]	4,600,000	2024 - 26
Taupo WWTP Transfer pump station upgrade [Growth]	900,000	2024 - 26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Taupō District Council
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Tūrangi

ASSET INFORMATION

The early development at Tūrangi began between the State Highway and the Tongariro River. The wastewater system was built by The Crown in 1965 to serve the old part of town and the newer part that was built for the Tongariro Power Development. This includes the industrial area south of State Highway 41. During the construction of the power project between 1968 and 1974 the town population was approximately 20 % greater than in the 1990's.

The power development scheme was expected to raise the population to 6,000 persons. The treatment plant was a model scheme with primary and secondary ponds and surface irrigation over grassed slopes. An impermeable layer under the grass meant that the effluent flowed towards side drains and drained through artificial wetland (mostly channelled) to an artificial drain and through a natural wetland to the Tongariro estuary and Lake Taupō.

In 1996/97 sludge and solids were cleaned out of the oxidation ponds. A step screen was added to the inlet and pumps and micro-strainers were added to the land irrigation system.

During the 1990's, the population has been approximately 4,500. Tūrangi (including Tokaanu) has 2,210 connections and 110 vacant lots that are not connected to the system.

Wastewater effluent from the existing Tūrangi Wastewater Treatment Plant (Pond system) is unable to meet the effluent quality requirements of the new resource consent. A significant upgrade of the existing treatment plant process was required to consistently comply with the new and higher discharge standards set by Waikato Regional Council, in particular nutrient (nitrogen and phosphorus removal) and disinfection to comply with faecal coliform levels.

A membrane bioreactor (MBR) plant was commissioned in January 2006 and compliance to date has been reasonably good to achieve total nitrogen discharges below target but has experienced poor performance during high inflows when storage on influent in the ponds has been required.

The wastewater from Tokaanu is also pumped back for treatment at the Tūrangi WWTP.

The Tokaanu Township is an historical settlement based around traditional Maori and European tourist interest. Much of the area is low lying and swampy following the raising of Lake Taupō. It has a history of wastewater related problems which range from pollution of the lake shore to soakage difficulties due the high-water table. Tokaanu is a Septic Tank Effluent collection system with treatment at the Turangi Wastewater Treatment Plant.

The first stage of the collection and pumping system was implemented in 1989 and the second stage in 1992.

The Tokaanu settlement is spread over 27 hectares in a band 180 metres wide by 1.5 km long. Within Tokaanu there are 50 domestic or commercial buildings with a dwelling equivalent of 52. The Tokaanu settlement is responsible for the maintenance of the Tokaanu collection system and contributes a share of the cost of the operation and maintenance of the Turangi treatment system.

The key issues relating to the management of the Tokaanu section of the sewerage scheme are:

- Many wastewater pipelines have flat grades.
- Blockages in the network due to residents putting unsuitable items down toilets or drains, including oil, grease, fat, bandages, sanitary pads, nappies, fabric wipes, or any other similar objects.
- Inflow/infiltration due to deteriorating pipes.
- Geothermal ground causing damage to infrastructure, particularly the small step pump stations and connecting pipelines.
- High water table and aggressive water.

The key issues relating to the management of the sewerage scheme are:

- Obtaining replacement resource consent for wastewater discharge.
- Land ownership grievances, relationship with key stakeholders.
- Potential for a land-based disposal system.
- Infiltration into reticulation due to deteriorating pipes and manholes
- Maintain consistent treatment plant performance.

ASSET DESCRIPTION

The current Tūrangi wastewater system is a conventional raw wastewater collection and pumping system. Pre-treatment comprises a new perforated plate screen and grit removal system. The existing step screen has remained to provide standby capacity. The screens are bagged for transport to the Taupō landfill and peak and diurnal flows are balanced in part of the existing oxidation pond.

Up until February 2006 the effluent has been discharged through two pumps and Arkal Spin Klin automatic backwash filters. The effluent is distributed to 7.5 hectares of irrigation beds. Effluent flowing off the irrigation beds is collected in drains and flows across artificial wetlands that flow through the natural wetlands to Lake Taupō.

The system now consists of a new MBR plant complete with alkalinity dosing (sodium carbonate) and Alum dosing for phosphorus removal. The plant contains anoxic, aerobic, and a membrane zone with sludge recycling to return active biomass to the inlet of the biological process.

A new blower house has been constructed as part of the tank to house the blowers and a new control building with associated electrical/control system. Final effluent (termed ‘permeate’) from the MBR process is now pumped for discharge approximately 1.0 km directory to the Hangarito stream.

In addition to the new MBR, the plant incorporates the use of the existing Pond 1 as part of an influent flow balancing system and for effluent flow containment during times of flooding. This has been achieved through the conversion of Pond 1 into two smaller ponds, with new waste bands constructed.

Rehabilitation of the disused pond sites are required.

Resource Consent number 102927 was granted to discharge up to 2,100 m³/day into the Hangarito Stream and Taupō South wetland and this consent expired in June 2018. A replacement consent application was lodged in December 2017 and the application is on hold pending consultation outcome with iwi. A land-based disposal system is being proposed.

ASSET CONDITION

Reticulation was built in 1964-68 and is suffering some inflow and infiltration. Over the period of 2018 to 2020 a significant sewer cleaning programme was completed, and condition assessment showed the network was in good condition overall. Targeted repairs were completed.

The assets associated with the new MBR plant are all in good condition.

ASSET CAPACITY/PERFORMANCE

High infiltration into the network can cause high inflows to the plant in wet weather and at times this has exceeded the capacity of the WWTP. In these cases, wastewater storage is required, and the old oxidation ponds are used for this purpose.

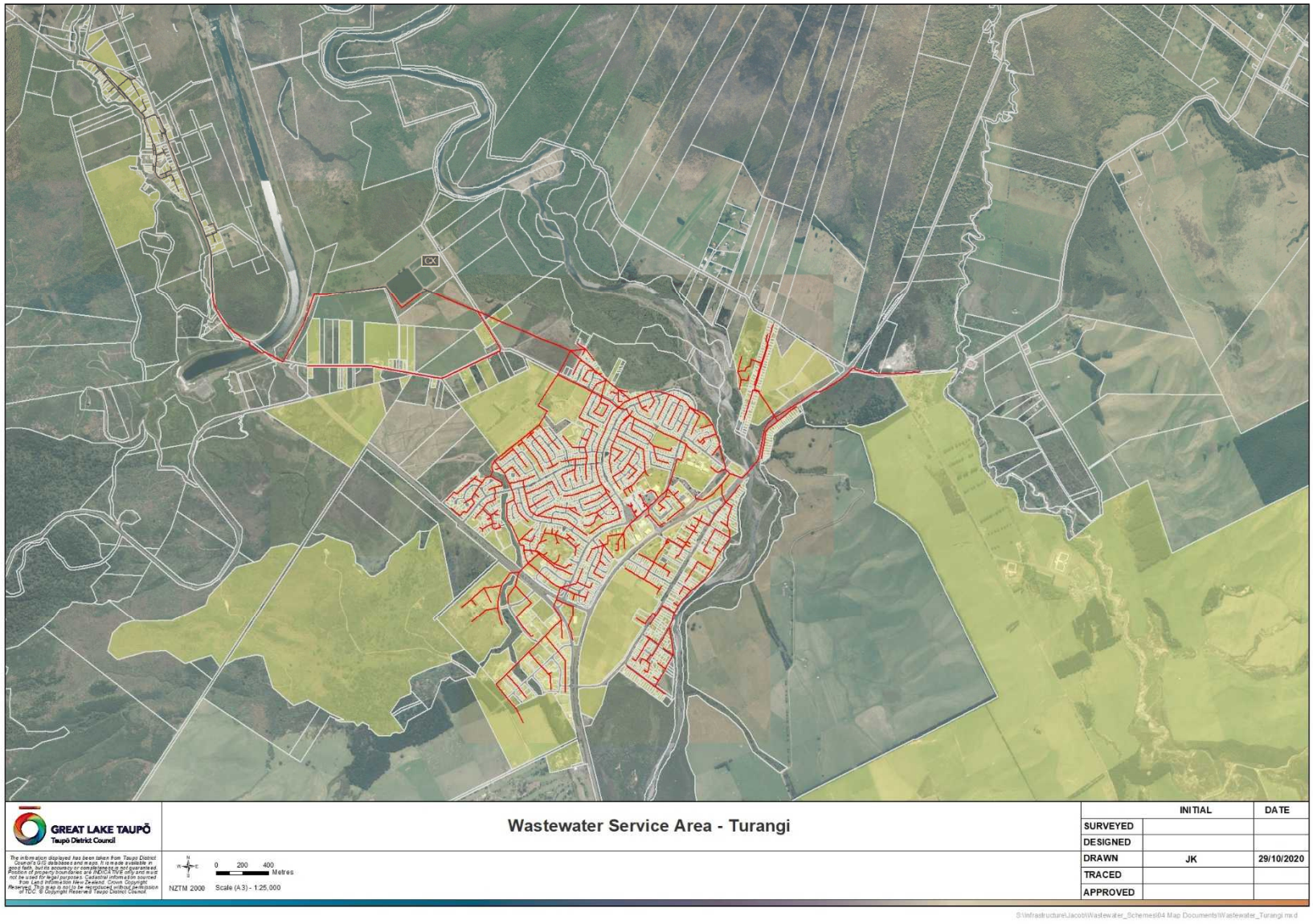
Problems have occurred with fouling of the membrane surfaces. This has affected the performance of the plant and has increased the operational and renewal costs of membranes. Careful management of the wastewater treatment plant is required to avoid fouling problems.

The South Taupō Wetlands extends from Waihi Bay and the Tongariro River delta, to the Motuoapa peninsula. The wetlands are included in the International Ramsar Convention which is designed to protect natural wetland areas.

DEVELOPMENT PLAN

There is some uncertainty around the long-term future for this site as a WWTP as there are significant land ownership grievances related to the site being taken from the original owners for use as a WWTP site.

An alternative disposal site has been investigated alongside an option to improve the discharge at the current site. Improvement of the discharge at the current site is allowed for in the 2024 LTP.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Whakamaru

ASSET INFORMATION

The Whakamaru scheme consists of two distinct areas, the Hydro village and the old village. The Whakamaru Hydro Village was built for staff working on the Whakamaru Hydro Electric Scheme. The hydro village has 60 dwellings plus a hostel.

