

USING WASTEWATER UPGRADES TO EMPOWER CULTURAL AND ECOLOGICAL VISIONS

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ABSTRACT (500 WORDS MAXIMUM)

Auckland is New Zealand's most populous region and it is continuing to grow rapidly. This growth is often in the rural urban boundary comprising of small communities in sensitive environmental settings. The provision of water and wastewater services in these growth areas is becoming increasingly complex and needs to be delivered in the context of the cultural, social and environmental circumstances. This paper presents how the development of wastewater solutions in these circumstances can be fundamentally linked to broader goals and visions within these communities and this can be the catalyst for further change. Two examples of this will be explored in detail:

1. In October 2017, a decision from independent commissioners for the Waikato Regional Council granted resource consent for the discharge of treated wastewater from the Pukekohe Wastewater Treatment Plant (WWTP) to the Lower Waikato River for a period of 35 years. Significantly, the discharge consent is the longest in duration (by 10 years) granted by the Waikato Regional Council for a discharge of municipal treated wastewater to the Waikato River. The legislative planning framework that governs the statutory process for discharges of treated wastewater to the Waikato River is dominated by the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 and the Vision and Strategy for the Waikato River. These seek the protection and restoration of the health and wellbeing of the Waikato River from its current degraded state. The proposed treatment solution, developed in collaboration with the mana whenua group Te Taniwha o Waikato will result in a projected improvement in the water quality of the receiving environment (Parker Lane Stream and the Waikato River) over the 35-year consent period.
2. Watercare has embarked on a replacement program for the existing WWTP's at Waiuku, Clarks Beach and Kingseat, as well as another private WWTP at Kingseat, with a state-of-the-art new WWTP to be located at the existing Waiuku WWTP location. The treated wastewater is then returned to Clarks Beach which will be held in an enclosed tidal holding facility and then discharged into the pūahatanga o Te Manukau on the outgoing tide via an offshore outfall. The strength of an adaptive management regime was instrumental in achieving a long-term discharge permit. This was built off a comprehensive analysis of the options available and extensive consultation with local iwi. This resulted in the setting of direct objectives that included achieving a Best Practicable Option (BPO) solution.

This paper describes how the challenges of providing for long term growth in a catchment can be achieved whilst also contributing towards a demonstrable improvement in achieving the vision for a receiving environment. This has been developed in close collaboration with iwi and stakeholders.

KEYWORDS

Wastewater, consent, Waikato River, tāngata whenua

PRESENTER PROFILE

Tanvir Bhamji is Watercare's Headwork Consents Manager responsible for obtaining statutory consents for water and wastewater treatment facilities. Tanvir holds a Master's degree in Urban Planning and Project Management from the University of Auckland and University of Southern Queensland respectively. Tanvir has over 13 years' experience in urban and infrastructure planning in New Zealand and Qatar. Tanvir was Watercare's project manager for the Pukekohe and Southwest WWTP consent projects.

Garrett Hall is a water quality scientist with Beca Ltd, based in their Auckland office. He holds a Bsc in Physical Geography and MSc (Hons) in Environment Science and Chemistry, both from the University of Auckland. As Technical Director – Beca Environments, he has over 19 years' experience working on a wide range of complex municipal wastewater and water supply consenting projects, both in New Zealand and the United Kingdom. Garrett's key areas of interest are the water quality effects of municipal wastewater discharges, beneficial uses for wastewater and the relationship of wastewater discharges with water allocation issues.

1 INTRODUCTION

This paper takes a detailed look at two recent Watercare projects where 35-year consents have been successfully obtained as a result of close working relationships being developed with mana whenua and other key stakeholders. Both projects will utilize state-of-the-art treatment technology and will result in significantly improved treated wastewater qualities when compared to the existing situation.

These consents, and the associated physical wastewater upgrades, will move significantly towards achieving both cultural and ecological visions for their respective receiving environments.

2 PUKEKOKE WASTEWATER SCHEME

2.1 DESCRIPTION OF THE PUKEKOHE WASTEWATER SCHEME

Watercare operates the Pukekohe Wastewater Treatment Plant (WWTP) which currently comprises two Sequencing Batch Reactors (SBR's) and Ultraviolet (UV) disinfection. A constructed wetland provides final treatment prior to the discharge to the Parker Lane Stream, a tributary of the Lower Waikato River.

The catchment from which the WWTP receives wastewater includes domestic (90% by flow) and industrial (10% by flow) wastewater sources from Pukekohe, Buckland, Patumahoe and Tuakau, as well as a connection from Pokeno. Recent industrial growth in the Pokeno area has been significant with two new dairy factories (one operating and the second soon to be operational) significantly increasing wastewater flows and loads from Pokeno.

Population growth within the wider catchment is currently rapid, with significant residential, business and industrial (trade waste) growth planned under the Auckland Unitary Plan (AUP) and Waikato District Plan. Over 35 years the connected population is projected to growth from 27,500 to 82,200 people in 2051.

