# Te Rautaki Whakarato a Waiheke

## Waiheke Servicing Strategy

**I whakaputaina i te Hakihea 2023** | Published December 2023

Watercare

# Ngā whakarite | Preparation

## I arotakengia, i taunakitia hoki tēnei whakaputanga e:
Reviewed and recommended for publication by:

Name: Chris Allen

Position: Manager Strategic Planning, Watercare

## I whakāetia tēnei whakaputanga e:
Approved for publication by:

Name: Priyan Perera

Position: Head of Strategy and Planning, Watercare

# Ngā mihi | Acknowledgements

This document was developed in collaboration with various entities and organisations. In partnership we acknowledge mana whenua that have interests within this strategic area, Ngāti Paoa, Ngaati Whanaunga, Ngāti Maru, Ngāti Tamaterā, Te Patukirikiri, Ngai Tai Ki Tāmaki, Ngāti Te Ata Waiohua. This publication was prepared by the Watercare Strategy Planning team with advice from Healthy Waters, and Auckland Council. We also acknowledge the contributions from Waiheke Local Board which has been incorporated into this strategy.

*Waiheke Servicing Strategy (Note)*

*This document has been produced as a pilot publication. Changes to structure, format and appearance may be required following a review of the preparation process to achieve a consistent and constant format for our future servicing strategy documents.*

# Ngā ihirangi | Contents

# Whakarāpopototanga matua

## Executive summary

This document sets out a long-term strategy to ensure that we continue to provide safe and reliable services to Waiheke Island. The purpose of this document is to describe our current state and future servicing options in light of the projected population growth, infrastructure needs, and challenges posed by climate change, so that we can make decisions about the future in partnership with the community we serve.

Waiheke Island, located approximately 17 kilometres from Auckland, is the second largest island in the Hauraki Gulf and a popular tourist destination. While the permanent population stands at approximately 9,300 individuals, the island experiences a significant surge in population during the summer months due to the influx of visitors and holidaymakers. This seasonal increase can result in the temporary population exceeding 40,000 people. The island's infrastructure was not designed to accommodate such a demand, and it faces significant pressure every summer.

Waiheke's residents are reliant on water tanks, private bores, and water carriers for their water supply. Due to the more frequent and severe droughts in recent years, Auckland Council built a contingency drinking-water supply in 2018 to provide emergency water on the island. Watercare does not provide water services to Waiheke Island.

Wastewater, for the most part, is managed by residents using their own on-site wastewater systems. Forty six commercial properties and public toilets in Oneroa village, together with Matiatia Wharf, are serviced by the only municipal wastewater treatment plant (WWTP) on the island (Owhanake WWTP). The treatment plant was built in 2001 and has gone through a number of upgrades over the years with the most recent one completed in 2021. Currently it accommodates a modern technology that treats wastewater to a high quality that is suitable to be reused for non-potable purposes.

Waiheke residents, for several years, have expressed opposition to any residential and island-wide wastewater or water reticulation on the island. It is believed that residential reticulation would facilitate subdivisions and housing intensification, increasing permanent population and ultimately change the village character of Waiheke Island. This viewpoint is endorsed by Waiheke Local Board and serves as the foundation for the development of this servicing strategy.

In the short term, we will renew the discharge consent for the Owhanake WWTP, which expires in December 2027. The WWTP functions well most of the year but nears its maximum treatment capacity when there is a significant rain event and a large influx of visitors to Waiheke. We will investigate ways to increase peak treatment capacity by installing an additional treatment module or creating additional buffer capacity to only deal with peak flows. This is also an opportunity for upgrading the WWTP to facilitate the delivery of septic waste in tankers during emergency situations.

The modern wastewater treatment technology means we can reuse the highly treated and purified wastewater for non-potable purposes. Before any options can be implemented, additional investigation, assessment and consultation with the community will be necessary.

In the medium to long term, we will continue to collaborate with Auckland Council and engage with the Waiheke community. If the council's proposed measures to improve the management of on-site wastewater systems do not achieve the desired outcome of clean waterways by mitigating the impacts of on-site wastewater systems effectively, the regulator could initiate an investigation into potential options for protecting the public and ecosystem health. This servicing strategy offers general considerations at a high level for this particular scenario.

However, it is important to note that the timing of such a scenario may vary depending on various factors, including the effectiveness of current on-site wastewater management measures, population growth, regulatory landscape, and any changing future plans and policies. At the time of writing this strategy in 2023, we have not received any indication that further reticulation of water or wastewater on Waiheke Island would be required.

5

# Tirohanga whānui, te whakatakanga, ngā aronga me ngā whāinga

## Vision and mission, goals and objectives

The services we provide are reliable and contribute to protecting and improving the health and wellbeing of the community and the ecosystem in the face of changing climate and population dynamics.

This servicing strategy plays an important role in informing our plans and operations.

It is the overarching document that outlines the long-term vision, objectives and goals for water and wastewater services in the area by considering factors like population growth, environmental issues, regulatory requirements and infrastructure needs. Our plans include facility plans, network plans and ultimately our tactical investment plan. Our Asset Management Plan translates these into actionable steps and specific projects.

All of these components work together to make sure we have reliable and safe drinking water and wastewater services that can provide for more people, cater for future generations, are good for the environment, and comply with the standards and regulations.

# Ngā whāinga rautaki whakarato
## Servicing strategy objectives

**Mana whenua engagement:** We're collaborating closely with local Māori communities to ensure that their perspectives and values help shape our plans. This approach brings diverse insights to the table, enriching our strategies with cultural wisdom and community voices.

**Community engagement:** We're 'all ears' when it comes to understanding what the community needs and aspires to. Our aim is to create services that match those needs and ensure everyone benefits from our efforts.

**Public health and community wellbeing:** The public's safety and wellbeing are top priorities. By providing services that keep the public healthy, we contribute to a thriving and secure community.

**Population growth:** As the community grows, we're working hard to prepare for the increased demand on our resources and services. Balancing this growth with protecting the natural environment is a key challenge we're addressing. We integrate land use and water planning at a regional, catchment and site scale in accordance with our commitment to the Auckland Water Strategy (see Appendix 1).

**Environmental enhancement:** Our commitment to nature is unwavering. We're not just providing drinking water and wastewater services – we're also dedicated to preserving and improving the environment.

**Carbon reduction:** We're taking steps to reduce greenhouse gas emissions from our activities. While this might mean changes in our practices, we believe the benefit to the environment is worth the effort.

**Sustainability:** Making decisions that stand the test of time is important to us. Although it might require some adjustments, the result will be a more resilient and lasting approach to providing water services to communities and protecting the environment.

**Meeting our statutory obligations:** Adding extra steps to our processes is necessary when delivering trustworthy services.

**Affordability and cost-effectiveness:** We strive to provide excellent services without 'breaking the bank'. Finding this balance ensures quality without overburdening the community's finances.

**Climate change:** This decade and the ones that follow are likely to bring unprecedented extreme weather. We need to muster all our foresight and adaptive ability to ensure that our services remain dependable when disaster strikes.

In making decisions, we consider various factors and trade-offs. Sustainability will require changes in our approach, and affordability will involve careful resource allocation. While we aim to strike the best balance we can with the information we have, these objectives sometimes need to be weighed against each other to enable us to make the best decisions for the community and the environment. We want these trade-offs to be more transparent, build understanding and, ultimately, enable us to make better decisions.

7

# Te aromatawai ratonga ā-rohe: Waiheke

## Service area: Waiheke

### **Kupu whakataki** | Introduction

Waiheke Island, located approximately 17 kilometres from Auckland, is the second largest island in the Hauraki Gulf. The island's landscape is characterised by low rolling hills that gradually rise to an elevation of around 121 metres above sea level. Its picturesque coastline is adorned with numerous beautiful beaches, which are occasionally interrupted by steep coastal cliffs.

Waiheke Island represents an example of New Zealand's rural-residential and holiday communities, which traditionally relied on roof-water supply and on-site wastewater disposal systems. While many similar communities across the country have evolved and developed community-based water supplies and wastewater treatment systems over time, Waiheke has retained its self-sufficient water supply and most wastewater is managed using on-site wastewater systems.