The 'old' Whakamaru village at the corner of Forest View Road and State Highway 41 is not served by a reticulated wastewater system and private septic tanks treat wastewater for the dwellings in the community. There is currently no proposal to develop a wastewater system for the old village.

This scheme is similar in characteristics to Atiamuri. All lots within the hydro village are connected to the wastewater system which is capable of treating wastewater from 60 houses plus the hostel. It is operating at capacity and cannot cope with further expansion without major capital works.
The key issues relating to the management of the sewerage scheme are:

- Increasingly higher environmental standards and resulting high monitoring costs.
- Infiltration due to deteriorating pipes.
- Monitoring of the soakage effluent plume to ensure that no adverse environmental effects occur.

ASSET DESCRIPTION

The reticulation network at Whakamaru has been recently condition assessed and poor-quality pipes relined. The reticulation is therefore in reasonably good condition.

An advanced treatment process (Recirculating Textile Packed Bed Reactor) was installed in the WWTP in 2019 and this plant reduces nitrogen discharges and is compliant with resource consent conditions.

Resource Consent number 130354 was granted to discharge up to 75 m^3/day onto ground. This consent expired on 31 May 2036.

ASSET CAPACITY/PERFORMANCE

The plant is currently at capacity and would require capital input to accept more expansion. The Imhoff tanks and soakage field can serve 60 dwellings plus the hostel but any further expansion would require an upgrade. An application is made to WRC for continued operation of the Whakamaru Wastewater Treatment Plant. It is noted from WRC River monitoring records that total annual load of nitrogen discharged from Whakamaru WWTP is minor (≅ 0.03%), hence no improvement is proposed in TYP.
The network is in good condition and the treatment plant having been recently upgraded is also in good condition.

An advanced treatment process was installed in the WWTP in 2019 and this plant reduces nitrogen discharges and is compliant with resource consent conditions.


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Taupō District Council
Wastewater Service Area - Whakamaru
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Whareroa

ASSET INFORMATION

The Whareroa wastewater scheme which was constructed in 1986 is south of the Whareroa stream. It is a gravity sewer scheme presently serving a small community of 202 residential lots when fully developed.

The Whareroa north development comprising of 170 potential lots is proposed, which will require an upgrade to the wastewater treatment facility or an alternative means of nitrogen offset.

The key issues relating to the management of the sewerage scheme are:

- Potential development of the Whareroa North area.
- Increasingly higher environmental standards and resulting high monitoring costs.
- Improving the irrigation system and increasing land area requirement.
- Improved management of the cut and carry crop for additional nitrogen removal.

ASSET DESCRIPTION

The system consists of a gravity reticulation system draining to two pump stations which pump to oxidation ponds.

The primary oxidation pond has a surface area of 1,300 m^2 and the secondary pond an area of 2,600 m^2. The upper pump station consists of two pumps capable of pumping 10.3 l/s each and a 26 m^3 storage tank while the lower station consists of two pumps capable of pumping 6.2 l/s each and a 22 m^3 storage tank. The lower pump station pumps wastewater to the upper station from where it is pumped to the plant. The treated effluent is required to be spray irrigated to 1.3 ha of pastureland.

A new Resource Consent was granted to discharge up to 201 m^3/day onto the ground in 2019. The resource consent expires in January 2039.

It was noted that during processing of the effluent discharge application the Resource Management Act allows WRC (consenting authority) to recognise the value of the investment.

ASSET CONDITION

The treatment plant was commissioned in 1986 and the bulk of the infrastructure is still in good condition. The ponds have been lined due to major leaks. A new step screen was constructed in 2010 and a new aerator was installed in pond 1 in 2009.

ASSET CAPACITY/PERFORMANCE

Reticulation capacity is good. The capacity of the irrigation system requires increasing because of new consent conditions and the subsequent changes is operating practices on the site.

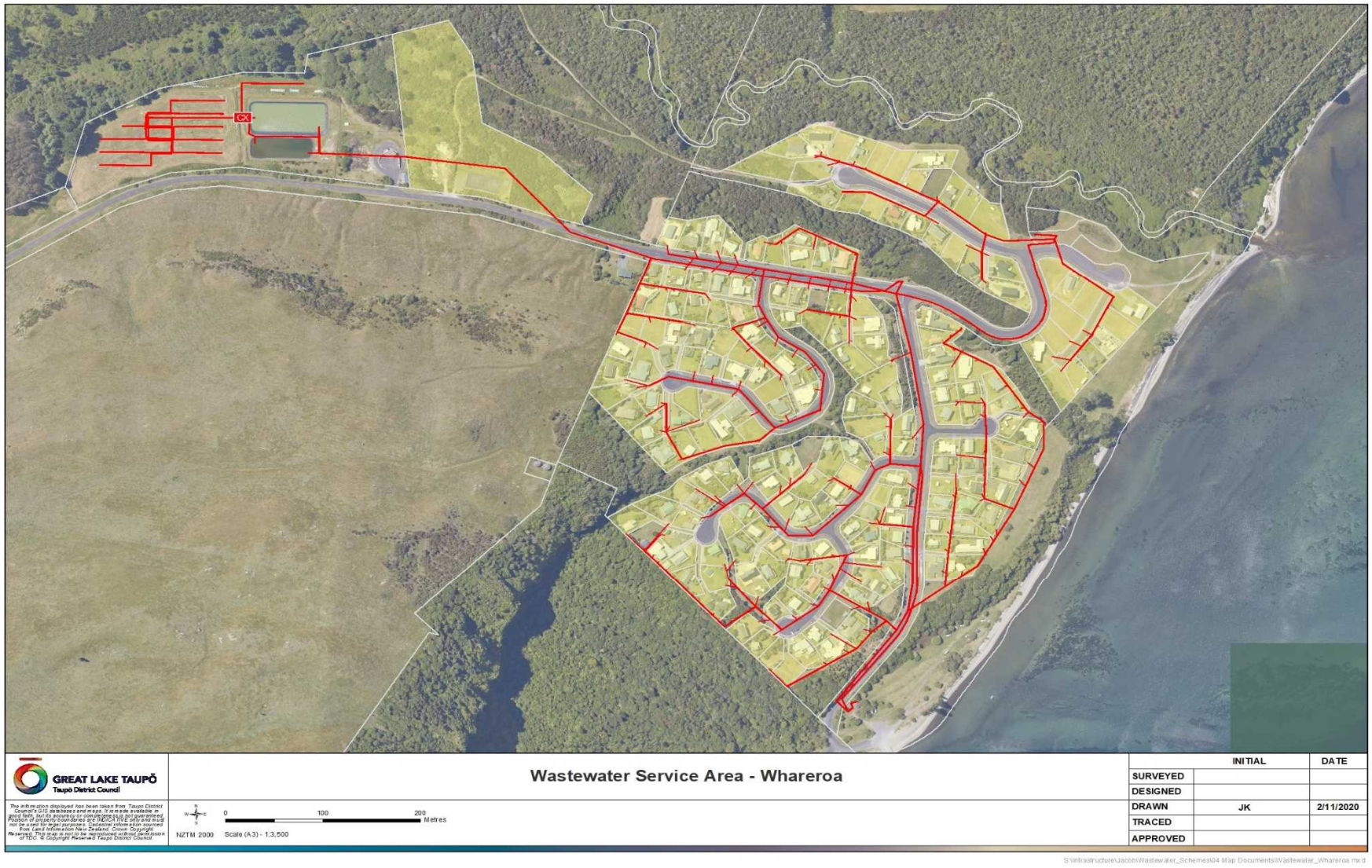
During the past five years there were no blockages or root intrusion problems recorded for this scheme. Generally, the reticulation system is considered reliable.

Effluent quality is basic pond effluent standards and the growth of the irrigated crop is used to remove nitrogen before the wastewater enters the receiving environment. Monitoring well are established.

Standard operation and maintenance information is provided in Section 8 of this Asset Management Plan.

DEVELOPMENT PLAN

Irrigation expansion is required to provide capacity for growth, timing of this project will be adjusted dependant on the rates of development within the community.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Summary of Resource Consent Compliance Status for year ending 30 June 2023

2023-year audits not yet included.

Area	Consent No.	Date of last WRC audit	Compliance status	Non-compliant Condition	Note	Reason for NC	Condition compliance status	Required Action	Due date for corrective action	Comments
Acacia Bay	122518	9/12/2022	Low Risk Non-Compliance	4	Annual median TN <6 g/m3, 90th percentile <25 g/m3 Maximum daily TN load <7.5 kg/day Annual TN discharge <700 kg/year	Maximum daily TN load 8.9 kg/day Daily discharge of TN exceeded on 2 occasions	Low risk non-compliance	Ensure compliance limits are met		
	122519	9/12/2022	Low Risk Non-Compliance	3	Prepare a Management Plan	Next scheduled review od OMP 2024. The current OMP does not incorporate requirements of Sections 4 and 5 of the consent condition	Low risk non-compliance	Provide details of the operational and maintenance procedures to minimise odour release from the inlet screen and treatment plant	31-Mar-23	
Atiamuri	109488	20/04/2022	Full Compliance							
Kinloch	113402	9/12/2022	Low Risk Non-Compliance	6	TN < 8 g/m3 and 90th percentile <20 g/m3. Median weekly TN over 1 month <28 kg/week Annual TN <1314 kg/year Annual TP <900 kg/year	Prior to the completion of the WWTP upgrade, consent limits were significantly exceeded. However, since commissioning Dece 2021 the WWTP is operating well and within consent limits	Low risk non-compliance			
				9	Loading rate of effluent to land shall not exceed the hydraulic absorptive capacity of soils	Ponding was observed on the golf course 2/11/2021 due to valve not resealing which prevented soak hole draining	Low risk non-compliance	Ensure loading rates are monitored closely to avoid ponding		
				10	No overland discharge of effluent for any part of the WWTP of effluent land	Inspections for ponding and leaks noted several incidences of overflow/ponding	Low risk non-compliance			

