



Te Rautaki Whakarato a Helensville me Parakai

Helensville and Parakai Servicing Strategy

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Ngā whakarite | Preparation

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This document was prepared by Watercare's Strategic Planning team. As consultants to Watercare, Aurecon and Stantec have led technical input to the plan and supported the mana whenua engagement. We also acknowledge the contributions from Rodney Local Board and the community in providing the feedback which has been incorporated into this strategy.

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.

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Whakarāpopototanga matua

Executive summary

This document sets out a long-term strategy to ensure we continue to provide safe and reliable services to Helensville and Parakai communities. The purpose of this document is to describe our servicing options in a way that the public can understand, so that we can make decisions about the future in partnership with the community we serve.

Helensville and Parakai are communities on the Kaipara River, about 40 kilometres north-west of Auckland and located within the Rodney Local Board area. Currently, the communities have a population of around 5,000 residents in total. By 2050, the communities are expected to have a population of around 6,500 people.

We provide water supply services and wastewater (sewage) services for Helensville and Parakai.

We face a number of challenges in providing drinking water services in the area. With the projected population growth and climate change, and limited and ageing assets in the area, we are preparing to make some important decisions with the Helensville and Parakai public about where their water is going to come from in the future and how their wastewater is managed.

Helensville and Parakai have been supplied with water from the Mangakura Dams since the early 1900s. The Sandhills Wetland water source was added to the water supply in 1975. Given that these are surface-water sources, the supply is not resilient enough in the context of climate change impacts and we face increasing demand due to housing development and population growth in the area. In the short term, we need to renew the Helensville water take consent, which is due to expire in 2026. We are also exploring reliable alternative water sources to accommodate for the growth in the area and for the generations to come.

Our wastewater service in the area is not without challenges either. Our wastewater infrastructure and consents require action in the short term. We need to renew the Helensville's Wastewater Treatment Plant (WWTP) discharge consent, which is due to expire in 2027. The plant had been facing significant capacity and treatment challenges but was upgraded to modern technology which treats wastewater to a high standard in 2023. The location of the wastewater treatment pond in the tidal range of the Kaipara River makes it prone to high tides in the short term and rising sea levels in the medium term, posing a significant resilience risk. We also want to minimise our impact on the environment. In the medium to long term, we need to investigate ways to reduce our discharges into the Kaipara River through options, including land treatment and wastewater reuse. Should recycling and reuse of highly treated and purified wastewater be pursued, this will allow us to reduce discharges into the Kaipara Moana (Kaipara Harbour) environment.

Our overarching strategy for communities that are not connected to the Auckland metropolitan water network is to pursue local solutions rather than connect to the metropolitan network. In doing this, we acknowledge our commitment to initially explore all local alternatives so that we can gradually decrease Auckland's reliance on te Awa Waikato (the Waikato River) as a water source. We will continue with this approach unless there is a substantial risk to public health or the environment resulting from the current way of operating.





Te mahi tahi me Iwi interests

The cultural information in this document belongs to the iwi that helped create this Helensville and Parakai pilot servicing strategy. To protect Mātauranga Māori, this cultural information shouldn't be shared beyond the context of this strategy without talking to and getting approval from the local iwi who own this information.

It is important to include cultural values and associations in any works programme. This means consistently using a partnership and co-management approach for each strategy area.

It is necessary to engage with the relevant iwi groups early and meaningfully. This ensures that as a member of the Auckland Council family we meet our obligations to ngā mana whenua o Tāmaki Makaurau and te Tiriti o Waitangi. As kaitiaki, iwi play a key role in shaping and supporting this servicing strategy.

The following guidance is to consider meaningful engagement with Ngāti Whātua o Kaipara to support the development of the Helensville and Parakai servicing strategy. Our engagement in 2022 and 2023 with iwi and previous mana whenua discussions indicate that six other iwi may also have a direct interest in this area.

Engagement with mana whenua

Broadly our wānanga (workshop) for this area suggested that our partnership discussions should predominantly be with Ngāti Whātua o Kaipara with Ngā Maunga Whakahii o Kaipara being the post-settlement governance entity with kaitiaki interest in this rohe (area).

Wānanga events over a number of weeks were attended by iwi partners and an iwi-appointed subject-matter expert. These events identified key priorities for mana whenua, including:

- Clean waterways
- Respectful service management
- Restoration of waterways
- Partnership and kaitiaki opportunities
- Sustainable resources for future generations.

The mana whenua stance that all waterways are important adds a level of certainty to the need for a partnership approach to achieve iwi-approved service management. Ngā Maunga Whakahii o Kaipara also identified the Sandhills Wetland as a sensitive environmental asset. This is supported by annual assessments of the stream environment by Watercare, which concur that the wetland is a viable fish habitat providing refuge for native eels.

In future revisions of this document, we will look to include more detailed considerations from Ngā Maunga Whakahii o Kaipara with their approval, including a location-specific te mana o te wai statement, whakapapa, history mātauranga and tikanga, the role and responsibilities of iwi as kaitiaki, Te Ao Māori (Māori world view) and kaitiakitanga (guardianship).



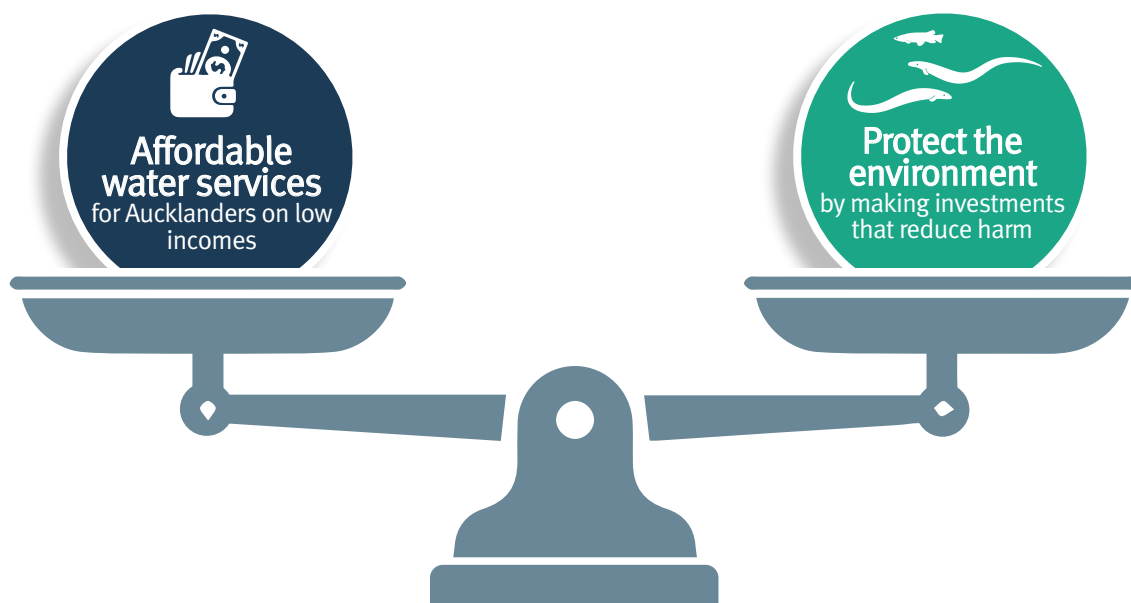
Te mahi me te hapori

Working with the community

Through this strategy, Watercare is committing to making decisions that balance our commitment to te Mana o te Wai with ensuring that our services remain affordable. Careful planning for growth will be important to the prosperity and wellbeing of the area and the health of people and their environment. The public has an important role to play in engaging with us and to ensure that we get this balance right.

As we consider future needs for water and wastewater services, we are taking a long-term and inter-generational approach, thinking about sustainable services for at least the next 70 years. When we build things like reservoirs, pipes, pumps, and treatment plants, they stay in place for decades. Decisions that we make today will affect the generations to come, and it's important to work together with the community to make the right choice of trade-offs.

Sharing this document give us a reference point to guide continued dialogue. We want to ensure everyone can access this servicing strategy and understand the water and wastewater issues and opportunities in Helensville and Parakai, and our approach to addressing them. We also want to hear whether this is a good strategy, whether there are better ideas out there and what we may have missed. This strategy will prepare ourselves and our communities for the complex kōrero that we need to have about water and wastewater services in this area. We are committed to transparency and accountability and are happy to be challenged with ideas for improvement.



Tirohanga whānui, te whakatakanga, ngā aronga me ngā whāinga

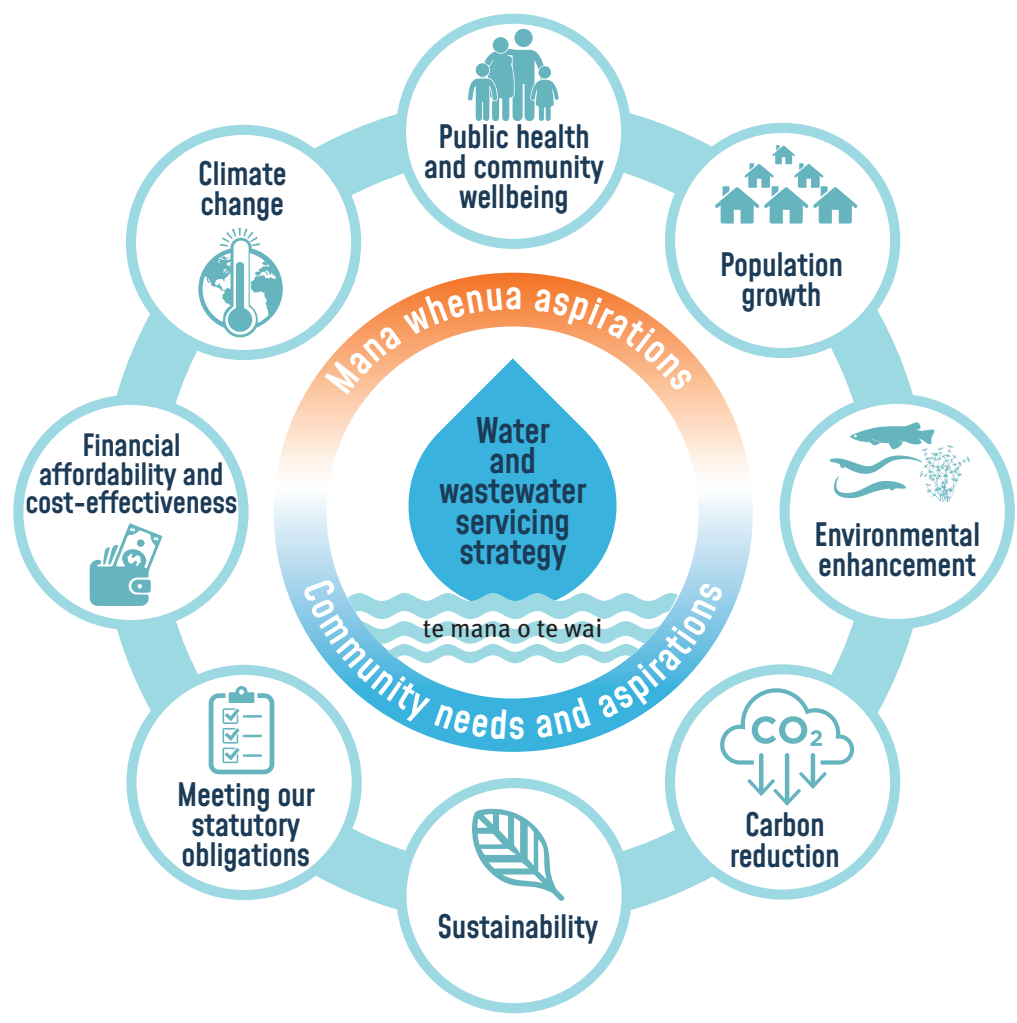
Vision and mission, goals and objectives

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 considerations, regulatory requirements, and infrastructure needs. Our plans including 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 water and wastewater services that can provide for more people, cater for future generations, are good for the environment, and follow the rules.