The island's unique blend of natural beauty, rural ambience, and holiday appeal attracts residents and visitors alike. As a result, Waiheke has seen gradual growth and development over the years. However, it has maintained its distinctive identity and a sense of authenticity that gives the island a special charm and character.

Balancing the preservation of Waiheke's natural environment and community values with the need for sustainable infrastructure and services remains a key consideration in the island's development.

# Settlement and development of Waiheke Island[1]

*Figure 1 - Picnickers and holiday makers arriving at Ostend, 1922, Boating NZ 'Waiheke Wonders', published November 2021*

Waiheke Island, settled by Polynesian voyagers 800 years ago, witnessed early rituals by canoes *Tainui* and *Te Arawa*. *Te Arawa* established the first fortified village, Te Pūtiki o Kahumatamomoe, on the island. Over the centuries, various tribes invaded, with Ngāti Paoa claiming the island around 1700.

In the late 1700s, Ngāpuhi challenged Ngāti Paoa's control, but the latter, strategically located at Putiki-o-Kahu pā on Waiheke, maintained dominance. Captain James Cook's arrival in 1769 marked European contact. Cook noted the island's valuable resources, including kauri trees for Royal Navy ship masts.

The Musket Wars in the early 1800s saw Ngāpuhi chief Hongi Hika acquiring muskets, altering the power dynamics. Ngāti Paoa faced defeat, leading to Waiheke's temporary abandonment. Te Tiriti o Waitangi (The Treaty of Waitangi) in 1840 brought Europeans. Subsequent land acquisition and epidemics led to Ngāti Paoa losing much of their land. Kauri extraction, shipbuilding, manganese mining, and sand extraction characterised the island's economy in the 1800s. Forest clearance paved the way for pastoral farming. From the late 1800s, Waiheke attracted visitors for recreational activities, and subdivisions in the early 1900s facilitated property ownership. Despite these changes, the island's unique road system reflects its historical development.

# Ngāti Paoa history[2]

Ngāti Paoa's history traces back to Tainui, with Paoa forming subtribes dominating the western shores of Tīkapa Moana o Hauraki, the Hauraki Plains, and the Piako River area. They expanded to the Tāmaki River, North Shore, Waiheke, Ponui, Rataroa, Pakatoa, and Gulf Islands. In the late 1700s, they exercised control over a substantial corridor but faced challenges in 1821 from northern tribes, leading to a decline in influence. Proximity to Auckland initially brought commercial advantages, but by the 1860s, pressure to sell land and and the break out of epidemics led to impoverishment. In the 1900s, Ngāti Paoa worked to reclaim their identity, marked by a Waitangi Tribunal case, with tribal centres at Wharekawa Marae, Makomako Marae and Waiti Marae today.

1 - Source: www.waihekelocal.co.nz/about/history-of-waiheke/ ]

2: Summary from www.ngatipaoaiwi.co.nz/history.html)

# Population

In 2022, Waiheke's population was estimated to be around 9,300. It is forecast that by 2050 Waiheke could be home to about 12,000 people under the medium-growth scenario, and about 14,000 people under the high-growth scenario (Figure 2).

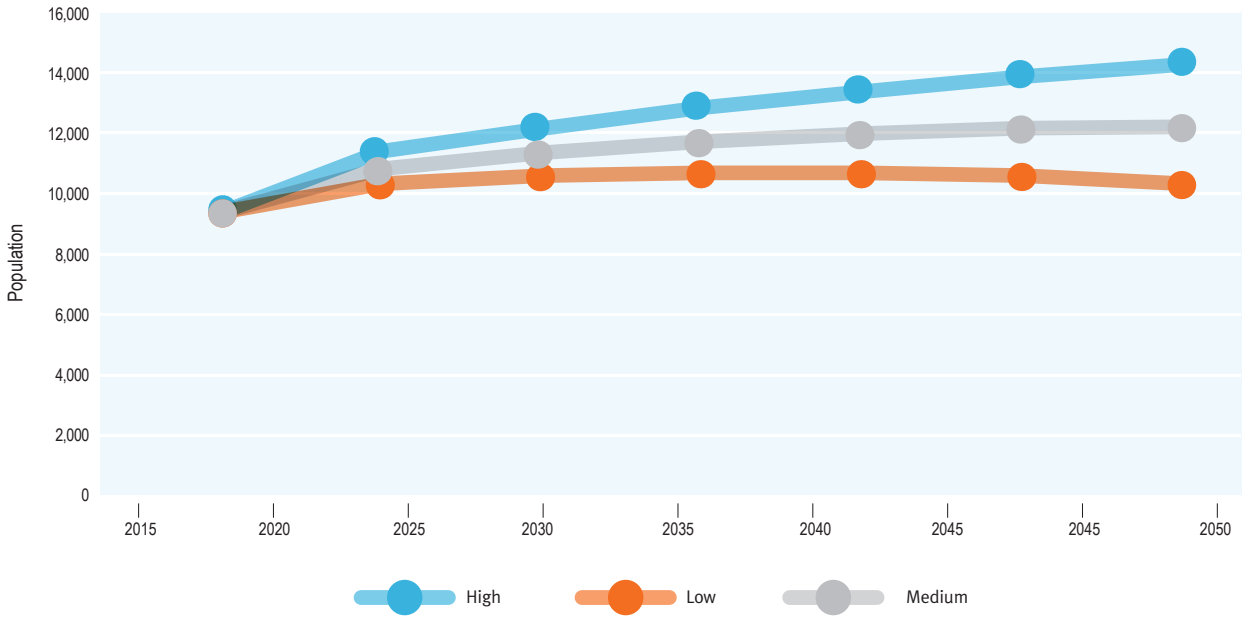



*Figure 2 – Population growth projection for Waiheke*

We recognise the unique population dynamics of Waiheke. While the permanent population stands at approximately 9,300 individuals, the island experiences a significant surge in population during the summer months due to the influx of visitors and holidaymakers. This seasonal increase can result in the temporary total population exceeding 40,000 people.

The substantial rise in population during the summer season presents specific challenges and considerations for our servicing strategy. It necessitates the need for a scalable and flexible wastewater network that can accommodate the seasonal increased demand.

Our strategy considers these seasonal fluctuations and incorporates measures to ensure that our wastewater infrastructure can handle the peak demands experienced during the busy summer period effectively.

## Housing

According to Auckland Council, approximately 56 new dwellings are built on Waiheke every year, typically single, detached dwellings. But between 2013 and 2018, Waiheke's housing stock was found to have increased by only 24 houses, an increase of 0.6 per cent, or only 5 houses per year. A high-level assessment of Waiheke's capacity to provide housing found that much of the current building activity replaces existing houses. While there is sufficient land capacity for the next seven years, if population projections are realised, approximately 1,444 dwellings will be needed over the next 30 years. At the current building rate only 150 additional new dwellings would be built: a shortfall of 572 dwellings.

## Oneroa and Ostend centres

Waiheke's two main centres are Oneroa and Ostend. Auckland Council identified the need for further planning and investment in these areas to be able to support the growth in tourism. Reinforcing the different roles and functions of the two centres may strengthen their economic performance by making them more attractive places to work and live in and to visit. Such a move would focus Oneroa as the retail and tourist centre and Ostend as a mixed business, retail and administrative centre.

New and improved public toilets and public water fountains in both centres are also required in recognition of the high number of visitors to Waiheke.

*Figure 3 -Oneroa Bay from the township.*

# Climate change impacts

In addition to the growing population, we need to be prepared for the impacts of climate change including more variable rainfall and extended drought periods, which will affect the availability and quality of surface-water sources, as noted above.

The seasonal distribution of rainfall is projected to change noticeably in Auckland, with spring rainfall expected to decline and autumn rainfall expected to increase. Increasingly dry periods in spring and summer, combined with heavier rain in autumn and winter, mean that although the total annual rainfall may not change significantly, we will still need to plan for the challenge of increased frequency and intensity of droughts, storms and floods. We anticipate greater vulnerability to El Niño and La Niña weather patterns, meaning that we must prepare for increasing situations of not enough and too much water as we plan our investments in the future.


