Kaitāia WWTP

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

Application to renew resource consents for the Kaitāia Wastewater Treatment Plant

August 2021

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APPLICANT AND PROPERTY DETAILS

Applicant	Far North District Council
Address for Service	Far North District Council Memorial Avenue Private Bag 752 Kaikohe 0440
Property Details	Kaitāia Wastewater Treatment Plant Bonnets Road, Kaitāia
Legal Description	Section 87 Block V Takahue SD,
Location	1620595E 6114496N

1. INTRODUCTION

1.1. Overview

The Kaitāia wastewater treatment plant (WWTP) services the townships of Kaitāia and Awanui within the Far North district. Consents for the continued discharge of treated wastewater to the Awanui River, to land from the base of the ponds and of odour to air are sought as well as consents enabling the operation of a sludge storage facility.

The requested term of consents is 15 years, with the expectation that the consent to discharge to water shall be surrendered within that period if the discharge of Kaitaia's wastewater to land becomes available and is commissioned.

FNDC acknowledge the public interest in the discharge activity and the adverse effects that the discharge of wastewater has on the mauri of the Awanui River and subsequently the mana of the iwi and accordingly request that this application is publicly notified in accordance with section 95A(3)(a) of the Resource Management Act (1991) (the RMA).

1.2. Current Consents

This is an application for resource consents to authorise discharges from the Kaitāia WWTP and sludge storage facility owned and operated by the Far North District Council (FNDC). These consents will replace existing consents, as shown in Table 1, which expire 30 November 2021.

AUT.00932.01.03	To discharge treated wastewater to the Awanui River on Pt Lot 4A DP 4093 Block V Takahue SD, at or about location co-ordinates 1620752E 6114931N
AUT.000932.02.02	To discharge contaminants (primarily odour) to air from a wastewater treatment system presently located on Section 87 Block Takahue SD at or about location co-ordinates 1620595E 6114496N.
AUT.000932.03.02	To discharge contaminants to ground via seepage from a wastewater treatment system located on Section 87 Block Takahue SD at or about location co-ordinates 1620595E 6114496N.
AUT.030602.01.02	Discharge contaminants to land by way of seepage from the base of the sludge storage facility
AUT.030602.02.01	Discharge contaminants to air (primarily odour) from the sludge storage facility

Table 1 Existing resource consents for Kaitāia WWTP

1.3. Document Purpose

This application has been prepared in accordance with the requirements of Schedule 4 of the RMA, and includes:

- a description of the proposal,
- an assessment of the actual and potential effects on the environment (AEE),
- an assessment of the proposal against Part 2 of the Act and relevant planning instruments, and
- consideration of the ways in which FNDC proposes to avoid, remedy or mitigate any adverse effects on the environment.

2. DESCRIPTION OF PROPOSAL

2.1. Location of the Kaitāia WWTP

The WWTP is located on Bonnetts Road approximately two kilometres to the west of the Kaitāia township and consists of three ponds in series. The location of the treatment plant and discharge point in to the Awanui River is shown in Figure 1, below.

The WWTP is identified as regionally significant infrastructure and provides an essential wastewater treatment service to Kaitāia and Awanui. The WWTP also receives and treats septage from across the upper Far North district. Located at the same site is a sludge storage facility that is used to store sludge from the district's pond-based wastewater treatment plants. These services are required under local government legislation as part of FNDC's function to provide for sanitation and community health and wellbeing.

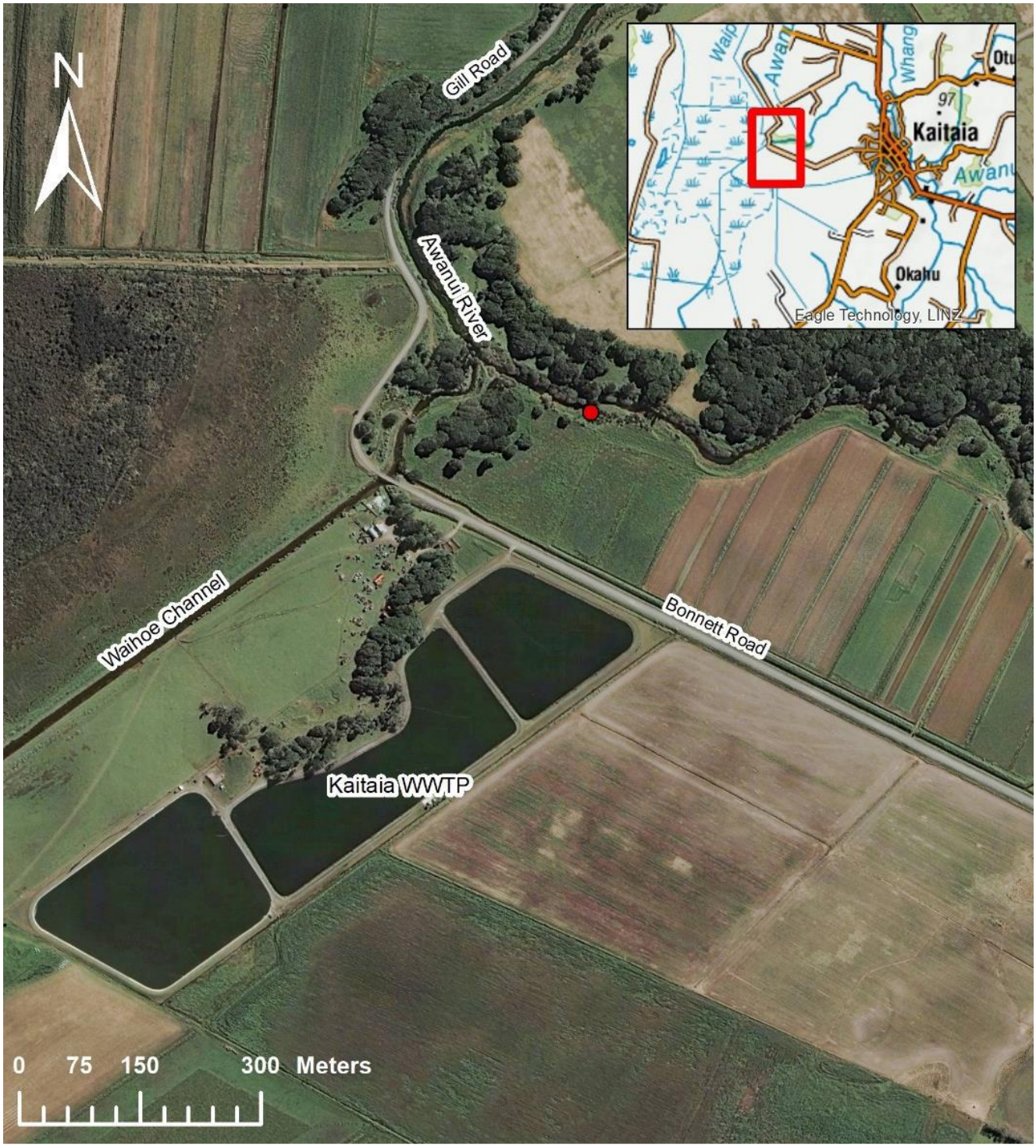


Figure 1 Kaitāia WWTP Location Plan. Red point depicts the location of the wastewater discharge into the Awanui River.

2.2. Current Treatment Process

The current WWTP consists of a septage receiving system, inlet screening, an oxidation pond, two baffled maturation ponds and a floating wetland, as shown in Figure 2 and Figure 3, below.

The wastewater treatment process involves the settling out of the inert inorganic fraction of wastewater and treating the organic portion. The organic portion is treated by settling out that which is readily settleable and then creating the environment for biological processes to degrade the remaining material. Biological processes employing micro-organisms are used to breakdown the wastewater to simpler and more stable end products.

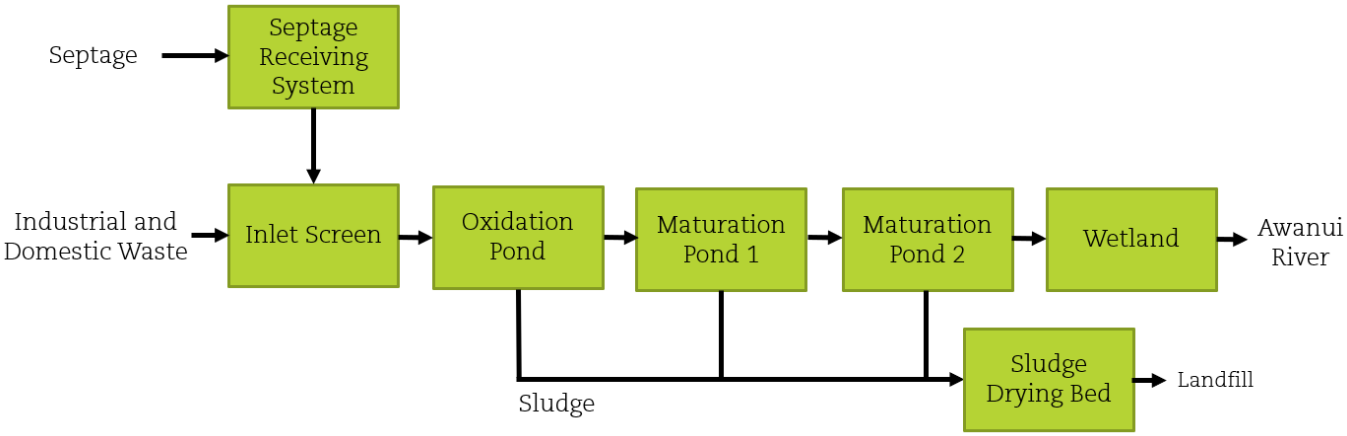


Figure 2. Diagram of the existing Kaitāia WWTP (Harrison Grierson)

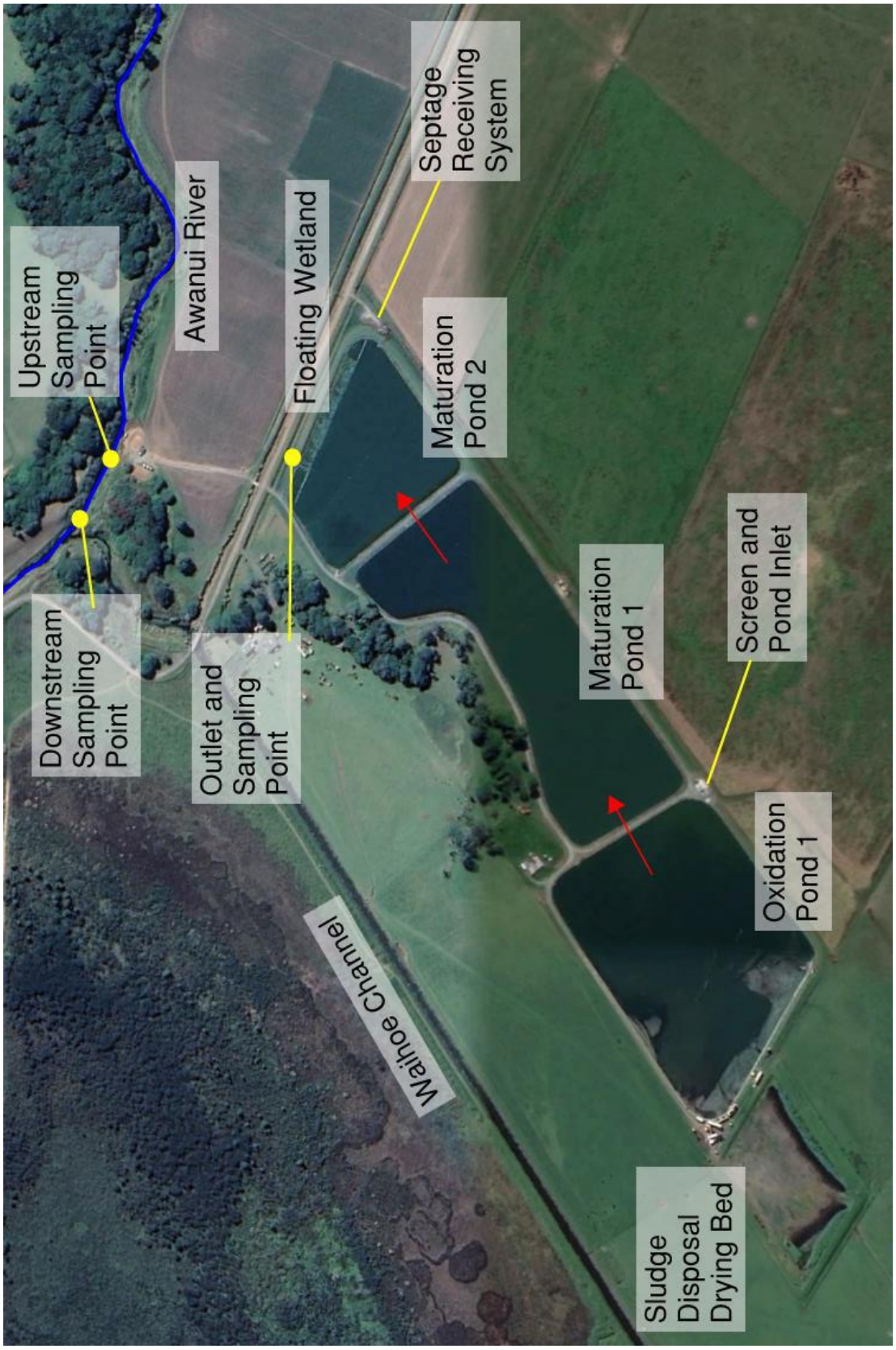


Figure 3. Kaitāia WWTP with treatment steps labelled (Harrison Grierson)

2.3. Wastewater Volumes

2.3.1. Current volumes

Condition 1 of the current consent (AUT.000932.01) requires that:

> The volume of treated wastewater discharged from the sewage treatment plant to the Awanui River shall not, based on a 30-day rolling average of dry weather discharges, exceed 3,100 cubic metres per day. Compliance with this condition shall be based on the average of the 30 most recent "dry weather discharge days".
>
> For the purposes of this consent, a "dry weather discharge day" is any day on which there is less than 1 millimetre of rainfall, and that day occurs after three consecutive days either without rainfall or with rainfall of less than 1 millimetre on each day.
>
> Advice Note: The rainfall measurements used to determine a dry weather discharge day shall be based on the nearest appropriate rainfall recorder site. This recorder site shall be selected in consultation with the Northland Regional Council.

'Dry weather days' are used so that factors such as stormwater inflow and groundwater infiltration to the wastewater network, that increase the volume of the wastewater, but not its contaminant load, are excluded from the collated volume data. The current average dry weather flow is 2,277m^3/day, based on data from January 2017 to March 2019.

2.3.2. Wastewater volumes, population, and growth

The average volume of discharged wastewater has increased over the term of the current consent and is expected to continue to rise as the Kaitāia and Awanui population increases, in turn increasing the domestic wastewater component of the wastewater. The population of Kaitāia and Awanui is projected to be 8,443 in 2055[1]. Industrial wastewater corresponds to about 40% of the total wastewater generated in Kaitāia[2] and is assumed to grow at the same rate as domestic flows. Using this data, it is expected that the average dry weather flow in 2055 will be 3,196m^3/day, more than the current average dry weather flow, but only 96m^3/day more than is currently consented. Accordingly, it is requested that the consented wastewater volume is increased to 3,200m^3/day, as shown in the proposed conditions in Section 12 of this application.

[1] Population, households and dwellings | Far North District Council | Population forecast (idnz.co.nz)
[2] https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=3672

2.4. Planned Treatment Upgrades

As discussed in section 6.2.12, below, the WWTP discharge has good records of compliance with the current wastewater discharge consent, and it is rare for the discharge standards set by the consent to be exceeded. In making this application and determining the effects of the treated wastewater discharge on the Awanui River an assessment of the stricter requirements for discharges to water in the Proposed Regional Plan for Northland (PRP) has been made. The National Policy Statement for Freshwater Management 2020 (NPS-FM) has also increased the emphasis on the primacy of the health and wellbeing of water bodies and aquatic ecosystems, including by requiring the Northland Regional Council (NRC) to include target attribute states in its regional planning instruments for a range of physical, chemical and biological attributes of water at or above national bottom lines. It is expected that NRC will notify a plan change to the PRP within the next three years to implement the national planning requirements.

An investigation has been undertaken into the various options available to increase treatment and to ensure that the discharge can meet the new discharge standards of the Proposed Regional Plan for Northland (PRP). The report for this investigation is titled 'Kaitāia WWTP Options Assessment' and is attached as appendix 1.

From this investigation a preferred upgrade option has been identified, the preferred option and rational are explained in appendix 1. Upgrades will ensure that the WWTP can treat ammonia loads that are likely to increase as the Kaitaia and Awanui population increases over the requested term of the replacement consent. This option will utilise two of the three ponds (oxidation pond and maturation pond 1), the septage receiving system, the inlet screen, and the sludge drying bed of the existing Kaitāia WWTP.

The treatment process at the plant will be upgraded to include a better septage receiving system, aeration and baffle curtains in the ponds, chemical dosing; and tertiary treatment which will consist of clarification, and UV disinfection. A diagram of the upgrade is shown in Figure 4, below.