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 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 community needs, making sure 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 that we are addressing. We integrate land use and water planning at a regional, catchment and site scale as per our commitment to the Auckland Water Strategy (see Appendix 1).



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



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



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



Meeting our statutory obligations: While it might mean added steps in our processes, it's a necessary aspect of delivering trustworthy services.



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



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 make the best decisions for the community and the environment. We want these trade-offs to be more transparent, to help build an understanding of how decisions are made.



Te aromatawai ratonga ā-rohe: Helensville me Parakai

Service area: Helensville and Parakai

Kupu whakataki | Introduction

This servicing strategy covers the communities of Helensville and Parakai, located about 40 kilometres north-west of Auckland in the Rodney Local Board area. Approximately 4,200 people call these two towns home, where they live, work and play. Among them, Kaipara College educates around 800 students, some of whom come from nearby towns, including a few from Auckland. There are about 1800 homes and more than 200 local businesses in the area. People in Helensville and Parakai share a strong sense of belonging with inter-generational connections to the land and history. In addition, new residential developments in the region are attracting newcomers for reasons such as affordable housing (compared with Auckland), employment opportunities in light industry, services, and retail sectors, and also retirement options.

Helensville, known for its historic charm, is home to the iconic Helensville Railway Station, a heritage-listed building dating back to 1915. The area also boasts the Kaipara Coast Sculpture Gardens, a serene spot where art and nature converge. Just a short drive away, four kilometres to the north, Parakai is famous for its natural thermal springs and the Parakai Springs Water Park, providing an escape for relaxation and aquatic adventures. These twin towns not only serve as gateways to the beautiful Kaipara Harbour but also offer a glimpse into New Zealand's rich history and the rejuvenating power of its geothermal wonders.

We provide both water supply and wastewater services for Helensville and Parakai.

We estimate that each person uses approximately 150 litres of water per day in Helensville and Parakai. Approximately 80 per cent of the water used in households becomes wastewater; this means that each person produces approximately 120 litres of wastewater every day. When it rains, rainwater also enters the wastewater network through incorrectly installed downpipes and unauthorised connections. In the Helensville and Parakai network, stormwater inflow into the wastewater network makes up to half of the volume of the wastewater that we would normally treat in dry weather. Wastewater and stormwater that enter into the network need to be treated at the WWTP before being discharged into the environment.

It is important that private properties contribute to the proper functioning of the wastewater network. Flushing unwanted objects down the toilet not only can cause clogging of private wastewater pipes, but also increases our operational costs related to removing blockages. Therefore, it is in the community's best interest to be mindful of what goes into the wastewater network. By minimising the introduction of rainwater and other non-wanted items, we can reduce maintenance requirements, control operational costs, and enhance the overall efficiency of our WWTP.

This will help us to be more efficient with our wastewater treatment and limiting untreated discharge into the environment. Balancing our need to invest in the wastewater network for environmental protection with keeping costs affordable for the community requires cooperation from everyone. Every resident plays a crucial role in creating a sustainable and efficient wastewater management system for Helensville and Parakai communities.

History of Kaipara River Catchment occupation and modification

The Kaipara River catchment, with a history of over seven centuries of human occupation, has been primarily shaped by Māori presence and European influences dating back nearly 180 years. Human activities in the catchment have left a mark on its vegetation, archaeological sites, historic structures, place names, and cultural associations.

In the pre-European era, the te Taou hapū of Ngāti Whātua and te Kawerau ā Maki had strong connections to the catchment. Māori occupation involved land modification, including the use of fire for land clearance, earthworks, and food cultivation. They harvested a variety of resources from the land, waterways and wetlands. Numerous place names throughout the catchment reflect the Māori connection, and these names still hold significance for local Māori communities.

'The name Kaipara appears to have applied traditionally to the Harbour and in particular to its southern arm. The Kaipara River itself had many different names that applied to its component parts. For example,



the meandering bends in the river near Helensville were known as Tungoutungou while the section near the main river bridge was known as Te Pu a Tangihua. Further upriver were the shoals known as Kaiwaka, and the meander north of Rewiti which was known as Tua te tua.'

The lower Kaipara River and its tributaries were significantly impacted by European settlement, especially in the mid-1800s when organised European communities began to establish themselves. Timber milling became a major industry, and this activity, along with agriculture, led to permanent changes in the landscape and water bodies. European settlement also introduced the practice of drainage and land clearance for agriculture, impacting water tables and water flows.

Exotic forestry operations, such as the development of Riverhead State Forest and Woodhill State Forest, further influenced water tables and water bodies. The growth of dairy farming and the development of creameries in the early 20th century had a significant impact on water resources. The introduction of bore wells and drainage works became common on farms.

The catchment continued to evolve with urbanisation and residential development, particularly in the Kumeu-Huapai and Waimauku areas. The expansion of market gardening, orcharding and viticulture, along with the impacts of bore installations and farm dams, continues to increase water demand and water allocation challenges.

Te taupori me ngā whakawhanaketanga | Population and development

Today Helensville and Parakai are identified as rural settlement areas of Auckland. The area has a range of different land-use zones: primarily residential, with some business land.

There is some growth in residential population and demand for services and expected plan changes for this area. While private developments are happening in the area, the recently approved Auckland Future Development Strategy suggests that full build out of the future urban-zoned areas in Helensville is to be scheduled to after 2035. This is to align with our provision of water and wastewater services, and the expected upgrade requirements of the treatment plants as a result of their respective consenting processes.

Helensville and Parakai population forecast

Currently, the communities have a population of approximately 5,000 residents in total. Population forecasts indicate a growing population in Helensville and Parakai over the next 30 years. Based on our water and wastewater connections and proposed new developments in the area, we estimate that there will be approximately 6,500 people living in the area by 2050 (see chart below). In the short term, our population forecast carries a reasonable level of certainty. However, it is crucial to acknowledge that the long-term forecast is susceptible to shifts influenced by regulatory and planning measures.

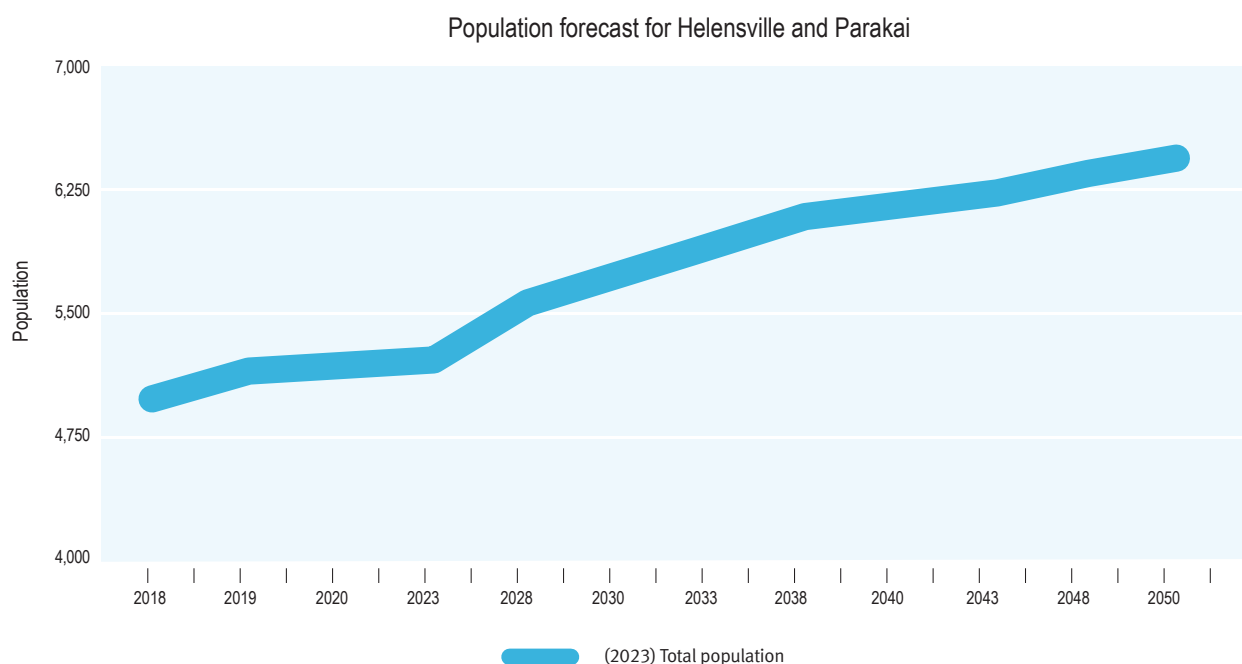


Figure 1 - Population forecast for Helensville and Parakai



In addition, the effects of climate change could make some of the low-lying areas around the Kaipara River uninhabitable, necessitating a strategic retreat from existing residential areas. Although these will become clearer in the future, it is vital that we proactively engage in discussions with the Helensville and Parakai communities, and continue to monitor the policies to prepare for such scenarios in the future.