*Figure 4 – Map of sea-level rise for Owhanake and Oneroa Beach on Waiheke*

A number of potentially significant consequences may result from the projected impacts of climate change in relation to WWTPs. The treatment performance of biological processes increases with temperature, which may be an opportunity for our plants. Prolonged dry periods followed by extreme rainfall events would lead to increased loads of first-flush events and increased inflow and infiltration may lead to more diluted flows in wet weather. This would cause highly variable wastewater load concentrations, potentially causing operational issues at treatment plants.

# Wai

# Water

Waiheke Island's water supply is diverse, drawing from rain tanks, groundwater, and surface water to cater to the needs of the community.

## Rain tanks

Rain tanks constitute a widespread water source for the majority of homes on the island. On a larger scale, groundwater extraction is facilitated through various consents, serving purposes ranging from commercial enterprises like wineries and horticulture to municipal and public water supply. While other groundwater and surface-water takes might exist for permitted activities or individual needs, their specifics are unknown.

Rainwater tanks serve not only as a sustainable choice but also offer resilience during unexpected events, as demonstrated during Auckland's Tasman Tempest in 2017. In addition, relying on rain tanks appears to have encouraged a culture of water conservation among the island's residents. This is exemplified by Waiheke's lower daily household water usage of approximately 60 to 70 litres per person compared with metropolitan Auckland's daily gross residential consumption of approximately 170 litres per person.

Beyond their water supply role, rain tanks contribute to flood mitigation by holding stormwater when they have sufficient capacity. Public support for incorporating rainwater tanks as a strategy for future water security is evident from the Auckland Water Strategy's engagement in 2019.

However, there are potential contamination risks in harvested rainwater due to sources like debris, bird droppings or dead rodents. To mitigate such risks, treating rainwater for potable purposes is recommended. The reliability of rainwater supply during dry spells, which also coincide with the peak tourist season and increasing water demand, also poses a challenge. During dry periods, there can be long delays in receiving top-ups from private water carriers due to high demand necessitating solutions like increased rainwater storage capacity and planning ahead for refilling the tanks before the start of the dry months.

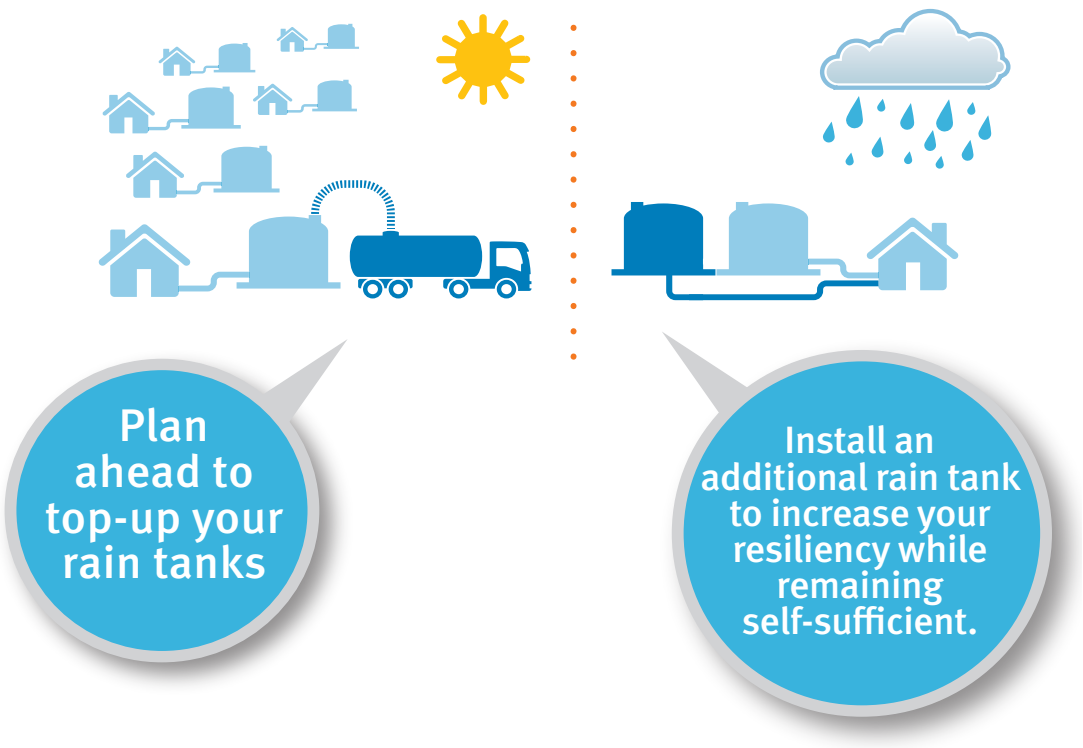



*Figure 5 - Ways properties on raintanks can better prepare for long, dry periods*

## Groundwater

Groundwater extraction on Waiheke revolves around the Waipapa aquifer, serving purposes such as community water supply, firefighting, irrigation and hotels. Monitoring efforts have revealed variable trends in groundwater levels, and while concerns have been raised about private bore usage, the aquifer's health does not currently indicate over-allocation.

Groundwater is being used by residents who have a bore, private suppliers (for example, Waiheke High School) and water carriers who supply tanker water to residents' water tanks.

Contamination risks in groundwater systems were underscored by incidents like the Havelock North outbreak in 2016, and Waiheke High School drinking-water contamination in 2017. While the likelihood of a widespread outbreak on Waiheke Island is low due to its non-reticulated drinking-water system, the possibility at a smaller scale still exists. Factors like poorly treated wastewater discharged from on-site wastewater systems or gaps in clay layers could compromise groundwater quality.

## Surface water

Surface-water supply on the island is limited due to its small stream characteristics, and the risk of contamination from underperforming wastewater systems is more direct in this case. Therefore, similar precautions to those applied for groundwater quality are relevant to surface water.

## Resilience against drought

Several initiatives have been undertaken on Waiheke Island to address water supply challenges. The Waiheke Water Plan was created to ensure emergency drinking-water supply during dry periods, utilising upgraded treatment facilities. During water shortages, contingency drinking-water supplies are available to Waiheke residents through treated sources at the Onetangi Sports Park and Matiatia Wharf. These measures aim to ensure a reliable and safe water supply for the island's population, especially in times of need. In light of changing climatic conditions and growing water demands, effective management and protective measures are crucial for sustaining Waiheke's water resources. Recent investigations and anecdotal evidence suggest that there is still a water deficit on the island during the summer months. This deficit is met by the purchase of water from one of the water supply companies on the island that draw groundwater from their bores. As mentioned above, forward planning is necessary for tanker top-up as rain tanks can go dry around the same time during an extended dry period.

Raising awareness about treating all drinking-water sources is important. The current water supply approach can pose health risks if water is not properly treated by all suppliers and users.

# Water supply options

## Challenges of supplying water to an existing community

While a wide range of options can be considered for supplying water to Waiheke, we recognise that building a water network in an established island community involves navigating a complex set of challenges.

Integrating new water pipes can be difficult due to existing structures, roads and utilities. Waiheke Island's narrow roads are likely to impede construction and would require closures or restricted access for long periods. Considering Waiheke Island's unique characteristics and distance from Auckland, the cost of construction also would be higher than a similar scheme in mainland Auckland. Lastly, once the costly construction of the network was finished, it would not be mandatory for property owners to connect to the water network, and because a number of people would opt out of the scheme, the costs of construction would not be recouped. All of these factors would need to be carefully investigated if water reticulation was needed for Waiheke.

At the time of writing this strategy Auckland Council had not provided any directive to explore the provision of drinking water services to Waiheke Island. Therefore, this strategy does not discuss any specific residential water supply options that would require reticulation.

## Recycled water

Recycled water can provide a level of water resilience by reducing the pressure from the main water sources during periods of high demand. On Waiheke Island, while the treated and purified wastewater can be reused for non-potable purposes, the current amount of wastewater treated at the Owhanake WWTP is not large enough to be relied on as a source of water. It could augment water supply during a drought or be used on pastures to minimise the risk of bush fires during hot and dry periods. We will continue to investigate these and other potential options for beneficially using the highly treated wastewater.

# Waipara

## Wastewater

### On-site wastewater systems

Waiheke Island's residents predominantly rely on on-site wastewater systems, including conventional septic tanks, modern systems, and long bores. However, many of these systems were developed prior to the introduction of the on-site wastewater systems design guideline (TP 58) in 2004. As a result, a significant number of these systems are approaching the age where replacement or renovation may be necessary.