					application system					
				17	Develop and retain a monitoring programme to evaluate environemntal effects of discharge	No E.coli test data for one round of monitoring	Low risk non-compliance	Ensure quarterly monitoring includes all parameters		
				30	Notify WRC within 24 hours of non-compliances	Indident reports not submitted within 7 working days	Low risk non-compliance	Ensure incident reports are submitted within 7 working days		
	113402	9/12/2022	Full Compliance	5	Prepare an Odour Management Plan	OMP does not include responses for sections I, ii, v and vi	Low risk non-compliance	Provide details of operational and maintenance procedures to minimise odour release from the inlet screen and treatment plant in the OMP	**31/03/2023**	
Mangakino	951023	16/02/2022	Full compliance							
Motuoapa	122515	10/11/2023	Moderate Non-Compliance	4	Effluent quality to comply with limits set in resource consent	Treatment plant issues caused prolonged period of elevated nitrogen, largely caused by suspected WWTP poisoning, increased flows and I&I	Moderate non-compliance	Comply with nitrogen consent limits at all times		
				22	Investigate disposal field capacity 2018, 2023 and 2028	Investigation not undertaken 2023 and now overdue	Low risk non-compliance	Ensure an investigation of the disposal field capacity is undertaken and satisfies all sections (I-V) of the condition by 1 February 2024.	**1/02/2024**	
				24	Forward results of the monitoring programme quarterly	July 2022 quarterly report not provided (NH was on leave)	Low risk non-compliance	Ensure monitoring results are provided to Waikato Regional Council on a quarterly basis		
				25	Forward results of the	July 2022 quarterly report	Low risk non-	Ensure monitoring		

					monitoring programme 6 monthly	not provided (NH was on leave)	compliance	results are provided to Waikato Regional Council on a quarterly basis		
				28	Invite submitters to an annual meeting to discuss any matter relating to the exercise and monitoring of the consent	Meeting not undertaken 2022/2023	Low risk non-compliance	Provide evidence to WRC by 30 November 2023 that all submitters to the application process have been invited to a meeting as described by this condition. The meeting must be held by 31 March 2023.	30/11/2023	
				29	Notify WRC within 24 hours of limits specidied in conditions 3, 4 and 11(v) being exceeded with written report being submitted within 10 working days of incident occurring	Non compliances were reported in 6 monthly reports rather than in specific incident reports	Low risk non-compliance	Ensure Waikato Regional Council is notified within 24 hours (where practicable) of the consent holder becoming aware of any occasion specified in Condition 29.		
	122517	10/11/2023	Full compliance							
Motutere	135813.01.01	17/01/2023	Low Risk Non-Compliance	8	Continuously monitor flow rate of wastewater entering the treatment plant and record total daily influent volumes	Flow measurement issue between 3 and 18 November, recirculation valve stuck open	Low risk non-compliance	Ensure all wastewater volumes are measured and if not, notify WRC within 7 days		
				9	Quality of wastewater discharged measured weekly	One E.coli test result was not provided for sample collecetd 25 January 2022	Low risk non-compliance	Ensure all parameters are measured and if not, ensure a notification is provided to WRC within 7 days of issue occurring		This non-compliance is ridiculous - to be pulled up on 1 missing test result when all samples have been collecetd and all other parameters have been tested on every sample - totally unreasonable. TDC will need to set up a notification system with Eurofins

				22	Results of monitoring provided to WRC 6-monthly by 30 January and 30 July	Results provided 20 January and 5 August (6 days late)	Low risk non-compliance	Ensure 6 monthly monitoring updates are submitted to WRC by 30 jan and 30 July		Another unreasonable compliance putcome - 6 days late on a compliance update
	135813.02.01	17/01/2023	Full compliance							
Omori	135810	8/12/2023	Low Risk Non-Compliance	3	The maximum volume of wastewater discharged must be <800 m3/day	The discharge limit was exceeded 7 times over the year and there were 50 days without discharge volume recorded. Exceedances caused by extreme weather events	Low risk non-compliance	1. Consent limits must be adhered to at all times. 2. Update the operations and Management plan with operating procedures for maintaining sufficient buffer within the storage ponds by maximising discharge rates ahead of predicted weather events. A copy of the updated management plan shall be submitted to Council by 31 January 2024. 3. Provide details of existing and planned inflow and infiltration reduction programs or works for the wastewater network to Council by 31 January 2024.	**31/01/2024**	
				4	The rate of treated wastewater dischargeed to ground not to exceed consent limits	The weekly application consent limit was exceeded on 37 days	Low risk non-compliance	1. Consent limits must be adhered to at all times. 2. A list of actions proposed to assist with the reduction of the volumes discharged to below the	**31/01/2024**	High irrigation rates due to extreme weather events

								consented limits is required to be supplied to Waikato Regional Council by 31 January 2024.		
				6	No overland flow, spray drift or significant ponding and even distribution of effluent	Several incidents of ponding noted in site inspection records	Low risk non-compliance	Comply with all sections of consent condition 6. Investigate additional actions to reduce ponding events		
				7	Irrigation not to occur when rainfall > 0.5mm/min for greater than 20 minutes duration and frost temperature is <-5 oC	Only 1 event was measured that would introduce these restrictions. Unable to audit this condition completely		Met data needs to be reviewed and corrected to allow more accurate reproting		
				9	Develop and retain an Operations and Management Plan, submitted within 24 months of commencement of consent (due 11 March 2021) and reviewed and updated 5 yearly	2021 version of the OMP was reviewed. OMP overdue for review and update	Low risk non-compliance	Update OMP with operating procedures for maintaining sufficient buffer within the storage ponds by maximising discharge rates ahead of predicted weather events. Include details of existing and planned inflow and infiltration reduction programs or works for the wastewater network	**31/01/2024**	
				13	Inspect property at monthly intervals and as soon as practicable to record presence of erosion, rills or gullies etc. Include records	Several incidents of ponding noted in site inspection records				

					in Annual Report					
				19	Volume and quality of treated wastewater measured fortnightly	Minimum and maximum daily mass loads and monthly average mass loads need to be included in report	Low risk non-compliance	NIL - corrected		Compliance assessment is unfair as this information was included in thedata submitted, but not to the format WRC are wanting
				22	Implement a monitoring programme to evaluate environmental effects of effluent discharge	Some samples missed	Low risk non-compliance	Ensure all sampling and analysis is completed on a quarterly basis and reported on.		
				25	Notify the WRC within 24 hours of limits being exceeded and provide report within 10 working days	Oxidation pond level sensor was inaccurate giving false indication of pond level which resulted in a pond overflow	Low risk non-compliance	the sensor has been repaired/replaced	31/01/2024	
Taupō	116596	25/11/2022	Low Risk Non-Compliance	4	Effluent hydraulic loading rates <45 mm/week, 15 mm/day and 5 mm/hr	Compliance with daily and weekly hydraulic loading limits was achieved 99.3% of the time, an improvement from 2020/21 but still non-compliant	Low risk non-compliance	Comply with maximum weekly hydraulic loading rate	None given	
				5	Manage disposal area to ensure the renovation of contaminants and uptake of nutrients is mazimised and the extent of nutrient leaching to groundwater is minimised	Tota N discharge = 554 kg/TN/ha/yr, over consent limit	Low risk non-compliance	Comply with maximum annual TN loading rate	None given	
				21	Characterise the quantity, quality and variability of the discharge	Daily rainfall data was not provided in the annual report	Full compliance	Ensure rainfall data is recorded and submitted in future reports	None given	

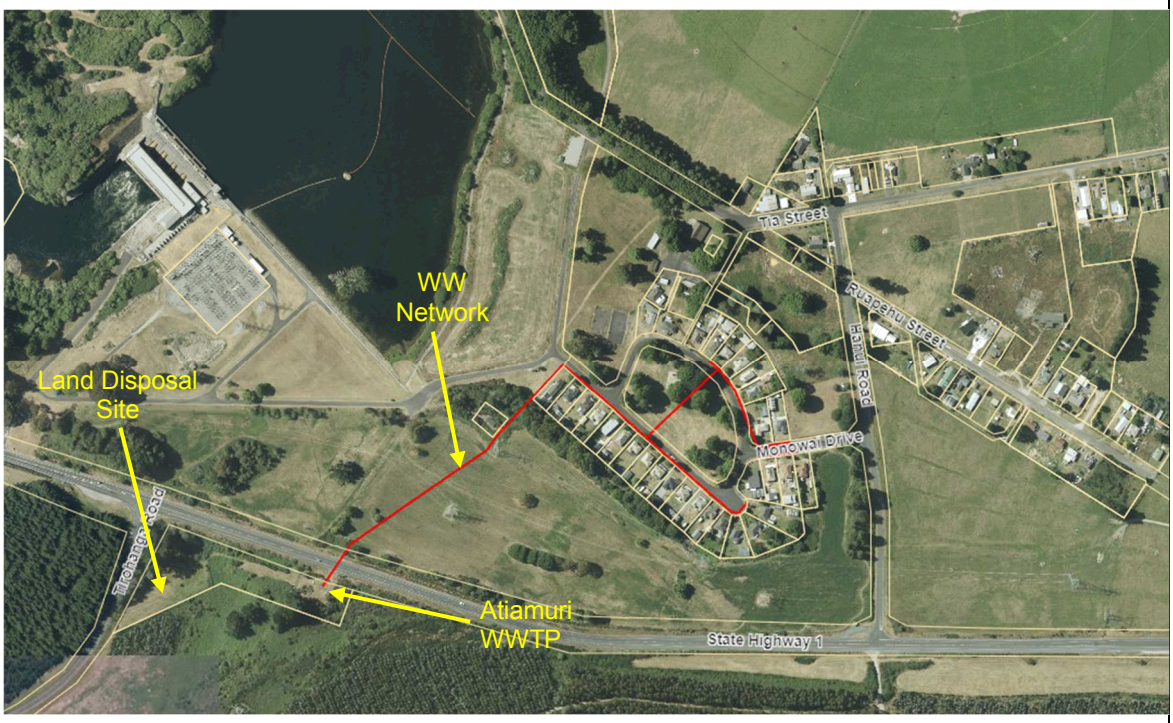
	121289.01.03	25/11/2022	Full compliance							
	930464	25/11/2022	Low Risk Non-Compliance	f	Median faecal coliform concentration < 3 x 10^6 MPN/100mL	Noted that some results exceed test detection limits	Full compliance	Ensure WRC are notified of exceedaces or process breakdowns which are likely to result in consent limits being exceeded		
				j	Maximum rate of irrigation is 35 mm/week	Maximum rate of irrigationimproved from 2020/21 which predominantly occurred on block E which needs investigating	Low risk non-compliance	Undertake an investigation into overapplication events (weekly loading) at the Rakaunui LDS. A report detailing the results of the investigation and an action plan to address identified issues must be submitted to Council no later than 31 March 2023.	**31/03/2023**	
				r	Determine quality, quantity and variability of WW and report quarterly	Results not submitted to WRC quarterly as required	Low risk non-compliance	Ensure provision of results 3 monthly	None given	
Turangi	102927	12/12/2022	Low Risk Non-compliance	9	Quality of discharge meets consent limits detailed in table	Elevated nitrogen levels ongoing. Elevated E.coli related to membrane fouling. Elevate TSS - no reasons included	Low risk non-compliance	None necessary		
				13	Characterise the quantity, quality and variability of the discharge	sampling was not alternated on different days of the week. No data or discussion on changes in soil, foliage levels and vegetation diversity within STW. No heavy metals tested.	Low risk non-compliance	Provide confirmation of the sampling and monitoring plan for the 2022/23 compliance period to Waikato Regional Council by 31 January 2023.	**31/01/2023**	