The orange area below shows the area under consideration in this strategy:



Figure 2 - Helensville and Parakai servicing strategy area

Demand in the area is usually higher during drier summer months and the holiday season. The increasing population will naturally increase raise the demand for water and production of wastewater, for which we need to prepare by planning the infrastructure to stay ahead of growth.





Ngā whakāweawe ā-hurihanga āhuarangi, taupori hoki ki te putunga me te hiahiatia | Climate change and population 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 impact on 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, means 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.

Low-lying areas at risk of sea-level rise in Helensville and Parakai

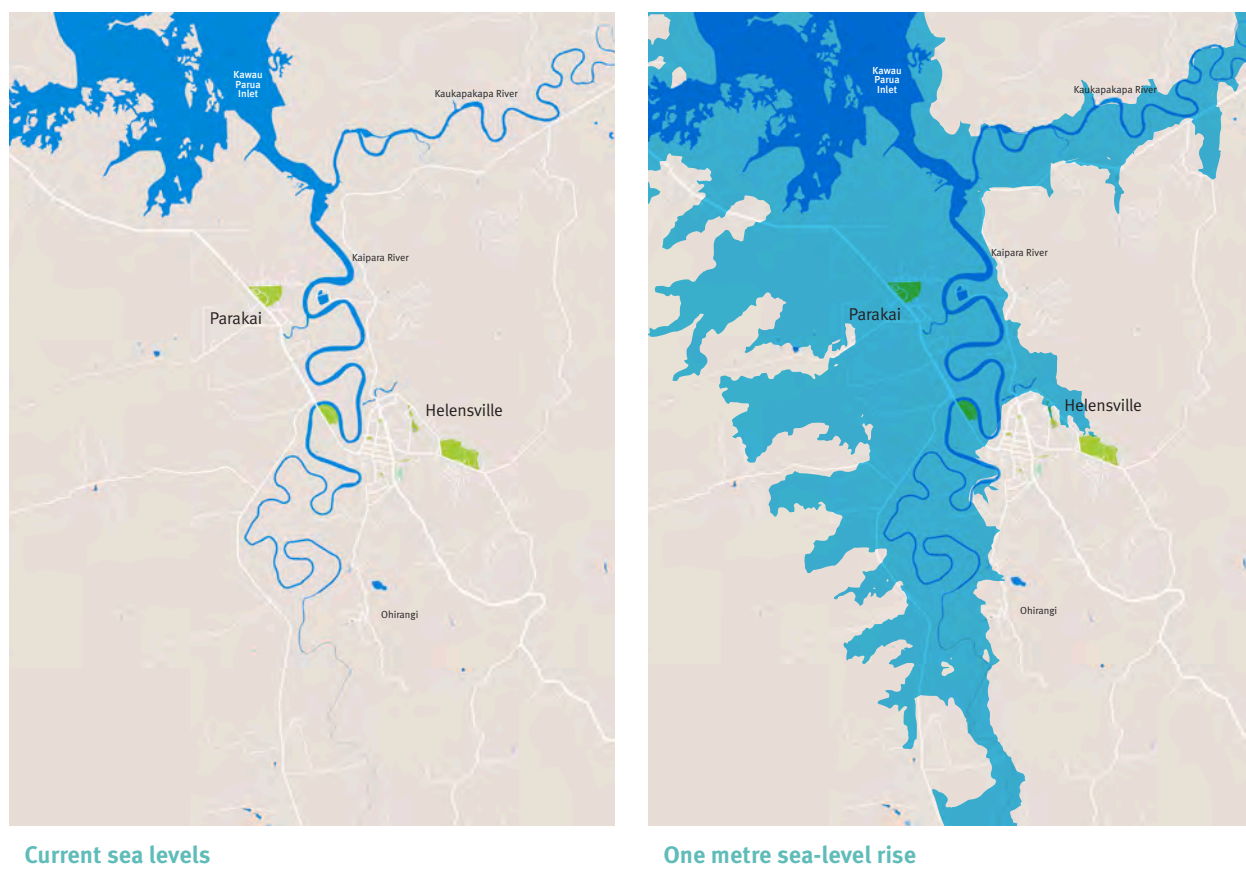


Figure 3 - Flood risk areas

Climate change will impact surface-water supplies such as Helensville's, and rainwater tanks, particularly for those with smaller tanks, which are more likely to spill over in wet periods and run dry in dry periods than larger tanks. Intensification can make it difficult for households to collect sufficient rain (with limited room for large enough tanks) to support full domestic water use. This is somewhat balanced by the opportunity to supplement public supply. An alternative source of water is needed for Helensville and Parakai to increase the resilience against climate change and projected population growth in the area. The water supply situation may be made worse by changing water take consent conditions limiting takes, or requiring stream compensation flows. These types of conditions can enhance the natural environment, but are likely to reduce the availability of water for use, increasing the need for an alternative source.

Climate change also has an impact on water demand. Aucklanders use more water when it is hot and dry, particularly those who live in homes with gardens and pools. This is also true of some businesses and organisations like schools and councils which need to keep lawns, sports fields and parks thriving in dry weather.

Our wastewater treatment plant in Helensville is at a high risk of impact from climate change too. Sea-level rise and tidal inundation within the next 20 years will have severe impacts on the WWTP.



Helensville Dam Feb 2023



Wai

Water

History of water supply

From the early 1900s the growing borough of Helensville had begun to experience water shortages. Several sources were inspected and in 1913 a concrete water supply dam was constructed on the upper Mangakura Stream, just south of the town. This source became insufficient for Helensville's needs within a decade. Investigations into the possibility of taking underground water from the sand country west of Te Pua were undertaken in 1930; however, the iron and other mineral contents of such water made it unsuitable. In 1934 a second larger dam was constructed on the Mangakura Stream greatly increasing storage capacity. The construction of a larger lower-level earth dam on the Mangakura Stream was proposed from the mid-1950s and commissioned in 1964, raising the total storage capacity to approximately 107 million litres. In 1975 a pumping station utilising the underground water resources of the Sandhills Wetland was finally constructed near Bradley Road, Wharepapa.

Water supply system today

Helensville's water supply system is an operationally and geographically separated system from the wider Auckland metropolitan system. Water is abstracted from the two sources of Mangakura Dams and Sandhills Wetland. Both sources supply the Helensville Water Treatment Plant (WTP), where water is treated and stored onsite in two treated water reservoirs. The WTP operates to maintain levels in the reservoirs at a set point. From the reservoirs, water is supplied to the Helensville distribution system under gravity.

As of 2022, we supplied water to about 1,700 connection points and a population of approximately 4,600. Note that the number of people connected to our network is lower than the total population (approximately 90 per cent) because people can choose to stay off the network and use their own water tank.

Helensville and Parakai water supply system



Figure 4 - Helensville and Parakai water supply network



Figure 5 - Mangakura Dam weir

Water quality

The water quality from the dam and spring-fed wetland can vary significantly following large rainfall events. Raw water quality data shows that the water abstracted from both sources contains high levels of iron and manganese, and both sources are subject to elevated levels of cyanobacteria and naturally-occurring organic compounds.

Algae and cyanobacteria levels are variable in the Mangakura Dam and can lead to elevated levels of odour-causing compounds, which can cause water to taste different, mainly throughout the warmer months of the year.

Water efficiency

We use universal metering to measure water use by all legal connections on the water supply network. All water meters are read every second month and water consumption for alternative months is estimated.

Water metering assists us in providing the data which is required to manage and operate the water supply system. Suitable water-use statistics contribute to promoting the wise and efficient use of available water, optimising network design and operation, and managing revenues and costs.



Watercare has a water efficiency plan covering all of Auckland, committing us to achieve our gross per-capita target of 253 litres per person per day by 2025. There are four pillars to this plan, as follows:

- Focus Area 1: Reducing leakage
- Focus Area 2: Improving oversight from source to tap
- Focus Area 3: Pressure management
- Focus Area 4: Residential, community and commercial water efficiency.

The responsibility for being water efficient falls to both Watercare and our customers. With improved digital oversight of our network and our customers’ consumption, we are increasingly able to provide useful advice on how we all might waste less water over time.

Post 2025, Watercare’s water efficiency commitments align with the Auckland Water Strategy Water Security Targets:

Consumption (demand)

2025	≤253 litres consumption per person per day (gross per capita consumption, network)
2030	≤247 litres consumption per person per day (gross per capita consumption, network)
2050	≤225 litres consumption per person per day (gross per capita consumption, network)



Helensville Water Treatment Plant 2023



Water use and availability

Figure below shows the amount of water we abstracted and treated from all water sources in the area and the amount that was used during the last five years.

We have become more efficient with our water use over time by reducing water waste. This reduction has been achieved through reducing leakages, implementing compliance monitoring to reduce unauthorised use and water conservation within the community. Although we are more efficient with our water use, we will still need a new source to improve our resilience against climate change impacts on supply.

Total consumption is rising due to increased residential and commercial consumption

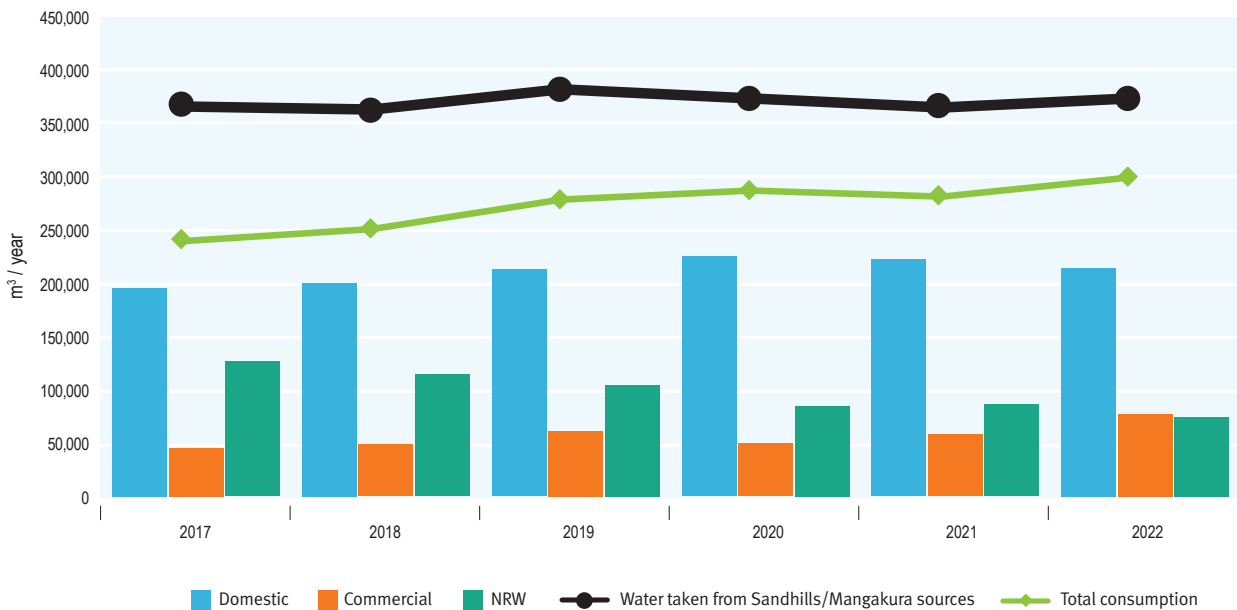


Figure 6 - Water supply and consumption in Helensville and Parakai

The average water use during the period 2017 to 2022 is summarised in the table and pie chart below:

Water Use	m ³ /d	ML/Y
Domestic	578	211
Non-domestic	156	57
Tankers	16	6
Irrigation (non-potable water)	5	2
Network non-revenue water	271	99
Total	1027	375





Future demand

The water demand in Helensville and Parakai will be driven (at least in part) by:

- **Urbanisation and population growth**

The number of residents in the area is a key driver of water demand. As the population increases, so does the demand for water for residential, commercial and construction purposes.