A study conducted in 2002 examined the condition of onsite wastewater systems on Waiheke. Out of the 2,000 properties inspected, 17 per cent of the systems either couldn't be identified on the section or needed repair. The study indicated that the actual extent of the problem is likely to be even larger, as it is generally assumed that on-site systems are functioning adequately unless visible issues are present.

In a more recent inspection carried out by Auckland Council in 2019, approximately 450 properties in Oneroa village were inspected, revealing that 45 per cent of the systems exhibited visible problems. This investigation highlighted the challenges associated with managing onsite wastewater systems effectively.

The increase in the frequency and intensity of rainfall events, coupled with faulty on-site wastewater systems, poses a risk to public health and the environment. Polluted run-off from these events can flow into streams and beaches, leading to potential contamination. In addition, shallow groundwater in some areas increases the risk of wastewater infiltrating and contaminating the water source through fractures in the ground.

### Owhanake Wastewater Treatment Plant (WWTP)

In the mid-1990s, due to the environmental pollution caused by the discharges from on-site wastewater systems in the Oneroa area, the Ministry of Health requested that Auckland City Council considers reticulation of the Oneroa commercial area. As a result, Owhanake WWTP was built and commissioned in 2001.

*Figure 6 – (a) Construction of underground tanks at Owhanake. (b) Aerial view of completed Owhanake wastewater treatment plant in 2002. (Source: Rob Tinholt and Rick Soar (2002) Treating Waiheke's Wastewater)*

# Location of the Owhanake WWTP

The Owhanake WWTP is located on Ocean View Road and encompasses a total area of approximately 7.5 hectares. The site has a southerly aspect, sloping from Delamore Drive in the north to Ocean View Road in the south, draining to Matiatia Wetland and in turn to Matiatia Stream, and ultimately to Matiatia Bay.


*Figure 7 – Owhanake WWTP and its catchment*

# Discharge consent

In 1998, Auckland City Council applied for resource consents to construct and operate the Owhanake WWTP. The treatment plant was initially built to receive primary treated wastewater from the Oneroa commercial area and discharge to the western tributary of Matiatia Wetland.

A new consent was obtained in 2004 to anticipate the construction of a development at Matiatia Wharf. The development did not happen, and the consent was never activated. Prior to the expiration of the original consent in 2009, Auckland City's water service provider, Metrowater, applied for a new consent (Permit No. 37282) to make provision for the existing plant. This consent was granted in 2012, with a duration of 15 years, allowing to discharge up to 250,000 litres of treated wastewater per day. The plant is currently operating under this consent, which is set to expire in December 2027.

# Consented service area

The discharge consent for the Owhanake treatment plant is unique in that it limits the consent holder to servicing a specific reticulated area. This limits the plant's ability to receive wastewater from outside of this service area. In addition, the current consent does not allow wastewater to be accepted at the plant through any other way than via the existing pipe network.

## Treatment technology and process

As described earlier, the treatment plant was built in 2002 as a sand filter plant. While adequate for its time, over the years with the increase in flows, the plant needed to be upgraded in order to treat more wastewater to a higher standard. Since 2020, the WWTP has modern Membrane Bioreactor (MBR) technology to improve environmental outcomes and to allow for the anticipated future growth of Oneroa.

## Reticulation area

The wastewater network on Waiheke Island is limited to the reticulated area in Oneroa, which receives wastewater from the Oneroa commercial area and surrounding residential properties. The public toilets in Oneroa village and Matiatia Wharf are also connected to the Owhanake treatment plant.

At the time of writing this document, 46 commercial properties were connected to the Owhanake WWTP All of the connected properties have an on-site wastewater system installed at their property. The wastewater from the properties initially enters into their on-site wastewater systems and receives a primary treatment (settlement of solids). The connected properties are required to have an outlet filter installed at the outlet pipe of their on-site system so that only liquid waste enters the reticulation network. The settled solid waste in the onsite system is pumped out and delivered to a licensed wastewater treatment facility on the island.

Wastewater from the Matiatia ferry terminal and Oneroa properties and public toilets, flow to the Oneroa Beach Pump Station through gravity and is then pumped to the Owhanake WWTP.  The overall treatment process is illustrated in Figure 8.

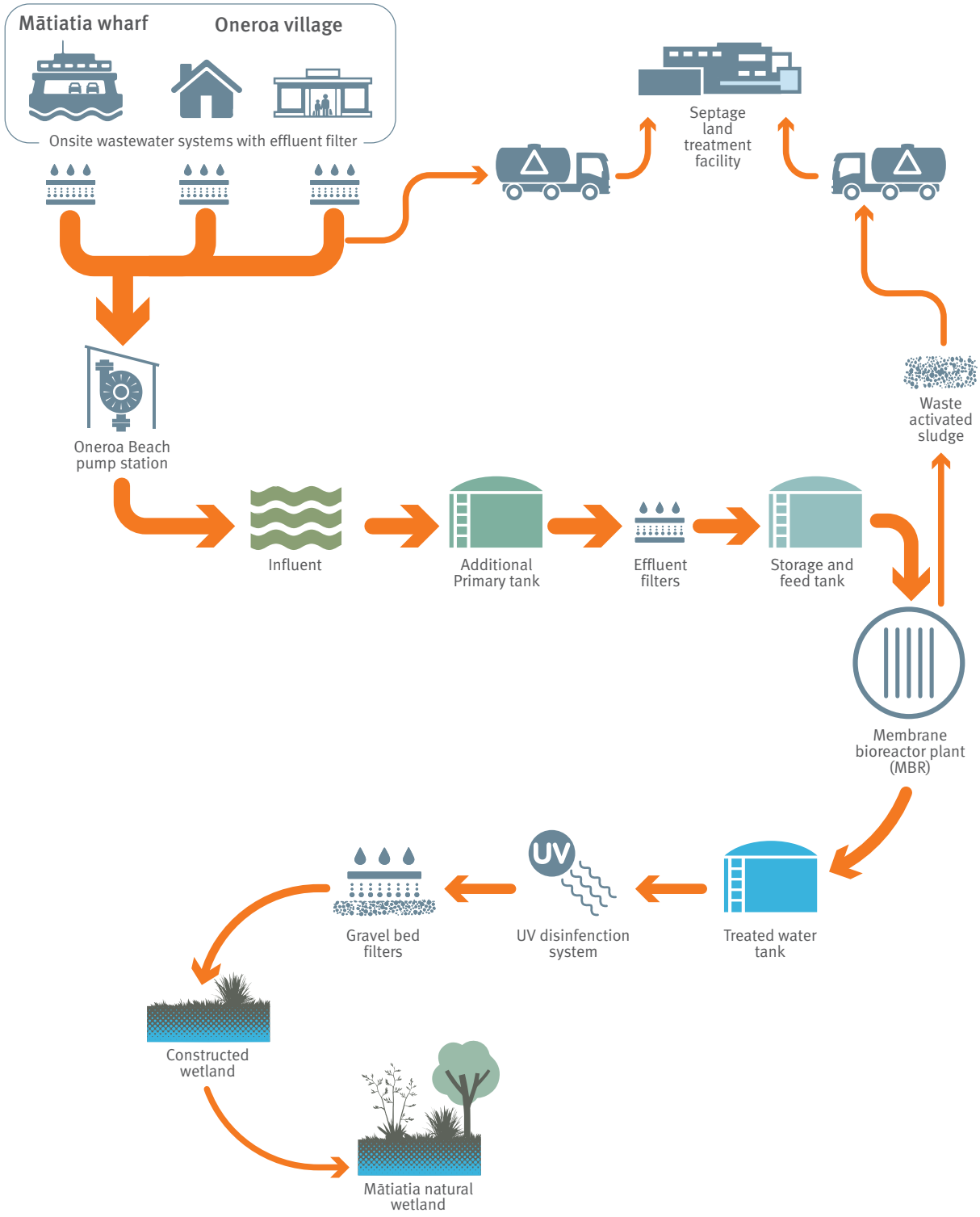



*Figure 8 – Process diagram for Owhanake WWTP*

## Treatment capacity

The Owhanake WWTP currently has the capacity to treat and discharge up to 130,000 litres per day. While during dry and non-holiday periods average wastewater flows are well below the WWTP capacity, wastewater flows significantly increase during heavy rain events and holiday periods.