				16	Notify WRC within 48 hours of NC and provide a report within 7 days of incident	Ongoing issues have been reported but notification of other exceedances were not	Low risk non-compliance	Ensure all parties are notified as soon as practicable, a report is supplied within 7 days of the incident occurring and a comment is provided in the Annual Report.		
Whakamaru	130354	17/01/2023	Full compliance	24	Forward results of WTP performance monitoring at 6 monthly intervals by 30 January and 30 July	6 monthly updates were sent to WRC 3 August 2021 and 17 January 2022	Low risk non-compliance	Ensure 6 monthly reporting is submitted to WRC by 30 January and 30 June		Completed
Whareroa	138347.01.01	3/11/2022	Low risk non-compliance	20	Monitor quality of effluent and report at required frequencies	WRC have reported that minimum and maximum daily mass loads and monthly averag mass loads based on fortnightly monitoring intervals have not been reported. This information has been consistently provided to WRC - the new monitoring officer is not understanding the information provided. Further explanation has been requested.	Low Risk Non-Compliance	Update report - format to be advised		
				23	Develop a groundwater monitoring programme and monitor quarterly for parameters listed in the consent	Ensure that nitrite-nitrogen is reported with all future data as well as other nitrogen species required.	Full compliance	Include NO2N test results with reporting		
				25	Forward results of monitoring to WRC, via electronic	July quarterly results not provided as NH off work with	Full compliance	Ensure monitoring results are reported		

					means, on a quarterly basis.	Covid		quarterly		

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	27/07/2023

Introduction

Investment/Project Name:	Atiamuri Wastewater Treatment Plant (WWTP) Upgrade
Project Purpose:	To upgrade Atiamuri WWTP to meet new resource consent conditions.
Business Need:	Council needs to maintain a wastewater treatment facility that complies with discharge consent conditions.
Background:	Atiamuri WWTP currently services 35 properties on the western side of Atiamuri Village but only provides basic solids separation in Imhoff Tank and provides no further treatment. Primary treated effluent from the Imhoff tank discharges to a soakage trench system in the field west of the tank. Settled sludge from the Imhoff Tank occasionally removed and is transported to taupo for disposal.  Fig. 1: Atiamuri Community and WWTP On the eastern side of Atiamuri, there are approximately 25 houses that are not connected to the Wastewater networks and are currently serviced by on-site septic tanks. A Wastewater discharge consent has been applied for to replace the current consent which expires on 01/04/2024. The new consent will cover increase in flow and load potentially coming from currently unconnected properties and future developments.
Project Description:	Upgrade of Atiamuri WWTP to meet new resource consent conditions
Project Location:	Atiamuri WWTP
Project Complexity:	Paint by Numbers

Strategic Case		
Primary:	Being Legislative Compliant	5
Secondary:	Protecting our Environment	3
Tertiary:	Placemaking	3
Investment objectives:	This project seeks to provide secondary treatment and allow for future expansion of capacity of the treatment plant. This project also ensures all relevant regulatory regulations and permit regulations are met.	
Opportunities:	Enable future development of Atiamuri by designing	

Potential Scope & Contextual Considerations	
Minimum scope:	• Planning and feasibility studies • Design and construction (upgrade) of the new WWTP to service the existing community • As-built drawings • Compliance and Regulations
Desirable scope:	
Aspirational scope:	
Excluded scope:	• Consenting (will already be completed) • Consultation (will be completed as part of consent process) • Networks renewals
Stakeholders:	Atiamuri community, iwi / hapu, TDC wastewater treatment operations team
Constraints:	Power supply. We have been trying to get power supply to site for over 18 months, but it has not yet been made available at site.
Assumptions:	• There is sufficient land to construct to construct the new WWTP. • Consent is granted in line with the proposed upgrade. • That the date of the upgrade proposed is acceptable to Waikato Regional Council (WRC) and to other stakeholders. • Power supply available on site.
Risks if project was deferred:	• Breach of consents • Reputational damage • Legal risk
Risks of doing the project:	Criticism for not developing a solution for the whole community now.

Options Analysis (add more options if applicable)			
Add more options if applicable	**Option One: Change Nothing**	**Option Two:** **Upgrade WWTP for the existing connections only**	**Option Three:** **Develop a wastewater reticulation and disposal system for the full Atiamuri community.**
Overview:	The option of whether "do nothing", or carry on with the status quo, is a viable option, will be determined though the resource consenting process that precedes this construction project. The assumption is that an upgrade will be required.	Upgrade the WWTP to meet new resource consent conditions for the existing reticulated community only (35 houses).	Upgrade the WWTP to meet new resource consent conditions for the existing reticulated community and expand the reticulation and treatment plant for the properties currently on septic tanks.
Advantages:	• No capital cost	• Meet consent conditions • Environmental improvement (groundwater)	• Meet consent conditions • Greater environmental improvement than Option 2 • Better scale of economy (more rate payers)
Disadvantages:	• Non-compliance and enforcement risk	• Capital cost • Half of community is still not provided for with reticulated wastewater and treatment	• Higher capital cost • The non-reticulated community has not been consulted with.
Costs:	No increase in capital or operational cost. Excluding any enforcement costs.	Capex (treatment) - $600,000 Opex - $5,000 p.a.	Capex (treatment + reticulation) ~$2,000,000+
Achievability:	N/A	Achievable	Achievable but can be deferred unit consultation with the community and/or environmental drivers require this change to be made.
Recommendation:	Proceed with Option 2 which provides greater environment improvement and covers the full Atiamuri community. Option 3 can also be considered now or in the future.		

Delivery		
*for the **recommended** option describe the delivery details:*		
Delivery details:	Gaining resource consent is a pre-requisite for this project. This project will involve: • Community consultation • Ground investigations • Design • Tender • Construction	
Outputs:	WWTP Upgrade	Compliant with resource consent
	Handover documentation	As-built records, O&M manuals

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	18/07/2023

Introduction	
Investment/Project Name:	Taupo Wastewater Control Gates Bridge Buffer Storage Tanks **'SHORT/MEDIUM TERM SOLUTION'**
Project Purpose:	To provide capacity for growth in the area to the North of the Waikato River including the Nukuhau area, Acacia Bay and future development zones.
Business Need:	Growth is occurring on the north side of the river and will be limited by a lack of capacity. Network capacity in the Nukuhau area (Taupo scheme) and treatment capacity (Acacia Bay scheme). Without additional capacity growth will need to stop.
Background:	Several developments have been planned on the northern side of the Control Gate Bridge and should be accommodated by the wastewater network. These are: Loch Views development, Nukuhau Plan Change area, and continued development of the existing residential area in Nukuhau, and Acacia Bay. Capacity over the twin pipes over the Control Gates Bridge is limited and near capacity. A buffer storage tank is considered however it will not allow for the full development of these areas and the connection of Acacia Bay to Taupo. Therefore, this business case addresses only the short-term need to allow growth to continue while a long-term solution is developed.
Project Description:	To enable growth to occur on the North side of the Waikato River but constructing a **Buffer Storage Tank** near the Control Gates Bridge. This project will provide the capacity needed to service the already zoned areas including the Nukuhau Structure Plan area, but will not allow for future connection of Acacia Bay and potentially further development areas that are currently not zoned.
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case		
Primary:	Housing	5
Secondary:	Looking after Public Health and Safety	5
Tertiary:	Maintaining Levels of Service	5
Investment objectives:	• To enable growth to continue in Taupo on the northern side of the Waikato River • To provide a resilient wastewater network	
Opportunities:	• Alignment with Mercury Energy and Taupo DC Transportation department on Control gates bridge / second bridge development. • Alignment with developers on land use opportunities.	

Potential Scope & Contextual Considerations	
Minimum scope:	• Storage tank and WWPS near the Traffic Lights on the north side on the Control Gates Bridge.
Desirable scope:	•
Aspirational scope:	• The size of the storage tanks could be increased to provide greater resilience; however, this will come at a cost.
Excluded scope:	• Network upgrade • Additional pipe over the Waikato River (Control Gate Bridge) • Connection to Acacia Bay Wastewater WWTP. • Development of a new WWTP facility
Stakeholders:	Mercury Energy, iwi / hapu, developers, neighbours, Council and generally public.

Constraints:	Limited space to build storage facility.
Assumptions:	• Availability of financial resources to fund the project. • Relocation of existing services is achievable (telecoms, gas etc…)
Risks if project was deferred:	• Housing Development (Nukuhau Plan Change) will not be able to proceed. • Overload of existing system due to increase in wastewater volumes. • Lack of buffer capacity resulting in operational disruption during periods of high wastewater flow. • Increase in emergency expenses resulting from costly clean-up operations.
Risks of doing the project:	• Cost exceeding initial budget estimate due to unforeseen challenges, change in design requirements etc. • Integrating the buffer storage tank with existing wastewater network. • Pushback from some groups as more wastewater will ultimately cross the river within existing network.