- **Climate and weather patterns**

Extended dry periods mean the need for providing additional storage capacity and resilient supply that is not dependent on surface water. We need to prepare to provide water for tanker filling for emergency supply to residents' houses with rain tanks during droughts.

- **Network losses**

Water losses in the network result in increased demand. In Helensville and Parakai currently we lose approximately 20 per cent of the water through the network before it reaches residents' houses. We will gradually renew the older parts of the network to reduce these losses.

Based on the projected population of 6,500 in 2050, peak daily water demand will increase to approximately 2,470 m³ per day on average [fig below]. Our current water take consents allow us to take a maximum of 2,500 m³ of water per day from the two water sources in Helensville. This indicates that in the short to medium term, we can take enough water to meet the needs of the community. However, we are limited by how much water is available to us.

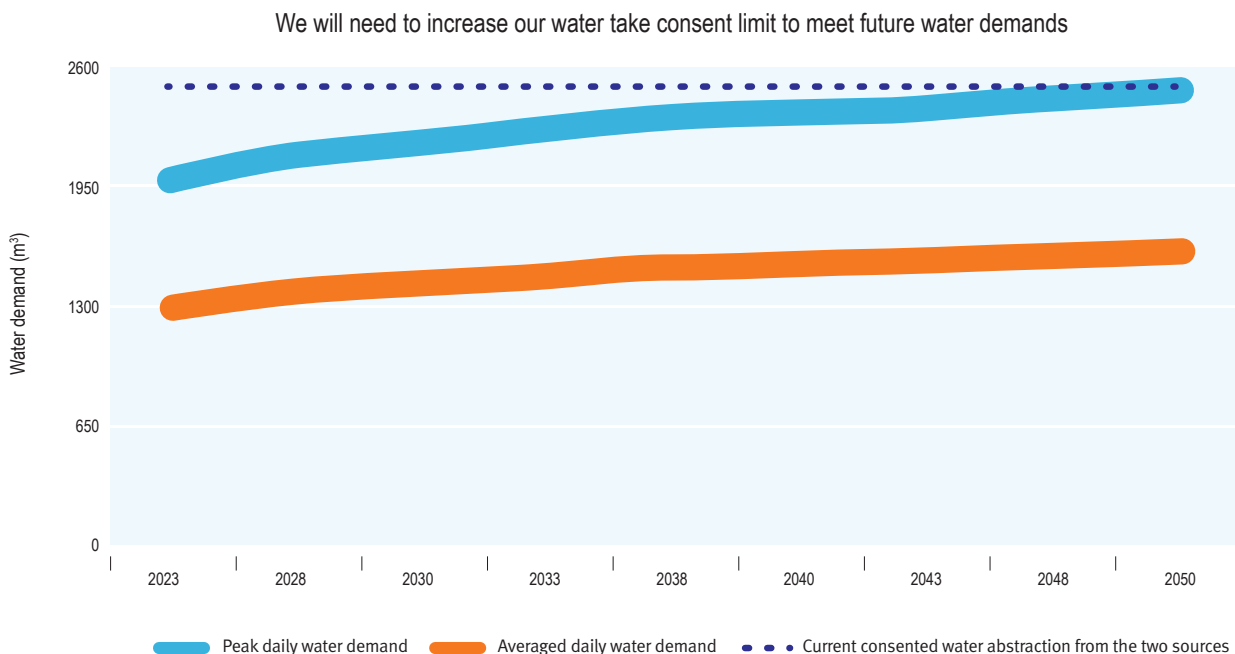


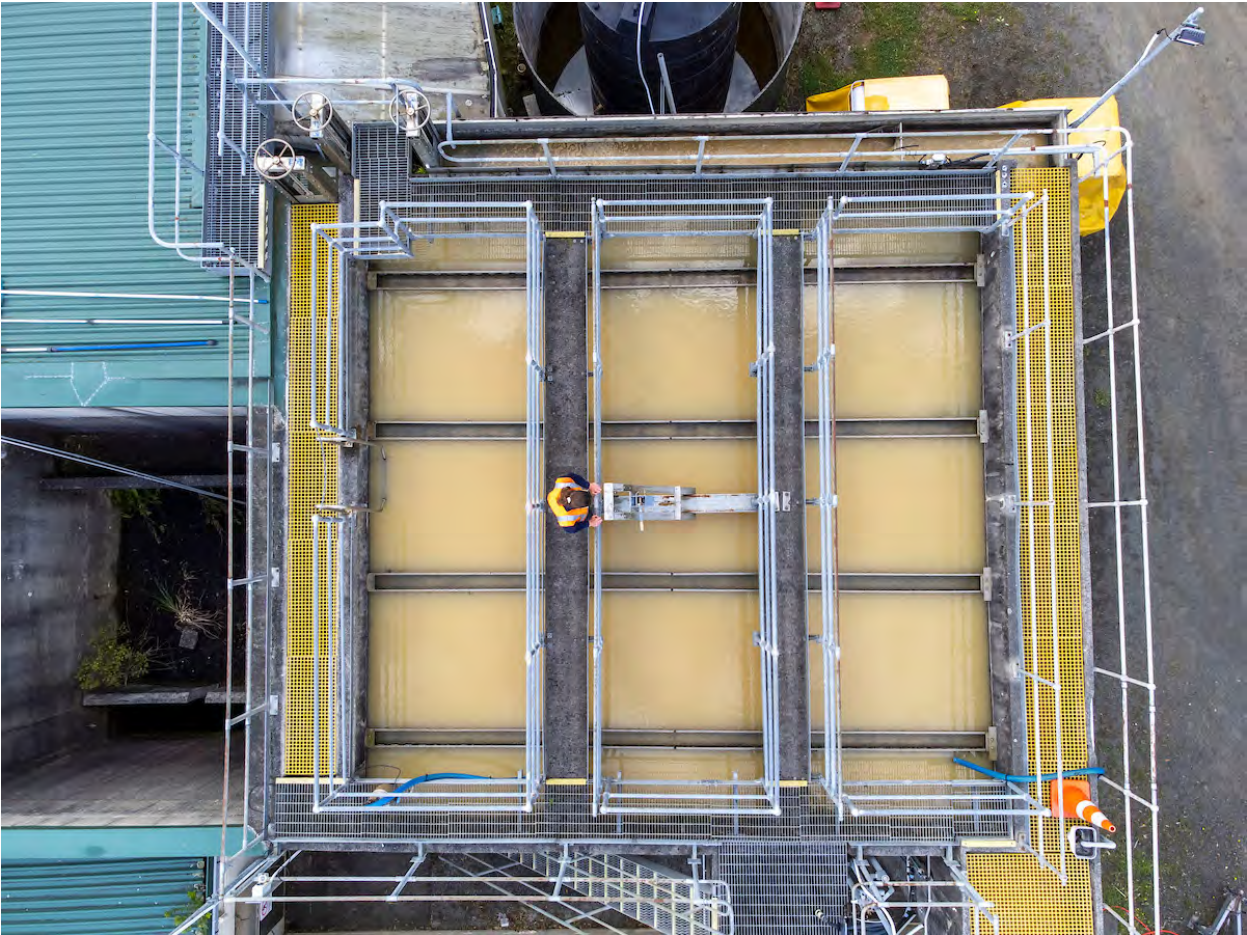
Figure 7 - Future water demands

While currently there is adequate water from our Ohirangi and Sandhills sources most of the time, both are surface water and are highly susceptible to the impacts of climate change, as we have seen in the past few years. Extended dry periods



reduce the amount of water available to take for town supply, and severe storms can significantly increase debris, mud and sediments in the water, making it challenging for our treatment plant to adequately treat the water.

Therefore, we need to increase the communities' water supply resilience to cope with the future changes. This will be further discussed in the following section.