## Flows to Owhanake WWTP increases during holiday periods

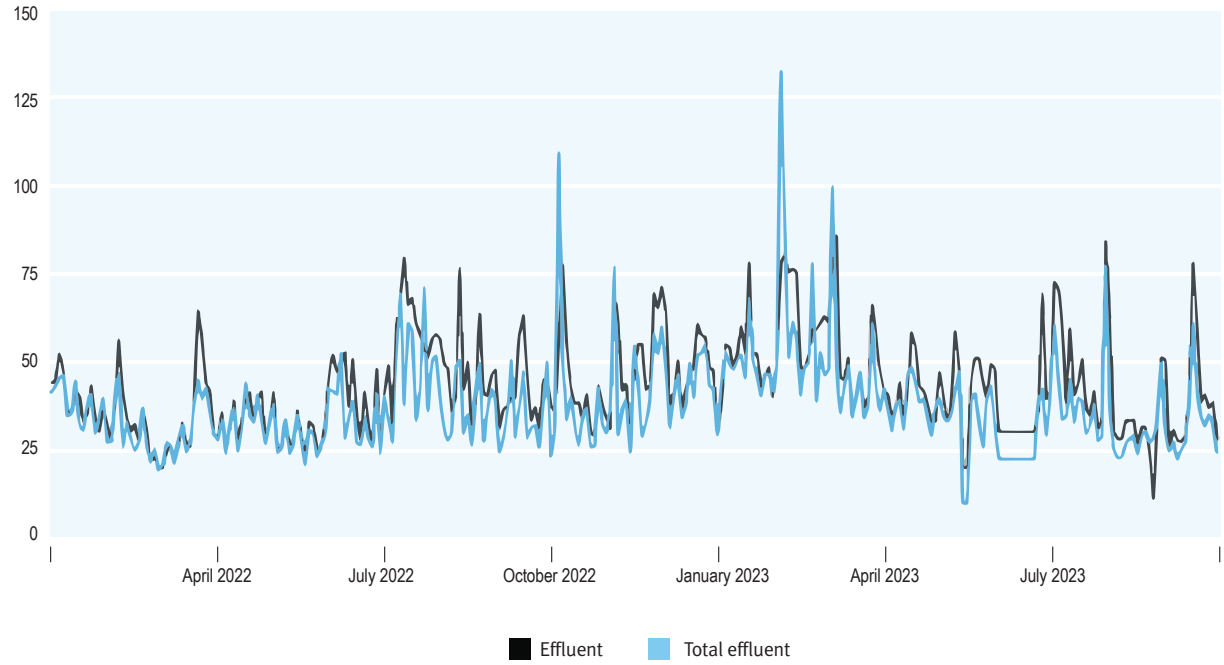



*Figure 9 – Flows to and from Owhanake treatment plant from January 2022 to April 2023*

# Treated wastewater quality

In year 2020/2021, immediately after the commissioning of the new plant, there were two instances in which the treated wastewater was non-compliant due to the total amount of nitrogen released into the environment. As MBR is a relatively new technology, some process adjustments were needed to be made to improve nitrogen removal at the plant, which proved to be effective for improving the total nitrogen removed in the following year (2021/2022).

# Engineered overflow location

The pump station, located on Beach Parade between numbers 18 and 20, serves as the sole overflow point for the public wastewater system on Waiheke Island (Figure 10). In the event of excessive wastewater flow, the pump station has a piped connection to a stormwater line. This stormwater line discharges into a cesspit located a few metres away from Oneroa Beach.


*Figure 10 – Oneroa Pump Station (Source: Google Streetview)*

The pump station, to which the majority of the connected commercial sites and public toilets flow, has an emergency storage of 8,450 litres. This provides approximately 12 hours' emergency storage in winter and nine hours in summer, when the wastewater flows are greater due to the high number of visitors to the island. The alarm level is set below the actual overflow point so that response action can be initiated well before an overflow may occur.

Discharges from the Oneroa overflow point are authorised by Watercare's regional network discharge consent (NDC). The NDC was granted on 17 June 2014, for 35 years. It authorises dry-weather and wet-weather overflows from the metropolitan and satellite township wastewater networks. The discharge frequency for wet-weather overflows must be complied with in all parts of the network (combined and separated). For an engineered overflow point, that is an average of no more than two wet weather overflow events per year.

### The Network Discharge Consent (NDC)

The NDC was granted on 17 June 2014, for 35 years. It authorises dry-weather and wet-weather overflows from our wastewater networks. It permits for 'an average of no more than two wet-weather overflow events per engineered overflow point per year, or an alternative discharge frequency that can be shown to be the best practicable option if two overflows cannot be achieved for an engineered overflow point.'

The NDC requires preparation of an annual network performance report and a six-yearly wastewater network strategy which should include a remedial plan for the wastewater networks. The remedial plan outlines the work to be undertaken in the next six-year period, to move the wastewater network closer to compliance with the terms of the discharge consent limit of two overflows per engineered overflow point on average per year. The first wastewater network strategy was completed in 2023 and can be accessed through [www.watercare.co.nz/Water-and-wastewater/Wastewater-network-strategy-2023].

No overflows have been recorded from the Oneroa Pump Station in the last five years (2017 to 2022).

# Engineered overflow location

The growth in tourism and the increasing number of seasonal visitors to Waiheke Island have a significant impact on the wastewater flow to the treatment plant. As indicated, the average influent to the plant is typically below the plant capacity, but it increases during weekends with good weather and peak tourist seasons. This demonstrates that the demand for wastewater production is closely linked to Auckland's population, as Aucklanders make up the bulk of visitors to the island.

According to Statistics New Zealand, the current population of Auckland is approximately 1.7 million people. It estimates that Auckland may reach a population of 2 million residents by the early 2030s, although this milestone could be reached earlier or later (Figure 11).

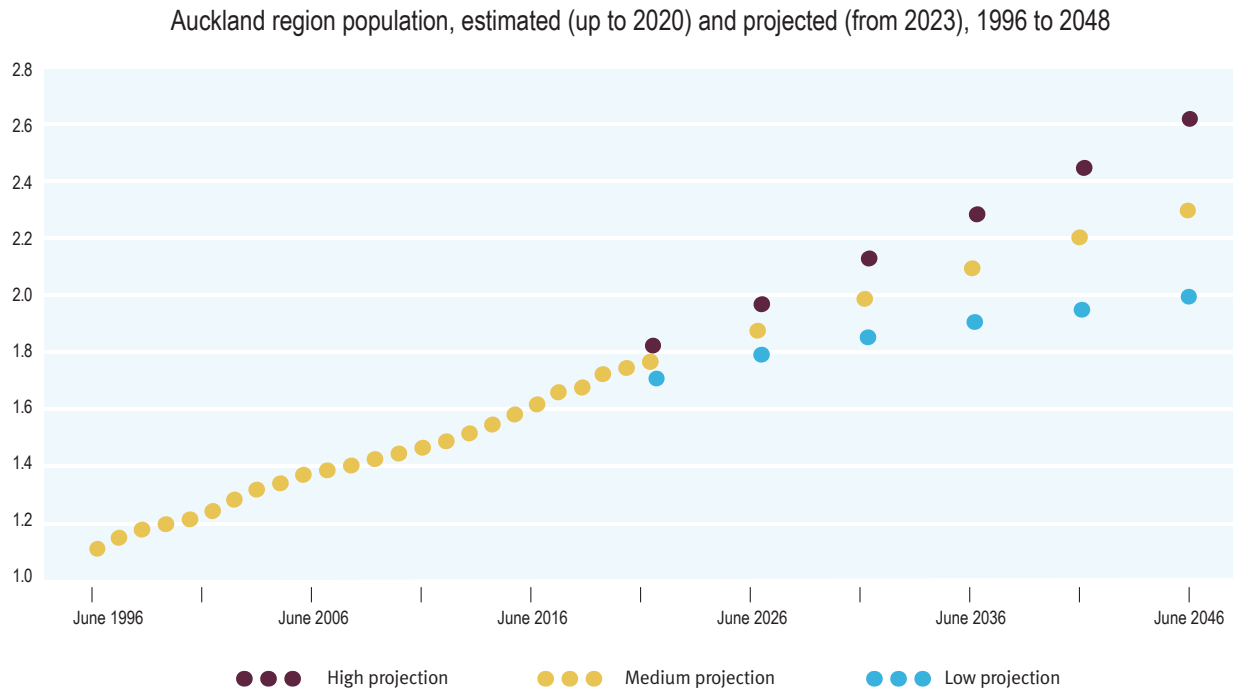



*Figure 11 – Auckland population projections (Source: Stats NZ)*

Considering the need to manage peak flows effectively, it is prudent to use the high-growth projection. By planning for a high-growth projection, we can mitigate potential risks associated with population growth and ensure that the WWTP remains capable of meeting the needs of the community even during periods of high demand.