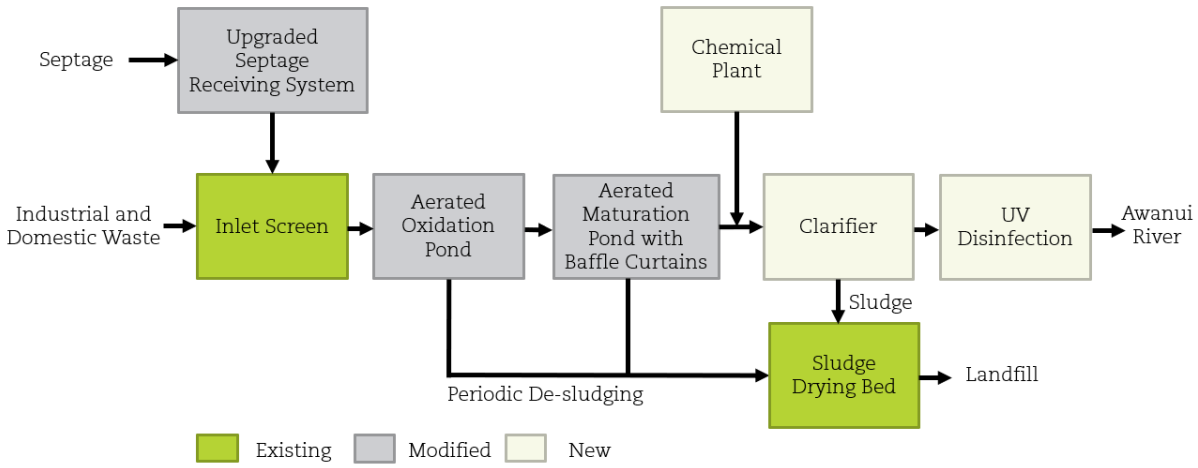


Figure 4 Diagram of planned Kaitāia WWTP upgrade (Harrison Grierson)

The treatment process upgrades will include:

1. De-sludging the oxidation pond and maturation pond 1 to improve performance and enable the installation of the aerators and baffle curtains.
2. De-sludging and decommissioning maturation pond 2. The installation of a UV disinfection system will eliminate the need for a second maturation pond to reduce the effluent bacterial levels. In addition, decommissioning one of the ponds may reduce problems related to algae blooms in the summer.
3. Decommissioning the wetland, which is performing poorly.
4. Upgrading the septage receiving system with the installation of a new wet well and a mechanical screen. This will reduce blockages and avoid trucks having to discharge septage directly into the ponds.
5. Installing pond surface aerators (in the oxidation pond and maturation pond 1) and baffle curtains (in maturation pond 1) to maximise ammonia removal.
6. Installing a new tertiary treatment system. This will involve constructing one or more buildings for a chemical dosing system (phosphorus removal) and UV units; and installing a clarifier. The clarifier will improve solids removal before the UV disinfection stage.

The funding for these improvements has been approved in FNDC's adopted 2021-2031 Long Term Plan and have been planned in the capital works programme[3] for 2023/2024.

[3] https://www.fndc.govt.nz/files/assets/public/objectivedocuments/policy-and-planning-pol/ltp-and-annual-plans/2021-2031-ltp/capital-works-programme.pdf

2.5. Viability Assessment of Discharge Alternatives

Section 105(1)(c) of the Act requires that the consent authority must have regard to any possible alternative methods of discharge, including discharge into any other receiving environment.

Policy D.4.3. of the PRP sets out that a resource consent application to discharge treated wastewater to water will generally not be granted unless a discharge to land has been considered and found to be neither practicably nor economically viable.

> Policy D.4.3 Municipal, domestic and production land wastewater discharges
>
> An application for resource consent to discharge municipal, domestic, horticultural or farm wastewater to water will generally not be granted unless:
>
> 1) the storage, treatment and discharge of the wastewater is done in accordance with recognised industry good management practices, and
> 2) a discharge to land has been considered and found not to be environmentally, economically or practicably viable.

A practicability and economic assessment to enable a determination of the viability of land-based discharge have been undertaken and the results are discussed below.

2.5.1. Practicability of Discharging Wastewater to Land

The first test under policy D.4.3 is to establish whether discharge to land is practicably viable.

Using an average annual wastewater flow of 2,827m^3/day in 2025, and an average loading rate of 2.6-5.6mm/day a minimum total area of 63.3 hectares is required to discharge 100% of the wastewater to land.

FNDC has undertaken an initial desk-top assessment of land that may be suitable for land-based discharge of treated wastewater from the WWTP and is continuing to identify areas of land that may be appropriate for discharge to land. Any preferred site needs to be within reasonable proximity to the Kaitāia WWTP, have sufficient area for 100 percent of Kaitāia's wastewater to be discharged to land, as well as a storage pond for times when soils are too high in water content to allow for discharge.

While the initial desk top study shows that discharge to land may be viable, there needs to be further design, engagement, contact with landowners, site investigations and economic analysis.

2.5.2. Affordability of Discharging Wastewater to Land

If, through the above process, the cost of establishing a land-based discharge scheme were to be considered viable then establishing a scheme could proceed to engagement with landowners and preliminary design.

A high-level estimate of costs to establish a land-based discharge scheme for the Kaikohe WWTP has been prepared, and the estimated costs are significant at $17.1 million, with a confidence range of between -35% and +50% (between $11.12M and $25.65M)[4].

There are enough similarities between the sites identified in Kaikohe and Kaitāia to use the cost estimate established for land-based discharge at Kaikohe to also determine the economic viability of establishing land-based discharge for the community of Kaitāia. This was considered acceptable given the similarities between the two schemes and due to the very high-level nature of the cost analysis. It was not considered necessary to spend an additional ~$10K+ to obtain a separate high-level cost estimate for the Kaitāia scheme, which was expected to differ very little from the estimate obtained for Kaikohe.

Policy D.4.3 requires an assessment of economic viability. "Economic viability" should be read within the context of Council's purpose of the Local Government Act 2001, that is: to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future. Section 10 of the LGA- 2002 (LGA), in achieving the purpose of local government, local authorities are tasked with delivering good-quality local infrastructure in a way that is most cost-effective for households and businesses of both current and future states of their communities. The requirement to provide infrastructure that is "most cost-effective" establishes a threshold requirement to consider the communities ability to pay for the infrastructure in the forefront of decision making.

In 2020, Business and Economic Research Limited (BERL) undertook a study on rates affordability in the Far North. This report is titled 'Rates Affordability in the Far North' and is

[4] To refine the margin of error, options need to be progressed to a 'Preliminary Design' stage, resulting in a reduced margin of error of between -15% and +20%. This work would be at a cost of approximately $150,000.

attached as appendix 4. This report has been used to frame considerations regarding the affordability of establishing land-based discharge schemes for those two communities.

Table 2, below, sets out the estimated total rating impact of upgrading the existing Kaitāia WWTP using the planned upgrade option and establishing a land-based discharge scheme for the community of Kaitāia, using the estimated value of $17.1M. To ensure greater certainty, the total value of the estimated rating impact of establishing land-based discharge activities should be added to the current adopted connected rates for Kaitāia. The current adopted WWTP connected rates for Kaitāia for the 2020-21 financial year is $189.43 per connection.

Option	FY24/25 (Y4)	FY25/26 (Y5)	FFY26/27 (Y6)	FY27/28 (Y7)	FY28/29 (Y8)	FY29/30 (Y9)	FY30/31 (Y10)
Land Discharge	-	$281.69	$277.10	$272.51	$267.92	$263.33	$258.74
WWTP upgrade	$103.50	$102.33	$101.16	$99.99	$98.82	$97.65	$96.48
Total	$103.50	$384.02	$378.26	$372.50	$366.74	$360.98	$355.22

Table 2 Estimated total rating impact of upgrading the Kaitāia WWTP and establishing land discharge.

2.5.3. Consideration of rates affordability

BERL has established that affordability, in the context of rates, has two aspects:

1. the cost relative to income (and wealth);
2. the ability of ratepayers to earn greater income in the future from the spending of rates, e.g. investment in infrastructure. It also sets out an approximate benchmark for affordability, whereby affordability concerns will arise where rates exceed 5% of gross household income.

Rates affordability is assessed by:

1. establishing an average lower quartile, average median, and average upper quartile 'total rates payable value' at district level, ward level, and smaller area level (the total includes both Northland Regional Council and FNDC rates)

2. determining an average gross household income for eight typical household types also defined at district, ward, and smaller area level, and
3. calculating the cost of total rates as a percentage of the gross income for each household type for the lower quartile, median and upper quartile average total rates values.

The results of the affordability assessments are depicted in Tables 20 and 21 of appendix 4. The current estimated total cost of rates exceeds 5% in six out of eight typical households. Taking into account BERL's findings, it is assumed that six out of eight typical households currently experience the issue of rates affordability in Kaitāia without the additional costs of a discharge to land scheme.

BERL has established that rates in Kaitāia are already predominately unaffordable. Taking this info account FNDC considers that discharge to land is not affordable, and therefore not economically viable currently.

2.5.4. Continued feasibility studies for discharge to land in Kaitāia

FNDC has assessed that the discharge of treated wastewater to land may be practicably viable but economically non-viable. Therefore, consent is sought for continued discharge to water. However, FNDC's Infrastructure Committee has resolved to progress the wastewater discharge to land investigations to 'preliminary design' for both Kaikohe and Kaitāia, with the intention of using the preliminary design to refine potential costs. Specifically, this project involves engagement with affected landowners and mana whenua to determine the selection of a preferred site to be taken forward for preliminary design that will include site specific technical, design and costs investigation of discharge to land. The preliminary designs are to be completed prior to December 2023 to enable the Long-Term Plan engagement process.

This work is expected to work towards mitigating some of the concerns expressed by iwi groups and specific requests in Te Runanga o Te Rarawa's Cultural Impact Assessment.

To fulfil the requirements of Policy D.4.3, and for this resource consent application, while the discharge of wastewater to land has been determined to be potentially practicable, the significant costs and the effect on ratepayers means that the discharge of treated wastewater to the Awanui River continues to be the best practicable option at this point in time.

2.6. Best Practicable Option

The RMA defines ‘Best Practicable Option’ as,

> in relation to a discharge of a contaminant or an emission of noise, means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to—
>
> a. the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and
> b. the financial implications, and the effects on the environment, of that option when compared with other options; and
> c. the current state of technical knowledge and the likelihood that the option can be successfully applied

The continued discharge of treated wastewater to the Awanui River better meets the purposes of the RMA than discharge to land because the establishment of a land-discharge option, at this stage, would create significant adverse effects on the community’s economic and social wellbeing, while not necessarily being able to provide for health and safety better than the current discharge.

Taking into account the ability of the receiving environment to assimilate the wastewater, the financial and unknown environmental implications of discharge to land, and the technical knowledge available about the current discharge, it is reasonable to conclude that the continued discharge to the Awanui River is currently the best practicable option for discharging Kaitāia’s treated wastewater.

3. COMMUNITY ENGAGEMENT

The Kaitāia and Awanui communities, as well as the wider district have been provided opportunities to provide informal feedback on the resource consent renewal project. The LTP 2021-31 engagement programme was carried out in early 2021 and included the opportunity to provide feedback on the upgrades to the WWTP.

For the resource consent renewal, a 'drop-in' day was held in Kaitāia in early June that was attended by approximately 15 members of the public. The general feedback was that people were supportive of the planned upgrades and FNDC's continued feasibility studies for discharge to land. Some members of the public said that they felt, as tangata whenua, that the mauri Awanui River is adversely affected by the treated wastewater discharge. This feedback has been reflected in the engagement undertaken with Te Rarawa, Ngāti Kahu and NgāiTakoto.

A survey on FNDC's Kaitāia WWTP Projects webpage[5] also provides the opportunity to provide informal feedback on the resource consent renewal and the upgrade project. At the time of submitting this application, no survey submissions had been received for this project.

The submissions and pre-hearing meetings as a result of public notification of this application will allow for consultation on the resource consent.

[5] This survey will be removed when the application is lodged with NRC

4. EXISTING ENVIRONMENT

- The Awanui River originates from Raetea Forest and meanders north for a significant distance through pasture and the Kaitāia township, eventually flowing into the Rangunu Harbour.
- The Awanui River is a statutory area recognised by Statutory Acknowledgements by both NgāiTakoto and Te Rarawa. Currently[6] neither the WWTP site nor the Awanui River are defined as areas of significance to tangāta whenua.
- Neither the site of the WWTP nor the Awanui River are recognised as Outstanding Natural Landscapes, or Outstanding Natural Features, nor are they recognised as having high or outstanding natural character.
- The Kaitāia WWTP sits within the NRC modelled river flood hazard zones, as shown in Figure 5, below. The site is surrounded by an engineered flood bank to protect the treatment plant and sludge storage facility from flooding. This is discussed further in section 6.4 of this application.
- Soils within the site and within proximity of Bonnetts Road are classified as “clayey recent alluvial soils’, and ‘peaty organic peat/alluvium soils”. Hand augers completed in 2011 to the west of the ponds indicate a very stiff to stiff, plastic and moderately sensitive clay layer, typically 0.5-1.5m beneath ground level. Free water was approximately 0.9-1.2m beneath ground level.
- According to NRC’s database there are a number of bores registered within the area. The closest known bore (LOC 210525) is 870 metres from the WWTP site footprint. According to the same database there are consented downstream surface water users, however there are permitted and stock-drinking water takes downstream of the treated wastewater discharge point.
- The WWTP is directly adjacent to 313 Bonnetts Road, which contains an occupied dwelling at the same elevation as the WWTP site. There are approximately 790 metres between the boundary of the WWTP at the first pond and the next nearest dwelling (866 Bonnetts Road).
- The area is zoned by both the Far North District Plan and the draft Proposed District Plan as Rural Production, and minimal further development around the WWTP should be expected.

[6] This provision is subject to appeal

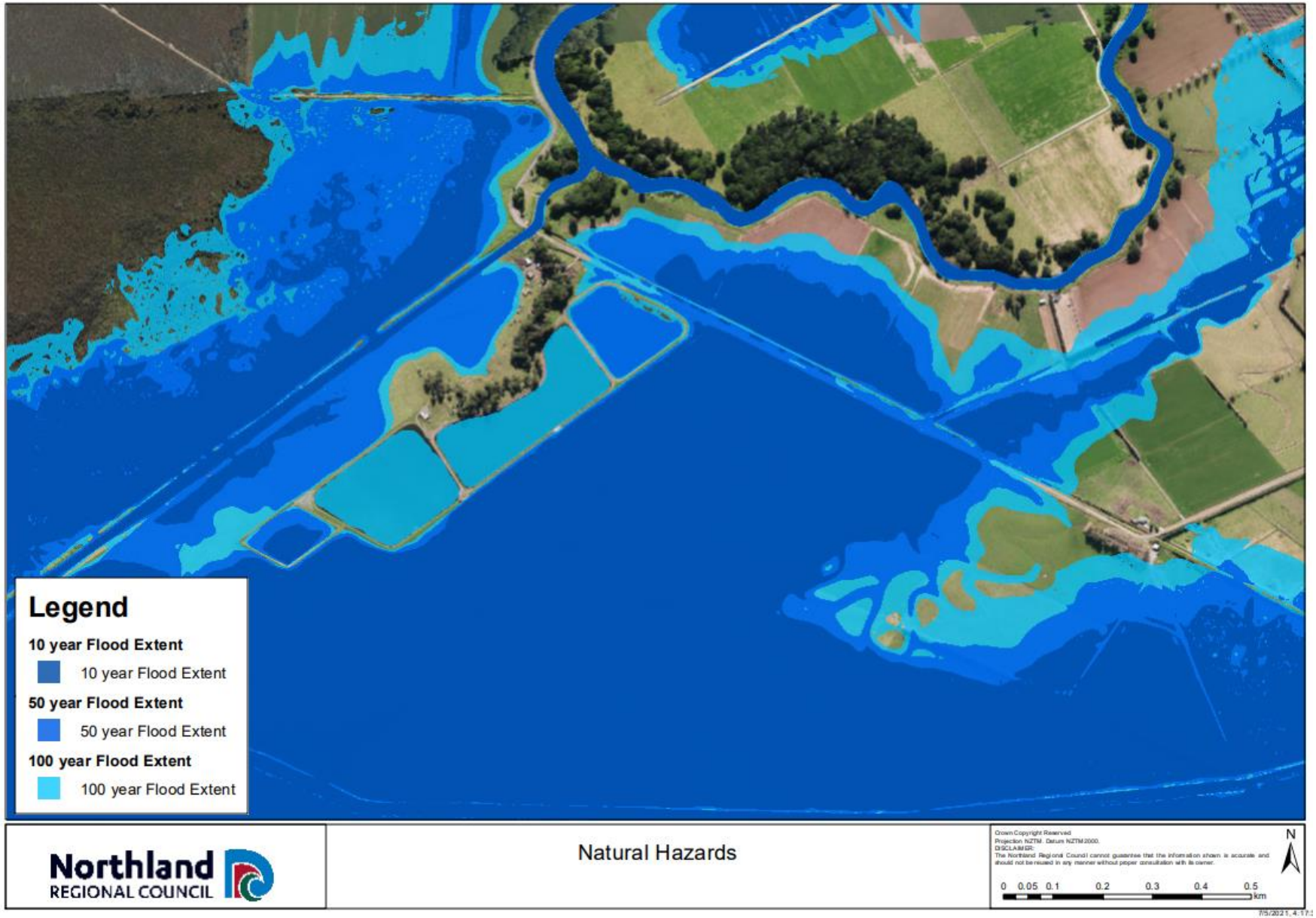


Figure 5 Flood extents

5. RESOURCE CONSENTS REQUIRED

The PRP was notified in August 2017 to replace the Regional Water and Soil Plan 2004 (RWSP) and Regional Air Quality Plan 2003 (RAQP). Several provisions in the PRP are the subject of appeals before the Environment Court and the relevant rules in the PRP are treated as operative under section 86F of the RMA.

Resource consents are required under the rules as shown in Figure 6, below. No other rules or regulations apply to these activities.

Activity	Rule
The discharge of treated wastewater into the Awanui River	The discharge of treated sewage effluent directly into a water course from a sewage treatment and disposal system is a **discretionary activity in accordance with Rule 15.3.2 of the RWSP**.
	The discharge of treated wastewater from a wastewater treatment plant into water or into land is a **discretionary activity in accordance with Rule C.6.2.2 of the PRP**.
The discharge of contaminants to land via seepage from the base of the WWTP and from the base of the sludge storage facility.	The discharge of sewage effluent into or on to land is a **discretionary activity in accordance with Rule 15.3.1(a) of the RWSP**.
	The discharge of treated wastewater from a wastewater treatment plant into water or into land is a **discretionary activity in accordance with Rule C.6.2.2 of the PRP**.
The discharge of contaminants, primarily odour, to air from the	The discharge of contaminants to air…is a **discretionary activity in accordance with Rule 9.3.2 of the RAQP**

WWTP and from the sludge storage facility	An application for a new resource consent to replace an existing resource consent for a discharge to air associated with an industrial or trade premises that is not the subject of any another rule in this Plan [the PRP], is a **restricted discretionary activity in accordance with Rule C.7.2.13 of the PRP** provided 1) The existing air discharge is authorised by an existing resource consent at the time of the resource consent application; and 2) There is no increase in the scale of or change to the type of the discharge as authorised by the existing resource consent.