Helensville WTP 16 Feb 2023





Whakarāpopototanga o ngā kōwhiringa putunga wai

Summary of water supply options

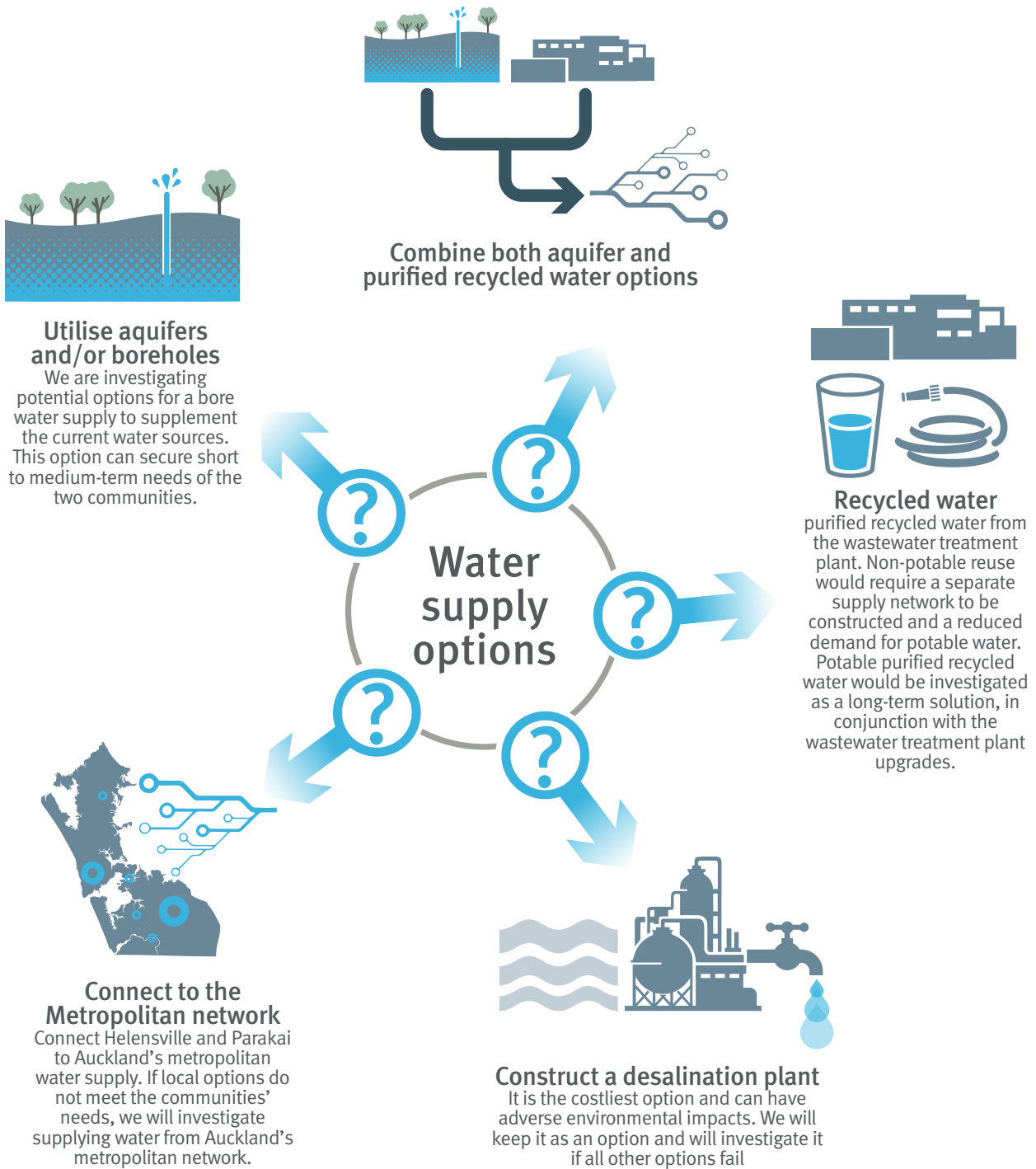


Figure 8 - Identified options for Helensville water supply



Groundwater

The aquifer in Helensville and Parakai is accessed by the local community privately for residential supply and by private water suppliers, for those not connected to the Watercare water network. An Auckland Council study showed that the groundwater level at Helensville in 2020 indicated no noticeable effect of the drought. This result was somewhat counter-intuitive as shallow, unconfined sands would be expected to be greatly affected by climatic conditions. Overall, the impact of the 2020 drought on water levels in the Helensville aquifer was less significant than many other aquifers in the region. This indicates that a groundwater source may be a suitable option to provide the resilience that our water supply needs.

We have been investigating a number of potential locations for using groundwater. This work is ongoing and requires careful consideration, including impacts of groundwater take on seawater intrusion into the aquifer, water allocation and long-term availability, and distance from our treatment plant. We also note that groundwater is a limited resource which is shared by all the users within the aquifer (allocation regulation is undertaken by Auckland Council). As a source of water for the region, groundwater could be an important part of the solution.

Recycled water

Recycled water has considerable potential in the medium to long term as an integrated water solution that provides benefits to both water and wastewater systems. As a source:

- It provides a climate-resilient supply that is relatively non-rainfall dependent.
- It is resource efficient as it preserves natural sources of water and maximises the amount of water flows in the natural creeks and waterways.
- It reduces the volume of treated wastewater discharged to the harbour.

As will be discussed in the wastewater section, we may need to relocate our wastewater treatment plant from its current location due to the potential risks we will face within the next 10 to 20 years. This creates an opportunity to develop an integrated water and wastewater system, where highly treated and purified wastewater would be beneficially reused. Options include (1) a local system to directly use Helensville's purified wastewater for local use, and (2) a regional system where purified wastewater from neighbouring wastewater treatment plants is stored at a central storage facility and used as a water source when needed.

Further engagement with local iwi and the Helensville and Parakai communities will be needed on the topic to understand whether these or any other options would be feasible. In addition, there is currently no regulatory framework for the potable use of purified recycled water. Further engagement with the regulators of water supply in Aotearoa New Zealand will be required before implementing this option.

Desalination

Desalination is often considered as an option if none of the more natural solutions are possible. This is because desalination has a high cost and is very energy intensive. The cost of desalination increases if it needs to be accompanied by a new renewable energy source (such as solar or wind).

While we keep desalination as an option for the future, it is probably not a suitable one for Helensville. Desalination sources typically need a deep-water intake to take in high-quality salt water, with minimal variability in salt concentration. The estuarine nature of the waters in the Kaipara Harbour means that the harbour does not have a stable salinity, is not deep enough, or does not have a suitable geology for the construction of an intake. A suitable site is also needed to discharge the hypersaline brine by-product of the process. The sensitive aquatic environments of estuaries tend to be unsuitable for this. The construction of an intake and outfall for desalination is very costly, which means it is usually only viable for a very large plant. If desalination were feasible, it is more likely to be part of a bigger solution to supply water for the wider Auckland region.

Connecting to the metropolitan system

If it isn't possible to find a local source of water to provide the level of water security the Helensville and Parakai



communities need, supplementary supplies could be obtained from the metropolitan system. This option is not ideal or preferred, as it will increase the demand on our metropolitan water supply and sources, and will also need a long pipeline, which is costly in terms of both money, disruption and carbon-emission equivalents. As noted in our introduction, the preferred approach to servicing non-metropolitan communities is to find local options unless there is a very strong health or environmental reason to do otherwise.

Rainwater harvesting and tanks

Rainwater tanks provide non-reticulated water and augment supplies to about 200 premises in and around Helensville and Parakai. There is a Watercare tanker filling station for drinking water located in Helensville on Mill Road.

This type of storage has been relied on for most rural and coastal areas in New Zealand. In terms of eco-conservation benefits it is an effective utilisation method of natural resources. In times of low rainfall, the Helensville community sources additional drinking water from private supplier collection points to top up the rainwater tanks. Experience elsewhere has been that during drought, communities might need to wait weeks for top-up water to be supplied. Rainwater harvesting has some benefits, but it is prohibitively expensive to retrofit existing households with such systems, particularly in intensively developed areas. However, it could be a viable source of supplementary water for new dwellings. The introduction of rainwater harvesting would need the support of the relevant stakeholders, and tanks would need to be of a size large enough to make a difference during the hottest and driest months of summer. Depending on the uptake and make-up of any rain tank installation provision for the community, peak-day volumes and maintaining pressure for firefighting would need to be considered to ensure that there is sufficient water if all rain tanks were not available for use.

Considerations

The level of water resiliency for the Helensville and Parakai communities is relatively low. This is mainly attributed to the limited size of the catchment areas and a reliance on surface-water sources. Consequently, water availability will be more vulnerable to fluctuations in rainfall patterns, increasing the risk for climate-dependent yields. This means that while there may be enough water to supply the communities and expected growth over the shorter term, the likelihood of these communities experiencing restrictions or outages in a drought or storm might be higher than for other areas of Auckland.

Renewal of the water take (consent expires in 2026) may require compensation flows in Ohirangi and Mangakura streams. Reconsenting of the take from the Sandhills Wetland may be subject to improved monitoring and understanding of the drought resilience of the source, stream ecological values, as well as water demand and usage.

Local iwi have identified Sandhills Wetland as an environmental taonga (treasure). In addition, Ohirangi Stream provides a safe and suitable natural habitat for local fish and native eels. Our future activities must consider these important ecological aspects and the environment that we are operating in, to ensure we are reducing our impact on the environment.



Waipara Wastewater

History of wastewater treatment

The Helensville wastewater treatment system was built in the 1970s. Watercare inherited the Helensville WWTP in 2010 when the Rodney District Council amalgamated with the rest of Auckland's local councils to form Auckland Council. The treatment plant used two oxidation ponds to treat the wastewater of Helensville and Parakai before discharging the treated wastewater into the Kaipara River, a major tributary of the Kaipara Harbour.

A discharge permit allowed the discharge from the treatment plant to the Kaipara River subject to meeting specific criteria, including discharge volume and discharge quality limits. Despite making substantial changes to how the treatment plant operated and its technology, we struggled to achieve the discharge standards of the resource consent due to the treatment plant receiving high inflows during storm events. As a result, we upgraded the treatment plant in 2023 by installing containerised treatment systems onsite. The upgrade has resulted in a significant improvement in the quality of discharged wastewater.

Wastewater system today

The Helensville wastewater system currently serves a population of approximately 5,000 people in Helensville and Parakai. It consists of two collection networks and eight pump stations. The picture below shows the Helensville and Parakai wastewater network.