2.2 2015 RESOURCE CONSENT APPLICATION

Watercare held resource consents for the discharge of contaminants to water, and land use consents for the Pukekohe WWTP which expired on 30 June 2015. For Watercare to continue to operate the WWTP in accordance with the existing resource consent (until new consents were issued) it had to lodge applications for new consents (in accordance with Section 124(1) of the Resource Management Act) by 3 March 2015.

Given the uncertainty around growth within the contributing wastewater catchments at the time (largely as the Proposed Auckland Unitary Plan (PAUP) not being finalized), a short term (seven year) consent was initially applied for which sought an upgrade to a Membrane Bioreactor (MBR) treatment process and subsequent relocation of the existing discharge from the Parker Lane Stream directly to the Waikato River through a new discharge/diffuser structure.

2.3 FURTHER WORK AND REVISED 2016 RESOURCE CONSENT APPLICATION

After lodging the resource consents application and Assessment of Effects on the Environment (AEE), Watercare requested that the Waikato Regional Council put the application on hold pending the results of a technical investigation into the dispersion of the (at that time) proposed direct discharge of treated wastewater into the Waikato River and the receipt of a Cultural Impact Assessment (CIA) that was being prepared by Te Taniwha o Waikato (a group of nine marae covering iwi and hapu in the Lower Waikato River)..

After the receipt of the CIA and non-support from Te Taniwha o Waikato, Watercare undertook a series of further investigations into alternative discharge locations and methods whilst at the same time working alongside Te Taniwha o Waikato to develop an alternative proposal for the Pukekohe WWTP.

The outcome of these investigations and consultation was a revised resource consents application and AEE for an upgraded Pukekohe WWTP to a proposed Membrane Bioreactor (MBR) plus UV disinfection (Enhanced MBR + UV). This revised proposal sought to improve the quality of the Parker Lane Stream and Waikato River from their current degraded state and contribute towards their protection and restoration in line with the Vision and Strategy for the Waikato River.

In March 2016 a second CIA was received from Te Taniwha o Waikato which was supportive of the revised proposal. After a consent hearing in August 2017, an independent commissioners' decision granted the discharge consents for a period of 35 years, 10 years longer than any other municipal wastewater discharge consent in the Waikato region. This decision was not appealed and the consents have now commenced.

Figure 1 shows a graphic of the original (2015) and revised (2016) proposals.

2.4 UNIQUE CHALLENGES

The legislative framework that governs the statutory framework for discharges of treated wastewater is dominated by the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 and the Vision and Strategy for the Waikato River. These seek the protection and restoration of the health and wellbeing of the Waikato River from its current degraded state. This coupled with a large population increase projected through the Auckland Unitary Plan (AUP) and growth in northern Waikato region provides a unique challenge for Watercare to respond to in terms of providing wastewater infrastructure to support population/commercial/industrial growth whilst restoring and protecting the health and wellbeing of the Waikato River receiving environment.