Figure 6 Relevant rules

6. EFFECTS OF DISCHARGE OF TREATED WASTEWATER TO THE AWANUI

6.1. Positive Environmental Effects

The WWTP serves the second largest urban population in the Far North District with approximately 2,500 wastewater connections and supports the industrial area of Kaitāia. The provision of the wastewater treatment service shapes, stimulates and directs opportunities for growth and economic development. It also allows for greater housing density, as smaller lot sizes can be achieved when on-site wastewater treatment is not required.

The WWTP provides an important and significant contribution to the social and economic wellbeing of the Kaitāia and Awanui communities, and the health and safety of people. The WWTP also provides a septage reception and treatment service for the upper Far North district

It is relevant to consider the positive effects associated the proposed discharge of treated wastewater when determining the overall effects associated with the activity. It is also reasonable to expect that the WWTP treats wastewater to a higher standard, with one point-source, instead of multiple sources where on-site wastewater treatment is required.

Typically, wastewater entering a WWTP is composed almost entirely of water (about 99.5%[7]) and it is the much smaller fraction that gives it its objectionable and pollution characteristics.

The primary reason for wastewater treatment to a high standard is to safeguard environmental values in receiving environments and protect public health and prevent the outbreak of disease. Pathogenic bacteria in wastewater die-off and are consumed by other organisms as they pass through the treatment stages. Disinfection treatment processes, such as ultraviolet disinfection is used to inactivate and kill any remaining pathogens in the treatment plant final effluent.

Wastewater is also treated to a standard that can be discharged to water while still preserving the receiving environment at a standard that enables other uses. Statutory documents, including water quality standards of the PRP and the monitoring and enforcement of resource consent conditions ensure that treated wastewater is of an appropriate quality for discharge.

7 WSP New Zealand Limited

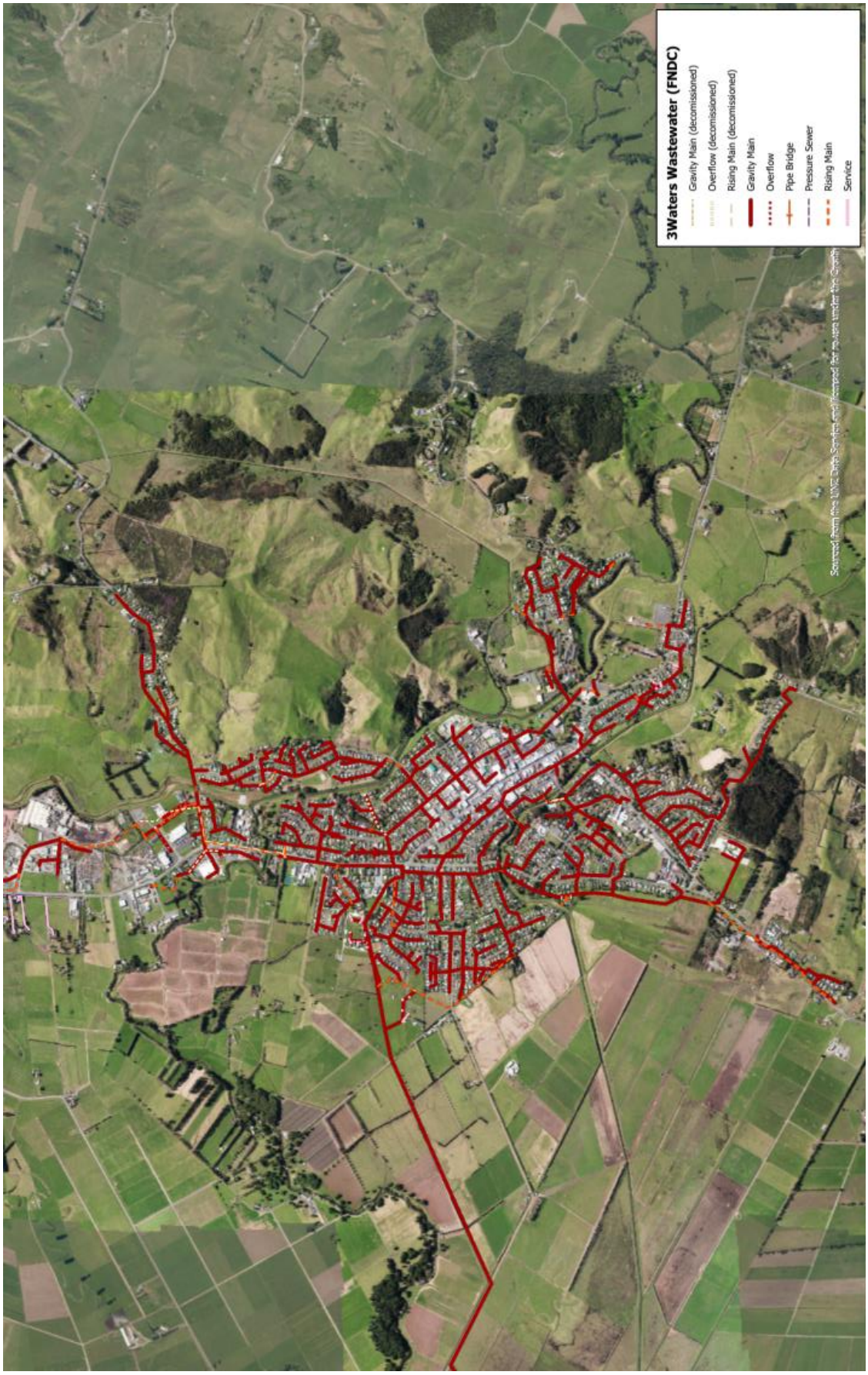


Figure 7. Extent of the wastewater network within Kaitāia

6.2. Effects on Ecological Values

6.2.1. Zone of Reasonable Mixing

Policy H.3.1[8] of the PRP sets out water quality standards in Table 20 of the PRP. They apply after reasonable mixing.

The zone of reasonable mixing for the replacement consent will be 120 metres from the discharge point[9]. The current zone of reasonable mixing, provided by the current resource consent, is about 150 metres downstream of the discharge point; however, it is important to note that the actual monitoring location for the duration of the consent has been 40 to 60 metres downstream of the discharge point. This is because the Waihoe Channel joins the Awanui River approximately 60 metres downstream of the discharge point and samples downstream of the confluence would be affected by the contaminants from the Waihoe Channel.

Importantly, the data that is used in the discussion below is based on samples that have been taken within the zone of reasonable mixing. Therefore, while the zone of reasonable mixing will shorten for the new consent, the information provided in this application confirms that the current wastewater discharge can comply with PRP standards, even when the mixing zone is shortened.

[8] Parts of this policy are subject to appeal.
[9] this is based on 'a distance downstream of the point of discharge that is the lesser of a distance equal to seven times the bed width of the surface water body, but which must not be less than 50 metres from the point of discharge'

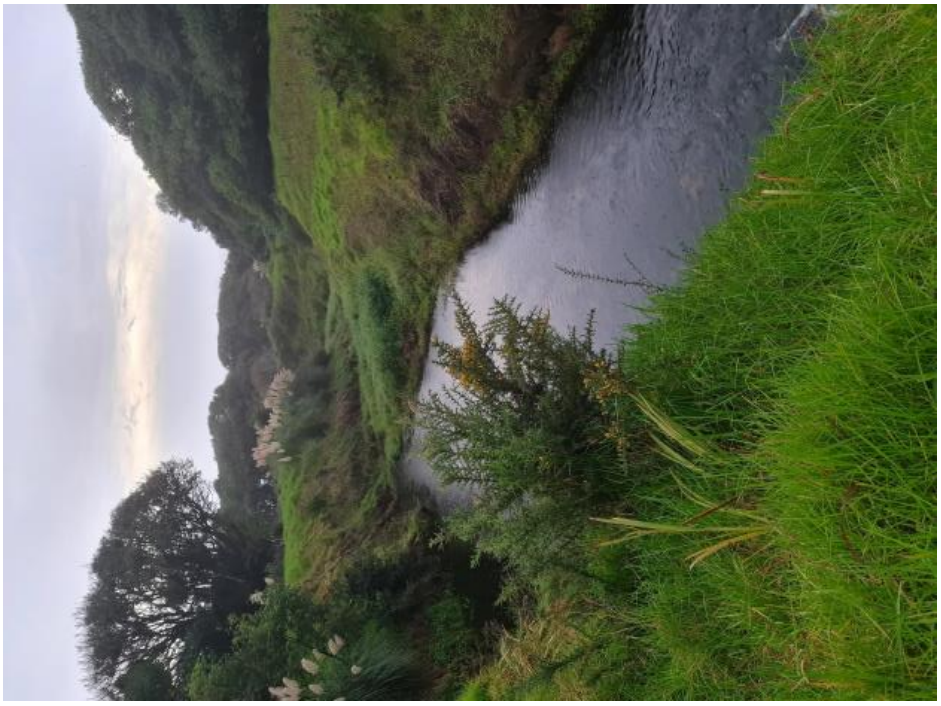


Figure 8 Looking upstream on the Waihoe Channel (2021)

Figure 9 Looking upstream on the Waihoe Channel from the Bonnetts Road bridge (2021)

6.2.2. Current treatment capability

To determine the effects of the treated wastewater discharge on the environment it is necessary to assess the ability of the current WWTP to treat wastewater to both the current standards set by the resource consent, and by the more stringent standards set by the PRP and the NPS-FM 2020.

Water quality monitoring is undertaken as part of the current consent and water samples from the upstream and downstream sites are analysed for E. coli, total ammoniacal nitrogen, temperature, dissolved oxygen and pH. The WWTP discharge has good records of compliance with the current wastewater discharge consent, and it is rare for the discharge standards set by the consent to be exceeded.

To reiterate section 6.1, the compliance data that is used in the discussion below is based on samples that have been taken within the zone of reasonable mixing. Therefore, while the zone of reasonable mixing will shorten for the new consent, the information provided in this application confirms that the current wastewater discharge can comply with PRP standards, even when the mixing zone is shortened.

Policy D.4.1(3) of the PRP states that, when considering an application for a resource consent to discharge a contaminant into water the decision-making authority shall generally not grant a proposal if it will, or is likely to, exceed or further exceed a water quality standard in the PRP's water quality standards and guidelines.

The relevant aspects of the standards are set out in Table 3, and the ability of the treated wastewater to meet each parameter is discussed below.

Attribute	Unit	Compliance metric	Standard
Nitrate (toxicity)	mg NO_3-N/L	Annual Median	≤1.0
		Annual 95th percentile	≤1.5
Ammonia (toxicity)[10]	mg NH_4-N/L	Annual median	≤0.24
		Annual maximum	≤0.40
Temperature		Summer period measurement of the Cox-Rutherford Index (CRI), averaged over the five (5) hottest days (from inspection of a continuous temperature record).	≤24°C
Dissolved Oxygen	mg/L	7-day minimum	≥5.0
		1-day minimum	≥4.0
pH	pH unit	Annual minimum and annual maximum	6.0 <pH <9.0

Table 3 Relevant water quality standards in Table 20 of the Proposed Regional Plan for Northland

[10] Based on pH 8 and temperature of 20 degrees Celsius. Compliance with the water quality standard should be undertaken after pH adjustment.

6.2.3. Dissolved Oxygen

The PRP sets a 7-day minimum for dissolved oxygen at ≥5.0mg/L, and a daily minimum of ≥4.0mg/L. Data from over 190 DO samples, taken since January 2010, indicate that the treated wastewater is not resulting in dissolved oxygen concentrations in the Awanui River that will breach dissolved oxygen standards of the PRP. This is illustrated in Figure 10, below.

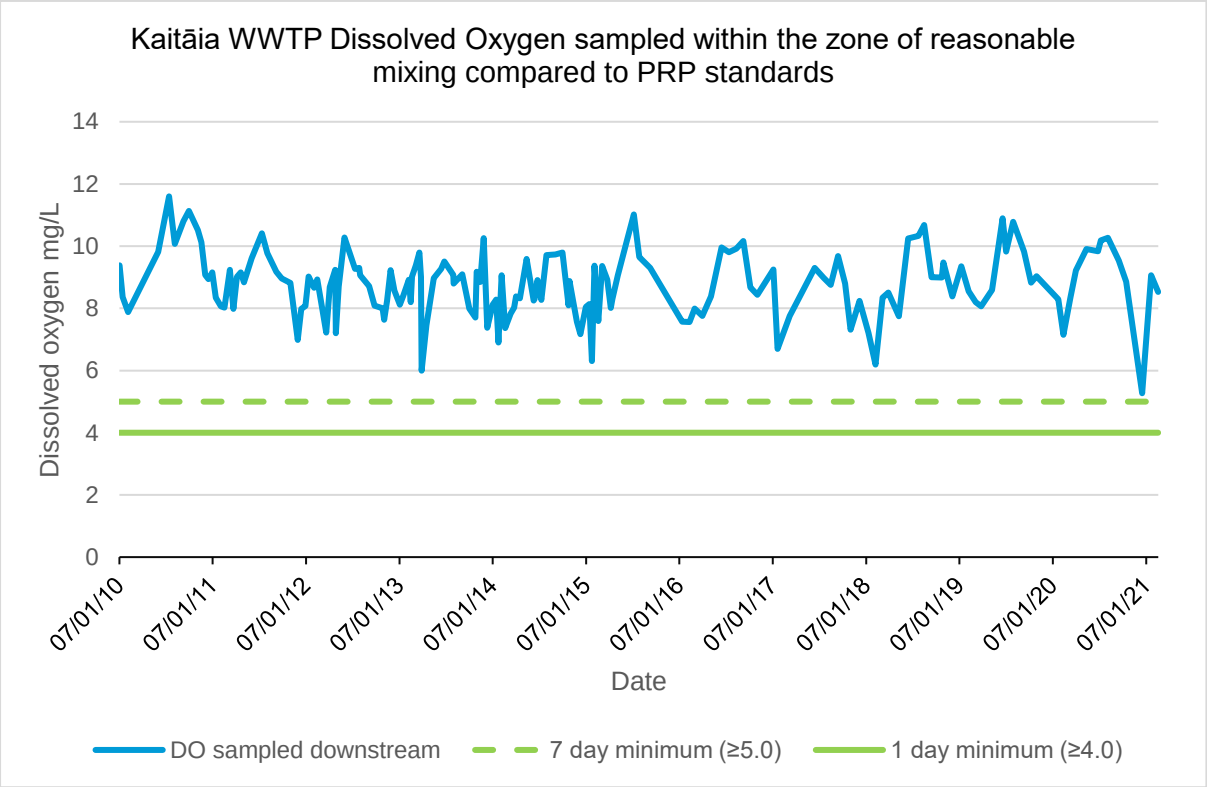
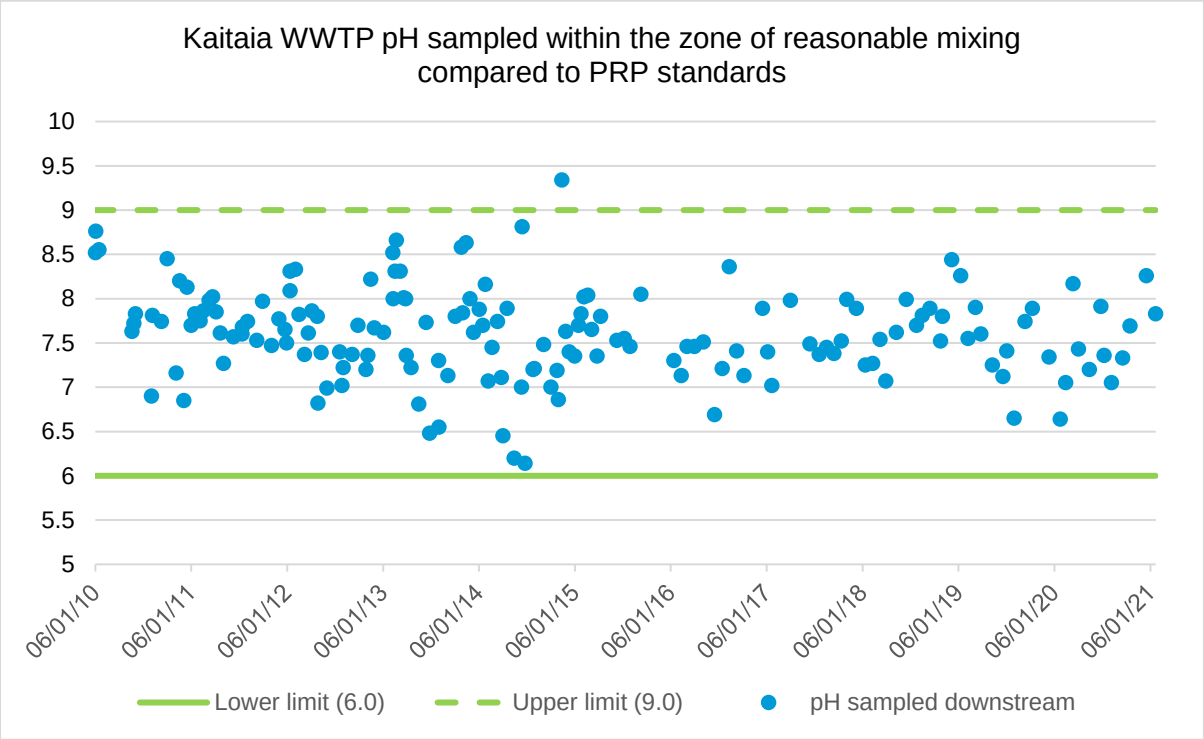


Figure 10 Kaitāia WWTP Dissolved Oxygen sampled within the zone of reasonable mixing compared to PRP standards

6.2.4. pH

pH has been monitored at the downstream site since 2010 and has been consistent with the PRP standards for pH over 165 samples with the exception of one exceedance of the upper limit where the pH was 9.34.



6.2.5. Temperature

The compliance metric for temperature is not a single maximum value but based on the Cox-Rutherford Index (CRI = (Tmax + Tmean)/2) which uses measurements of temperature from continuous measurements, over the hottest five consecutive days at all flows. CRI data is not available and comparing upstream and downstream is considered a reasonable method for determining compliance with the PRP.

Data from over 190 temperature samples, taken since January 2010 has been assessed to determine whether the WWTP can continue to comply with the temperature requirements. This information shows that the temperature of the wastewater discharged into the Awanui River, at the discharge point is within 0.2 and 1.5 degrees of that of the upstream sampling point. The temperature of the downstream sampling point is within 0.2 and -0.25 of the upstream sampling point.