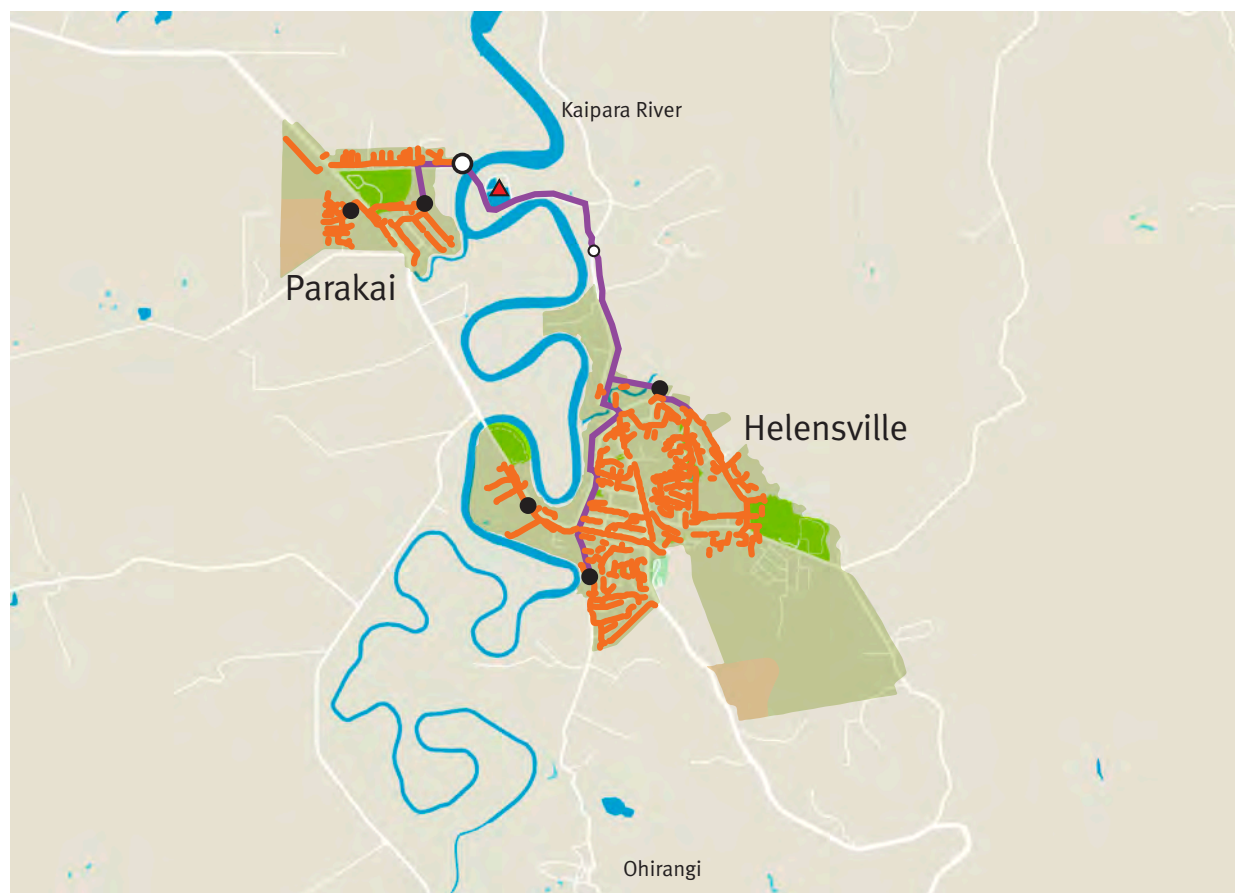


Figure 9 - Helensville wastewater supply system



There are eight engineered overflow points (EOP) in the network (five in the Helensville network and three in the Parakai network). These are regulated under a regional network discharge consent (NDC).

The Network Discharge Consent (NDC)

The NDC was granted on 17 June 2014, for 35 years. It authorises dry- 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].

The two wastewater networks convey wastewater to the Helensville WWTP, located on the right bank in the bend of the Kaipara River, across from Parakai, five kilometres from the harbour.

Receiving environment – where Helensville and Parakai’s treated wastewater goes

The current discharge consent condition for the Helensville WWTP permits a maximum of 5,500,000 litres of treated wastewater per day to be discharged into Kaipara River on an outgoing tide. The discharge consent expires in 2027.

Kaipara River is of moderate size, draining a catchment of 270 square kilometres extending to the Waitākere Ranges in the south and Riverhead Forest in the east. It flows to Kaipara Moana (Kaipara Harbour).

Kaipara River is a taonga and treated wastewater discharges reduce availability and safety of kaimoana (seafood) due to disrupting the natural salinity levels and quality of the water. The Kaipara River is sacred to iwi and we need to further protect and progressively reduce discharges for the generations to come.



Helensville WWTP June 2023



Water quality improves as we move away from Kaipara Bank towards Kaipara Head

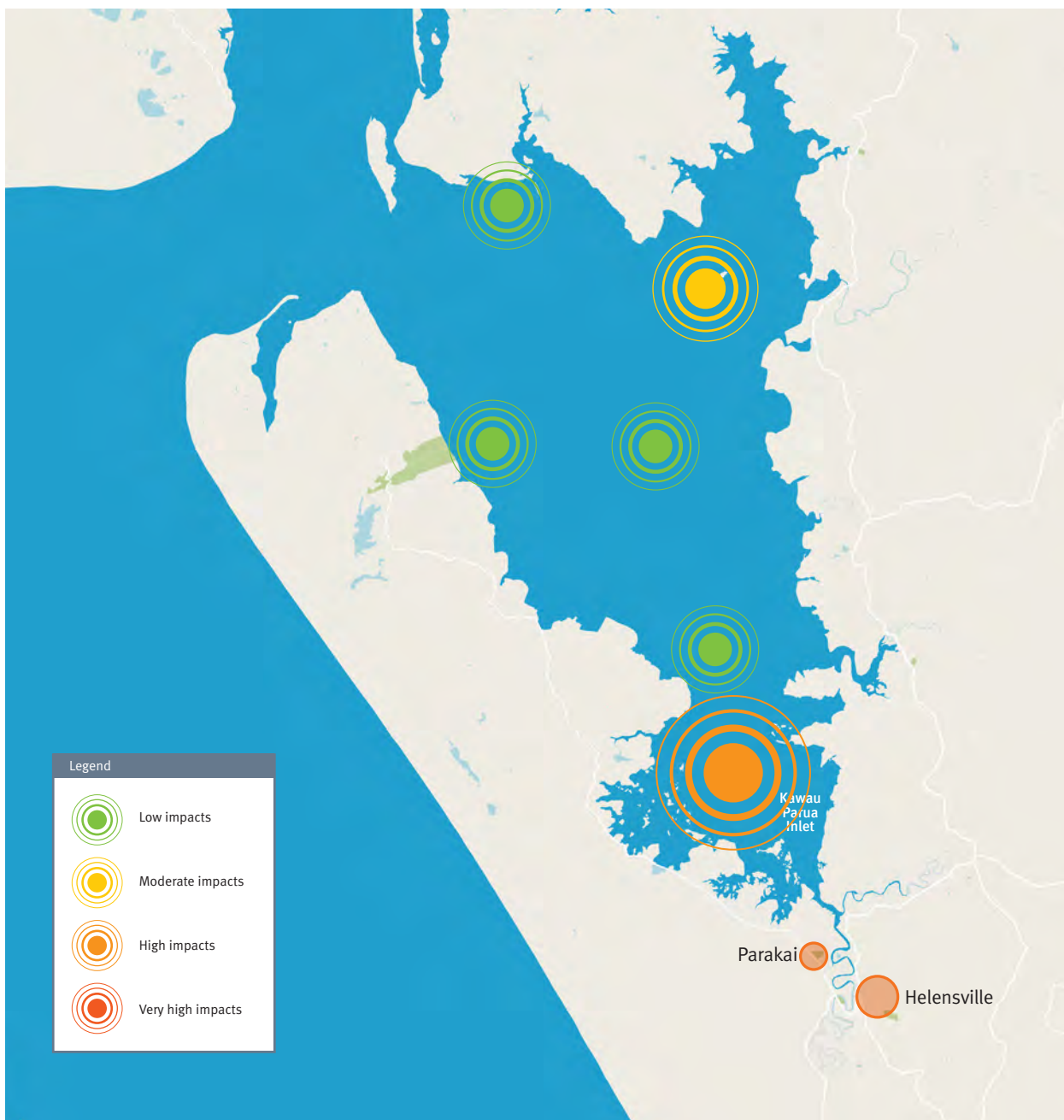


Figure 10 – Estuary health indicator of Kaipara Harbour
 [Source: www.lawa.org.nz/explore-data/auckland-region/estuaries/kaipara-harbour-south/]

The environmental condition of Kaipara Harbour shows an improvement as one moves farther from the mouth of the Kaipara River towards Kaipara Head (Figure Y). The reduced health in proximity to the river mouth can be primarily attributed to the extensive modification of the river catchment area, where approximately 90 per cent of the land cover is no longer comprised of native wetlands or vegetation. This change has led to elevated levels of soil erosion and sedimentation in both the river and the downstream section of the harbour. There are no Safeswim monitored beaches in Helensville or Parakai so regular environmental monitoring is not available.



Wastewater treatment plant upgrade

As an old and rural wastewater treatment system, the Helensville WWTP had received inadequate care and attention for decades. There were high sludge levels in the ponds, increasing anaerobic digestion and ammonia load. As a result, the plant had been performing poorly for years, causing breach of its discharge consent conditions, highlighted by the several abatement notices issued by Auckland Council since Watercare inherited the plant from Rodney District Council in 2010.

We committed to improve the situation to meet our regulatory obligations and protect the public and ecosystem health. In addition to improving the access road, de-sludging and other remedial works, we invested \$17 million to upgrade the WWTP to an innovative technology. This was completed in 2023 and has vastly improved the quality of the treated wastewater by effectively removing ammoniacal nitrogen, which is a toxic pollutant to humans and the ecosystem. The upgrade means the plant is now better able to cope with peak flows in wet weather.

The technology was tested at our innovation centre at the Māngere WWTP, which gave us confidence that it was the right solution for Helensville.



Figure 11 - Upgrading the Helensville Wastewater Treatment Plant



Helensville WWTP June 2023



Wastewater demand projection

Figure below shows the monthly average wastewater that was received by and discharged from the Helensville WWTP since January 2022. It shows the significant impact of wet weather on the wastewater system in Helensville and Parakai.