On this basis, we estimate that peak dry-weather wastewater flows to the Owhanake WWTP will reach 130 cubic meters per day by the mid-2030s. It is important to note that this projection assumes that the current reticulated service area will not expand significantly.

To manage the increasing wastewater production effectively, it is essential to plan prudently and to continuously inspect and maintain the wastewater network to minimise illegal connections and address any issues related to stormwater inflow and infiltration. These measures help to mitigate the impacts of climate change on the network and ensure its reliable operation.

Owhanake WWTP will reach its maximum treatment capacity in the mid-2030s.

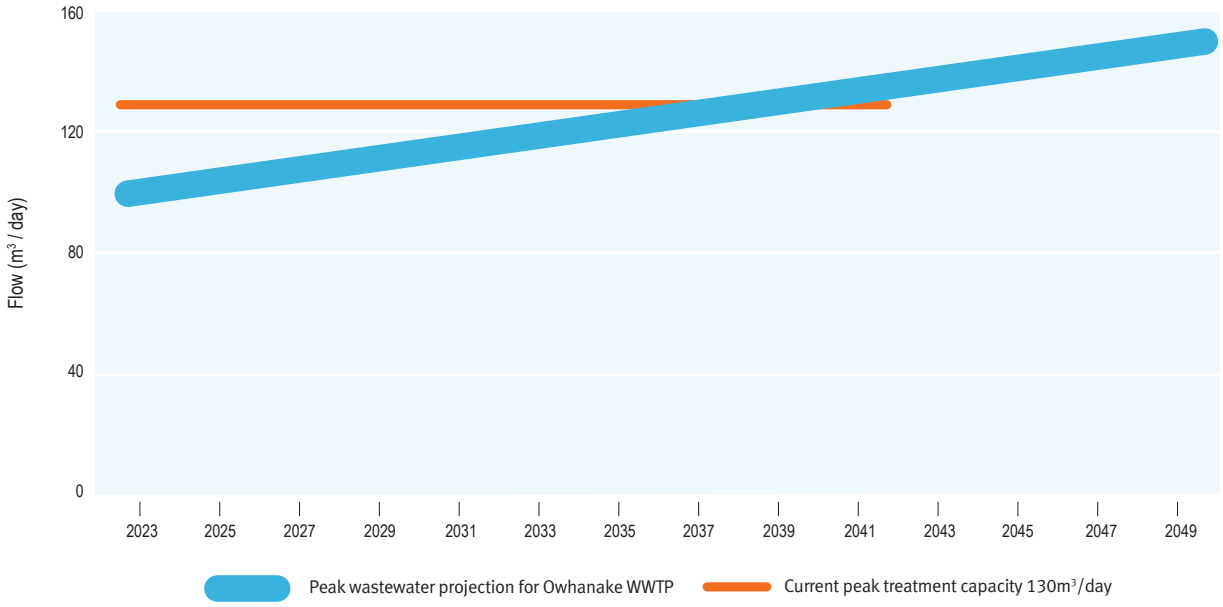



*Figure 12 – Projected peak wastewater flows to Owhanake treatment plant based on the high-growth projection for Auckland population*

It is important to review and update these projections periodically as demographic and environmental factors can evolve over time.

# Wastewater challenges and opportunities

In 2018, a CCTV survey was conducted for the Owhanake catchment, aiming to assess the condition and functionality of the reticulation network. This survey was followed by a desktop review of private drainage as-built plans to gather additional information. During the review, it was identified that five dwellings had an improper connection to the wastewater network.

To address these illegal connections and inspect other potentially unauthorised ones, we will continue to perform field investigations to ensure the integrity and proper functioning of the wastewater network while minimising any unauthorised inflow or infiltration that may contribute to network overload or environmental concerns.

# Wastewater options

## Short-term options

### Renewal of discharge consent

Our immediate priority in the near future is the renewal of the Owhanake WWTP's discharge consent, which is set to expire on 30 December 2027. This renewal presents a valuable opportunity to explore options that would bring additional advantages to the community. These are further explored below.

### Complete beneficial reuse of purified and treated wastewater

While the current volume of treated wastewater is relatively small for most of the year, the peak flows occur during the dry months of the summer holiday season. This brings the opportunity to utilise purified treated wastewater to reduce the pressure on water resources on Waiheke.

The current Owhanake discharge consent conditions requires for actively investigating options to reuse the treated wastewater. Reuse of highly treated wastewater has several benefits, including reducing the reliance on groundwater sources during drought periods. By utilising treated wastewater for irrigation purposes, valuable nutrients can be supplied to plants, thereby reducing the need for additional fertilisers. In additionally, it helps in decreasing the volume of treated effluent discharged into the natural environment, promoting better environmental stewardship.

An initial investigation was conducted in 2002 for potential reuse options. Consultation was made with a number of groups including Waiheke Community Board, Department of Conservation, Ngāti Paoa, Waiheke Golf Course and the Royal Forest and Bird Protection Society.

The consultation indicated that there was general support to reuse treated wastewater from the Owhanake plant for irrigation purposes. However, a number of challenges were also identified, which included public health concerns, nutrient loading rates, and land stability.

The treatment technology has vastly improved since the construction of the WWTP. The current MBR system treats wastewater to a high quality that is already suitable for some non-potable purposes. Potential application for reuse, which we will thoroughly investigate, includes:

- Irrigation to parks, reserves, farmland, or the local golf course.
- Flushing water for toilet cisterns.
- Commercial or industrial activities (wash or process water etc),
- Car washing,
- Firefighting.

Key considerations that will be part of the investigation will be around the storage and delivery cost of recycled water from Owhanake treatment plant to the application site or sites.

### Increasing WWTP capacity

The upgraded plant is presently equipped to handle peak wastewater flows during the summer season when the island's temporary population reaches 40,000. However, considering the projected population growth in Auckland and the subsequent rise in peak flows to the treatment plant, it is anticipated that the plant will reach its treatment capacity within the next 10 to 15 years. Therefore, we should proactively investigate and plan for potential expansion measures to ensure the plant's continued ability to treat wastewater effectively and meet the demands of the growing population in the coming

years. This can be achieved through (a) installation of additional treatment modules or (b) increasing buffer capacity to treat peak flows.

## Installation of additional treatment modules

One of the advantages of MBR plants is their containerised and modular nature. This feature allows for relatively straightforward capacity expansions by installing new modules at the current WWTP site. This flexibility enables a more efficient and cost-effective method of increasing treatment capacity compared to expensive plant expansions or constructing entirely new facilities.

## Increasing buffer capacity to treat peak flows

As indicated earlier, wastewater flows to the Owhanake treatment plant exhibit significant seasonal variability, primarily due to the extreme rain events and influx of visitors and holidaymakers. During other periods, the average flow to the treatment plant is considerably lower, amounting to less than half of the current maximum treatment capacity.

By providing additional buffer capacity to handle peak flows, the existing treatment plant can be optimised to accommodate fluctuating demands, thereby deferring the need for immediate plant expansion (in this case, the installation of additional MBR modules).

## Receive tanker wastewater in an emergency

In the emergency event of the pump station failure, where wastewater from connected properties cannot be delivered to the treatment plant, one temporary option would be to pump out wastewater from individual septic tanks and transport it in trucks to the Owhanake WWTP.