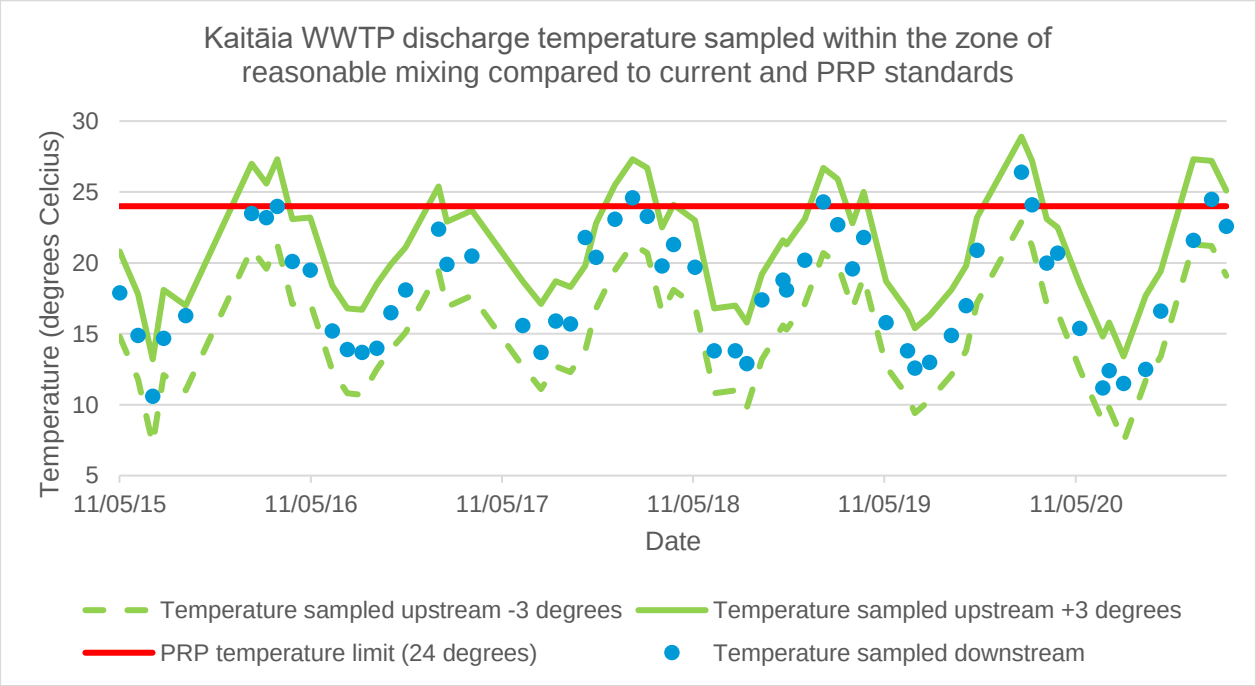


Figure 11 Kaitāia WWTP discharge temperature compared to current and PRP standards

Over the sampling period there have been 15 instances where the temperature of the water at the downstream monitoring site has been at 24 degrees or above. On each of these occasions the upstream water temperature has also been in excess of 24 degrees (with the exception of one sample where the temperature was 23.8 degrees).

Therefore, it is considered that the wastewater discharge has very little influence on the temperature of the Awanui River.

6.2.6. Turbidity and visual clarity

Turbidity and total suspended solids have been assessed as being marginally higher at the downstream monitoring site compared to the upstream monitoring site, however this value is compliant with relevant default guidelines at the end of the mixing zone.

6.2.7. Toxicants

The two nutrients of concern in wastewater are nitrogen and phosphorus. These are required in sufficient amounts to allow bacterial growth for wastewater treatment, and their concentration affects the performance of biological processes. However, as final wastewater (i.e., wastewater that is discharged) nitrogen and phosphorus can provide a nutrient load that has an adverse effect on a receiving environment. Phosphorus is a major nutrient for biological growth and high concentrations can cause significant adverse effects on receiving waters.

The ecological assessment reports that the effects on the water quality and ecology of the Awanui River from the current WWTP discharge below the reasonable zone of mixing (120 m) is minimal. Ammonia and nitrate discharged from the WWTP within the zone of reasonable mixing are compliant with the PRP water quality standards.

6.2.8. Nitrate

Over the term of this consent nitrate has not been monitored other than in the form of ammoniacal nitrogen and dissolved inorganic nitrogen. However, based on the downstream water quality data is it reasonable to determine that the discharge does not have an affect relative to the nitrate toxicity standards in the PRP.

6.2.9. Ammonia

The PRP sets the annual median limit for ammonia (NH_4-N) at ≤0.24 mg/L, and the annual maximum at ≤0.40 mg/L. Data from over 190 samples, taken since January 2010 have been assessed to determine whether the WWTP can continue to comply with the ammonia requirements.

Using a 12-month rolling average of the ammonia sampled at the current downstream sampling point, the current level of treatment is sufficient to ensure that the wastewater will meet these ammonia standards after the zone of reasonable mixing. This is illustrated in Figure 12, below.

It should be noted that the assessment of ammonia in appendix 1 has determined compliance with ammonia standards using an AGNZ (2018) Default Guideline Value, which is significantly lower than the A grade/state for ammonia toxicity in the NPS-FM (<0.03 annual median; 0.05 annual maximum) and another order of magnitude lower than the PRP standards.

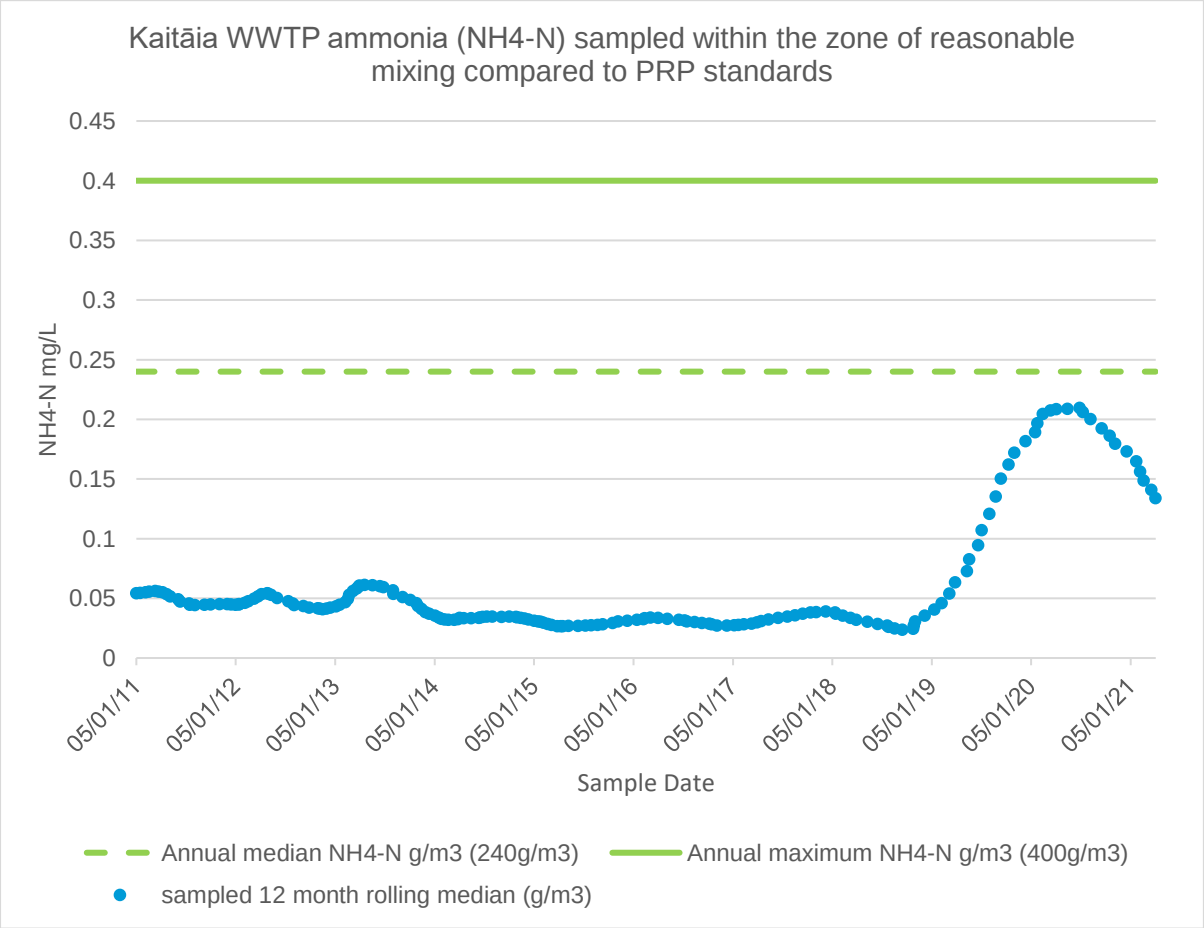


Figure 12 Ammonia (NH4-N) sampled within the zone of reasonable mixing compared to PRP standards

6.2.10. Trade waste discharge from JNL

Junken New Zealand (JNL) is a tri-board manufacturing mill in Kaitāia, it is the primary contributor of industrial wastewater to the WWTP. Pre-treated wastewater from JNL is discharged into the Kaitāia wastewater network for treatment at the WWTP.

A water quality monitoring programme was undertaken in early 2021 to characterise the JNL trade waste discharge and to assess the effect that the discharge from JNL has on the Kaitāia WWTP as well as the toxicity effects of products used by JNL on the WWTP and Awanui River.

The report for this assessment is titled 'Kaitāia Wastewater Treatment Plant Trade Waste Effects Assessment' and is attached as appendix 3 and summarised below.

Over a two-week monitoring period wastewater from JNL was sampled at the outlet of the JNL wastewater treatment plant, and the influent to the Kaitāia WWTP. Overall, the monitoring shows that the JNL discharge has little to no effect on the influent to the Kaitāia WWTP. All sampled contaminants show a decrease in their concentration between the influent and effluent samples, except for nitrate-N and nitrite-N, which increased. The increase in nitrate-N and nitrite-N indicates that the treatment processes at the WWTP converts ammonia-N into nitrates and nitrites, as designed. The impact of the JNL discharge on the Kaitāia WWTP wastewater has been determined to be negligible.

Toxicity sampling was undertaken for toxicants identified as likely to originate from the processes that occur at JNL including melamine, formaldehyde, propiconazole, tebuconazole, TPH and permethrin. Samples were taken from the JNL discharge and the WWTP influent and effluent sampling points. Across all parameters none of the sampled toxicants are expected to affect the Awanui River due to the low concentrations within both the influent and effluent sampled.

Of the possible toxicants discharged by the treatment plant, none are expected to have an impact on the receiving environment. None of these potential toxicants are likely to result in biological accumulation in fish and the subsequent risks of adverse effects on human health as a result are considered to be extremely unlikely.

6.2.11. Trophic state

Total phosphorus was monitored at the WWTP over the period of January 2010 to March 2015. Mean total phosphorus from these samples range between 1.1g/m^3 and 6.85g/m^3. Typical total phosphorus concentrations within pond-based treatment plant wastewater are likely to be between 6 to 8.2g/m^3 [11], and while it is reasonable to assume that the current total phosphorus of the wastewater would remain within the range that was sampled between 2010 and 2015, the higher value of 8.2g/m^3 has been adopted for the purposes of this exercise.

Total nitrogen has not been monitored at the WWTP. The New Zealand Guidelines for the Design, Construction and Operation of Oxidation Ponds (Revised 23 May 2005) indicate total nitrogen from a pond-based system is likely to average approximately 40g/m^3.

Typical nutrient concentrations (total nitrogen plus total phosphorus) from the WWTP are therefore assumed to be 50g/m^3. Analysis of the flows from the WWTP over the same period indicate that the average dry weather flow from the WWTP 2,277m^3/day and the typical daily nutrient loading from the WWTP is estimated to be 114 kilograms per day.
The NPS-FM 2020 periphyton compliance metric specifies monthly time series of periphyton observations (as chlorophyll a) for at least three years. The metric used for grading a site is the 92nd percentile of chlorophyll a (hereafter referred to as “Chla_92”), which is equivalent to at least three exceedances of the thresholds separating bands A and B (50 mg/m^2), B and C (120 mg/m^2) and C and D (200 mg/m^2) recorded during three years of monthly monitoring. NRC routinely monitors periphyton biomass at 39 sites, including one site upstream of the WWTP discharge (Awanui River at FNDC).

A relatively recent report prepared by NIWA for NRC assessed current state of periphyton growth in Northland rivers and relationships between periphyton biomass and nutrients.[12] The report found that the Awanui River at FNDC site is graded as being in the C periphyton attribute state band. It is understood that there is insufficient data to assign a periphyton attribute state band to the reach of the river below the WWTP discharge. An earlier report prepared by NIWA for Northland Regional Council found that the Awanui River at Waihoe Channel and Awanui River at FNDC sites are nitrogen limited.[13].

[11] (Hickey et al. 1989, Davies-Colley et al. 1994)
[12] Cathy Kilroy and Rick Stoffels. June 2019. Periphyton growth in Northland rivers: Current status, and development of relationships for nutrient limit-setting. Prepared for Northland Regional Council. NIWA Client Report No: 2019064CH.
[13] Craig Depree and Kathy Walter. March 2016. Average annual and seasonal accrual periods for Northland streams. Prepared for Northland Regional Council. NIWA Client Report No: HAM2016-020.

6.2.12. Fish and macroinvertebrates

An ecological and water quality investigation has been undertaken to assess the effects of the current discharge on the ecology of the Awanui River. Water quality monitoring and ecological sampling was undertaken in April 2021, across six representative reaches of the river, both upstream and downstream of the discharge point.

The assessment revealed degraded water quality and stream health of the Awanui River, both upstream and downstream of the point of discharge. The results of the survey are indicative of, among other things, long-term agricultural land use within the wider Awanui catchment.

This assessment is titled 'Baseline Ecological Report – Awanui River at Kaitāia Wastewater Treatment Plant' and is attached as appendix 2. A summary of the key findings is presented below.

- Water quality monitoring results were compared against the National Policy Statement for Freshwater Management 2020 (NPS-FM) and where the NPS-FM does not include a standard for a parameter these were compared against the default guideline trigger values of the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG). ANZG default guideline values indicate potential risk of adverse effects at a site.
- Within the mixing zone concentrations of total nitrogen, total ammoniacal nitrogen, dissolved reactive phosphorus and total phosphorus exceeded ANZG guidelines. Dissolved reactive phosphorus exceeded the NPS-FM 2020 national bottom line directly below the discharge point site.
- With the exception of total nitrogen concentration, at the termination of the 120-metre mixing zone nutrient concentrations decreased to below default ANZG guideline values. Total nitrogen within the Waihoe Channel also exceeded default guidelines and it is reasonable to conclude that the Waihoe Channel contributes not insignificantly to total nitrogen concentrations within the Awanui River.
- Turbidity, suspended solids and biological oxygen demand were compliant with the relevant default guideline values 120 metres downstream of the discharge point.
- E. coli concentrations were lower below the discharge point compared to upstream, indicating that the wastewater discharge provides dilution of E.coli within the Awanui River.
- The peak daily temperatures recorded from both reaches were below the PRP standard for water temperature for the entire continuous monitoring period.

- Dissolved oxygen (DO) measurements recorded upstream were consistently higher than those downstream, however downstream DO concentrations and saturations were above the PRP standard of 4.0 mg/L. The range of concentrations and saturations recorded for the upstream reach 7.68-11.64 mg/L and 82-127.28%. Downstream DO concentrations and saturation ranged between 6.48-9.42 mg/L and 70.2-103.36%.

6.2.12.1. Habitat Assessment

- The riparian zone upstream of discharge point is classified as 'suboptimal'. At the time of sampling periphyton presence was very high with filamentous periphyton covering 50-75% of available substrates. Habitat for instream fauna is diverse, including undercut banks and woody debris of various sizes.
- The riparian zone in the subject area downstream of the discharge point ranks similar to the upstream subject area, also falling within the suboptimal category. Periphyton is prolific through the downstream reach and appeared to have marginally less cover than the upstream site.

6.2.12.2. Macroinvertebrate Assessment

- The Awanui River reach located downstream of the Kaitāia WWTP discharge point scored slightly worse than the upstream 'control' reach across most macroinvertebrate indices.
- MCI scores upstream and downstream of the point of discharge were below the NPS-FM (2020) national bottom line (<90). The QMCI scores were 2.14 and 2.05, respectively, and are also significantly lower than the NPS-FM 2020 national bottom line.
- Poor stream health and probable severe pollution in the Awanui River is likely a result of agricultural land use in the wider catchment. Benthic invertebrate communities are largely composed of taxa insensitive to inorganic pollution and nutrient enrichment.

6.2.13. Effects on Ecological Values - Conclusion

Overall, the results of this assessment demonstrate that the WWTP discharge is not having a pronounced effect on the water quality and ecology of the Awanui River relative to the upstream reach. Given the assessment of effects from the current discharge, it can be assumed that the planned WWTP upgrades will only improve the quality of the treated wastewater discharge into the Awanui River and that the wastewater discharge will continue to have a no more than minor effect on the ecological values of the Awanui River.

6.3. Water Users

6.3.1. Fecal Pathogens

In a properly performing treatment plant pathogenic bacteria in wastewater die-off and are consumed by other organisms as they pass through the treatment stages. In the Kaitāia WWTP exposure to sunlight and algae present in the ponds is used to inactivate and kill pathogenic bacteria. This treatment will be upgraded to include an ultraviolet (UV) disinfection treatment processes, to treat the final effluent before it is discharged. The installation of filtration and UV disinfection of the WWTP prior to discharging to the river will reduce pathogen concentrations significantly

Faecal indicator bacteria (FIB) are common bacteria normally found in the gut of warm-blooded animals and people. The presence of FIB in water indicates that other harmful pathogens may also be present. FIB are monitored in water using a faecal indicator bacteria, for the Kaitāia WWTP E. coli is the chosen indicator.

In 2015 FNDC undertook a linear regression analysis to compare the influence of the wastewater discharge and the upstream water quality on downstream E. coli values.