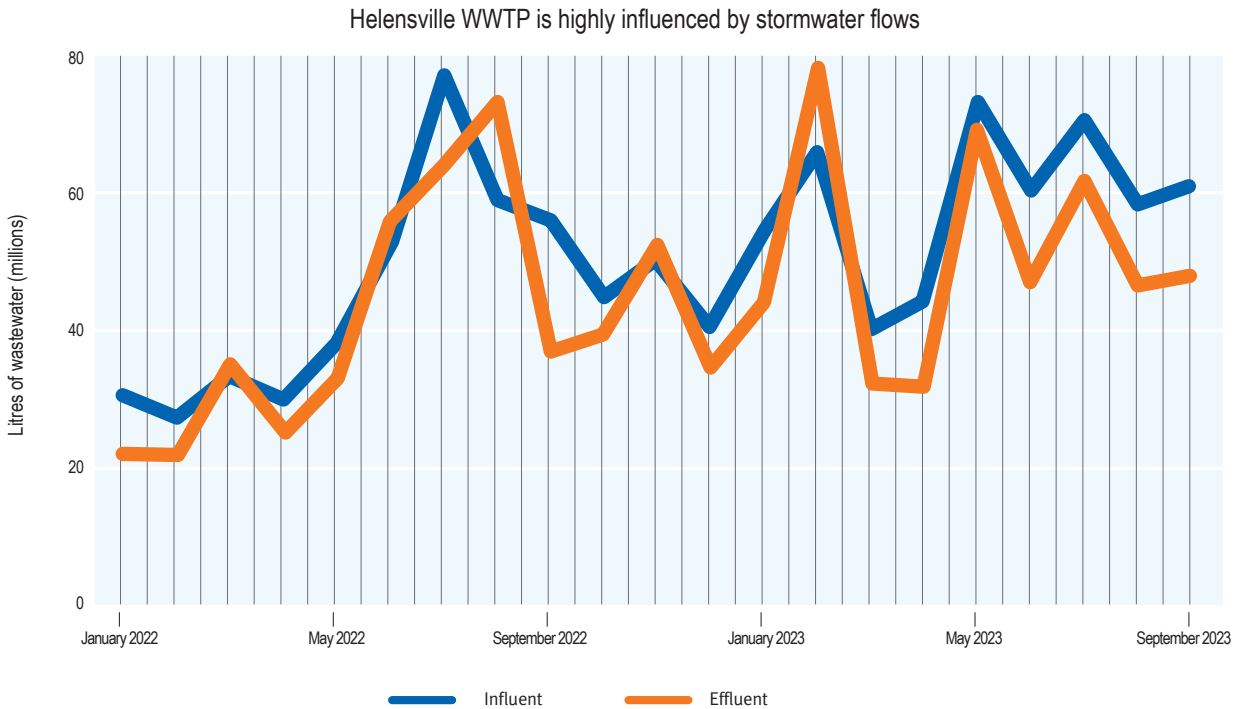


Figure 12- Average monthly wastewater flowing to and from Helensville WWTP

As discussed earlier, assuming no significant change in the development momentum, our population forecast modelling indicates that approximately 6,500 people will be living in the area by 2050. Allowing a gross per-capita wastewater production of 435 litres per person per day (including 50 per cent stormwater inflow and infiltration), adding 1,500 people to the community served would produce 652,500 litres of wastewater each day during rainy periods.

The plant installed as part of the recent upgrades can treat 1,500,000 litres of wastewater each day, so we have sufficient wastewater treatment capacity. In addition, the new technology allows additional containerised modules to be simply attached to the existing ones, if more treatment capacity were needed. Our challenges are in the discharge of treated wastewater, and resilience against natural hazards.





Wastewater system challenges and opportunities

Location of the treatment plant

The Helensville wastewater treatment ponds were commissioned in 1975, during a period when oxidation ponds were globally accepted as an effective wastewater treatment system. The oxidation ponds in Māngere were commissioned in September 1960 and other regions in New Zealand followed suit. Being adjacent to the receiving environment was a key consideration for a pond system to be low cost and efficient at a time when we had limited knowledge about climate change and its potential implications. Therefore, our Helensville WWTP was constructed on the banks of the Kaipara River.

Being located within an oxbow bend of Kaipara River puts the treatment plant at a high risk from the forces that flow of river exerts on the pond embankment, as well as climate-related natural hazards. Recent investigations have indicated deteriorating conditions of the pond embankments. While there is no immediate risk to the integrity of the treatment plant or the network, the experience of the events in summer 2023 taught us that a combination of natural events (for example, king tide and a hurricane at the same time) could bring about a hazardous situation.

Stormwater inflow and infiltration

The plant is susceptible to significant wet weather peak flows due to the high levels of infiltration and stormwater inflow into the wastewater system. During the events of 2023 summer, the plant had to bypass the majority of the inflow, meaning that untreated wastewater flowed into the environment. We believe that combined with high groundwater levels, the current deterioration in the pipes is causing operational problems for the plant.

While the recent upgrade to our WWTP addresses wet weather flows to a large extent, we will continue to reduce stormwater inflow and infiltration into the wastewater network to improve the efficiency of our wastewater system.

Receiving environment

As discussed above, Kaipara river is a taonga and we need to contribute to improving the mauri of the awa. This can be achieved through careful considerations including the treatment plant's capacity so that untreated wastewater does not enter the river. We need to consider new ways of discharge (including discharge to land) or recycling and reuse of the highly treated and purified wastewater.

Wastewater servicing options

As discussed above, Helensville WWTP has enough capacity to support growth in the area for the next 30 years. However, it is an ageing asset and located at a highly risky location, susceptible to natural hazards. In the short term we will renew our discharge consent, and we will closely monitor the condition of the treatment ponds and perform any remedial works required to ensure the WWTP is operating safely.

We will also start the conversation with the community to discuss future options that include:

- Remediating and reinforcing the existing WWTP at its current location to safeguard it against climate change impacts in the medium to long term.
- Abandoning the existing WWTP and building a new plant somewhere else in Helensville.
- Abandoning the existing WWTP and connecting Helensville and Parakai wastewater networks to the metropolitan network.



As part of this discussion, we will explore potential future disposal options.

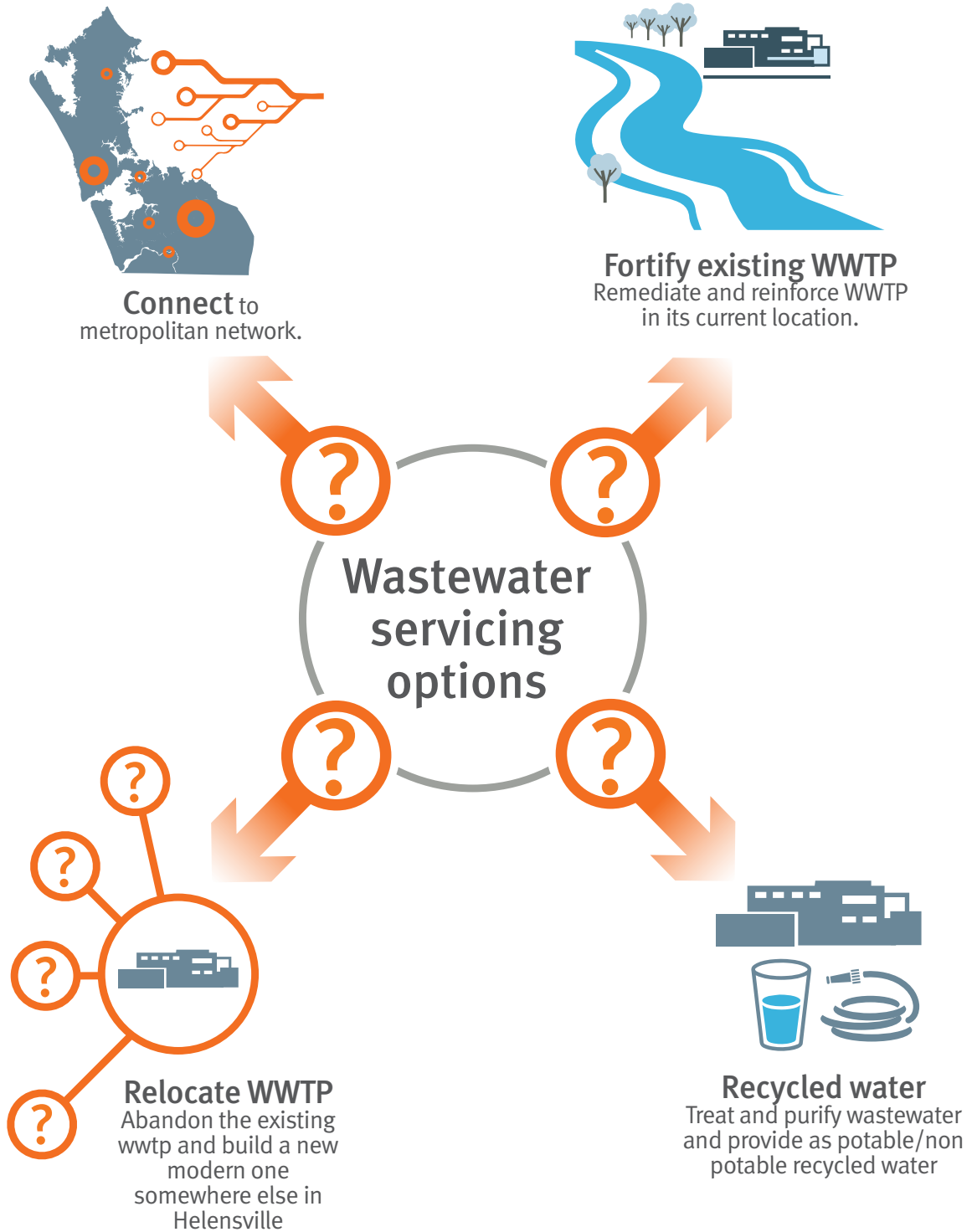


Figure 13 - Identified options for Helensville wastewater disposal





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 the Helensville and Parakai communities 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.



Te rautaki urutau a Helensville me Parakai | Helensville and Parakai adaptive strategy