Options Analysis (add more options if applicable)			
Add more options if applicable	**Option One:** **Do Nothing**	**Option Two:** **Build a Storage Tank North of Control Gate Bridge**	**Option Three:** **Develop the Long-term solution now. (Additional Control Gates Bridge Pipe or New WWTP).**
Overview:	No changes to network. Wastewater will continue to be transported from the Nukuhau area to the treatment plant via the Control Gate Bridge.	Construction of a wastewater buffer storage tank north of Control Gate Bridge.	See the Taupo North 'long-term solution' business case.
Advantages:	• No capital cost.	• A buffer storage tank provides additional storage capacity for wastewater as a result of increased population in the Nuhuhau area and during periods of high flow and allow growth to continue in the short/medium term. • Tank acts as a buffer thereby allowing for better flow control and smoother operations. • Prevent wastewater overflows and spills into the Waikato River thereby protecting the environment. • Having the buffer tanks in place will make renewal of the twin control gates feed pipes easier.	See the Taupo North 'long-term solution' business case.
Disadvantages:	• Capacity constraint remains. • Risk of overflows increases. • Growth constrained by a lack of capacity.	• Constructing a buffer storage tank involves a significant capital investment. • Does not provide for growth beyond the currently zoned areas and doesn't not permit full connection of Acacia Bay to the Taupo WWTP.	See the Taupo North 'long-term solution' business case.
Costs:	-	Control Gates Buffer Tank $3 – $4.5 million.	See the Taupo North 'long-term solution' business case.
Achievability:	This option is achievable but not practical.	Achievable	Not achievable in the short-term.
Recommendation:	**Option 2: Build a Storage Tank North of Control Gate Bridge.**		

Delivery		
Delivery details:	• Buffer Tanks and WWPS	
Outputs:	Design and Engineering.	This involves detailed design of the storage tank showing tank specifications, materials, structural integrity, integration with existing system and safety considerations.
	A new Wastewater storage tank	Construction plan outlining timeline, resources allocation, procurement of materials, subcontracting (if required) etc.
	Integration with existing Wastewater System	Storage tank is connected to existing WW networks.
	As-builts and Handover	

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	18/07/2023

Introduction	
Investment/Project Name:	Taupo Wastewater (WW) Southern Trunk Sewer Main
Project Purpose:	To provide the wastewater conveyance capacity needed to enable growth to occur in the southern area of Taupo.
Business Need:	The business is to provide adequate wastewater network capacity to convey wastewater to provide for growth areas. Failure to provide this capacity will result in a greater overflows risk increasing in time.
Background:	The growth areas in Southern Taupō, as defined by TDC2050, drives the need to provide additional capacity to convey wastewater to the Taupo WWTP. The 2017/18 LTP included projects to continue with staged upgrades to the Southern trunk main. Before commencing this work, we have paused to review the upgrade options as upgrade of the trunk as the option of upgrading on the existing alignment involves complex construction and will cause significant disruption to property. Bypass pumping options are also to be considered. Prior to continue with upgrade of the trunk sewer, an options review was undertaken with alternative options considered.
Project Description:	The Southern Trunk Sewer Capacity Upgrade project will provide the capacity needed to move wastewater from Taupo southern growth area to Taupō WWTP.
Project Location:	Taupo (Between Wharewaka and Taupō CBD)
Project Complexity:	Paint by Numbers

Strategic Case		
Primary:	Housing	5
Secondary:	Being Resilient and Prepared	5
Tertiary:	Looking after public health and safety	5
Investment objectives:	<describe what we are hoping to achieve from this specific investment/project? the council or community can expect and consider the social, economic, environmental &/or cultural benefits. Where possible quantify these>	
Opportunities:		

Potential Scope & Contextual Considerations	
<describe the potential scope associated with different levels of investment. **BOLD** the preferred scope option>:	
Minimum scope:	• Pipeline upgrade • Sewer diversions • New wastewater pump station (WWPS) • Additional wastewater storage • Corrosion investigation and implementation of solution • Upgrade of pump station storage where required.
Desirable scope:	<describe the 'additional' requirements which may justify extra spend on a value-for-money basis what we are hoping to achieve from this specific investment/project?
Aspirational scope:	<describe the 'possible' gold standard requirements which could be achieved from this this specific investment/project?

Excluded scope:	Renewals of existing assets
<describe other considerations affecting the investment/project:	
Stakeholders:	Senior Management, Councillors, Residents of Acacia Bay, Tūwharetoa Maori Trust Board, Project team (TDC staff and Consultants), TDC Wastewater Treatment Operation Team.
Constraints:	• Private Property access • Suitable locations for WWPS and storage
Assumptions:	• Currently zoned growth areas only. • No land purchase is required (pump station location)
Risks if project was deferred:	Overflow risk increases as development in the Southern area continues.
Risks of doing the project:	Depending on the option selected; there is a risk of private property damage.

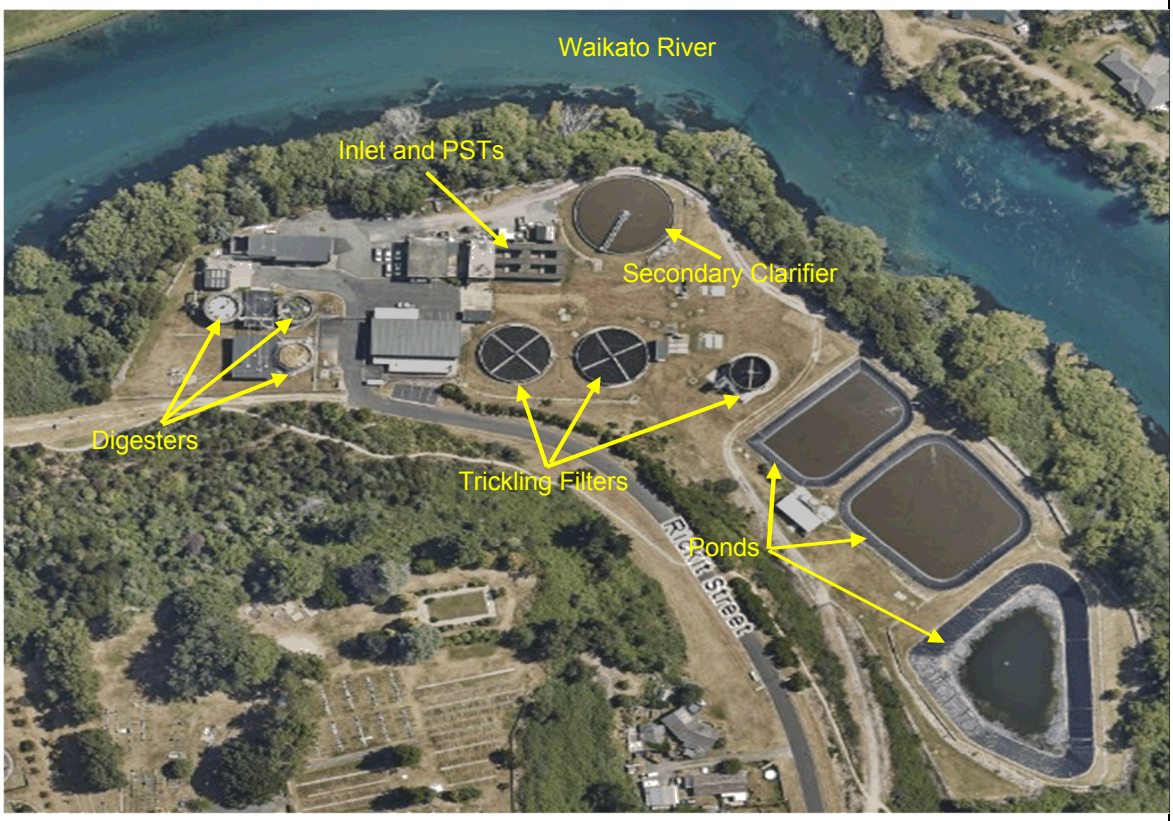
Options Analysis (add more options if applicable)			
Add more options if applicable	**Option One:** **Upgrade of the gravity sewer network**	**Option Two:** **Bypass pumping via Lake Terrace**	**Option Three:** **Bypass pumping – alternative high alignment**
Overview:	• Upgrade of the gravity trunk sewer on existing alignment. • This option will include major works within private property and cause significant disruption. • New, or upgraded pipe bridges over multiple gullies.	• Provide additional capacity that bypasses the need to upgrade the trunk sewer line. • A new pump station will be utilized to provide a bypass solution. • Storage is required to attenuate peak flows.	• Provide additional capacity that bypasses the need to upgrade the trunk sewer line. • **Two** new pump station will be utilized to provide a bypass solution. • Storage is required to attenuate peak flows.
Advantages:	• Existing alignment maximises the use of gravity • Reduced risk and cost associated with pumping • Potential to provide greater capacity for increased growth to Southern area. However, growth beyond TDC2050 is unlikely to occur.	• Lower disturbance to private property. • Lower risk of damage to private property damage vs Option 1 • Lower Capex • Construction could likely begin more quickly than Option 1. • Increased resilience as wastewater from the Southern area will be conveyed via 2 separate routes.	• Lower disturbance to private property. • Lower risk of damage to private property damage vs Option 1. • Lower Capex than Option 1 but higher than Option 2. • Construction could likely begin more quickly than Option 1. • Increased resilience as wastewater from the Southern area will be conveyed via 2 separate routes.
Disadvantages:	• All capacity contained in one trunk sewer i.e., limited resilience if failure occurs (Lake Terrace incident) • Major disruption to private property and may not be practically achievable. • Largest cost uncertainty.	• Reliance on pump stations (requirements for good telemetry, emergency storage and generators) • Limited further growth potential beyond the existing identified growth areas • Higher risk of overflows due to a less conservative design. • Increased Opex and maintenance.	• More expensive than Option 2 • Longer pipeline than Option 2 • Two pump station vs one pump station for Option 2. • Higher operating pressure than Option 2. • Higher Opex than Option 2.
Costs:	20M+	$ 15,200,000 Budget currently available ($3,650,000 + 4,779,000 (2023/24 AP) = $8,429,000. Required additional budget $6,800,000. *[Budget previously approved in 2021 LTP was $10.2 million]*	20M+

Achievability:	Achievable but very complex given physical constrains and will cause significant damage to private property. High-risk, high-cost.	**Previously committed. Design phase complete.**	
Recommendation:	Option 2 – Pumped rising main via Lake Terrace Design is complete and is current at 1st tender stage.		