The results, shown in Figure 13 , indicate a strong positive relationship between the upstream; around 90% of the variation in downstream E. coli can be explained by upstream water quality.

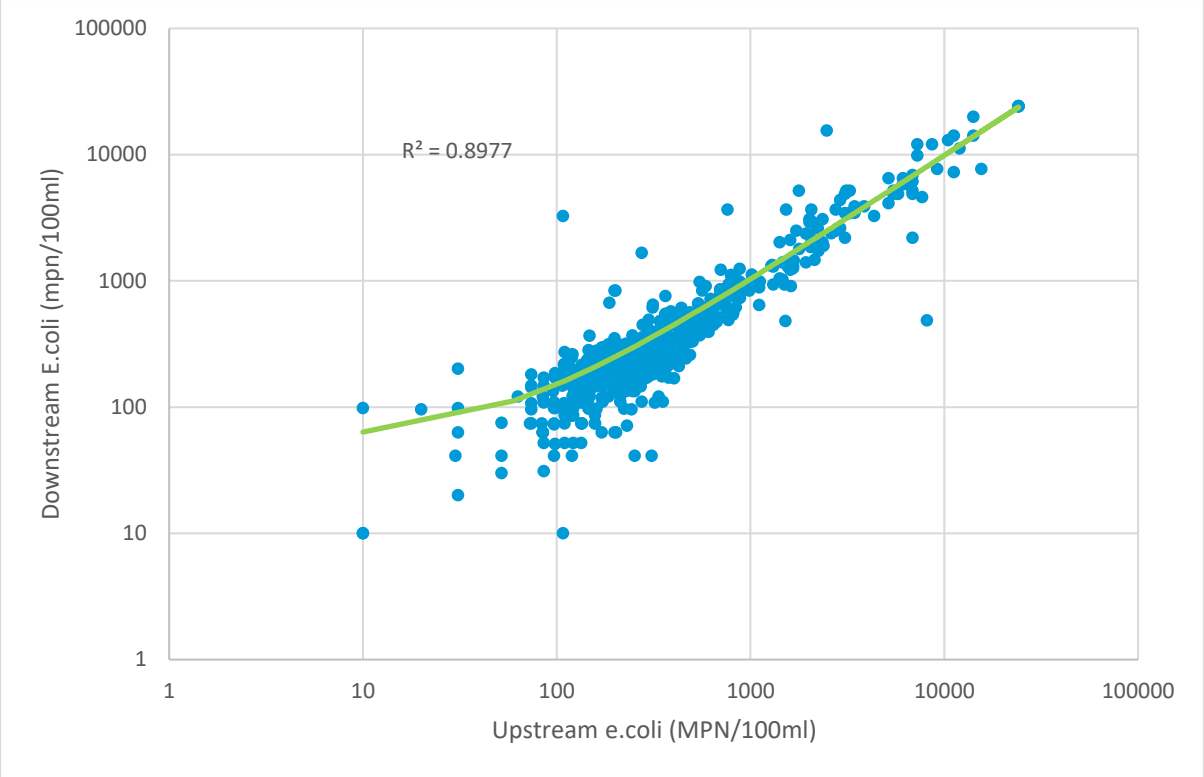


Figure 13 Scatter plot showing E. coli concentrations (independent variable) compared against downstream concentrations (dependant variable). Variables are plotted against a logarithmic scale owning to the extreme variability in E. coli concentrations

Using the same analysis with discharged E. coli as the independent variable and downstream water E. coli as the dependant variable yielded an R^2 value of 0.01 as shown in Figure 13. This suggests that around 1% of the variation in downstream E. coli can be explained by changes in E. coli levels within the treated wastewater discharged into the Awanui River.

In other words, E. coli concentrations in the wastewater cannot be used with any degree of confidence to predict E. coli levels downstream of the discharge point.

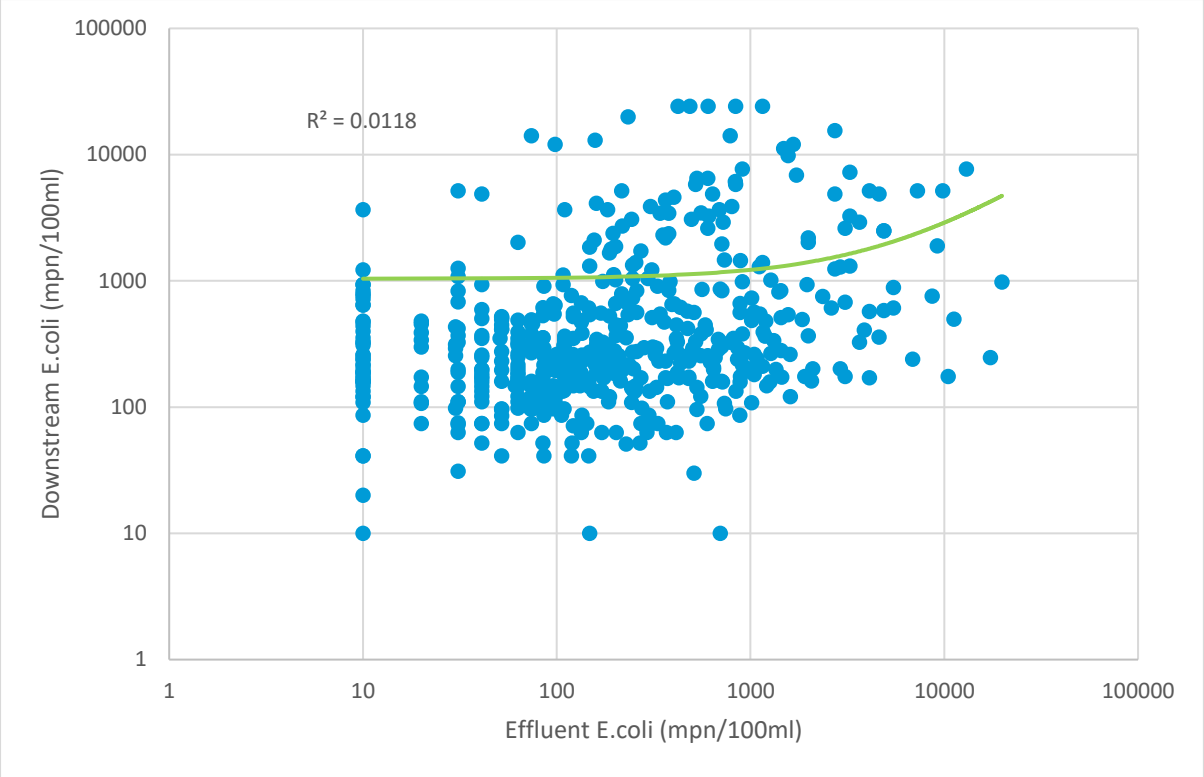


Figure 14 Scatter plot showing effluent E. coli concentrations (independent variable) compared against downstream concentrations (dependant variable). Values are plotted against a logarithmic scale owing to the extreme variability in E. coli concentrations.

To understand why the treatment plant discharge has a minimal influence on the E. coli concentrations within the river, it is useful to consider the total daily E. coli loading rates from both sources. By knowing the daily flow rates and median E. coli values at both sources it is possible to extrapolate approximate daily E. coli loading.

The Awanui River's mean annual low flow (MALF) value of 892l/s can be used to provide some conservatism in the estimate. For the Kaitāia WWTP, average flow of 27l/s (or 2,277m^3/day) was used. The Kaitāia WWTP average discharge rate is about 3% of the Awanui River MALF flows, so it is reasonable to expect that the E. coli loading rate from the WWTP would be significantly less than the river itself.

Using the median E. coli concentrations derived from the results of the resource consent monitoring programme between 2005 and 2015, the approximate E. coli daily load is $4.3x10^{11}$ E. coli from the Kaitāia WWTP, and $1.1X10^{13}$ E. coli from the Awanui River. Therefore, on average the Kaitāia WWTP can be expected to make up about 4% of the total daily E. coli load into the river at the point of discharge.

Taking into account the above, the E. coli sampling carried out over the 10-year period between 2005 and 2015 demonstrates with a high degree of confidence that the discharge does not cause an appreciable increase in E. coli within the Awanui River.

The PRP does not contain standards for E. coli, however the Environment Court has heard appeals on this aspect of the PRP and baseline standards for E. coli may be included as a result of those appeals. For the purpose of this assessment, it has been assumed, based on the content of the appeals, that discharge standards for E. coli equivalent to Attribute State C (yellow) of the NPS-FM will need to be achieved at the downstream sampling point.

E.coli[14]	% exceedances over 540/100mL	10% - 20%
	% exceedances over 260/100mL	20-34%
	Median	≤130
	95th percentile	≤1200

Table 4 Attribute State C (yellow) of the NPS-FM

Over the period January 2016 to July 2020 E. coli has been sampled at the downstream and upstream site 63 times. While concentrations of E. coli are relatively high at the downstream sampling point, there is generally no discernible difference between the upstream and downstream E. coli concentrations.

In terms of compliance with the NPS-FM standards, across this period there have been 14 instances of the discharge sampled at the downstream sampling site exceeding 540/100mL, equivalent to approximately 22.2% of the exceedances. For all these exceedances the upstream sample has also been in excess of 540/100mL. For nine of these 14 results the downstream E. coli value was lower than the upstream value, likely owing to dilution provided by the discharge. Adjusting the exceedances of 540/100mL to five exceedances over 63 samples; 10.5% of the exceedances have been more than 540/100mL.

Similarly, 34 of the 63 samples have been more than 260/100mL, equivalent to approximately 54% of the exceedances. Adjusting the exceedances of 260/100mL to account for the 14 samples where the downstream value is less than the upstream value, 33.3% of the exceedances have been more than 260/100mL.

[14] Attribute state should be determined by using a minimum of 60 samples over a maximum of 5 years, collected on a regular basis regardless of weather and flow conditions.

It is considered that the wastewater discharge has very little influence on the E. coli concentrations in the Awanui River beyond the zone of reasonable mixing, and that the discharge has a less than minor effect on water use values of the Awanui River.

6.3.2. Cyanobacteria

Cyanobacteria, sometimes known as blue-green algae, is a group of bacteria that are widely and naturally present in aquatic environments. Cyanobacteria use sunlight to make their food and in warm nutrient-rich environment cyanobacteria can multiply quickly creating blooms that spread across the surface of the water.

The WWTP is prone to developing cyanobacteria blooms during summer months when increased temperature conditions are experienced in both the WWTP and the receiving environment.

Cyanobacteria does not affect the ability of the WWTP to treat effectively treat wastewater, but it can cause an odour issue (if it decomposes on the ponds) and can be fatal to aquatic life when discharged into surface water in high concentrations, or fatal to animals consuming affected water.

An assessment has been undertaken to determine the potential effects of cyanobacteria on people and animals, and downstream cyanobacteria populations, attached as appendix 2, and discussed below.

Condition 8(g) of the current consent (AUT.000923.01.03), and condition 4.2.3 of the current consent's monitoring schedule respectively require:

> 8 (g) The waters shall not be tainted so as to make them unpalatable to farm animals, not contain toxic substances to the extent that they are unsuitable for consumption by farm animals. The microcystin concentration shall not exceed 2.3 micrograms per litre, expressed as microcystin-LR, for samples taken in accordance with Section 4.2.3 …
>
> 4.2.3 During periods when blue-green algae are prominent in the pond discharge one triplicate sample shall be taken each week from NRC Sampling Site 100370, and analysed for microcystins, expressed as microcystin-LR.

Since the current consent was issued, cyanobacteria monitoring, and management guidelines have been published by the Ministry for the Environment. These are expressed in

terms of three alert levels: surveillance (green mode), alert (amber mode) and action (red mode)[15].

Over the period from 9 January 2012 to 9 February 2021 a total of 164 samples were collected from the downstream site and analysed for total cyanobacteria cell count. 91% of these samples exceeded the surveillance (green mode) alert level guideline of 500 total cyanobacteria cells per millilitre.

In the same period, a total of 241 samples were collected from a farm water intake approximately 1.5 km downstream of the discharge point and analysed for microcystin cyanotoxins concentration. On all occasions the toxin concentrations recorded for the farm intake site were below the minimum detection limits of the analysis.

While it appears that cyanobacteria at the WWTP discharge point can exceed the surveillance (green mode) guideline, the concentrations of cyanotoxins have never reached levels that would breach the action (red mode) guideline that indicates a risk to public health.

It is known that cyanotoxins like microcystin can accumulate in the tissues of organisms that are subjected to elevated cyanobacteria numbers. Wood et al (2006), documented the bioaccumulation of microcystins in the tissues of rainbow trout and while it is acknowledged that trout have not been recorded in this catchment, this study has been used as a comparative example. Dolamore et al (2017) found that cyanotoxins accumulated in eel liver at much higher concentrations than in muscle tissue. This study concluded that while eels may be an important mahinga kai species, provided the liver is discarded, the risk of adverse effects to human health from the consumption of eels is low.

Based on the concentrations of microcystins found in this study, the Cyanobacteria Interim Guidelines suggest it is unlikely that eating fish flesh as part of a regular balanced diet would result in adverse health effects. The Guidelines recommend that fish be gutted and thoroughly washed in clean tap water before eating. The assumption of low human health risk may need to be revisited if intense or prolonged cyanobacterial blooms occur.

Should the action level (red mode) cyanobacteria guideline be triggered as a result of monitoring, then signs should be erected advising the public not to consume fish from the affected areas.

[15] https://environment.govt.nz/assets/Publications/Files/nz-guidelines-cyanobacteria-recreational-fresh-waters.pdf

Cyanobacteria cannot be removed from the treatment ponds, however the conditions in which it might bloom can be managed. Planned upgrades to the WWTP will see the decommissioning of the final maturation pond which should reduce the ability of cyanobacteria to develop.

Recommendations in appendix 2 (PDP – Baseline Ecological report) include maintaining available phosphorus to below 10mg/m^3 and temperature to below 15 degrees. As shown in Figure 15 below, the dissolved reactive phosphorus and total phosphorus in the discharge is consistently maintained below 10mg/m^3. No interstage testing information to confirm the concentration of available phosphorus throughout the stages of treatment.

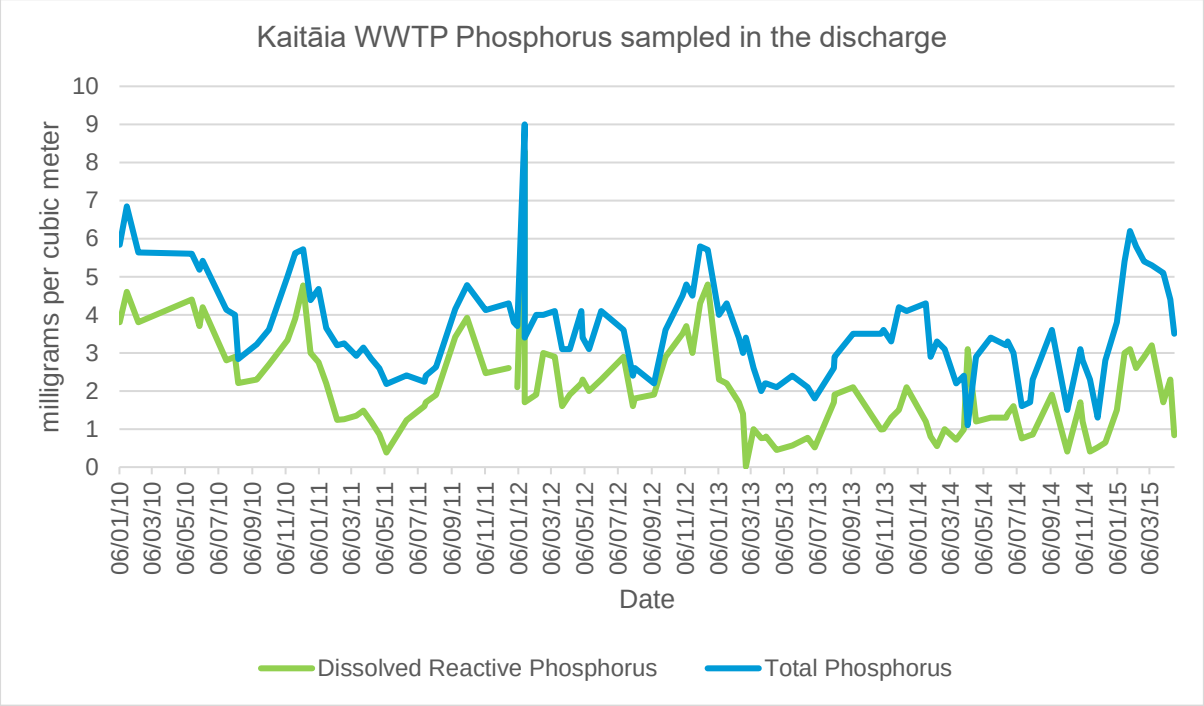


Figure 15 Kaitāia WWTP phosphorus sampled in the discharge

It is not practical to maintain the temperature of the ponds below 15 degrees in a Far North climate or without significant upgrades to the WWTP to limit the exposure of the ponds to sunlight and without likely adversely affecting the temperature of the Awanui River.

The potential effects of cyanobacteria on people and animals at the current levels discharging from the Kaitāia WWTP are minimal and can be managed in accordance with the Ministry for the Environment (MfE) guidelines.

Cyanobacterial monitoring should be undertaken on the effluent discharge from the WWTP and within the receiving environment. Monitoring should include parameters that reflect the current guidelines issued by MfE and (Ministry of Health) MoH. This monitoring should include analysis for total cyanobacterial cell counts, biovolume equivalents for combined total of all cyanobacteria, biovolume equivalent of potentially toxic cyanobacteria and total microcystin concentrations.

This sampling should be undertaken on a fortnightly basis when there is greatest potential for cyanobacterial proliferation between spring and autumn, i.e., when water temperatures in the receiving environment exceed 15 degrees celcius, with sampling frequency increasing in response to cyanobacterial monitoring results, as per the MfE and MoH guidelines.

Proposed cyanobacteria monitoring conditions are included in section 12.