Pukekohe Wastewater Treatment Scheme

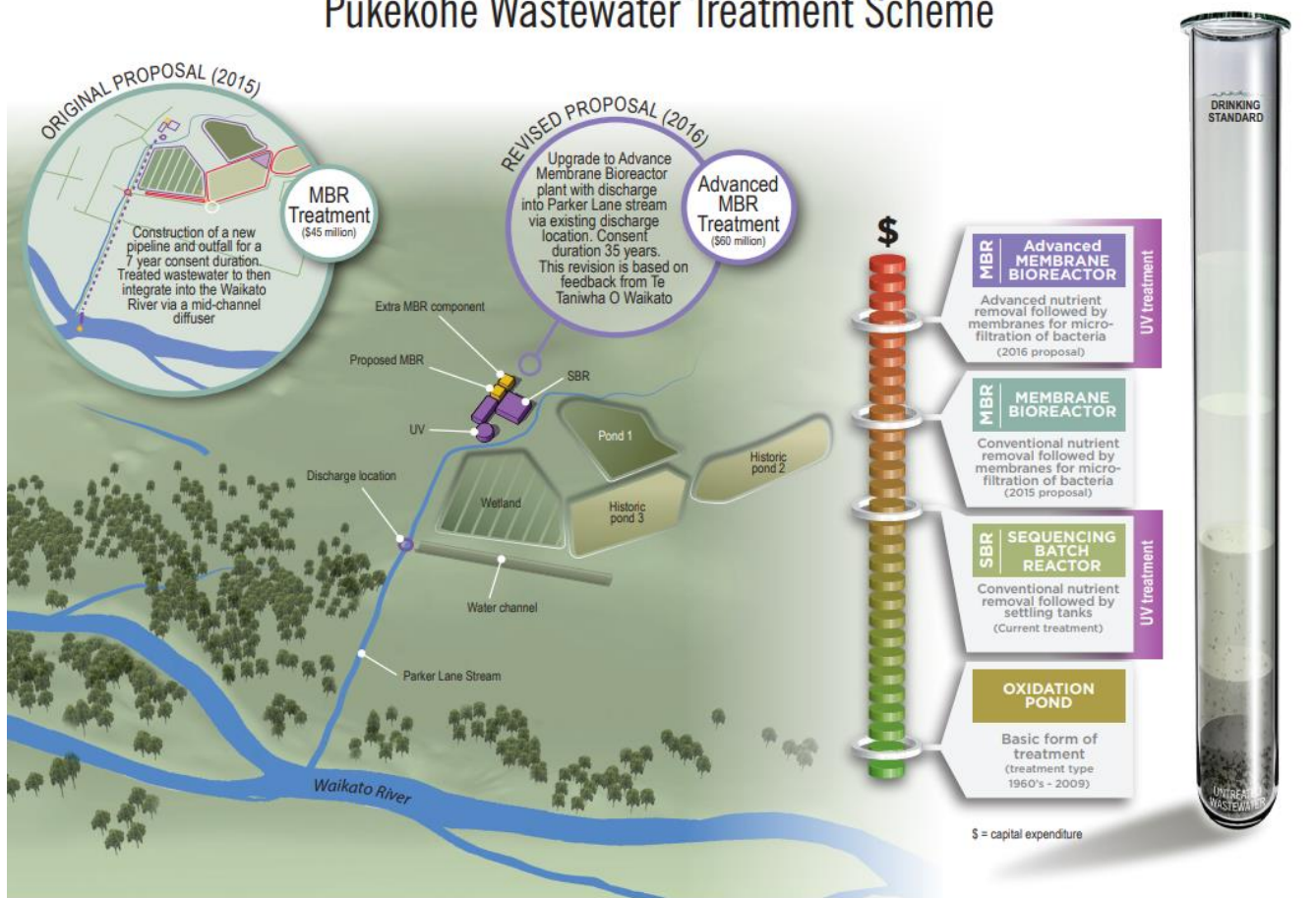


Figure 1: Pukekohe Wastewater Scheme – Original (2015) and Revised (2016) Proposal

2.5 TE TURE WHAIMANA O TE AWA O WAIKATO – VISION AND STRATEGY FOR THE WAIKATO RIVER

The Vision and Strategy was developed and published in 2008 under the guidance and direction of the Guardians Establishment Committee.

The vision for the Waikato River is as follows:

"Our Vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come."

The Vision and Strategy has 13 objectives, the key themes of which include (amongst others):

- The restoration and protection of the health and wellbeing of the Waikato River;
- The restoration and protection of the relationship of Waikato-Tainui with the Waikato River, including their economic, social, cultural and spiritual relationships;
- Adoption of a precautionary approach towards decisions that may result in significant adverse effects on the Waikato River;
- Recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments;

- The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities;
- The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length; and
- The application of both mātauranga Māori (body of Māori knowledge originating from ancestors) and latest available scientific methods.

With respect to the Pukekohe Wastewater Discharge Consent Project, the most challenging aspect in responding to the Vision and Strategy was the recognition that the Waikato River is currently degraded and that water quality should be restored (from its current state) to enable safe swimming and food gathering.

This was a significant challenge for the project to respond to when faced with major projected growth (and associated increase in wastewater flows) as described below.

2.6 PROJECTED GROWTH UNDER THE AUCKLAND UNITARY PLAN AND WAIKATO DISTRICT PLAN

2.6.1 AUCKLAND UNITARY PLAN

The AUP and Waikato District Plan (WDP) identify the contributing catchments to the Pukekohe WWTP as major growth areas. The AUP identified Pukekohe as a major growth area, with the updated Future Urban Land Supply Strategy (FULSS) identifying the areas of Wesley (Paerata) and Belmont (Pukekohe) being 'development ready' by 2017 and other areas between 2018 and 2027. Assuming an average of 2.8 people per household, the additional dwelling capacity enabled by the FULSS could result in an additional 39,956 people within the Auckland portion of the Pukekohe WWTP catchment by 2027.

The Auckland Plan (2012) development strategy identifies Pukekohe as a satellite town. Satellite towns were identified due to their potential to function semi-independently of the main metropolitan area, and to provide a range of services to the surrounding rural areas. These factors make them suitable locations for substantial residential populations (of between 20,000 and 50,000) and employment growth.