Several considerations would need to be assessed for this option:

- **Discharge consent:** The existing discharge consent for the treatment plant would need to be updated to include trucked wastewater as an accepted form of inflow. This can be included as part of the investigations required for the renewal of the consent.
- **Management plan:** The management plan for the treatment plant will need to be revised to incorporate the handling and treatment of trucked wastewater. This includes outlining the procedures for receiving, storing, and treating the wastewater, as well as any additional monitoring and reporting requirements.
- **Physical upgrades:** Upgrades to the treatment plant will likely be necessary to accommodate receiving the trucked wastewater. Also, the access road to the plant would need to be upgraded to support heavy vehicle use, ensuring safe and efficient transportation.
- **Security, and health and safety:** The introduction of trucked wastewater would require careful consideration of measures to keep the site secure and its workers safe. We would need to establish protocols for truck entry and exit, implementing appropriate security measures to prevent unauthorised access, and ensuring the safety of personnel working with the trucked wastewater.
- **Facility plan:** The overall facility plan for the treatment plant needs to be updated to reflect the inclusion of trucked wastewater. This includes documenting the changes made to the infrastructure, as well as outlining the operational procedures and contingency plans specific to handling trucked wastewater.

# Long-term options

As discussed earlier, this strategy has been developed to prepare us for the unknown future. If things changed from the current course of events, we could be instructed by the regulator to investigate these options. While we don't have any control over the decisions made by the regulator, we can prepare ourselves. A decision on which option to take should be taken through a comprehensive and transparent consultation with the Waiheke Island community.

## Expansion of Owhanake WWTP

If a larger area in Oneroa, or commercial and industrial areas in Ostend would require wastewater reticulation, one option could be expansion of the Owhanake WWTP and connecting all the properties through a pipeline to it. Building a pipe network from other commercial areas of Waiheke to connect to the Owhanake WWTP would be highly complex and challenging due to the limited access and hilly nature of the island. It would also require pumpstations to be built, which adds to the complexity of the system. On the other hand, a centralised WWTP would allow for efficient treatment and reuse of a large volume of wastewater.

## A new WWTP

An alternative option could be the construction of a new WWTP in a central location on Waiheke to treat wastewater from other commercial and high-use areas. While this option would require the installation of a shorter pipe network, construction of a new WWTP would be significantly challenging considering Waiheke's sensitive environment and availability of suitable land that is away from residential areas.

# Cost estimate for long-term options

No detailed investigation or cost estimate analysis was conducted for the development of this servicing strategy for the above long-term options due to the high level of uncertainty associated with them. Factors such as evolving technologies, changing regulations, and other socio-economic conditions can significantly impact these options and consequently cost considerations.

As the scenarios evolve and it becomes clearer which pathway would possibly be taken, cost analysis can be conducted to provide a more accurate understanding of the financial implications associated with each option. This servicing strategy provides a platform to communicate such shifts transparently with the community.

# Te whakamahere urutau
## Adaptive planning

We can't predict all the changes we will face in any future state, but we do forecast service delivery based on current expectation and anticipated condition. There will be factors that impact the requirements of servicing Waiheke Island that are beyond our control. This means we need to keep our servicing options open for as long as possible while we identify the foundations for future decisions. Adapting to future scenarios requires a flexible approach that avoids the risk of locking decisions and investments into agreements that cannot be changed, or are not fit for purpose in future, for example, building inappropriate infrastructure.

The Dynamic Adaptive Policy Pathways (DAPP) approach develops a series of actions over time (pathways). It is based on the idea of making decisions as conditions change, before severe damage occurs, and as existing policies and decisions prove no longer fit for purpose.

Adaptation is a pathway. The end point is not only determined by what is known or anticipated at present, but also by what might be experienced and learnt when the future unfolds, and by responses to events. We develop a series of tipping-point triggers. For example, as the sea-level rises, the frequency of hazard events (such as flooding) might approach an agreed trigger. At this point we need to make decisions or take additional or different actions, and perhaps choose an alternative pathway to adapt to the new situation.

By exploring different pathways early and testing the consequences, we can design an adaptive plan that includes a mix of short-term actions and long-term options.

The plan is monitored against the tipping-point trigger for signals that a decision point is approaching to:

- Implement the next step of a pathway
- Shift to an alternative pathway
- Reassess the objectives of the plan itself.

Adaptive strategies need to be targeted and specific, with the chosen strategy and pathway taking into account the unique character and values of the servicing area. The development of adaptive strategies requires consideration of escalating risk, the values and associations of iwi/mana whenua, cooperation with other infrastructure providers, and the objectives of the local community.

Adaptive strategies are recommended across the short (0 to 10 years), medium (11 to 30 years) and long (31+ years) timeframes. However, it is important to note that the timing of when a change in strategy is required can be uncertain. Some specific signals and triggers are identified in this strategy. We have endeavoured to provide high-level indications of potential impacts that would lead to a change in strategy, and this would be when further formal engagement with the community is most likely.