Figure 16 Kaitaia WWTP constructed wetlands (2021)

6.4. Natural Hazards

6.4.1. River flood hazards

A flood hazard risk assessment has been undertaken to confirm the actual risk to the WWTP and sludge storage facility. This assessment is titled ‘Kaitāia Wastewater Treatment Plant – Flood Assessment’ (appendix 6), and is summarised below

- According to NRC’s modelling, the wastewater treatment ponds will be subject to flooding in a 1:50 year flood and 1:100-year flood event and the sludge storage facility will be subject to flooding in a 1:10, 1:50 and 1:100 year flood event. The modelling technique used by NRC has averaged-out the stop bank level over a ‘mesh area’, effectively lowering the bank level for the purposes of the modelling
- Bunds surrounding the WWTP have been surveyed to determine their height in comparison to the modelled flood levels.
- The expected freeboard around the flood bank is greater than 500mm under a 1:100-year flood scenario.
- The expected freeboard under a 1:100-year flood scenario, plus climate change AEP, is less than 500mm, with a minimum of 200mm.

An assessment of the effects of the WWTP on flood water displacement has also been undertaken. Flood water displacement assessments are only required for new structures that infill a floodplain, however, to understand the effects of the treatment plant on nearby properties, and to allow for any future planning or expansion of the WWTP a floodwater displacement assessment was undertaken.

The effect on floodwater displacement from the Kaitāia WWTP being located within the active floodplain is minimal, with a calculated increase of water level of 13mm in a 1:100 year plus climate change event. Adding additional height to the bunds is likely to have little to no effect on the surrounding flood levels.

6.4.2. Extreme rainfall

Wastewater networks can be affected by extreme rainfall events due to significant stormwater flows entering the system and increased groundwater infiltration into pipes. In extreme cases, where wastewater networks have relatively high stormwater inflow and infiltration, severe weather events can result in the network being overloaded, resulting in network overflows.

Extreme inflow and infiltration events can also reduce the treatment capacity of the wastewater treatment plant by reducing residence time as a result of significant increases in wastewater flows.

The magnitude and frequency of storm events is predicted to increase as a result of global warming. An increase in the magnitude and frequency of storm events may potentially increase the magnitude and frequency of wastewater overflows due to inflow and infiltration.

The High Intensity Rainfall Design System (HIRDS) can estimate high intensity design rainfall depths at any point in New Zealand. It can be used for assessing storm rarity and for hydrological design purposes. HIRDSv4 has been used to predict the changes in extreme rainfall intensity and duration in at Kaitāia.

Output tables include predicted changes in rainfall depth based on the four climate change scenarios ‘Representative Concentration Pathways’ by the Intergovernmental Panel on Climate Change (IPCC). Representative Concentration Pathways represent different climate change mitigation scenarios, one (RCP2.6) leading to very low anthropogenic greenhouse gas concentrations (requiring removal of CO2 from the atmosphere), two stabilisation scenarios (RCPs 4.5 and 6.0), and one (RCP8.5) with very high greenhouse gas concentrations. Therefore, the Representative Concentration Pathways represent a range of twenty first century climate policies.

HIRDSv4 output table for the RCP8.5 scenario is provided in Figure 17 below.

Duration		ARI years											
		1.58	2	5	10	20	30	40	50	60	80	100	250
10m		9.41*	10	13.5	16	18.4	20	20.9	22	22.4	24	24.3	28
		10%**	10%	11%	11%	12%	11%	11%	11%	11%	12%	11%	12%
20m		14.3	16	20.7	24	28.1	30	31.9	33	34.2	36	37.2	42
		10%	10%	11%	11%	12%	11%	11%	11%	11%	11%	12%	12%
30m		18	20	26	31	35.4	38	40.2	42	43.2	45	46.9	54
		10%	10%	11%	11%	11%	11%	11%	11%	12%	12%	12%	11%
1h		25.9	29	37.5	44	51	55	58.1	60	62.3	65	67.8	77
		10%	10%	11%	11%	11%	11%	12%	11%	11%	12%	12%	12%
2h		35.8	40	51.9	61	70.7	77	80.6	84	86.5	91	94.1	108
		9%	10%	10%	11%	11%	11%	11%	11%	11%	11%	11%	12%
6h		55.1	61	80	94	109	118	125	130	134	141	146	167
		8%	8%	9%	9%	9%	9%	10%	9%	10%	10%	10%	10%
12h		68.9	76	100	118	137	148	157	163	168	177	183	210
		7%	7%	8%	7%	8%	8%	8%	9%	8%	9%	8%	9%
24h		83.3	92	121	143	166	179	189	197	204	214	222	254
		6%	6%	6%	7%	7%	7%	7%	7%	7%	8%	7%	7%
48h		97.1	107	141	167	194	210	222	231	238	250	260	298
		5%	5%	5%	6%	6%	6%	6%	6%	6%	6%	7%	6%
72h		104	115	152	180	209	226	239	249	257	270	280	322
		4%	5%	5%	5%	6%	6%	6%	6%	6%	6%	6%	6%
96h		109	120	159	188	219	237	250	261	269	283	294	337
		4%	4%	5%	5%	5%	5%	5%	6%	5%	6%	6%	6%
120h		113	124	164	194	226	244	258	269	278	292	303	348
		5%	4%	4%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Figure 17 HIRDSv4 projected rainfall depth (mm), duration and frequency statistics for Kaitāia based on RCP8.5 for the period 2031-2050

**= depth of rainfall in mm*

***= percentage increase in depth compared to current day*

Based on the output from the HIRDSv4 RCP8.5 scenario, it is projected that for the period 2031-2050 rainfall depths associated with extreme rainfall events will increase by 7% to 12% for events less than 12 hours, and between 4% and 8% for events occurring over a period of between 24 hours and 120 hours.

Overflows within the network associated with rainfall events are currently very common (approximately 15 per year), however overflows are currently being addressed through network improvements which aim to bring the overflow frequency down to once a year. Network improvements will also see a reduction in stormwater inflow and infiltration, and it is considered that the increases in rainfall extremes identified above are unlikely to materially affect the capacity of the network or the WWTP.

6.4.3. Managing the effects of natural hazards

The FNDC 30 Year Infrastructure Strategy sets out the need to manage change as a result of climate change as a strategic priority. The 30 Year Infrastructure Strategy identifies responses to climate change impacts on infrastructure that requires active management alongside affected communities throughout the term of the strategy.

Responses to climate change will likely be varied, ranging from relocating affected assets through to managed retreat and associated reduction in levels of service. These are significant decisions that will potentially result in major impacts on Far North communities.

The 30 Year Infrastructure Strategy sets out a strategic commitment to ensure the resilience of the wastewater network is improved taking into account the impacts of climate change.

The decisions made by FNDC will require consultation within the community in accordance with the Local Government Act 2002, and it is not possible at this time to confirm what those management approaches might entail.

Taking into account the relatively low risk to the network associated with anticipated climate change impacts, it is not considered necessary to do so for the purpose of this resource consent application, particularly given the most extreme impacts are unlikely to occur within the term of the replacement resource consent.

6.5. Tangata Whenua and Cultural Values

Policy D.1.1 of the PRP sets out the requirements for when an application for resource consent must analyse the effects of an activity on the assessment of effects on tangata whenua and their taonga.

Policy D.1.1 - When an analysis of effects on tangāta whenua and their taonga is required

A resource consent application must include in its assessment of environmental effects an analysis of the effects of an activity on tangāta whenua and their taonga if one or more of the following is likely:

1. adverse effects on mahinga kai or access to mahinga kai, or
2. any damage, destruction or loss of access to wāhi tapu, sites of customary value and other ancestral sites and taonga with which Māori have a special relationship, or
3. adverse effects on indigenous biodiversity in the beds of waterbodies or the coastal marine area where it impacts on the ability of tangāta whenua to carry out cultural and traditional activities, or
4. the use of genetic engineering and the release of genetically modified organisms to the environment, or
5. adverse effects on tāiapure, mataitai or Māori non-commercial fisheries, or
6. adverse effects on protected customary rights, or
7. adverse effects on sites and areas of significance to tangāta whenua mapped in the Regional Plan.

The wastewater discharges directly into the Awanui River which ultimately discharges into the Rangaunu Harbour. NgāiTakoto, Te Rarawa and Ngāti Kahu are the iwi that have kaitiaki and mana whenua over the Awanui River.

The tikanga of Ngāti Kahu is that the hapū with mana whenua provide cultural and other assessments regarding any developments within their rohe. For this application Ngāi Tohianga hapū have been identified as the mana whenua hapū.

It is widely understood that the discharge of treated wastewater to surface water can have an adverse effect on Māori cultural values and FNDC's initial discussions with representatives from each of the identified mana whenua indicate that the discharge of treated wastewater from the WWTP has an adverse effect on the mauri of the Awanui River and mana of iwi.

Likely effects include those listed in D.1.1.1 to D.1.1.3 and D.1.1.5, as this application does not include genetic engineering, affect a protected customary right, or affect a site or area of significance to tangata whenua that have yet been mapped by the PRP.

Both Te Rarawa and Ngāti Kahu have been engaged to prepare a cultural impact assessment (CIA) in accordance with Policy D.1.1.2 of the PRP.

These CIA will analyse the effects of the treated wastewater discharge on cultural values, and the ways that any more than minor adverse effects on cultural values may be avoided, remedied or mitigated.

6.5.1. Te Rarawa

A CIA has been prepared on behalf of Te Runanga o Te Rarawa and its hapū constituents and is attached as appendix 5. Mana whenua of Te Runanga o Te Rarawa have identified concerns related to both the discharge of wastewater in to the Awanui, and the seepage of wastewater from the base of the WWTP. It is clear from the CIA that the continued discharge of wastewater to the Awanui, and the current management of the use of the Awanui River and its catchment has an adverse effect on tangata whenua values.

The CIA contains a number of recommendations to manage the general use of the Awanui River. A number of these recommendations, particularly those in Part 1 – 'Tangata Whenua and Council Working Together', Part 2 'Towards Integrated Catchment Management', Part 4 'Freshwater and Climate Change Reforms' cannot be ensured by FNDC, by way of a consent condition, because these are functions of the Regional Council that FNDC cannot influence.

Some of the recommendations in Part 3 'Kaitāia Wastewater Treatment Resource Consent' can be carried out by FNDC, including those where Te Runanga o Te Rarawa are engaged in determining the feasibility of discharge to land, cultural health monitoring and providing performance information.

FNDC and Te Rarawa are working toward an agreed way forward on all of the recommendations. It is likely that a working group, with a terms-of-reference based on the recommendations of the CIA will be formed including representatives from Te Rarawa, FNDC and NRC.

Te Rarawa have also shared concerns that a 35-year consent term is too long, and that a shorter term would be more suitable as it would work to ensure the treated wastewater is removed from the Awanui River sooner rather than later. FNDC has requested a 15 year consent term to reflect this concern, and has also proposed a condition whereby the

resource consent to discharge to water is surrendered when discharge to land is available (should the infrastructure be commissioned in less than 15 years)

6.5.2. Ngāi Tohianga hapū

Ngāi Tohianga hapū have been formally engaged by FNDC to author a CIA. Ngāi Tohianga hapū are currently drafting the CIA and this will be provided to NRC once it is finalised. Based on discussions with representatives of Ngāi Tohianga hapū, it is likely that some mitigation recommendations will be similar to Te Rarawa's CIA (e.g., cultural Health monitoring and sharing information on WWTP performance) and so it is sensible to wait until this CIA is received before offering consent conditions.

6.5.3. NgāiTakoto

At the time of preparing this application Te Runanga o NgāiTakoto has indicated that it does not wish to undertake a CIA. Should this position change after this application is lodged, FNDC continues to be supportive of a CIA being undertaken.

NgāiTakoto identifies the Awanui River as a statutory area in one of the iwi's nine Statutory Acknowledgements. With respect to bodies of water a Statutory Acknowledgement applies to the whole body of water, so the statutory area applies to the whole of the Awanui River.

Knowing that the discharge of treated wastewater to surface water can have an adverse effect on Maori cultural values, and that NgāiTakoto is not supportive of the continued discharge of treated wastewater to water, an analysis of the effects of the activity on NgāiTakoto against policy D.1.2 is required regardless of whether a CIA is undertaken by the relevant tangata whenua.

To identify the effects that the discharge of treated wastewater has on NgāiTakoto, policy D.1.2(a) of the PRP requires that an analysis must have regard to Te Iwi o Ngāi Takoto environmental plan (TRONT Environmental Plan). The discharge of treated wastewater into the Awanui is not consistent with the objectives and policies of the TRONT Environmental Plan, specifically those that apply to water as the discharge of treated wastewater to the Awanui River does not preserve the mauri of the water and with the objectives as strategies for NgāiTakoto's vision for the Awanui River

6.5.4. Tangata Whenua and Cultural Values Conclusion

In accordance with Policy D.1.3 Te Rarawa, Ngāti Kahu and NgāiTakoto are identified as adversely affected parties for the purposes of notification as the adverse effects on cultural values are expected to be more than minor. While, for the purposes of this application, the

discharge of wastewater to water is considered the best practicable option, the FNDC is continuing to investigate wastewater discharge to land options (and therefore the removal of wastewater from the Awanui River) alongside iwi and the removal of the wastewater from the Awanui River is expected to significantly reduce the effects that the wastewater discharge has on tangata whenua values.

7. DISCHARGE OF TREATED WASTEWATER TO LAND (SEEPAGE)

The current consents provide for the possibility that wastewater may seep from the bottom of the treatment ponds and the sludge storage facility into the ground underneath. Neither consent sets out conditions specific to monitoring this discharge and there are no requirements to monitor the contamination of groundwaters or Waihoe Channel.

No changes to the discharge of treated wastewater to land from the base of the WWTP or the sludge storage facility are requested through this application.

The treatment ponds are clay lined and engineered to minimise seepage, and the natural sealing of the base of the ponds over time ensures that any discharge of contaminants to water is minimal. It is reasonable to expect that when wastewater experiences sufficient pressure to cause it to seep through the sludge layer to the base of the pond to where it may seep out, it has received at least partial treatment within the ponds; solids have been removed and microbial action has occurred.

The sludge storage facility is located adjacent to the treatments ponds as shown in Figure 3. Sludge from all the district's pond-based treatment plants is stored for drying at the Kaitāia sludge storage facility.

The sludge storage facility is lined with compacted clay to provide a seal but has not been engineered to a standard where it can be deemed to be impermeable. To minimise the effect on groundwater from seepage any stored sludge is dewatered to a dry matter content of at least 20 percent prior to it being placed into the sludge storage facility. The reduced water content of the sludge reduces the risk of contaminants being transported into the subsoil through seepage.

Soils within the site and within proximity of Bonnetts Road are classified as “clayey recent alluvial soils’, and ‘peaty organic peat/alluvium soils”. Hand augers completed in 2011 to the west of the ponds indicate a very stiff to stiff, plastic and moderately sensitive clay layer, typically 0.5-1.5m beneath ground level. Free water was approximately 0.9-1.2m beneath ground level.

The closest known bore (LOC 210525) is 870 metres from the WWTP site footprint and considering the distance and soil permeability any seepage discharge from the WWTP or sludge storage beds is unlikely to be affected by these discharges.

Given the lining of both the treatment ponds and the sludge storage facility, the clayey soils in the area, and the distance to groundwater, it is reasonable to expect that for both the discharge from the base of the treatment ponds and the sludge storage facility, the effect on both groundwater and surface water is less than minor.

Figure 18 Sludge storage facility and Waihoe Channel (2021)

8. DISCHARGE OF CONTAMINANTS TO AIR (ODOUR)

8.1. Description of Activities - WWTP Odour Discharges

All WWTPs and their operation have the potential to generate objectionable or offensive odours. Wastewater treatment plants are designed to ensure that anaerobic activity does not occur in a manner that would give rise to odours and efficient and quick odour control measures are available should adverse odour be experienced.

Provided that the best practicable option for preventing or minimising the adverse effects of the odour discharge is adopted, and the treatment efficiency of the WWTP is maintained the potential for objectionable or offensive odours, and the adverse effect of the discharge of contaminants to air, is minimal.

Figure 19 Maturation Pond (2021)

8.1.1. Waterfowl deaths

More recently odours have been experienced during summer and have been attributed to decomposing waterfowl (geese and ducks) that had flocked to the WWTP died from avian botulism poisoning.

Avian botulism is a paralytic disease caused by the bacterium Clostridium botulinum, it's spores can lie dormant for years in soil and benthic substrates and are released when favourable environmental conditions are reached leading to an outbreak with the potential to kill high numbers of waterfowl. Macroinvertebrates and maggots living in dead animals are vectors for further transmission of the toxin. A single duck carcass can hold 9,000-10,000 maggots. The ingestion of as few as two toxic maggots can kill a duck, thereby perpetuating the botulism cycle.

Avian botulism is natural and unable to be prevented or removed from the WWTP. Outbreaks on oxidation ponds typically occur during periods of hot, dry and calm weather from December-March but can occur outside these times. No singular causal factor has been isolated; however, conditions leading to an outbreak include:

- Declining water levels
- High pH (optimum 7.5-9.0)
- Warm water temperatures (optimum 25-40 ºC)
- Reduced oxygen levels (especially anoxic events in the hypolimnion)
- Negative redox potential
- A suitable organic substrate

Once botulism becomes established in a water body it is very difficult to eliminate. Therefore, management actions need be taken to minimise the likelihood of an outbreak occurring. All reasonable attempts are made to:

- Maintain minimum water levels
- Avoid sharp water drawdowns especially during warm weather
- Maintain aeration and mixing of the water column to minimise anaerobic conditions
- Reduce the excessive build-up of sludge

Avian botulism poisoning is a common occurrence throughout New Zealand.

To prevent waterfowl from landing on the ponds noise cannons and lasers have been employed in some locations, however neither option has been successful in the long-term. Waterfowl have become indifferent to noise cannons and lasers very quickly and for this reason the cannons or lasers can only be used sparingly and when warranted for examples, when deaths are occurring in high numbers over a prolonged period.

Culling and pond netting are other known techniques for waterfowl control in these circumstances, however these have undesirable consequences and have not been pursued by FNDC. Culling may be opposed by the community and it is essential that injured or dead birds and collected and disposed of to ensure that disease is not spread. Pond netting is not practicable or affordable for very large ponds like those in Kaitāia (~16 hectares), especially where aerators are used in the treatment process, and, anecdotally, the nets provide a good habitat for birds to create nests.