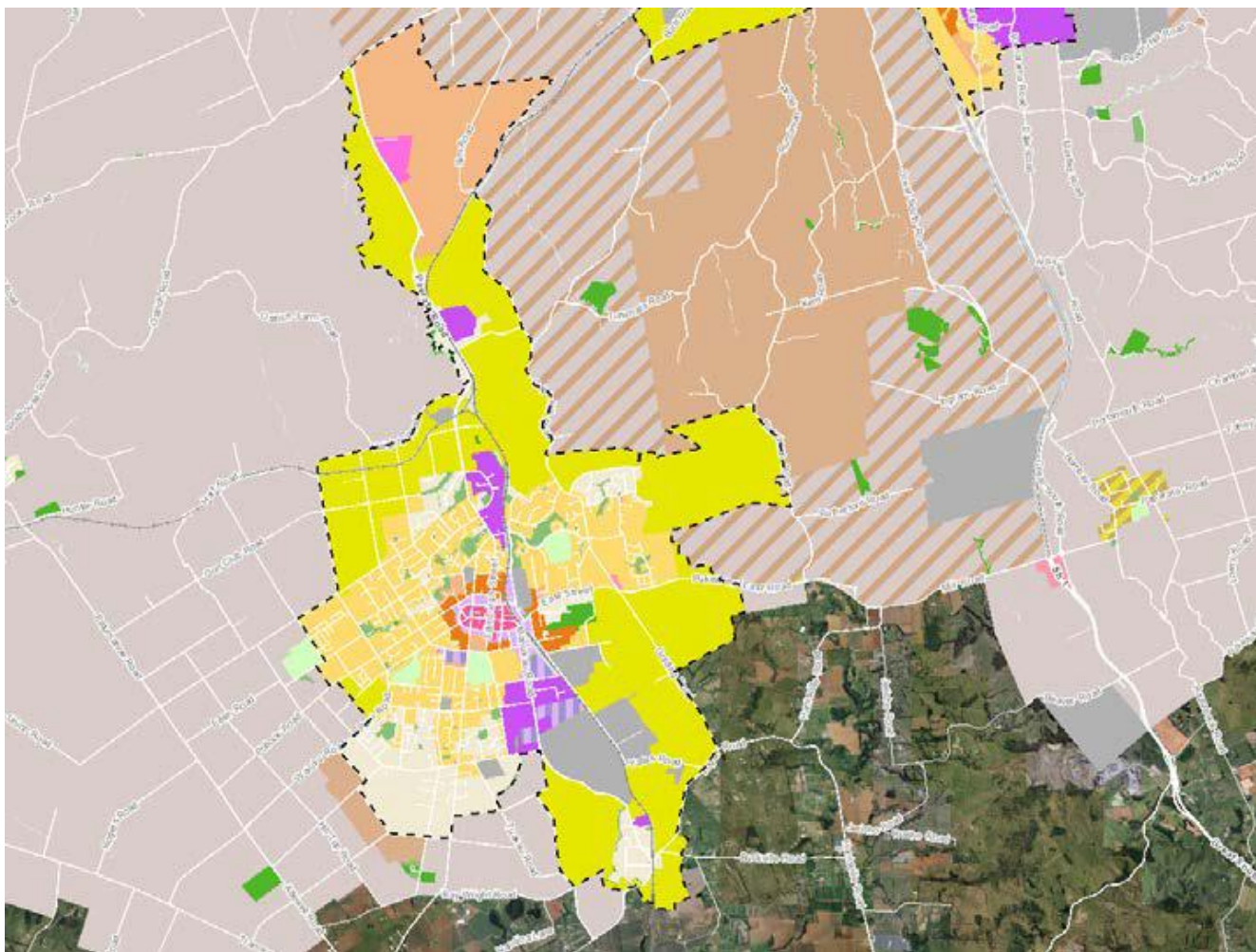


Figure 2: Pukekohe Future Urban Zoned Land (identified in yellow from the Auckland Unitary Plan)

2.6.2 WAIKATO DISTRICT PLAN

The Pokeno and Tuakau areas are identified in the WDP as areas of significant growth. In round numbers, projections are for future residential populations in 2045 requiring wastewater servicing as approximately:

- 12,000 for Pokeno
- 10,500 for Tuakau, including future urban areas of Buckland South, Redoubt and Opuawhanga.

2.7 PROVIDING FOR LONG-TERM GROWTH AND ACHIEVEING AN IMPROVEMENT IN WATER QUALITY

A key issue for the project was the projected increase in wastewater flows as a result of the anticipated population growth and the overarching policy direction to improve the health and wellbeing of the Waikato River.

This required an ongoing assessment of alternative wastewater treatment and discharge technologies and associated assessment of environmental effects of various options with respect to the overall policy direction set through the Vision and Strategy for the Waikato River. The outcomes of this assessment of alternatives were provided to Te Taniwha o Waikato on an ongoing basis.

The preferred treatment and discharge option sought to achieve an improvement in the water quality of the receiving environment—both in terms of a comparison to the effects of the existing discharge, and when compared to background (upstream) water quality in the Parker Lane Stream.

2.8 RESPONDING TO UNCERTAINTY WITH A LONG-TERM DURATION CONSENT

A key issue in contention was the issue of ‘uncertainty’ over the 35-year consent term sought by Watercare. One submitter stated that the 35-year duration was unacceptable as further technological advances over that period could be made.

In response, Watercare proposed several conditions that relate to the collection of information over the term of the consent, with the ability of the Waikato Regional Council to respond to that information if it demonstrates that the discharge is causing adverse effects over the term of the consent. These include:

- Fortnightly treated wastewater quality monitoring;
- Annual reporting requiring summary results to the Waikato Regional Council each year;
- The Monitoring and Technology Review Report; and
- A condition to enable the Waikato Regional Council to review the consent conditions if the monitoring indicates that the discharge is having adverse effects on the receiving environment.

With respect to advances in wastewater treatment technology, the Monitoring and Technology Review Report is required to include an “outline of any technological changes and advances in relation to wastewater management, treatment, discharge and beneficial reuse technologies” whilst also including an assessment of whether any newly available technology options or combination of options represent the Best Practicable Option (BPO), and advice on whether Watercare intends to adopt that BPO and incorporate such changes.