Delivery		
Delivery details:		
Outputs:	Planning and Design	Detailed design and cost estimate from engineers [99% complete]
	Construction - New WWPS - New Rising main - Associated equipment	
	Handover documentation	As-builts records

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	18/07/2023

Introduction

Investment/Project Name:	Taupō Wastewater Treatment Plant (WWTP) Primary Sedimentation Tank (PST) No.3
Project Purpose:	To enhance the overall efficiency of the treatment plant and ensures compliance with environmental standards for wastewater discharge.
Business Need:	The capacity of the existing primary settling tank (PST) is at its hydraulic capacity therefore a third PST is required to maintain adequate settling performance.
Background:	Taupo WWTP consist of primary and secondary treatment processes. The primary treatment area currently incorporates Two (2) PSTs and as wastewater flow to the plant increases, additional capacity is required to maintain plant performance. The third tank also provides operation flexibility. The PSTs are at capacity and as influent flow increases; the performance of these units can be expected to deteriorate over time. 
Project Description:	Construct a third Primary Settling Tank.
Project Location:	Taupō WWTP
Project Complexity:	Paint by Numbers

Strategic Case

Primary:	Protecting the Environment	5
Secondary:	Being Legislatively Compliant	5
Tertiary:	Maintaining Levels of Service	5

Investment objectives:	• One of the primary objectives is to improve the overall efficiency of the wastewater treatment process and to improve effluent quality. • Secondly is to ensure compliance with environmental regulations and discharge standards. • A new PST will extend the lifespan of the entire wastewater treatment infrastructure. • Enhances plant`s ability to handle peak flow conditions effectively.
Opportunities:	• Improved treatment efficiency. • Operational flexibility • Maintain regulatory compliance. • Enhanced system resilience • Enhanced sludge management

Potential Scope & Contextual Considerations	
Minimum scope:	• Design and construction of PST No. 3 • Electrical, control and automation upgrades associated with the addition of PST No. 3 • Operators Training.
Desirable scope:	• Modernization of the existing tanks to match the equipment in the new settling tank (this could be partially funded by renewals budgets. • Potentially include renewal of the inlet works equipment.
Aspirational scope:	• Include the Transfer Pump Station upgrade in the same contract. • Include renewal of other degraded assets within the facility.
Excluded scope:	•
Stakeholders:	• TDC Wastewater Treatment Operations Team, community, iwi / hapu, Council.
Constraints:	• Site conditions which could impact tank`s size and configuration. • Structural integrity of the existing tanks.
Assumptions:	• There is sufficient land to construct PST No. 3 • New PST integrates into existing treatment plant`s infrastructure without major disruptions to ongoing operations.
Risks if project was deferred:	• Deteriorating treatment performance that could affect downstream treatment processes. • Reduce the overall plant efficiency, operational risk. • Consent compliance risks (related to irrigation sites). • Lack of resilience to peak flows conditions, such as heavy rainfall events.
Risks of doing the project:	• Exceeding initial estimated budget due to unforeseen construction complexities etc. • Integrating the new PST into existing treatment plant may cause temporary operational disruptions, affecting overall treatment process.

Options Analysis (add more options if applicable)			
Add more options if applicable	**Option 1:** **Do nothing**	**Option 2:** **New Primary Tank #3**	**Option 3:** **Relocate WWTP**
Overview:	Do nothing.	Construct Primary Tank number 3 adjacent to the existing two tanks. This was allowed for in the original design of the plant several decades ago.	New WWTP at a different site.
Advantages:	• No cost	• Maintain treatment standards. • Increased operational flexibility. • Will allow critical maintenance on Clarifier 3 to be undertaken.	•
Disadvantages:	• Performance of the WWTP will continue to deteriorate over time. • Loss of operational flexibility. • Overflow risk.	• More infrastructure at the current site which will become more constrained over time. •	• High cost.
Costs:	-	$ 3,500,000 $1,000,000 is already available in the 2023/24 AP therefore $2,500,000 is requested in Year 1 of the LTP.	
Achievability:	-	Detailed design to commence in 2023/24 AP	Very high.
Recommendation:	**Option 2:** **New Primary Tank #3**		

Delivery		
Delivery details:		
Outputs:	Planning and design	Detailed design and cost estimate from engineers
	PST No. 3 Refurbish hardware in PST#1 & #2.	
	Handover documentation	As-builts records, O&M manuals, Operators Training

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	18/07/2023

Introduction

Investment/Project Name:	Taupō Wastewater Treatment Plant – Side Stream Treatment
Project Purpose:	To reduce the amount of nitrogen that leaves the treatment plant to the irrigation sites so compliance with nitrogen loading can be maintained and expansion of irrigation systems deferred.
Business Need:	As the wastewater load from the community increases the capacity of our infrastructure must also increase.
Background:	Treated WW effluent from Taupō Wastewater Treatment Plant (WWTP) is applied to land at Rakaunui and View Road Land Disposal sites, with consent limits on the maximum Nitrogen (N) loading rate. Loading rate limits on the Rakaunui Road site have decrease but are offset by the new View Road area being developed. Nitrogen loads in the treated effluent has been steadily increasing and is now reaching the consent limits. Side stream refers to the liquid generated from sludge treatment and is a smaller treatment plant within the treatment plan that will target this stream specifically. Within Taupō WWTP, the side stream under consideration is sludge thickener filtrate, sludge filter press filtrate, and the wash water used in that area. The side stream is highly concentration compared to raw sewage and accounts for between 20 – 30 % of the TN load on the WWTP. Therefore, this project seeks to look at reducing the amount of TN that leaves the WWTP to irrigation sites. This project will target a high concentration nitrogen source within the WWTP and remove nitrogen from that stream rather than treating the whole flow.
Project Description:	Side stream treatment plant for nutrient removal (Nitrogen) as an alternative to expanding irrigation systems to meet consent compliance.
Project Location:	Taupō WWTP
Project Complexity:	Movie

Strategic Case

Primary:	Being Legislative Compliant	5
Secondary:	Looking after Public Health and Safety	5
Tertiary:	Protecting our Environment	5
Investment objectives:	The primary objective of this project is to achieve nitrogen removal through side stream treatment. This will help the WWTP meet regulatory requirements as set out by Waikato Regional Council (WRC) for nitrogen discharge limits and reduce its environmental impact on the environment.	
Opportunities:	• Regulatory Compliance • Reduced Nutrient Pollution • Improved Effluent Quality • Introduce a technology to NZ that other could utilize to build off further.	

Potential Scope & Contextual Considerations

<describe the potential scope associated with different levels of investment. **BOLD** the preferred scope option>:	
Minimum scope:	• Installing a side stream treatment process that targets to achieve effective nitrogen reduction. • Controls and Monitoring systems to ensure effective nitrogen removal process. • Operator(s) Training of the new system. • Integration with existing treatment processes.
Desirable scope:	• Consider new technology '**Anammox'** that is used widely overseas but not yet in NZ.
Aspirational scope:	
Excluded scope:	• Full WWTP upgrade • Land expansion/acquisition • Plant-wide advanced control systems
Stakeholders:	TDC Wastewater Treatment Operation Team, NZ Water Industry / WaterCare
Constraints:	Space at the WWTP is limited.
Assumptions:	Sufficient land within the treatment plant to installed side stream treatment facility
Risks if project was deferred:	• Deteriorating treatment performance that could affect downstream treatment processes. • Reduces overall plant efficiency. • Consent compliance risks (relating to irrigation site).
Risks of doing the project:	• Cost overruns – unforeseen construction complexities or changes in scope during the project. • Implementing new nitrogen removal technology/process may encounter technical challenges affecting plant overall performance. • Long-term maintenance and operation cost of running the side stream process. • Option to include an NZ first treatment method.

Options Analysis (add more options if applicable)			
Add more options if applicable	**Option One:** **Do Nothing**	**Option Two:** **Installation of side stream treatment for nutrient removal.**	**Option Three:** **Expansion of irrigation sites**
Overview:	The "Do nothing" option means to continue operating the WWTP as it is now.	Installation of side stream treatment plant for nutrient removal as an alternative to expanding irrigation system	This option looks at having another irrigation sites in addition to Rakaunui and View Road Land Disposal Sites (LDS).
Advantages:	• No budget required	• Meeting WRC resource consent regarding Nitrogen discharge to the environment. • Nitrogen removal reduces the risks of harmful substances entering water sources thus safeguarding public health.	• Expanding irrigation sites with treated wastewater helps mitigate the environmental impact of nutrient-rich discharges into water bodies. • Meeting WRC resource consent regarding Nitrogen discharge to the environment. • Treated wastewater can be used to grow crop/grass thus generating additional income to Council.
Disadvantages:	• Non-compliance with environmental and regional regulations which could result in enforcement from Waikato Regional Council (WRC). • Potential additional legal cost resulting from breach of resource consents. • Extra cost associated with purchasing additional irrigation land.	• Capital investment required. • Additional operating and maintenance costs.	• Establishing irrigation infrastructure, including pipelines, pumps, and distribution systems, can be costly and require ongoing maintenance and investment. • Long term application and excessive irrigation can lead to soil and groundwater contamination if not fully taken up by plants, potentially causing nitrate pollution and affecting nearby drinking water supplies.
Costs:	-	$3,000,000 - $4,000,000 best estimate at this stage. Some cost uncertainty.	$15M+
Achievability:	This option is achievable but with negative environmental consequences and breach of WRC resource consent	Achievable with ongoing operation costs.	Achievable, but long implementation as land acquisition and consenting is required.
Recommendation:	Option 2 : Side Stream Treatment		

Delivery		
Delivery details:	• Initial investigation, consultation, design, and tendering • Standard construction – contract delivery • Option to utilize novel treatment process for NZ.	
Outputs:	Technology agreement	
	Installation/construction of side stream system process	
	Handover documentation	As-built records, O&M manuals

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	18/07/2023

Introduction

Investment/Project Name:	Taupō Wastewater (WWTP) Transfer Pump Station Upgrade
Project Purpose:	To upgrade the transfer pump station at the Taupō WWTP to increase capacity to align with current requirements and future growth.
Business Need:	To reduce the risk of overflow to the Waikato River during extreme weather events.
Background:	In 2008 and again in 2011 the Taupo WWTP overflowed to the Waikato River during large storm events. In both instances the overflow occurred at the 'Transfer Pump Station' as it could not keep up with the incoming wastewater flows. There have been several improvements at the site since these overflows occurred however further improvements should be made as there is some risk this can happen again. It is not possible to prevent overflows under all circumstances; there is always risk of an event the is larger than can reasonably be provided for. The 2011 event was significant, and overflow occurred. While there have been minor improvements made to the site to reduce the risk of overflow, should an event like 2011 occur again, an overflow could still occur, albeit at a reduced volume. The 2008 and 2011 storm events resulted in 1,730 m^3 and 2,221 m^3 of effluent being discharged to the Waikato River respectively, which accounted for 13% and 15% of the daily influent respectively (Mott MacDonald, 2015). These events show that at flows of up to 1,950 m^3 /h, the critical hydraulically limited point in the system was the Transfer Pump Station and effluent storage pond capacity. The capacity of the Transfer Pump Station is currently 1,250 m^3 /h.
Project Description:	To increase the capacity of the Transfer Pump Station at the Taupo WWTP to reduce overflow risk to the Waikato River.
Project Location:	Taupo WWTP
Project Complexity:	Paint by Numbers

Strategic Case

Primary:	Being Resilient and Prepared	5
Secondary:	Looking after Public Health and Safety	4
Tertiary:	Protecting the Environment	3
Investment objectives:	To maximize efficiency, minimise costs, ensuring compliance, reducing risks, and contributing to plant`s overall sustainability and long-term success.	
Opportunities:	• Upgrading the pump station provides opportunity to expand its capacity to handle higher flow rates. • Increasing plant resilience and ability to handle varying wastewater flow. • Ensures compliance with environmental regulations and potential to avoid penalties and legal issues.	