Currently the only successful means of attempting to control the disease is to remove dead waterfowl from the ponds (where it is safe to do so) and dispose of them off site, which helps to break the maggot-cycle. This is considered the best practicable option for Kaitāia WWTP

8.1.2. Cyanobacteria

As discussed in Section 6.3.2 the WWTP is prone to developing cyanobacteria blooms during summer months when increased temperature conditions are experienced in the WWTP. More recently (2019/20 and 2020/21 summers) likely owing to high temperatures and very low rainfall in the Kaitāia area, algae has matted on the ponds and has been able to decompose.

NRC records show that there has been one recorded odour compliant over the period of this resource consent. This complaint was made in March 2021 which can be attributed to the build-up of algal mats at the floating marshland, closest to the Bonnets Road boundary. This was rectified quickly by applying powdered lime to the affected area. As discussed in section 6.3.2 FNDC is managing cyanobacteria blooms in accordance with best practice and planned upgrades to the WWTP will see further reductions in cyanobacteria occurrences.

8.2. Description of Activities – Sludge storage facilities

Odour associated with the sludge storage facility will be associated with the drying of sludge over time.

Because the sludge being removed from the ponds has been in the ponds for approximately 10 years, it is expected to be well digested to a relatively odour-free mixture. Once a sludge deposit is complete the sludge will naturally form a crust that will prevent odours generation. Simple odour control measures, such as applying lime, are available should adverse odour be experienced.

8.3. Conclusions

Provided that the best practicable option for preventing or minimising the adverse effects of the odour discharge is adopted, and the treatment efficiency of the WWTP is maintained, the potential for objectionable or offensive odours, and the adverse effect of the discharge of contaminants to air, is minimal.

It is reasonable to conclude that the sludge storage facility and operations contribute a minimal odour discharge and the operation is unlikely to give rise to odours at or beyond the property boundary.

The WWTP is directly adjacent to 313 Bonnetts Road, which contains an occupied dwelling at the same elevation as the WWTP site. Given the proximity of the dwelling to the site it is possible that this property could be subject to offensive or objectionable odours .

In terms of other effects beyond the property boundary, there is approximately 790 metres between the boundary of the WWTP at the first pond and the next nearest dwelling (866 Bonnetts Road). The distance indicates that it is unlikely that the discharge of odour will have an adverse effect beyond these properties.

No other spray-sensitive areas, as defined by the PRP, are in proximity of the WWTP.

The area is zoned by both the Far North District Plan and the draft Proposed District Plan as Rural Production, and minimal further development around the WWTP should be expected.

9. STATUTORY ASSESSMENT

Clause 2 in Schedule 4 of the RMA requires an assessment of the activity again any relevant provisions in section 104(1)(b). The assessment must include any assessment of the activity against:

- Any relevant objectives, policies, or rules in a document;
- Any relevant requirements, conditions, or permissions in any rules in a document; and
- Any other relevant requirements in a document (for example, in a national environmental standard or other regulations).

This section provides an assessment against relevant provisions of the documents identified in Table 5, below. An assessment against relevant rules is provided in section 5 above.

The assessments demonstrate that the granting of resource consent for these activities is consistent with the relevant objectives and policies and assessment criteria of the statutory documents.

Requirement	Document
National Environmental Standards (NES)	None are applicable. The NES for Freshwater Management does not apply to the constructed wetlands within the Kaitāia WWTP
National Policy Statements (NPS)	National Policy Statement for Freshwater Management 2020
New Zealand Coastal Policy Statement	None are applicable
Regional Policy Statement	Regional Policy Statement for Northland 2016
Plan or Proposed Plan	Regional Water and Soil Plan for Northland Regional Air Quality Plan for Northland Proposed Regional Plan for Northland

Table 5 Relevant statutory documents

9.1. National Policy Statement for Freshwater Management 2020

The provisions of the NPS-FM 2020 that are relevant to this application have been assessed below.

Provision	Comment
2.1 Objective 1. The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that prioritises: (a) first, the health and well-being of water bodies and freshwater ecosystems (b) second, the health needs of people (such as drinking water) (c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.	The granting of this application is consistent with this objective, in that it ensures that the health and wellbeing of the Awanui River is provided for, and well as the health and wellbeing of people and communities.
Policy 2 Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for.	Māori freshwater values have been identified through engagement with tangata whenua and in the Te Rarawa CIA. The continued study of the feasibility of discharge of wastewater to land (rather than to the Awanui River) works towards providing for Māori freshwater values.
Policy 9 The habitats of indigenous freshwater species are protected	This is discussed in section 6.2 of this application.
Policy 12 The national target (as set out in Appendix 3) for water quality improvement is achieved.	The quality of treated wastewater discharge with the zone of reasonable mixing is consistent with national water quality targets. FNDC plans to install a UV

	disinfection system which will reduce E.coli loads to the river and in turn contribute to achieving the national target for primary contact recreation.
Policy 15 Communities are enabled to provide for their social, economic, and cultural wellbeing in a way that is consistent with this National Policy Statement.	The WWTP, and its associated discharges, provide for the wellbeing of the Kaitāia and Awanui communities.

9.2. Regional Policy Statement for Northland 2016

The Regional Policy Statement for Northland (RPS) aims to promote the sustainable management of Northland's natural and physical resources, with a focus on key management issues such as water quantity and quality, biodiversity, economic potential and social wellbeing, infrastructure, natural hazard risk and natural character.

The WWTP and associated activities are consistent with the RPS as they support economic and social wellbeing by providing vital services to the Kaitāia and Awanui townships, while ensuring that any adverse effects on the environment are mitigated or avoided.

Matter	Comment
Water Quality	
Objective 3.2 – Region Wide water quality Improve the overall quality of Northland's fresh and coastal water with a particular focus on: (a) Reducing the overall Trophic Level Index status of the region's lakes; (b) Increasing the overall Macroinvertebrate Community Index status of the region's rivers and streams; (c) Reducing sedimentation rates in the region's estuaries and harbours; (d) Improving microbiological water quality at popular contact recreation sites, recreational and cultural shellfish gathering sites, and commercial shellfish growing areas to minimise risk to human health; and (e) Protecting the quality of registered drinking water supplies and the	The effects of the discharge of treated wastewater to the Awanui River are discussed in section 6.

potable quality of other drinking water sources.	
Regionally Significant Infrastructure	
Objective 3.7 - Regionally Significant Infrastructure Recognise and promote the benefits of regionally significant infrastructure, (a physical resource), which through its use of natural and physical resources can significantly enhance Northland's economic, cultural, environmental and social wellbeing.	The WWTP is regionally significant infrastructure as defined in the Regional Policy Statement. The provision of this infrastructure provides for economic, cultural, environmental and social wellbeing benefits to Kaitāia and Awanui.
Objective 3.8 – Efficient and effective infrastructure Manage resource use to: (f) Optimise the use of existing infrastructure. (g) Ensure new infrastructure is flexible, adaptable, and resilient, and meets the reasonably foreseeable needs of the community; and (h) Strategically enable infrastructure to lead or support regional economic development and community wellbeing.	This objective recognises that upgrades to existing infrastructure and the building of new infrastructure are costly activities and resources are limited, so it is important to get the best out of existing infrastructure.
5.2.2 Policy – Future-proofing infrastructure Encourage the development of infrastructure that is flexible, resilient, and adaptable to the reasonably foreseeable needs of the community.	The WWTP and associated activities allow for resilience and adaptability for the reasonably foreseeable needs of the community.

5.2.3 Policy – Infrastructure, growth and economic development. Promote the provision of infrastructure as a means to shape, stimulate and direct opportunities for growth and economic development.	The provision of a wastewater network and WWTP works to shape, stimulate and direct opportunities for growth and economic development.
Policy 5.3.1 Identifying regionally significant infrastructure. The regional and district councils shall recognise the activities identified in Appendix 3 of this document as being regionally significant infrastructure.	Appendix 3 Section 1 (h) of the RPS recognises wastewater trunk lines and treatment plants as Regionally Significant Infrastructure. The policy allows for the benefits of the WWTP to be weighed against any adverse effects.
Policy 5.3.2 Benefits of regionally significant infrastructure. Particular regard shall be had to the significant social, economic, and cultural benefits of regionally significant infrastructure when considering and determining resource consent applications or notices of requirement for regionally significant infrastructure. The intent of this policy is to assist regionally significant infrastructure when it comes to the overall judgement to be made in terms of Section 5 of the Act, during the resource consent process, by providing clear recognition of the social, economic and cultural benefits of regionally significant infrastructure.	The intent of this policy is to recognise the benefits of regionally significant infrastructure when it comes to the overall judgement. The WWTP provides significant social, economic and cultural benefits to Kaitāia and Awanui.

Policy 5.3.3 Managing adverse effects arising from regionally significant infrastructure, where: (3). When managing the adverse effects of regionally significant infrastructure decision makers will give weight to: a. The benefits of the activity in terms of Policy 5.3.2; b. Whether the activity must be recognised and provided for as directed by a national policy statement; c. Any constraints that limit the design and location of the activity, including any alternatives that have been considered which have proven to be impractical, or have greater adverse effects; d. Whether the proposal is for regionally significant infrastructure which is included in Schedule 1 of the Civil Defence Emergency Management Act as a lifeline utility and meets the reasonably foreseeable needs of Northland. e. The extent to which the adverse effects of the activity can be	This policy provides guidance on matters to be considered when assessing proposals for regionally significant infrastructure. a. Policy 5.3.2 is discussed, above. b. The provision of this infrastructure is not provided for by the National Policy Statement for Urban Development. The provision of infrastructure is required for a well-functioning urban environment. c. Alternatives have been considered and are outlined in section 2.5, above. d. The infrastructure is a lifeline utility in accordance with Part B of Schedule 1 of the Civil Defence Emergency Management Act 2002, as an entity that provides a wastewater or sewerage network that disposed of sewage. Section 2.3.2 discusses the ways that the infrastructure meets the reasonably foreseeable needs of the community. e. With the exception of adverse effects on cultural values, the adverse effects

practicably reduced. Such an assessment shall also take into account appropriate measures, when offered, to provide positive effects, either within the subject site or elsewhere provided that the positive effects accrue to the community of interest and / or resource affected; and	on the environment will continue to be no more than minor.
f. Whether a monitoring programme for any identified significant adverse effects with unknown or uncertain outcomes could be included as a condition of consent and an adaptive management regime (including modification to the consented activity) is used to respond to such effects.	f. An adaptive management programme is not required as the effects of the activity are known.
g. Whether the infrastructure proposal helps to achieve consolidated development and efficient use of land.	g. The WWTP directly achieves the consolidated development and efficient use of land as it allows for greater housing density, as smaller lot sizes can be achieved when on-site wastewater treatment is not required.

9.3. Regional Water and Soil Plan for Northland

The objectives and policies of the Regional Water and Soil Plan for Northland, which are relevant to the activities, are set out below:

Section 7 Water Quality Management Policy	Comment
7.5.4.4. The Council will not grant a discharge permit which, either on its own or in combination with other lawful discharges, will result in any of the following effects in the receiving water, after reasonable mixing: a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials; b) Any emission of objectionable odour; c) The rendering of freshwater unsuitable for consumption by farm animals. Except where: i. exceptional circumstances justify the granting of a permit; or	This policy is implemented via the process of deciding on discharge permit applications under s.105 of the Act. As demonstrated in section 6, the discharge to water does not result in any of the listed effects.

ii. the discharge is of a temporary nature; or iii. the discharge is associated with necessary maintenance work …	
Transitional Policy 7.8 1. When considering any application for a discharge the consent authority must have regard to the following matters: (a) the extent to which the discharge would avoid contamination that will have an adverse effect on the life-supporting capacity of fresh water including on any ecosystem associated with fresh water and (b) the extent to which it is feasible and dependable that any more than minor adverse effect on fresh water, and on any ecosystem associated with fresh water, resulting from the discharge would be avoided.	The effects of the discharge on the listed parameters are discussed in section 6, above. Anticipated adverse effects on the listed parameters as a result of the discharge are expected to be no more than minor.
2. When considering any application for a discharge the consent authority must have regard to the following matters: a) the extent to which the discharge would avoid contamination that will have an adverse effect on the health of people and communities as affected by their secondary contact with fresh water; and	

b) the extent to which it is feasible and dependable that any more than minor adverse effect on the health of people and communities as affected by their secondary contact with fresh water resulting from the discharge would be avoided	
Discharges **Objective**	**Comment**
8.6 1. The effective treatment and/or disposal of contaminants from new and existing discharges in ways which avoid, remedy or minimise adverse effects on the environment and on cultural values.	The WWTP allows for effective treatment and discharge of contaminants. The high quality of the treatment of wastewater before it is discharged minimises some of the effects on cultural values, (for example policies of the NgāiTakoto Environmental Management Plan prefer high-levels of wastewater treatment prior to discharge to water) but it does not avoid the wider significant effects on cultural values.
8.6.2. The reduction and minimisation of the quantities of contaminants entering water bodies, particularly those that are potentially toxic, persistent or bioaccumulative.	The WWTP ensures that contaminants in the discharge are minimised before being discharged.
Policy	**Comment**
8.7.2 To require by the year 2004 or according to an upgrading programme established as part of the conditions on a discharge permit all existing discharges of sewage or	As discussed in section 2.5, the discharge of wastewater to the Awanui River is considered the best practicable option for discharge.

discharges with a high organic content to be: a) By land disposal; or b) To water, if after reasonable mixing: (i) it does not cause a discernible adverse change in the physicochemical and/or microbiological water quality of the receiving water at the time of discharge; and (ii) it is the best practicable option (as defined by Section 2 of the Act)	Consistent with this policy, the discharge does not result in adverse change of the listed parameters after reasonable mixing.

9.4. Regional Air Quality Plan for Northland

Discharges of Contaminants to Air	
Objective	**Comment**
6.6.1 The sustainable management of Northland's air resource including its physical, amenity and aesthetic qualities by avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to air.	There are no anticipated adverse effects to the air resource as a result of the discharge of odours to air. Is it expected that the discharge of odour to air will continue to have a less than minor effect on the environment.
Policy	
6.7.1 To recognise and, as far as practicable provide for the relationship of Maori and their culture and traditions with respect to the use, development and protection of natural and physical resources in the Northland region.	

9.5. Proposed Regional Plan for Northland 2017 (Appeals Version, July 2021)

Matter	Comment
Tangata Whenua	
Policy D.1.1 When an analysis of effects on tangāta whenua and their taonga is required	These policies have been analysed in section 6.5. The Awanui River is a significant and important resource, as recognised by each iwi. A CIA has been provided by Te Runanga o Te Rarawa and a CIA will be provided by Ngāi Tohianga hapū that discuss the significant adverse effects on cultural values and how these can be mitigated. The Awanui River has not been identified as Site or Area of Significance to tangata whenua in accordance with Policy D.1.5 of the PRP.
Policy D.1.2 Requirements of an analysis of effects on tangāta whenua and their taonga	
Policy D.1.4 Managing effects on places of significance to tangata whenua Resource consent for an activity may generally only be granted if the adverse effects from the activity on the values of Places of Significance to tangāta whenua in the coastal marine area and water bodies are avoided, remedied or mitigated so they are no more than minor.	
Social, cultural, and economic benefits of Regionally Significant Infrastructure	
Policy D.2.2 Social, cultural, and economic benefits of activities Regard must be had to the social, cultural, and economic benefits of a proposed activity, recognising significant benefits to local communities, Maori and the region including local employment and enhancing Maori development, particularly in areas of Northland where alternative opportunities are limited.	As discussed in section 6.1 above, the WWTP is regionally significant infrastructure and the service that it provides ensures social, cultural and economic benefits to Kaitāia and Awanui.

Policy D.2.5 Benefits of regionally significant infrastructure Particular regard must be had to the national, regional and locally significant social, economic, and cultural benefits of regionally significant infrastructure.	
Objective F.1.5 Enabling economic well-being Northland's natural and physical resources are managed in a way that is attractive for business and investment that will improve the economic well-being of Northland and its communities.	
Objective F.1.6 Regionally significant infrastructure Recognise the national, regional and local benefits of regionally significant infrastructure and renewable energy generation and enable their effective development, operation, maintenance, repair, upgrading and removal.	
Managing Air Quality	
Policy D.3.2 General approach to managing adverse effects of discharges to air Adverse effects from the discharge of contaminants to air are managed by: 1. avoiding, remedying, or mitigating cross-boundary effects on dust, odour, smoke and spray sensitive areas from	As discussed in section 8, the discharge to air does not cause any of the listed effects on human, animal or ecosystem health. No cumulative effects are expected.

discharges of dust, smoke, agricultural spray drift and odour; and 2. protecting dust, odour, smoke and spray-sensitive areas from exposure to dangerous or noxious levels of gases or airborne contaminants; and 3. recognising that land use change can result in reverse sensitivity effects on existing discharges to air, but existing discharges should be allowed to continue where appropriate.	
Policy D.3.4 Dust and odour generating activities When considering resource consent applications for discharges to air from dust or odour generating activities: 2) require a dust or odour management plan to be produced where there is a likelihood that there will be objectionable or offensive discharges of dust or odour at the boundary of the site where the activity is to take place, or where the activity is likely to cause a breach of the ambient air quality standard for PM10 in Schedule 1 of the National Environmental Standard for Air Quality. The dust or odour management plan must include: a. a description of dust or odour generating activities, and b. potentially affected dust sensitive areas or odour sensitive areas, and c. details of good management practices that will be used to control dust or	

odour to the extent that adverse effects from dust or odour at the boundary of the site are avoided, remedied or mitigated.	
Objective F.1.13 Air quality Human health, ambient air quality, cultural values, amenity values and the environment are protected from significant adverse effects caused by the discharge of contaminants to air.	
Water quality	
Policy D.4.1 Maintaining overall water quality When considering an application for a resource consent to discharge a contaminant into water: 1) have regard to the need to maintain the overall quality of water including the receiving water's physical, chemical and biological attributes and associated water quality dependent values, and …	The effects of the discharge on maintaining overall water quality are discussed in section 6. These effects have been established as being no more than minor.
Policy D.4.2 Industrial or trade wastewater discharges to water An application for resource consent to discharge industrial or trade wastewater to water will generally not be granted unless the best practicable option to manage the treatment and discharge of contaminants is adopted.	As discussed in section 2.6, the continued discharge to the Awanui River is the best practicable option for discharging Kaitāia's treated wastewater at this time.