The combination of continuous monitoring, reporting and consent holder reviews (including an ongoing review of technological changes and advances) were critical considerations in the commissioners’ decision to grant the 35-year term to Watercare.

2.9 ACHIEVEING SUPPORT FROM TE TANIWHA O WAIKATO

Watercare’s approach to engaging with Te Taniwha o Waikato and the community in respect of its activities was to engage early and often. Watercare led all engagement with TToW. This engagement did not end with the granting of a resource consent, but rather has continued with regular mana whenua meetings through the implementation phase. For the Pukekohe Wastewater Discharge Consenting Project, there was a close working partnership with Te Taniwha o Waikato. Throughout engagement with Te Taniwha o Waikato a number of matters of interest or concern were raised. These included the:

- Discharge quality (including nitrogen and ammonia levels);
- Location of the discharge point, i.e. into the Waikato River or Parker Lane Stream;
- Insufficient flow of water in the Parker Lane Stream;
- Impact on the health and wellbeing of the Waikato River;
- Length of the consent term;

- Impact on the mātaītai (food gathering area on the Waikato River banks near the Parker Lane Stream);
- Effects of the avian population from the wetlands and oxidation ponds; and
- Impacts on the mauri (spiritual essence) of the Waikato River (broader cultural impact of discharging treated wastewater into the River).

In response to these issues and concerns, Watercare substantially changed the proposal, which was revised to include the following:

- Investment in higher treatment technology through an upgrade to Enhanced MBR + UV wastewater treatment technology;
- UV disinfection included as part of the treatment process prior to discharge to the Parker Lane Stream at the existing discharge location;
- No outfall and diffuser structure on the Waikato River bed;
- Significant reduction in nutrient parameters; and
- Riparian planting to be undertaken along Parker Lane Stream within Watercare-owned property.

With respect to cultural effects the commissioners' decision stated the following:

"Notwithstanding our findings, Mana Whenua submitters to these applications, namely Te Taniwha o Waikato, Ngaati Te Ata (and Mr Potini), either fully supported or conditionally supported the proposal subject to appropriate conditions. This support was on the basis of what they perceived to be substantial water quality improvements over time as well as a commitment to an on-going relationship between Watercare and Mana Whenua groups.

We were impressed by the comprehensive CIA and evidence prepared by Te Taniwha o Waikato, and the clear commitment they had to fully engaging in this process. It was their view that consent could be granted on the basis of the water quality improvements over time and the on-going relationship between Watercare and Mana Whenua groups."

2.10 DEVELOPMENT OF THE BEST PRACTICABLE OPTION WITHIN THE WAIKATO RIVER CATCHMENT

The concept of the BPO is one which is often relied upon in discharge consenting projects. The RMA defines the BPO as the best method for preventing or minimising effects on the environment having regard to the:

- Nature of the discharge or emissions and the sensitivity of the receiving environment to adverse effects;
- Financial implications and the effects on the environment of that option when compared with other options; and
- Current state of technical knowledge and the likelihood that the option can be successfully applied.

In determining the preferred option for which discharge consent was ultimately sought, it was the iterative options assessment process and feedback of results of environmental

effects studies applied to the assessment of treatment process and discharge alternatives which determined the BPO for which consent was sought.

The Enhanced MBR + UV treatment process is considered to be at the 'operational limit of technology' and, with respect to other WWTPs in New Zealand, will be the first of this type of technology to be constructed at this scale.

3 SOUTH-WEST SUBREGIONAL WASTEWATER SCHEME

3.1 INTRODUCTION

The South-West Growth Area is currently serviced by three satellite WWTPs in Waiuku, Clarks Beach and Kingseat. The average distance between these townships is 12 km, which supports a sub-regional approach to wastewater servicing should urban growth generally proceed as expected.

When Watercare commenced this project in 2015, key issues for wastewater servicing in this area were:

- Significant growth was predicted for Clarks Beach, Glenbrook Beach and Kingseat;
- The discharge consent for the Clarks Beach WWTP expired in April 2013 and a new consent was lodged with Auckland Council in 2012. In light of the strategic approach being adopted for the South-West Growth Area, consent processing had been on hold since that time.
- Plan Change 28 stipulated that any development in Kingseat must be supported by a public wastewater system. Kingseat is close to a Tāngata Whenua Management Area (Whatapaka Creek), and a discharge of treated wastewater in the vicinity is unlikely to be consentable for the proposed growth in the area. The discharge consent for Watercare's existing small WWTP expires in 2022.
- The discharge consent for the Waiuku WWTP will expire in June 2019. A new long-term discharge consent to the current location at the upper end of the Waiuku Estuary may be difficult to obtain because of increasingly high requirements for wastewater discharges to sensitive water bodies.

The south-west subregion and location of existing WWTP's is shown in Figure 3. In addition to the existing municipal WWTP's located at Kingseat, Clarks Beach and Waiuku, a private WWTP also serves the existing Kingseat Hospital site.