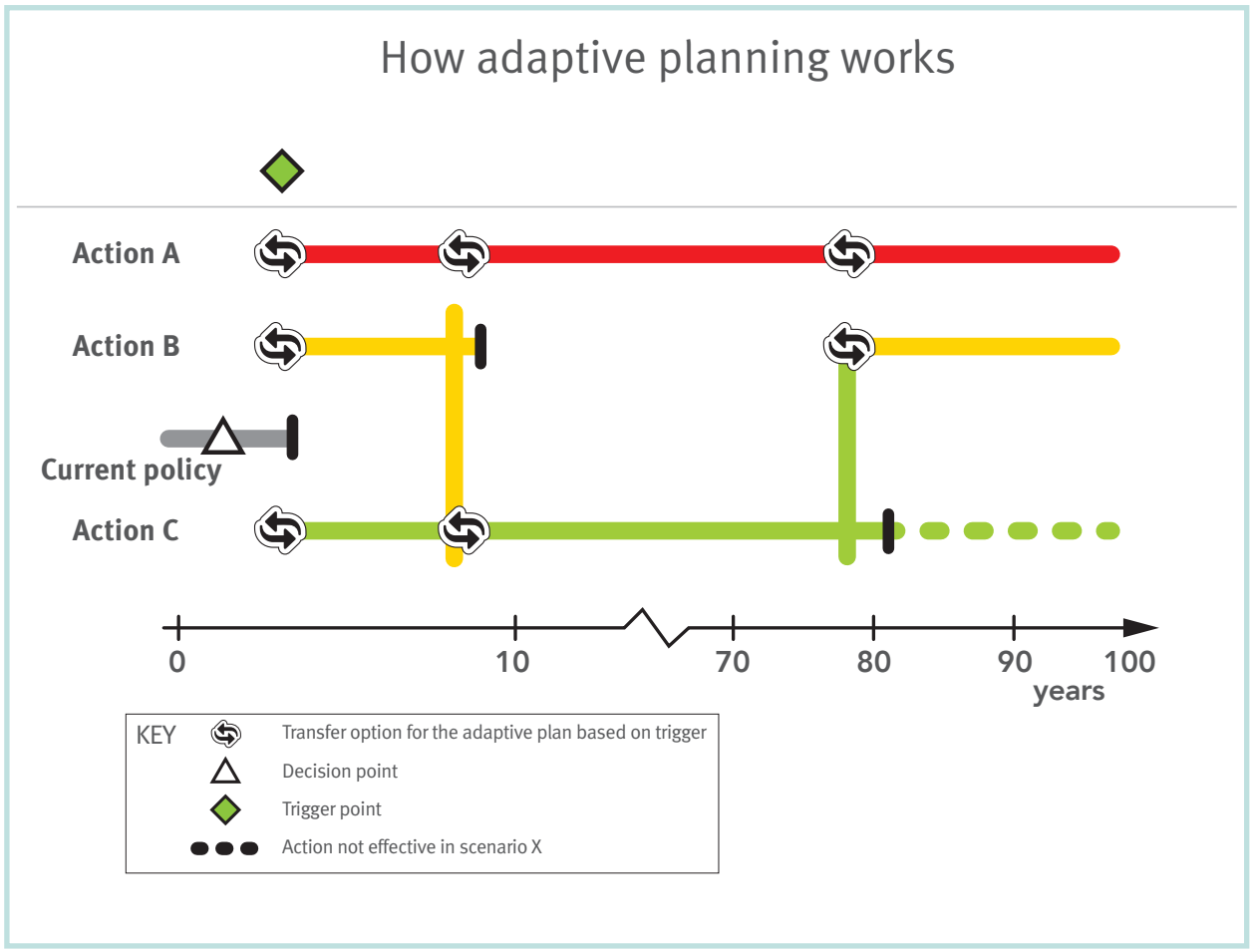
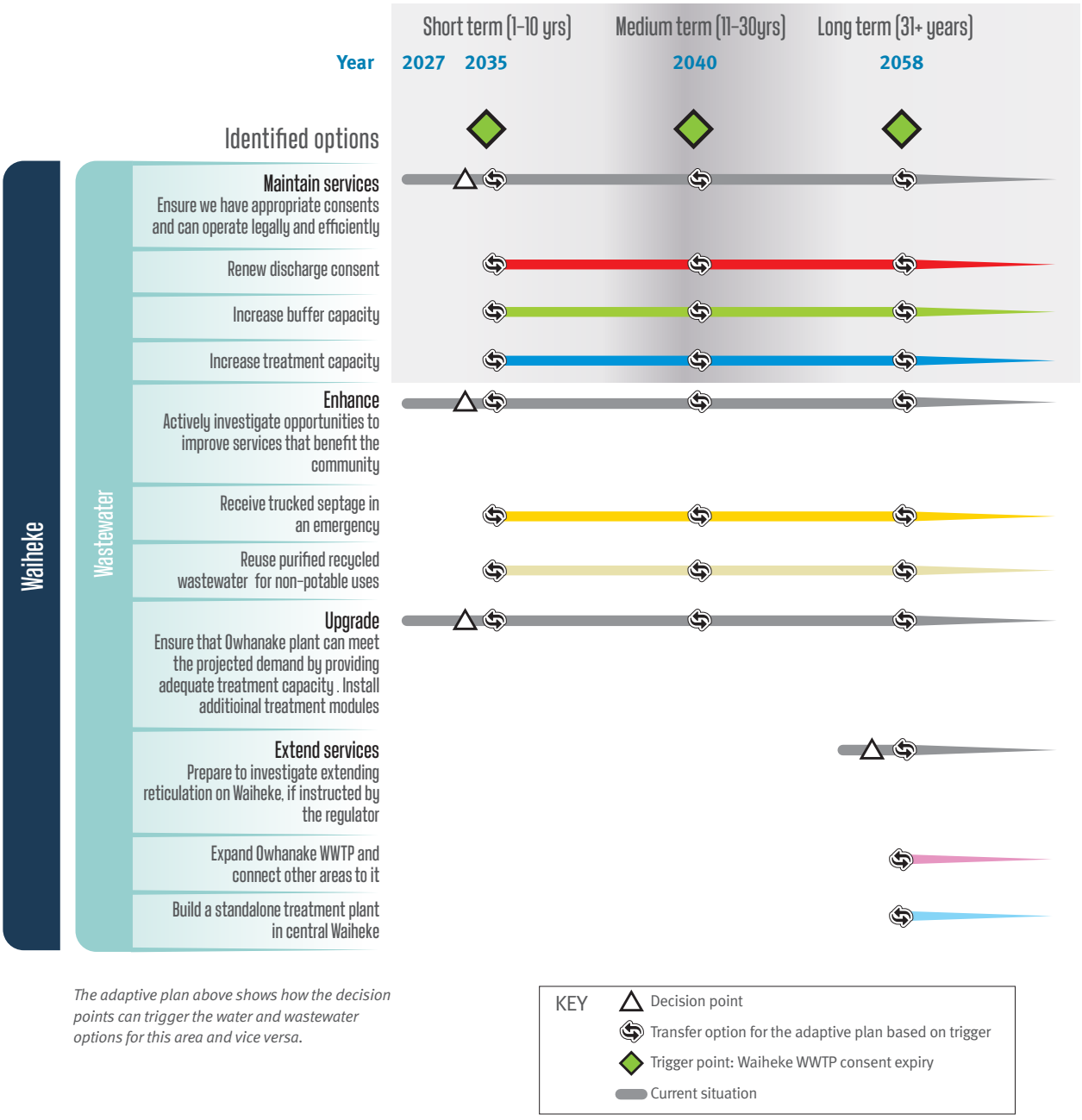



*Figure 13 - How adaptive pathways work*

# Te rautaki urutau a Waiheke | Waiheke adaptive strategy

The following diagram contains a list of wastewater servicing options.




*The adaptive plan above shows how the decision points can trigger the water and wastewater options for this area and vice versa.*

*Figure 14 - Waiheke adaptive wastewater strategy*

## Ngā kōwhiringa ratonga wai | Water servicing options

As discussed earlier, while there are a number of water supply options that can be investigated, no reticulated water servicing is provisioned for Waiheke Island in this servicing strategy. If in the future a decision is made by the community and responsbile authorities that reticulated drinking water would be needed, we will investigate the available options.

## Ngā kōwhiringa ratonga waipara | Wastewater servicing options

In the short term, we will renew the Owhanake WWTP discharge consent, which is due to expire in 2027. This brings the opportunity to consider additional services that we could provide to improve the community's resilience, including receiving septic waste in tankers during an emergency and reusing the highly treated and purified wastewater. We will also investigate how we can increase peak treatment capacity to continue to service the community, providing for the projected growth in visitor population. In the medium to long term, we will continue to monitor the regulation and policy environment. If we were instructed to provide wastewater services to other areas of Waiheke Island, there are options that we can investigate, which we will do transparently together with the community. However, the authority to make such a decision rests with other entities, and we do not have any control over it.

# Whakakapinga | Conclusion

We hope that this servicing strategy has clearly articulated the complex factors that will influence the future of Waiheke Island. These factors inform the timing and nature of what is developed and when, to ensure reliable, environmentally-aware and affordable services for decades to come.

We recognise that Waiheke Island's residents have the aspiration to retain the village and suburban character of the island, and that an island-wide residential reticulation of water or wastewater is deemed undesirable. Independence from a reticulated water network offers a certain type of resilience to the Waiheke community. While the projected droughts and population growth could put more pressure on the water sources, through proper planning and water conservation measures it can be dealt with. Contingency water supply is an important aspect of drought resilience and we will continue to work with the council and the community to ensure their dry-season water needs are met.

The only municipal wastewater treatment plant on Waiheke Island, which services Oneroa businesses, was upgraded in 2020 and is set to continue to provide wastewater treatment service to the community. The WWTP is an integral part of the community as it supports the growth of the businesses. To contribute to the community's circular economy approach, we will investigate ways to reuse the highly treated and purified wastewater, mainly for non-potable uses. While we have pointed to a number of long-term options for providing additional services to the community, we acknowledge that such decisions sit with the community as a whole and other authorities.

We want to reiterate our commitment to our objectives in writing this servicing strategy as identified at the outset: having purposeful conversations with our partners and the community which help us make wise investments at the right time, providing services for a healthy and growing population, adapting to and mitigating the impacts of climate change, and maintaining a focus on protecting the local environment. To even begin to achieve these aspirations, we need to set out our servicing strategy as a foundation for the conversations and decisions for which we need to make space.

We welcome feedback on this document. We are interested to know whether there is agreement on the stated facts and, if so, whether the options we have described are appropriate, sufficient and not missing key alternatives or opportunities for Waiheke island.

## Ngā mahi ka whai ake | Next steps

This servicing strategy is a pilot initiative, to be developed and shared with the community and improved as our conversation develops. Its purpose is to transparently communicate our approach, enhance the best-practice strategy development process, including mana whenua partnership and community engagement, as well as the creation of long-term adaptive strategies.

To sustainably serving the community, adaptive approaches will be integrated into relevant Asset Management Plans and decision-making. Implementing these strategies will involve continuous collaboration among Watercare departments to support iwi/tangata whenua as partners. Throughout the development of the servicing strategy, work programmes will be established as options to be selected, assessed and further refined. Each work programme or project will undergo a thorough assessment and business case evaluation.

## Arotake o te rautaki whakarato | Review of servicing strategy

This servicing strategy will be reviewed in March 2024, incorporating suggestions by iwi, the Local Board and the public, or as required as a result of a specific trigger or signal which would necessitate adjustments in our approach. These reviews will consider new information related to the servicing strategy area, such as hazards, climate change, asset data, and cultural and environmental factors. These reviews provide an opportunity for formal engagement and receiving feedback from the community.

Watercare