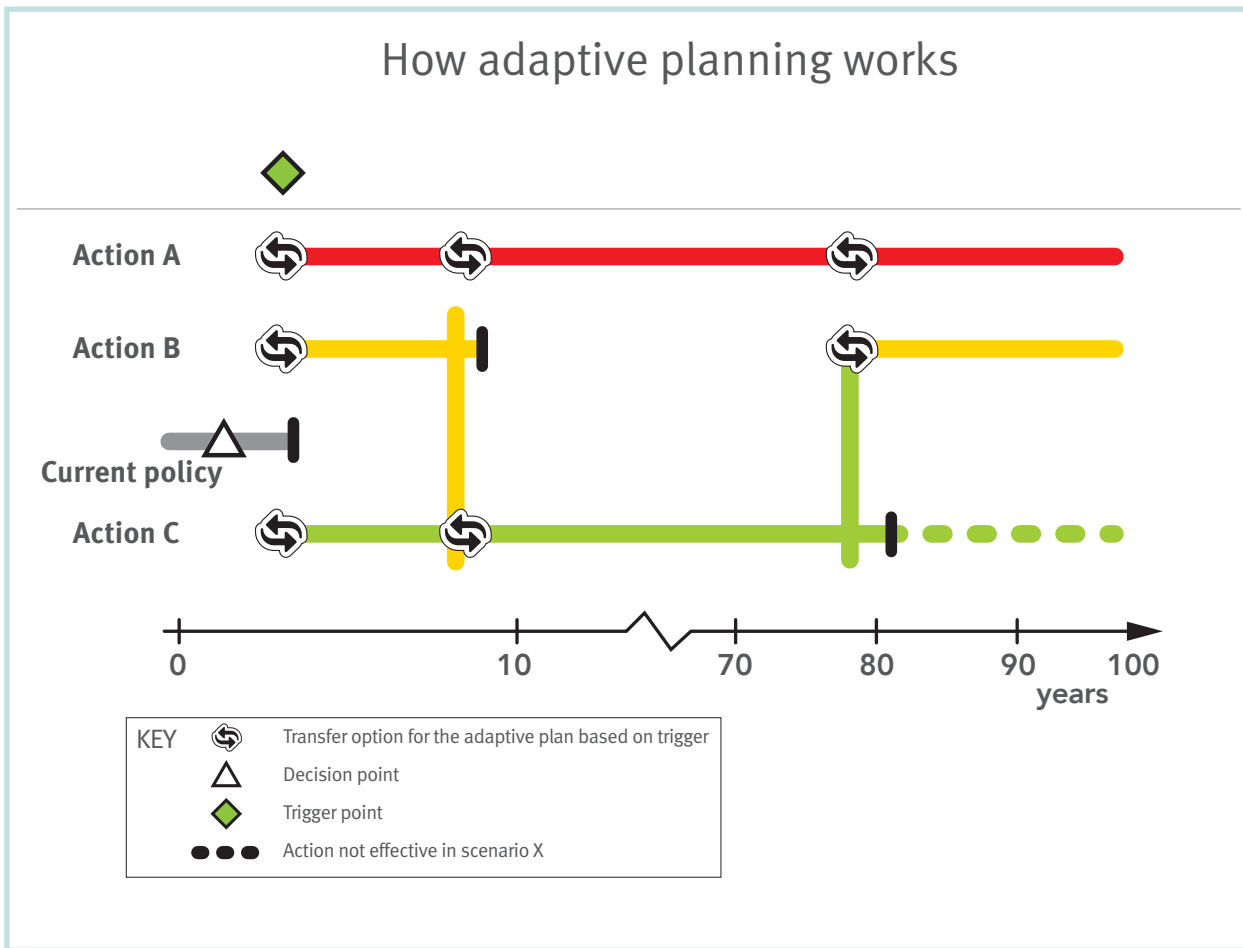


Figure 14 - How adaptive pathways work



The following diagram contains a list of the water and wastewater options and their respective trigger points:

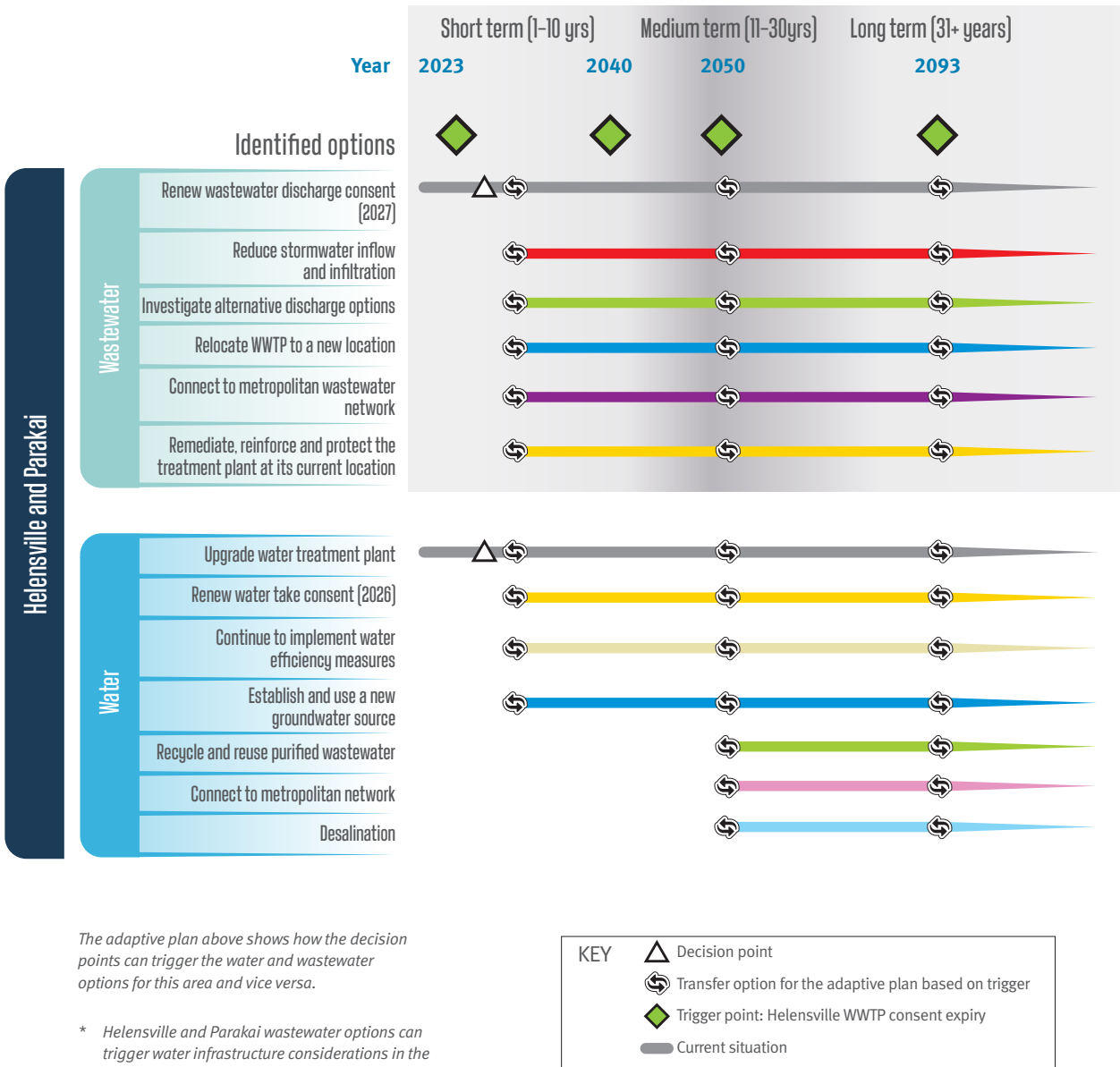


Figure 15: Adaptive planning pathways for Helensville and Parakai

Ngā kōwhiringa ratonga wai | Water servicing options

We are currently in the process of upgrading our water treatment facility to meet the evolving needs of our community. In the short-term, we plan to renew our water take consent and continue to explore the most suitable location for a new groundwater bore to supplement the water supply and improve its resilience in the face of climate change impacts.

We are also committed to our Water Efficiency Strategy and continue to implement measures to maximise the utilisation of extracted and treated water, aligning with our dedication to environmental responsibility.

Looking ahead to the medium to long term, our approach involves close monitoring of the area’s growth and development. Should population growth exceed our projections, we are prepared to explore additional water supply options. This proactive approach allows us to stay ahead of the demographic shifts and ensures a sustainable and reliable water supply to our community.

Ngā kōwhiringa ratonga waipara | Wastewater servicing options

In the short term we will renew the discharge consent. We need to start a conversation with the community about the future of the WWTP. In the medium term, we will be facing the potential impacts of climate change and will need to either abandon the existing plant or reinforce it to cope with the effects of sea-level rise and tidal inundation.

We have recently completed a comprehensive upgrade to our WWTP, significantly fortifying it against the challenges posed by wet-weather conditions. The upgraded plant has the capacity to accommodate the anticipated growth in population over the medium term. In the short term, we will need to start the process of renewing our wastewater discharge consent, while diligently monitoring the state of our ageing ponds and undertaking any remedial works needed to ensure safe and optimal functionality.

Looking ahead, we recognise the importance of engaging in a dialogue with the community to collectively decide on the future course of the WWTP. In the medium term, we are gearing up to address potential impacts of climate change, specifically considering the implications of rising sea levels and tidal inundation. This involves a crucial decision-making process as to whether to invest in reinforcing the existing wastewater infrastructure to withstand these environmental shifts or explore alternative solutions, such as abandoning and retreating to a different location.

Whakakapinga | Conclusion

We hope that this servicing strategy has clearly articulated the complex and important factors that will influence the future of the Helensville and Parakai area. These factors inform the timing and nature of what is developed and when, to ensure reliable, environmentally-aware and affordable water and wastewater services for decades to come. We aspire for these decisions to be made in partnership with mana whenua and through deep engagement with communities in the spirit of transparency and openness.

We have signalled in this strategy that there are a number of options around water supply scenarios for Helensville and Parakai. Independence from the metropolitan water network offers a certain type of resilience to these communities. The prospect of droughts and projected population growth in the area necessitate proactive consideration of water solutions that will give communities confidence that they will have access to the water they need. Currently we will continue the approach of private supply until there is a requirement to implement a public supply solution. This tipping-point trigger may include legislative requirements or an appropriate wastewater solution.

We have described the options for wastewater management, which in the short term will require a new consent, and upgrading the existing treatment plant and the alternative disposal options. In the longer term, it is likely that a mix of solutions will emerge as the water and wastewater needs of the new community members in developing areas are realised and the true impacts of climate change are felt in the area.

Whatever option we decide upon, the wastewater network requires responsible management from private properties to prevent clogs and reduce maintenance costs. Community cooperation in minimising rainwater and unwanted items in the system is crucial for efficient wastewater treatment, limiting untreated discharges into the environment. Balancing environmental protection with cost affordability requires the involvement of every resident in creating a sustainable wastewater management system for the current community and generations to come.

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 in the Helensville and Parakai area.

Ngā mahi ka whai ake | Next steps

The Helensville and Parakai area's servicing strategy is a pilot initiative, to be developed and shared with the community. Its purpose is to enhance understanding of the complexities of the water and wastewater systems in Helensville and Parakai. We are committed to the best-practice development process, including mana whenua partnership and community engagement, as well as the creation of long-term adaptive strategies. The Helensville and Parakai servicing strategy is dynamic and subject to ongoing review by the infrastructure strategy and planning team, and mana whenua partners.

To sustainably manage this strategy, 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

The Helensville and Parakai servicing strategy will be regularly reviewed if suggested by iwi, or required as a result of a specific trigger or signal which would necessitate adjustments. These reviews will consider new information related to each servicing strategy area, such as hazards, climate change, asset data, and cultural and environmental factors. These reviews are the most likely opportunity for formal engagement with and feedback from the community.

In addition, the future review schedule will allow for addressing and incorporating any potential impacts resulting from changes to the Resource Management Act into the future plans and implementation of the servicing strategy.





Watercare