Figure 3: South-West Subregion showing the three growth areas of Kingseat, Clarks Beach and Waiuku

3.2 GROWTH PROJECTIONS

Given the uncertainty at the commencement of the project with respect to future population growth anticipated under the AUP, during the development of the wastewater scheme and assessment of options, Watercare assessed a range of population growth scenarios ranging from 30,000 to 100,000 Population Equivalents (PE). This work included testing various option scenarios and sensitivity of receiving environment effects in response to various population growth scenarios.

As the project progressed, Watercare refined the project scope to cater for an estimated maximum population of 30,000 over the duration of a 35-year consent, in response to the AUP process confirming the scale of growth.

3.3 PROJECT OBJECTIVES

The main objective of the project was to work in partnership with the community and mana whenua to identify and implement the best practicable option for providing wastewater services for the Clarks Beach, Glenbrook Beach, Waiuku and Kingseat communities. These objectives, developed in partnership with mana whenua, included the following:

“The aim of the project is to work in partnership with the community and mana whenua to identify the best practicable option to provide wastewater services for the Waiuku, Clarks Beach, Glenbrook Beach and Kingseat communities. In doing this we aim to:

- *Keep our communities healthy;*
- *Protect our environment, particularly the water quality and ecology of the Manukau Harbour;*
- *Provide a solution that caters for planned growth that keeps the overall costs of service to customers (collectively) at sustainable levels;*
- *Recognise the significance of the Manukau Harbour to Mana Whenua and, where possible, provide for local Mana Whenua’s cultural and spiritual objectives; and*
- *Retain flexibility for future, sustainable, longer-term solutions.”*

3.4 ASSESSMENT OF ALTERNATIVE OPTIONS

To ensure robustness and reliability of outcomes, Watercare adopted a three-stage assessment process (Figure 4) consisting of:

Stage 1 – Fatal Flaw Assessment

Stage 2 – Traffic Light Assessment

Stage 3 – Multi-Criteria Analysis.

Although the process primarily sought to identify the BPO for a discharge (which included re-use) of treated wastewater to enable a consent application to be made, the assessment process was wide ranging and also considered the implications for the entire wastewater scheme required to support the discharge option, i.e. the treatment plant location and conveyance pipeline routes. The process was characterised by:

- **A progressively more detailed level of assessment**, starting with high-level options focusing on the discharge of treated wastewater (re-use and/or discharge to the environment) to location-specific options that required a high level of detailed information about site-specific factors to be assessed.
- **Assessment criteria based on applicable statutory and planning requirements and a proven multi-criteria analysis (MCA) approach.** The criteria used to compare wastewater discharge alternatives was developed and refined as the project progressed. Additional considerations were introduced to cater for the increasing level of detail in subsequent assessment stages.
- **Distinction between near-term and long-term options.** Recent land use changes in the project area had opened up the potential for urban growth that requires wastewater services to be implemented. Once authorisations under the Resource Management Act (e.g. designations and resource consents) have been secured, the necessary infrastructure could be installed within a timeframe of approximately 5-10 years and be serviceable for a number of years until a given

population threshold is reached (near term), depending on the option. However, a suitable near-term option may not represent a sustainable long-term option, hence the timeframe over which an option is potentially viable is taken into account.

- **Focus on Mana Whenua and other stakeholder engagement.** Watercare was committed to engaging with mana whenua, key stakeholders and the community. A multi-stage options assessment process provided appropriate scope for feedback and input.