Potential Scope & Contextual Considerations

Minimum scope:	• New or upgraded Transfer Pump Station. • Pump station is designed to be resilient and adaptable to the potential impacts of climate change such as extreme weather events.
Desirable scope:	•
Aspirational scope:	•

Excluded scope:	• Emergency generator upgrade (if needed)
Stakeholders:	• TDC Wastewater Treatment Operation Team.
Constraints:	• Depending on project timing, resources could be a constraint.
Assumptions:	• Engineering feasibility • Operational compatibility.
Risks if project was deferred:	• If a repeat of 2011 storm event was to occur again, it would likely result in overflow to the Waikato River (but at a reduced volume). Although this was an extreme event the fact that it occurred in recent past means that this event could happened in future (probably more severe).
Risks of doing the project:	• Overflow risk always remains even post upgrade.

Options Analysis (add more options if applicable)			
Add more options if applicable	**Option One:** **Do Nothing**	**Option Two:** **Upgrade the Transfer Pump Station**	
Overview:	This option will mean accepting the current level of overflow risk.	Increase pump station capacity to manage larger storm events.	
Advantages:		Lower risk of overflow to the river (but not zero risk)	
Disadvantages:	A storm event, that has occurred in the past, if repeated could result in another overflow, but at a reduced volume.	Cost	
Costs:	-	$900,000	
Achievability:		Achievable. Some uncertainty is scope to deliver this i.e. civil/structural elements or just mechanical. Prelim design is underway.	
Recommendation:	**Option Two:** **Upgrade the Transfer Pump Station**		

GREAT LAKE TAUPŌ
Taupō District Council

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	08/04/2023

Introduction	
Investment/Project Name:	Tūrangi Wastewater Disposal Project
Project Purpose:	To improve the wastewater disposal system for discharges from the Tūrangi WWTP.
Business Need:	To obtain resource consent for wastewater discharge. To make treatment plant upgrades, or disposal system upgrades as required by Resource Consent.
Background:	The Tūrangi WWTP delivers an essential service, treating wastewater from the townships of Tūrangi and Tokaanu. The Tūrangi WWTP has been operating under a resource consent that allowed for the discharge of treated wastewater to the former Hangarito Stream Channel and Te Matapuna o Taupo Moana wetland. This consent expired on June 2018. On 11 December 2017, TDC lodged applications with the Waikato Regional Council (WRC) to renew the expiring discharge consents, and in doing so, TDC secured s.124 rights under the Resource Management Act 1991 to continue to operate under the expiring consents while a replacement consent is being sought. Following lodgement of the resource consent application WRC received letters of opposition from the Tūwharetoa Māori Trust Board (TMTB), Ngāti Tūrangitukua and Ngāti Kurauia. WRC placed the application on hold to enable further consultation. The Ministry of Works and Development established the Tūrangi sewerage system and associated treatment plant on the current site in 1965. In the development of the WWTP and the Tūrangi township, the crown acquired significant portions of Ngāti Tūrangitukua ancestral land without proper regard for the interests of Ngāti Turangitukua. Throughout the development of Tūrangi WWTP, Ngāti Turangitukua have maintained a position of opposition to the location and operation of the WWTP and the effects of the wastewater discharge on waterways. Ngāti Kurauia, Ngāti Tūrangitukua, TMTB and TDC representatives agreed to form a Steering Group to work together to consider alternative options for the discharge of treated wastewater from the Tūrangi WWTP focusing on disposal to an alternative site and preferably to a land disposal system. The Steering Group is to report back to Council with an option for an alternative disposal site, if available, for final decision on a project by Council. At the time of writing this report, there has been some investigation into a particular site however the Steering Group has not provided a recommendation to Council for a land disposal site this work is on-going.
Project Description:	Improve Tūrangi wastewater disposal system in line with resource consent conditions (to be determined).
Project Location:	Tūrangi
Project Complexity:	The selected option will determine the level of complexity. A land disposal project will be more complex than improving the current site. However, these are typical wastewater industry projects and there is nothing out of the ordinary that cannot be overcome.

Strategic Case		
Primary:	Placemaking (cultural)	5
Secondary:	Being Legislative Complaint	3
Tertiary:	Protecting our Environment	2
Investment objectives:	To improve the effluent disposal system for Tūrangi's wastewater system.	

Opportunities:	To work with hapū/iwi to develop a long-term wastewater disposal option that is culturally acceptable.

Potential Scope & Contextual Considerations	
Minimum scope:	To develop a solution that improves the wastewater disposal system for Tūrangi's wastewater.
Desirable scope:	To develop a solution that is ideally supported by hapū and the wider community.
Aspirational scope:	
Excluded scope:	Relocation of the wastewater treatment plant.
Stakeholders:	Hapū / Iwi, landowners, Waikato Regional Council, Councillors, TDC operations team, other stakeholders.
Constraints:	Resource consent for wastewater discharge is required before any construction/enhancement work can begin. Landowner agreement is required if an alternative disposal site is preferred. Council decision required.
Assumptions:	Consents will be granted for the selected disposal option. An alternative, suitable site can be found if a new disposal site is preferred.
Risks if project was deferred:	Risk to programme as project timing may be dictated by future resource consent conditions; however, this is not yet known. Relationship risk with iwi/hapū could be strained if a land disposal option to a new site is not selected as the preferred option.
Risks of doing the project:	Cost risk, capital and operational costs need to be considered.

Options Analysis (add more options if applicable)		
Add more options if applicable	**Option One:** **Remain at current site and improve the current discharge system**	**Option Two:** **Move to land-based disposal system**
Overview:	The base option means Council would aim to continue to discharge at the current location. Some improvement will be required to mitigate localised environmental effects and this work will likely be related to improving the distribution of the effluent discharged i.e. multiple discharge points. Further enhancement could be made such as development of artificial wetland and/or rehabilitation of the wetland area. The scope of this project should be determined alongside Council and hapū members.	Disposal of wastewater by irrigation to land on the east side of the Tongariro River.
Advantages:	• Lower capital cost vs a land-based irrigation scheme (less hard infrastructure to be built) • Lower operating cost (lower power use, operating cost, maintenance cost etc) • Lower infrastructure risk (no need for pump stations, long pipelines, river crossing etc..) • Can be developed on TDC owned land. • Serves as rehabilitation of the currently impacted land areas, old ponds and irrigation areas, which will likely need to be addressed in the future regardless of the disposal option selected.	• Disposal to land is a culturally acceptable method of wastewater disposal (to land) preferred by hapū. • Consenting process likely to be supported by hapū
Disadvantages:	• Discharge to water (wetland/Lake Taupō) remains and this is not acceptable to hapū, and relationship may be damaged. • Consent application will likely be opposed and likely challenged to hearing or further. • Costs of consenting process including hearing or court costs if this is needed. • Uncertain consent outcome including the extent of improvements that might be required.	• Higher capital cost • High operational cost, energy use. • Increased operational risk (pump stations, long pipelines, river crossing etc.) • Risk that the consent process is challenged by others as the discharge will be relocated to a new catchment i.e. the Tongariro River. • Council does not own land for this land disposal process (however a long-term lease could mitigate this concern).

Costs:	Capex estimates $ 2,000,000 – 6,000,000. Opex: TBC but relatively low. Project scope is to be confirmed and ideally this is done alongside hapū in a co-design process. Scope could be minimal, as in minor rehabilitation or could be more significant such as development of a constructed wetland alongside a rehabilitation project. The consent process and further consultation will determine the final scope of the project.	Capex $ 17,000,000 +/- Opex $ 440,000 p.a. Project assumes a site is found on the east side of the Tongariro river and an irrigation project to discharge to land, either irrigation to pasture or trees is developed.
Achievability:	We are advised by our planning consultants that this approach is likely to receive resource consent. TDC has the capacity to deliver this project.	Achievable assuming land availability and consenting is achieved.
Recommendation:	Option one is a is a softer solution that required less infrastructure to be built with lower energy use and is also a lower cost option and can be achieved on land held by Council. Option two is higher cost but addresses concern held by the local hapu about discharge at the current site. **The recommendation option is option one - Remain at current site and improve the current discharge system.**	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Consent risk – consent is challenged and takes longer to get, and at higher cost	5 [almost certain]	2 [minor]	Medium
Consent risk – consent is not granted for the preferred option	2 [unlikely]	4 [major]	Medium
Cost risk – cost could be higher than expected (project cost)	2 [unlikely]	2 [minor]	Low
Relationship risk – relationship with hapu deteriorates.	5 [almost certain]	2 [minor]	Medium

Business Owner:	Michael Cordell	Author:	Michael Cordell
Approver:	Tony Hale	Date:	08/04/2023

Introduction

Investment/Project Name:	Taupo Wastewater North Solution
Project Purpose:	To provide capacity for growth in the area to the North of the Waikato River including the Nukuhau area, Acacia Bay and future development zones.
Business Need:	Growth is occurring on the north side of the river and will be limited by a lack of capacity; network capacity in the Nukuhau area (Taupo scheme) and treatment capacity (Acacia Bay scheme). Without a solution that can provide additional capacity growth will need to stop.
Background:	Several developments have been planned on the northern side of the Control Gates Bridge and should be accommodated by the wastewater network. These are: Loch Views development, Nukuhau Plan Change area, and continued development of the existing residential area in Nukuhau, and Acacia Bay. There are also potential future development areas between Nukuhau and Acacia Bay. However, the twin pipes over the Control Gates Bridge are near capacity meaning development may be stopped if a wastewater solution is not found. The capacity currently available is limited to the areas already zoned for residential development and does not include the Nukuhau Plan Change area, there is no new capacity for new growth areas A buffer storage tank (separate business case) is proposed on the north side of the Control Gates Bridge near the traffic lights to provide increased resilience and allow some growth to continue in the short term while the longer-term solution is developed. However, it will not allow for the full development of these areas mentioned above and the future connection of Acacia Bay to Taupo. Therefore, a long-term solution is needed to provide the extra capacity needed if continued growth is desired.
Project Description:	This project will provide the capacity needed to service the already zoned areas including the Nukuhau Structure Plan area, future connection of Acacia Bay and potentially further development areas that are identified in Taupo DC growth strategy but are currently not zoned. Future growth areas are those detailed in TD2050 (TDCs growth strategy).
Project Location:	Taupo
Project Complexity:	This project is complex as it involves many stakeholders. The Control Gates Bridge is owned by Mercury Energy and iwi / hapu have a strong interest in the project. The detail of a specific solution is still to be determined.