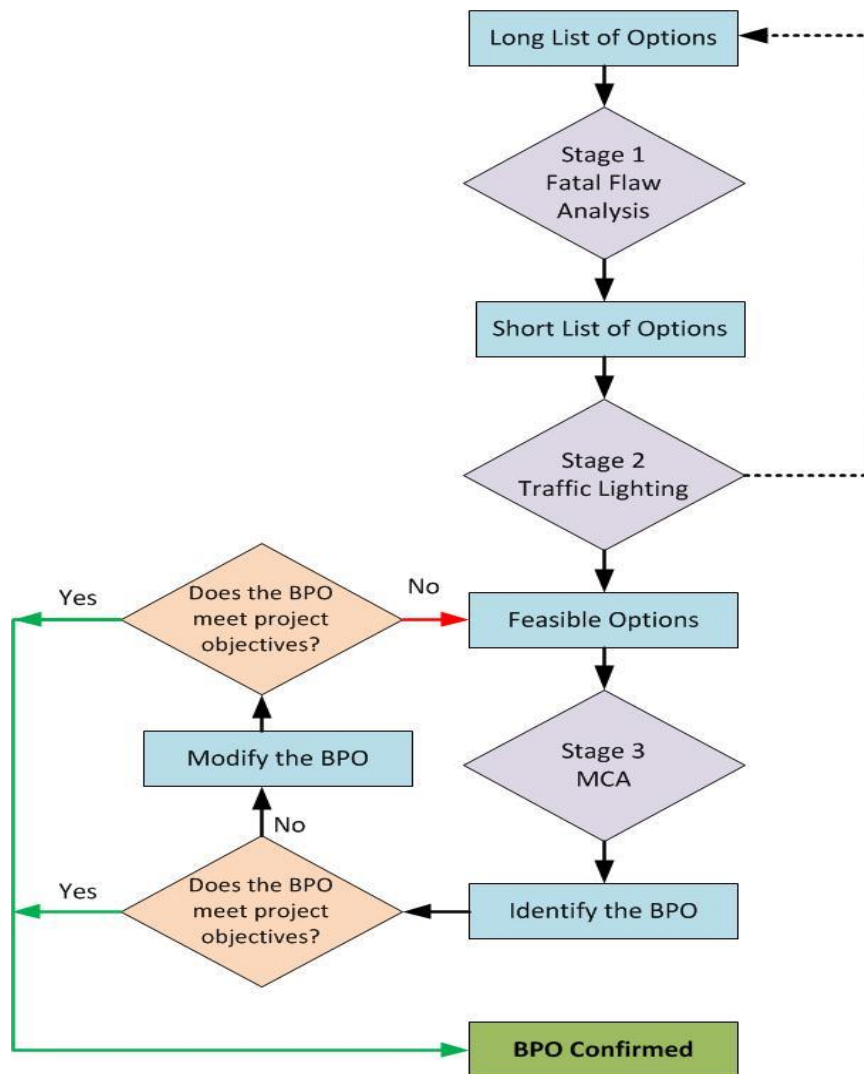


Figure 4: Overview of alternative assessment process

3.5 MANA WHENUA ENGAGEMENT

As part of Watercare’s regular Kaitiaki Forum, five mana whenua entities advised Watercare that they wanted to be either actively involved or keep a watching brief over the project. These entities included:

- Ngāti Te Ata;
- Ngāti Tamaoho;
- Te Akitai;
- Te Kawerau a Maki; and

- Te Ahiwaru

Waikato Tainui also expressed an interest in the project but chose to engage directly with Watercare when appropriate.

Watercare acknowledged from the outset that engagement with mana whenua would be a key feature of the project and committed to collaborating with the relevant iwi and undertaking engagement activities together or in a parallel process (for example in option assessment workshops), to ensure there was a shared understanding between the different groups and robust discussion about specific options.

Watercare's commitment to mana whenua was:

- Better understand cultural values;
- Work closely with mana whenua to determine any effects its operation may have on the environment and cultural values;
- Develop a long-term wastewater treatment strategy with mana whenua; and
- Explore options to improve/alleviate any effects.

These principles also applied throughout engagement on the South-West Wastewater Servicing Project.

3.6 RATIONALE FOR THE PROPOSED WASTEWATER SCHEME

Following the extensive option assessment and engagement process, the preferred option was selected as a new WWTP at the Waiuku site using a high level of treatment (Membrane Bioreactor and UV disinfection) discharging to a new outfall in the Waiuku Channel (as shown in Figure 5). The reasons for selecting this option can be summarised as follows:

- The proposed wastewater scheme provides the best overall solution at this time to meet the current growth objectives, while maintaining flexibility to accommodate other options, including reuse, in the future;
- Mana whenua's long-term vision is to cease discharges of treated wastewater to the Manukau Harbour, and groups stated that the discharge of treated wastewater to the Manukau Harbour is opposed. Although the proposed wastewater scheme did not remove the discharge of treated wastewater from the Manukau Harbour, the proposed treatment process technology presents a significant improvement in the level of treatment when compared to the existing WWTP's.
- The proposed scheme allows for future adoption of other discharge options such as land application, industrial reuse and managed aquifer recharge, and Watercare is committed to investigating these options and working with mana whenua on a long-term basis to find solutions towards achieving mana whenua's long-term vision;
- The AUP classifies the receiving environment as Degraded 1, meaning it has moderate sensitivity (moderate level of resilience) to adverse effects. As the existing discharges from the Waiuku WWTP and Clarks Beach WWTP (and the Kingseat WWTP further to the east) will be removed and replaced with one single discharge of considerably better quality, beneficial effects in terms of water quality within the Waiuku Estuary and the south-west Manukau Harbour are expected. However, any beneficial effects in terms of the ecology of the Estuary or the Manukau Harbour are unlikely to be noticeable without an integrated catchment-wide land use management approach;

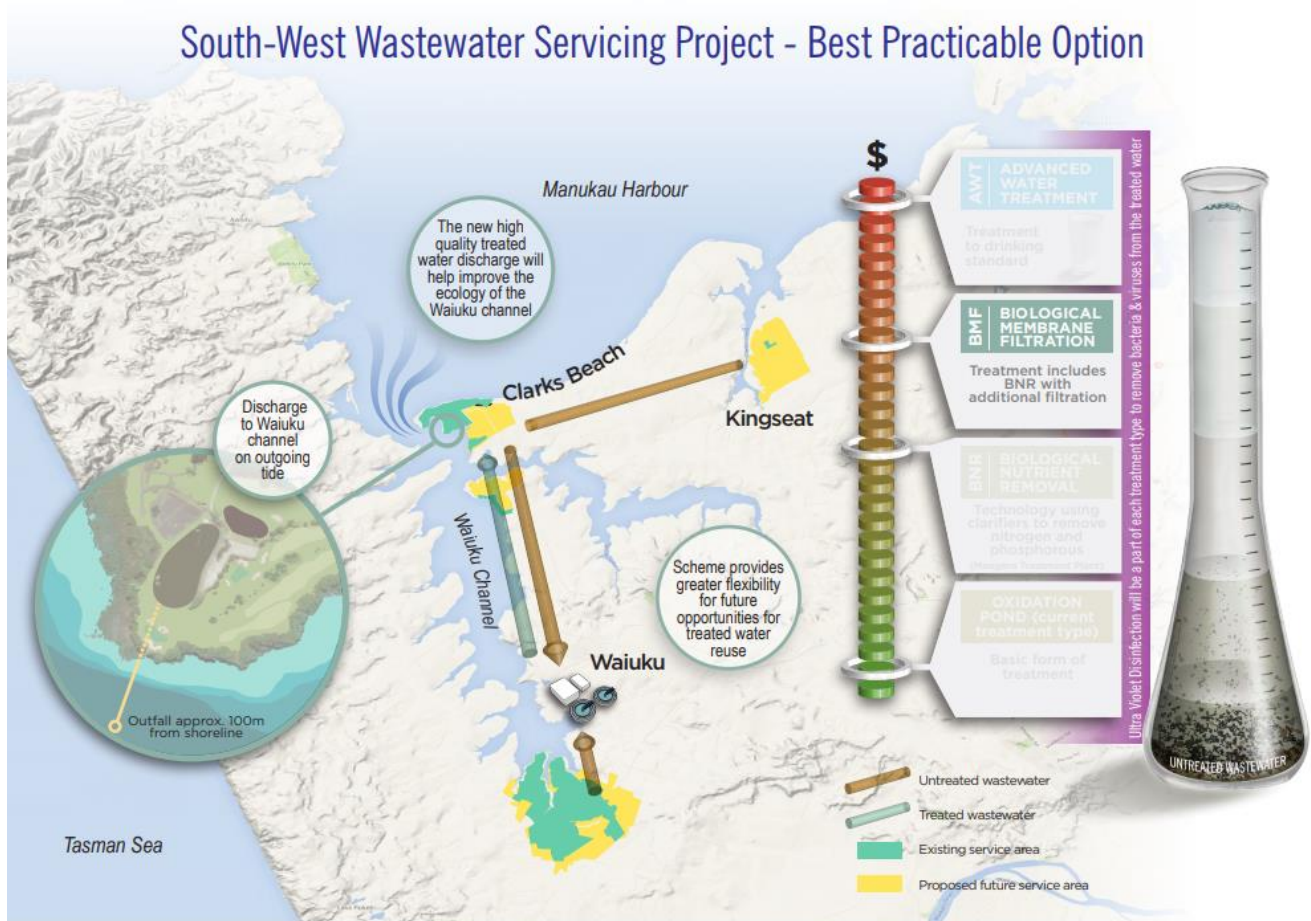


Figure 5: Preferred Option for the South-West Wastewater Scheme

- Risks to public health, from both contact recreation and shellfish gathering, will be very low, due to the very high level of treatment and rapid dilution and dispersion of treated wastewater at the discharge location;
- The proposed discharge location is a highly dynamic receiving environment that provides for significant mixing and dilution. Combined with the high level of treatment and discharging on the outgoing tide, any effects will be no more than minor beyond the immediate mixing zone of 50 m around the outfall structure;
- The treatment technology for the proposed scheme is well proven overseas, and to some extent in New Zealand, and can be relied upon to provide a long-term and robust treatment process. The off-shore outfall and diffuser structure into the Waiuku Estuary will be short and significantly easier to construct and maintain than an off-shore ocean outfall in the Tasman Sea due to the low wave energy environment of the Waiuku Estuary and proximity to the shoreline. Construction activities can be timed to minimise the effects of tidal currents on construction activities, as can ongoing repair and maintenance activities;
- The proposed scheme can be delivered within the project timeframe necessary to support the anticipated urban growth; and
- While the proposed scheme is not the lowest cost option of all those considered, it is the lowest cost option of the three short-listed options, at an estimated capital cost of \$128m and estimated annual operating costs of \$2.6m.

Following a successful Council hearing process, Watercare received an appeal to the decision. This was subsequently resolved without requiring an Environment Court hearing and Watercare was successfully granted a 35-year discharge consent in 2018.

4 CONCLUSIONS

Key factors in both the Pukekohe and South-West wastewater projects include:

- Working collaboratively with mana whenua to develop wastewater solutions that empower cultural visions. In doing so, Watercare realises that some cultural visions (such as the removal of treated wastewater from the Manukau Harbour), cannot be achieved in the short-term but have selected options which enable options such as reuse and land discharge to be investigated in the future;
- To fulfill its requirement to support projected population growth, Watercare is moving towards centralised treatment and discharge solutions for smaller communities, utilizing state-of-the-art treatment technologies to achieve both improvements in the receiving environment whilst also providing infrastructure to support significant growth.

Whilst both projects attained 35-year resource consents, both consents contain significant review conditions which require the regular review of environmental monitoring results, treatment technology, beneficial reuse and other matters to ensure these matters are the subject of review on an ongoing basis throughout the consent duration. These reviews will ensure that both cultural and ecological visions are being reviewed and assessed against throughout the life of these consents.