Strategic Case

Primary:	Housing (required for development)	5
Secondary:	Looking after Public Health and Safety (overflow risk)	4
Tertiary:	Maintaining Levels of Service (overflow risk)	4
Investment objectives:	• To enable growth to continue in Taupo on the northern side of the Waikato River. • To provide a resilient wastewater network	
Opportunities:	• Alignment with Mercury Energy and Taupo DC Transportation department on Control Gates Bridge / second bridge development. • Alignment with developers on land use opportunities.	

Potential Scope & Contextual Considerations

Minimum scope:	Additional capacity over the Control Gates Bridge / Waikato River to provide capacity for the anticipated growth.
Desirable scope:	-
Aspirational scope:	Develop a new wastewater treatment facility on the north side of the river to manage all wastewater generated on that side and remove the need for a wastewater river crossing

	completely. Ensure the new facility has the capacity for the future development of areas not currently zoned but identified in TD2050.
Excluded scope:	
Stakeholders:	• Community, iwi / hapu, Councillors, Mercury Energy, Developers.
Constraints:	• Time to develop solution / matching with growth • Land is not owned by TDC.
Assumptions:	• The project will be supported by the Landowners. • The project programme allows sufficient time for a solution to be developed. • Project cost is uncertain as the exact solution is not known. Cost is broadly based on a new stand-alone pipe-bridge on the lake side of the control gates bridge. •
Risks if project was deferred:	• Overload of existing system due to increase in wastewater volumes. This can result in overflow of wastewater into the Waikato River, harm to local communities and ecosystem. • Increase in emergency expenses resulting from costly clean-up operations. • Halt in development of new growth.
Risks of doing the project:	• Budget (option dependant) • Relationship risk (option dependant)

Options Analysis (add more options if applicable)				
Add more options if applicable	**Option One:** **Do Nothing**	**Option Two:** **Construct Pipe across the Control Gates Bridge (or adjacent new structure)**	**Option 3:** **Major Upgrade Acacia Bay WWTP to MBR** and **Construct Control Gates Bridge Buffer Tank**	**Option 4:** **New Wastewater Treatment Plant on the North Side of the river (Nukuhau WWTP).**
Overview:	No changes to network. Wastewater will continue to be transported from the Nukuhau area to the treatment plant via the Control Gates Bridge.	The project will increase capacity over the Control Gates Bridge, or more likely provide a new pipe and pipe bridge with additional capacity.	Upgrade of the Acacia Bay WWTP could provide for continued growth in the Acacia Bay catchment only. The Nukuhau and areas proximate areas would still need a solution. Installation of a buffer tank at the Control Gates Bridge will allow for development of the already zoned areas in the Nukuhau area (including the Structure Plan Change 37) to continue to develop but will not provide for growth beyond the zoned areas. Buffer tanks should not be relied on as the long-term solution as pipe capacity over the river a constraint There is a separate business case that considers Control Gates Bridge Buffer Tank as a separate and stand-alone project. T**his option is unlikely to be able to provide a complete solution.**	A new Nukuhau / Taupo North WWTP to service the Nukuhau and Acacia Bay area and other growth areas; removing the need for wastewater pipelines over the Waikato River. This project will provide a new wastewater treatment facility on a larger site and assumes the Acacia Bay WWTP is decommissioned as the Acacia Bay WWTP site will be too small upgrade to meet the entire capacity needed to service the north side of the Waikato River . A land disposal system would also be developed under this option.
Advantages:	• No capital cost.	• Lower capital cost compared to other options. • Make use of existing assets at the Taupo WWTP. • Lower operating cost compared to developing a new stand-alone WWTP.	• Allows growth to continue in the short-term but only in already zoned areas.	• Once complete the wastewater pipes over the Waikato River could be removed. • Likely supported by iwi / hapu. • Provide more resilience. • Removes load from the Taupo WWTP.

Disadvantages:	• Capacity constraint remains. • Risk of overflows increases. • Growth constrained by a lack of capacity.	• Adds additional load to the Taupo WWTP as growth occurs and upgrades to capacity need to be made, whereas a new WWTP for Taupo North would defer upgrades at the Taupo WWTP. • Additional capacity over the Waikato River has been opposed in previous submissions to the LTP by iwi / hapu. • More recently hapu have expressed opposition to further pipelines over the river. • There could be significant changes in the area of the Control Gates Bridge in the future as we understand Mercury Energy are developing a project looking at the Control Gates. Taupo District Council is also looking a options for more roading capacity over the river. Careful planning will be needed to ensure any new structures will be suitable for the long term and fit with other stakeholders.	• Acacia Bay WWTP upgrade would be very expensive relative to the additional capacity it will provide. • It is risky to expend significant sum at Acacia Bay WWTP with less than 10 years left on the resource consent, therefore a new resource consent should be sought prior to undertaking an upgrade project. • Still reliant on buffer tanks to service the Nukuhau area which is a short-term solution but is not a good solution for the long term. • Unlikely to be able to provide sufficient capacity to enable development of all growth areas identified in TDCs growth plans and is therefore unlikely to be a suitable long-term solution.	• High-cost and high-cost uncertainty relative to other options. • No land identified for a WWTP and disposal system. • Consents will be needed for new disposal system. • Long time to implement. Likely 5+ years. • Nitrogen discharges to the lake Taupo Catchment may need to increase as the Taupo WWTP discharges outside of the lake catchment but a new WWTP would likely be within that catchment.
Costs:	-	New wastewater main on a new stand-alone pipe bridge: Approx $6 million. Note: High-cost uncertainty due to uncertainty over scope of project due to roading bridge project and Mercury Energy developments.	Acacia Bay WWTP Upgrade $10M+ for MBR. Control Gates Buffer Tank $2.5 – $3.5 million.	Approx $60 – 100 million [TBC]. High uncertainty.
Achievability:	This option is achievable but not practical.	Achievable but will require careful planning with other stakeholders to ensure the solution does not impact future projects in the area. This project can be combined with Buffer Tank first to provide capacity/time for Control Gates Bridge and roading plans to firm up	This option is achievable but has deficiencies as it does not enable growth for all areas identified.	Likely achievable with sufficient funding and time but high uncertainty at this stage of the project.

		and combine new pipe capacity with a future bridge project. Control Gates Buffer Tank $2.5 – $3.5 million.		
Recommendation:	The options presented above are based on the best available information at the time and further work is needed conclude the best option. Options 2 and Option 4 are contrasting, while Option 3 offers a middle ground solution that aims to minimise the amount of wastewater crossing the river but still requires pipes over the river, including additional pipe capacity. Therefore, the practical options at this stage are Option 2 or Option 4. Option 4 is not preferred due to the high cost. Option 2 will provide the capacity by providing additional pipes over the river, however, there have been objections to this additional pipeline and there remains high uncertainly over related projects in the same area (Mercury Energy and TDC transport). A buffer tank can provide for future growth in the short/medium term, while providing the time needed to understand the future infrastructure projects in this area. Therefore, it is recommended the Control Gates Buffer Tank is constructed now (covered in its own business case) while the long-term solutions of (1) additional capacity over the Waikato River, or (2) a new Nukuhau WWTP are considered. Option 2 is included in the LTP.			

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Relationship risk with hapu/iwi	4 [likely]	2 [minor]	Medium
Can not get permission to construct on Mercury Energy Land or in the needed location	3 [moderate]	4 [major]	High
Delay due to other projects such as bridge or energy project	4 [likely]	2 [minor]	Medium

ASSET MAINTENANCE, RENEWAL AND CAPITAL EXPENDITURE POLICY

PURPOSE

The Asset Management Policy is aligned with Council's vision "To be the most prosperous and liveable district in the North Island by 2022" and the long-term strategic goals found in the 2018 LTP of:

- Ensure that the Taupo District remains a great place to live
- Promote economic development
- Protect our water resources and use them wisely
- Maintain the quality infrastructure that we have
- Keep rates and debt affordable

OBJECTIVE

The objective of Council's Asset Management Policy is to:

- ensure service delivery is optimized to deliver agreed community outcomes and levels of service for both residents, visitors and the environment
- optimize expenditure over the life cycle of the assets
- risks and opportunities are identified and managed appropriately
- provide a
- service delivery that is sustainable for today and future generations

PRINCIPLES

The following principles will be used by Council to guide asset management planning and decision making:

- effective consultation with the community to determine appropriate levels of service
- Integration of asset management within Council's strategic, tactical and operational planning frameworks including corporate, financial, and business planning
- Informed decision making using lifecycle cost and risk management and the inter-generational approach
- Transparent and accountable asset management decision making
- Sustainable management of assets for present and future needs

CORPORATE FRAMEWORK

This Asset Management Policy links to Council's LTP, Infrastructure and Financial Strategy and Asset Management Plans. It builds on Council's strategic goals by promoting an integrated approach to the management of service delivery and across all asset classes.

STRUCTURED ASSESSMENT of ASSET MANAGEMENT PRACTICE

Council has undertaken a structured assessment of the appropriate level of asset management practice for each of the asset classes. This structured assessment follows the guidelines provided in Section 2.1.3 of the International Infrastructure Manual (IIMM 2011v4). The level of maturity determined for each asset class can be found in Section 1 - Introduction of the respective Asset Management Plan.

REVIEW of POLICY

This Asset Management Policy has informed the development of the 2018 asset management plans. It will be reviewed prior to undertaking asset management plan updates to support the 2021 LTP.

MATURITY ASSESSMENT

In the first quarter of 2015 the maturity level of each of the Asset Management Plans was assessed through an external review process to determine the actual level of maturity. This review formed the basis for the further refinement of each of the AMP's Improvement plans.

Further assessments will be undertaken every three years to determine the progress of improvements to the maturity level of the AMP's.