Policy D.4.3 Municipal, domestic and production land wastewater discharges An application for resource consent to discharge municipal, domestic, horticultural or farm wastewater to water will generally not be granted unless: 1) the storage, treatment and discharge of the wastewater is done in accordance with recognised industry good management practices, and 2) a discharge to land has been considered and found not to be economically or practicably viable.	The storage, treatment and discharge of wastewater is managed in accordance with industry best practice. As discussed in section 2.5 the discharge of wastewater to land has been considered and found to be economically non-viable at this time, however FNDC is undertaking further investigations on this issue.
Objective F.1.2 Water Quality Manage the use of land and discharges of contaminants to land and water so that: 1) existing water quality is at least maintained, and improved where it has been degraded below the river, lake or coastal water quality standards set out in H.3 Water quality standards and guidelines, and 2) the sedimentation of continually or intermittently flowing rivers, lakes and coastal water is minimised, and 3) the life-supporting capacity, ecosystem processes and indigenous species, including their associated ecosystems, of fresh and coastal water are safeguarded, and the health of freshwater ecosystems is maintained, and	

4) the health of people and communities, as affected by contact with fresh and coastal water, is safeguarded, and 5) the health and safety of people and communities, as affected by discharges of sewage from vessels, is safeguarded, and 6) the quality of potable drinking water sources, including aquifers used for potable supplies, is protected, and 7) the significant values of outstanding freshwater bodies and natural wetlands are protected, and 8) kai is safe to harvest and eat, and recreational, amenity and other social and cultural values are provided for.	
Natural Hazards	
F.1.10 Natural hazard risk The risks and impacts of natural hazard events (including the influence of climate change) on people, communities, property, natural systems, infrastructure and the regional economy are minimised by: … 2) becoming better prepared for the consequences of natural hazard events, and 3) avoiding inappropriate new development in 100-year flood hazard areas and coastal hazard areas, and 7) recognising that in justified circumstances, critical infrastructure may have to be located in natural hazard-prone areas, and	As discussed in section 6.4 the effects of flooding hazards on the WWTP are able to be avoided through engineered bunds. Improvements to the wastewater network, including reducing stormwater inflow and infiltration will ensure that the service is able to adapt to the consequences of increased rainfall events.

8) anticipating and providing for, where practicable, landward migration of coastal biodiversity values affected by sea-level rise and natural hazard events.	

9.6. Part 2 of the Act: Purpose and Principles

Clause 2 in Schedule 4 of the RMA states that an application for an activity must also include an assessment of the activity against Part 2 of the RMA.

Part 2, Section 5, of the Act identifies the purpose of the Act as being the sustainable management of natural and physical resources. The WWTP and associated discharge activities are sustainable use of natural and physical resources in that they enable people and communities to provide for their social, economic and cultural well-being and for their health and safety.

The discharge of treated wastewater to the Awanui River is consistent with Sections 6(a), 6(b), 7(b), (c), (d) and (f).

Section 6(e) of the Act identifies the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga as a matter of national importance and states that it should be recognised and provided for. The duty in this section is to consider the effect of the discharge activities on the relationship of Te Rarawa, Ngāti Kahu and Ngāi Takoto with the Awanui River. Part 2, Section 7(a) of the Act requires that particular regard shall be had to kaitiakitanga, which is exercised by Te Rarawa, Ngāti Kahu and Ngāi Takoto. Section 7(a) requires NRC to have particular regard to tangata whenua views regarding the way in which the physical resource is to be used. While acknowledging under Section 6(e), the vital relationship of tangata whenua with the Awanui River, recognised in its role as kaitiaki of the river under Section 7(a), there are no apparent efficient land-based solutions available at this time.

Granting these resource consent applications is consistent with the purpose and principles of the RMA.

10. NOTIFICATION AND AFFECTED PARTY ASSESSMENT

FNDC acknowledge the public interest in this application and the adverse effects that the discharge of wastewater has on the mauri of the Awanui River and subsequently the mana of iwi and accordingly request that this application is publicly notified in accordance with section 95A(3)(a) of the Act.

While the best practicable method for preventing or minimising the adverse effects of the odour discharge has been adopted, there is still the potential for objectionable or offensive odours beyond the property boundary. The owner(s) and occupier(s) of 313 Bonnetts Road are identified as affected parties for the purposes of notification.

As discussed in section 6.5 the Awanui River is a Statutory Acknowledgement Area for Te Runanga O Te Rarawa and NgāiTakoto. In accordance with Policy D.1.3 Te Rarawa, Ngāti Kahu and NgāiTakoto are identified as adversely affected parties for the purposes of notification as the adverse effects on cultural values are more than minor.

11. DISCHARGE MONITORING

FNDC and its alliance partner, Far North Waters operate the WWTP. As part of this relationship Far North Waters operational staff manages and monitors the WWTP and its discharge in accordance with the current resource consent and its monitoring programme. There is no anticipated change to this relationship. NRC monitor the discharges from the WWTP at least quarterly. Proposed conditions of consent, included in section 12, include monitoring requirements.

12. PRELIMINARY PROPOSED CONDITIONS

12.1. Wastewater Treatment Plant Discharges

Purpose: To undertake the following activities associated with the operation of the Kaitāia Wastewater Treatment Plant system:

AUT.000932.01.04: To discharge treated wastewater to the Awanui River on Pt Lot 4A DP 4093 Blk V Takahue SD, at or about location co-ordinates 1620752E 6114931N.

AUT.000932.02.03: To discharge contaminants (primarily odour) to air from a wastewater treatment system presently located on Section 87 Blk V Takahue SD, at or about location coordinates 1620595E 6114496N.

AUT.000932.03.03: To discharge contaminants to ground via seepage from a wastewater treatment system located on Section 87 Blk V Takahue SD, at or about location co-ordinates 1620595E 6114496N.

AUT.000932.01.04 and AUT.000932.03.03:

1. The volume of treated wastewater discharged from the Kaitaia treatment plant to the Awanui River shall not, based on a 30-day rolling average of dry weather discharges, exceed 3,200 cubic metres. Compliance with this condition shall be based on the average of the 30 most recent "dry weather discharge days". A "dry weather discharge day" is any day on which there is less than 1 millimetre of rainfall, and that day occurs after three consecutive days either without rainfall or with rainfall of less than 1 millimetre on each day.

   Advice Note: The rainfall measurements used to determine a dry weather discharge day shall be based on the nearest appropriate rainfall recorder site. This recorder site shall be selected in consultation with the Northland Regional Council.

2. The Consent Holder shall install and maintain a flow meter with an accuracy of ±5% on the outlet of the wastewater treatment system to measure the volume of treated wastewater discharged to the Awanui River.

3. The Consent Holder shall verify that the meters required by Condition 4 are accurate. This verification shall be undertaken prior to 30 June:

   (a) Following the first exercise of these consents; and

   (b) At least once in every five years thereafter.

   The verification shall be undertaken by a person, who in the opinion of the Regional Council's Monitoring Manager, is suitably qualified. Written verification of the accuracy shall be provided to the Regional Council's Monitoring Manager by 31 July following the date of verification.

4. The Consent Holder shall keep records of the daily volume of the treated wastewater discharged to the Awanui River, as measured by the meter required to be maintained on the outlet of the wastewater treatment system in accordance with Condition 2. The Consent Holder shall record the local daily rainfall over the same 24-hour period. These records shall be recorded in a format agreed to by the Northland Regional Council and shall be made available to the Northland Regional Council on request.

5. The Consent Holder shall maintain a record of the results of all monitoring required to be undertaken in accordance with Condition 8. That record shall include both the raw data and calculations used to determine compliance. This record shall be in a format agreed to by the Northland Regional Council and shall be made available to the Northland Regional Council upon request. If the monitoring results indicate a non-compliance with any consent condition, then the Consent Holder shall report the results to the Northland Regional Council within 24 hours of receiving the analysis results.

6. The Consent Holder shall provide and maintain easy and safe access to a sampling point no more than 120 metres downstream of the discharge point.

7. The exercise of these consents shall not cause the following effects on the Awanui River as measured at the sampling point identified in Condition 6, when compared to water quality at the Northland Regional Council Monitoring site 100369:

a. production of conspicuous oil or grease films, scums or foams, floatable or suspended materials or emissions of objectionable odour;
b. to exceed an annual median concentration of 1.0 NO_3-N mg/L;
c. to exceed an annual 95th percentile of 1.5mg NO_3-N /L;
d. to exceed an annual median concentration of 0.24mg NH_4-N/L;
e. to exceed an annual 95th percentile of 0.40mg NH_4-N /L;
f. to decrease below a 7-day minimum concentration of 5.0mg DO/L;
g. to decrease below a 1-day minimum concentration of 4.0mg DO/L;
h. the pH to be outside the range 6.0 to 9.0

8. The Consent Holder shall monitor the exercise of these consents in accordance with the attached monitoring programme.

Cyanobacteria monitoring

9. During periods when blue cyanobacteria is prominent in the wastewater in the treatment ponds one triplicate sample shall be taken fortnightly from NRC sampling site 100370 and analysed for total bacterial cell counts, biovolume equivalents for combined total of all cyanobacteria, biovolume of potentially toxic cyanobacteria and total microcystin concentrations. Actions are required as follows:

Situation	Actions required
a) Biovolume equivalent of 0.5 to <1.8mm^3 of potentially toxic cyanobacteria (see Tables 1 and 2 of the New Zealand Guidelines for Cyanobacteria in Recreational Fresh Waters (2009); and/or b) 0.5 to <10mm^3/L total biovolume of all cyanobacterial material	• Increase sampling to at least weekly; and • Notify the public health unit • Notify the Regional Council

c) ≥12µg/L total microcystins or biovolume equivalent of ≥1.8mm^3/L of potentially toxic cyanobacteria and/or d) ≥10mm^3/L total biovolume of all cyanobacteria material and/or e) Cyanobacterial scums are consistently present	• Continue to monitor at least weekly; and • If potentially toxic taxa are present, then consider testing samples for cyanotoxins; • Notify the public health unit

Advice note: The greatest potential for cyanobacteria is between spring and autumn.

AUT.000932.02.02 Discharge to Air

10. The Consent Holder's operations shall not give rise to any discharge of contaminants to the air beyond the boundary of property owned by the Consent Holder, that is deemed by a Northland Regional Council monitoring officer to be noxious, dangerous, offensive or objectionable.

11. A record shall be kept of any significant odours beyond the treatment plant boundary. The record shall identify the source and cause of any significant odour, duration of the odour, wind strength and direction, remedial action undertaken and the degree of success of the remedial action.

General conditions

12. The Consent Holder shall maintain the treatment system so that it always operates effectively, and a written record of all maintenance undertaken shall be kept. A copy of this record shall be forwarded to the Northland Regional Council upon request.

13. The consent holder shall monitor the exercise of these consents in accordance with Schedule 1 (attached)

14. The Consent Holder shall, for the purposes of adequately monitoring these consents as required under Section 35 of the Act, maintain records of any complaints relating to the operation of these consents received by the Consent Holder, as detailed below:

1. The name and address of the complainant (where provided);
2. The date and time the complaint is received;
3. The duration of the event that gave rise to the complaint;
4. The location from which the complaint arose;
5. The weather conditions prevailing at that time;
6. Any events in the management and operation of any processes that may have given rise to the complaint; and
7. Any actions taken by the Consent Holder, where possible, to minimise contaminant emissions.

The Consent Holder shall notify the Northland Regional Council as soon as is practicable of any complaint received. Records of the above shall also be sent to the Northland Regional Council immediately upon request.

15. The Consent Holder shall, on becoming aware of any unauthorised discharges associated with the wastewater treatment plant,
    a. Immediately take such action, or execute such work as may be necessary, to stop and/or contain such escape; and
    b. Immediately notify the Northland Regional Council by telephone of an escape of contaminant; and
    c. Take all reasonable steps to remedy or mitigate any adverse effects on the environment resulting from the escape; and
    d. Notify the Northland Regional Council in writing within one week on the cause of the escape of the contaminant and the steps taken or being taken to effectively control or prevent such escape.

    For telephone notification during the Northland Regional Council's opening hours, the Northland Regional Council's assigned monitoring officer for these consents shall be contacted. If that person cannot be spoken to directly, or it is outside of the Northland Regional Council's opening hours, then the Environmental Hotline shall be contacted.

    Advice Note: The Environmental Hotline is a 24 hour, seven day a week, service that is free to call on 0800 504 639.

16. The Northland Regional Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of these consents. Such notice may be served annually during the month of May. The review may be initiated for any one or more of the following purposes:

    a. To deal with any adverse effects on the environment that may arise from the exercise of these consents; or
    b. To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

    The Consent Holder shall meet all reasonable costs of each review.

EXPIRATION DATES:

AUT.000932.01.04 this consent shall expire 15 years after it is issued, unless it has been surrendered within that period, as a consequence of the consenting, construction and commissioning of a discharge to land system

AUT.000932.02.03 this consent shall expire 15 years after it is issued

AUT.000932.03.03: this consent shall expire 15 years after it is issued

Schedule 1 - Monitoring Schedule

The Consent Holder (or its authorised agent) shall monitor these resource consents in accordance with the following monitoring programme

1. Discharge and receiving water monitoring

1.1. Sites

The following sites shall be monitored

NRC monitoring site number	Location Description
100373	Discharge from the treatment plant (Outlet from the treatment plant)
100369	Awanui River 50 metres upstream of the treatment plant discharge
100370	Awanui River immediately upstream of its confluence with the Waihoe Channel
TBC	Awanui River 120 metres downstream of 100373

1.2. Sampling procedures, determinands and frequency

One triplicate sample at each of the sample sites shall be collected once each month. All samples must be taken between 1000 and 1200 hours and analysed for the following determinands:

- Temperature
- pH
- Dissolved oxygen concentration
- Total ammoniacal nitrogen
- E.coli
- Total Nitrogen
- Dissolved Reactive Phosporus

- Nitrate Nitrite Nitrogen

The discharge sampling shall be undertaken on the same day as the receiving water sampling. If possible, each discharged wastewater sample shall be taken from the discharge which enters the body of the receiving water from which the upstream sample has been taken, and from which the downstream receiving water sample is to be taken.

Notes:

1) Triplicate samples shall involve the collection of three separate samples taken at least five minutes apart during the same sampling event. Analysis shall be conducted on a composite sample made up of equal volume of each triplicate sample.
2) Temperature and dissolved oxygen concentration shall be measured in the field using a meter in accordance with standard procedures and triplicate measurements are not required for these parameters.
3) E.coli shall, unless otherwise agreed to with the Northland Regional Council, be measured using the ColilertTM method.

12.2. Sludge Storage Facility

Purpose: To undertake the following activities associated with the operation of a sludge storage facility on Section 1 on SO 447437, being Part Pukepoto No.6 Blk II Ahipara SD Blk V Takahue SD, at or about location co-ordinates 1620128 E 6114229 N.

AUT.030602.01.02: Discharge contaminants to land by way of seepage from the base of the sludge storage facility.

AUT.030602.02.01: Discharge contaminants to air (primarily odour) from the sludge storage facility.

1. The sludge storage facility shall be maintained generally in accordance with the attached Opus plans entitled:

   (a) "Storage Area Layout Plan", Drawing Number: 9/1063/159/7114, Dated 17/4/2014; and
   (b) "Site Plan and Notes", Drawing Number: 9/1063/159/7114, Dated 17/4/2014, Dated 17/4/2014.

   However, if there are any differences or apparent conflict between these documents and any conditions of this consent, then the conditions of consent shall prevail.

2. All sludge shall be dewatered to a dry matter content of at least 20 percent prior to it being placed into the sludge storage facility, as shown on the plans attached to Condition **Error! Reference source not found.**.

3. The Consent Holder shall prepare and maintain a Management Plan that covers all aspects of the operation and maintenance of the sludge storage facility. The Management Plan shall include, but not be limited to, the following:

   (a) A schedule of inspection, servicing, and maintenance actions to be carried out on the sludge storage facility.
   (b) Methods to be used to mitigate any nuisances that might arise from the activity including odour or midges and other insects.

4. The Consent Holder may amend the Management Plan at any time. A copy of the amended Management Plan shall be forwarded to the Northland Regional Council's

Monitoring Manager within one week of the amended Management Plan becoming operative.

5. The sludge storage facility shall be correctly operated and maintained in an effective and workmanlike manner. This operation and maintenance shall, as a minimum, be undertaken in accordance with the Management Plan required by Condition 3. For compliance purposes, the most recent copy of the Management Plan held by the Northland Regional Council will be used.

6. The Consent Holder's operations shall not give rise to any discharge of contaminants to the air beyond the boundary of property owned by the Consent Holder, that is deemed by a Northland Regional Council monitoring officer to be noxious, dangerous, offensive or objectionable.

7. The Consent Holder shall, for the purposes of adequately monitoring the consent as required under Section 35 of the Act, on becoming aware of any contaminant associated with the Consent Holder's operations escaping otherwise than in conformity with this consent:

    (a) Immediately take such action, or execute such work as may be necessary, to stop and/or contain such escape; and
    (b) Immediately notify the Northland Regional Council by telephone of an escape of contaminant; and
    (c) Take all reasonable steps to remedy or mitigate any adverse effects on the environment resulting from the escape; and
    (d) Report to the Northland Regional Council in writing within one week on the cause of the escape of the contaminant and the steps taken or being taken to effectively control or prevent such escape.

    For telephone notification during the Northland Regional Council’s opening hours, the Northland Regional Council’s assigned monitoring officer for these consents shall be contacted. If that person cannot be spoken to directly, or it is outside of the Northland Regional Council’s opening hours, then the Environmental Hotline shall be contacted.

Advice Note: The Environmental Hotline is a 24 hour, seven day a week, service that is free to call on 0800 504 639.

8. The Northland Regional Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of these consents. Such notice may be served annually during the month of May. The review may be initiated for any one or more of the following purposes:

    (a) To deal with any adverse effects on the environment that may arise from the exercise of these consents; or
    (b) To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

    The Consent Holder shall meet all reasonable costs of each review.

Expiry Date: 15 years after issue.

13. DURATION OF CONSENTS

To ensure that the benefits of regionally significant infrastructure can be fully realised, it is important to recognise the long-term needs of FNDC to operate, maintain and enhance this infrastructure. A 15-year consent term is considered reasonable and is requested for both the WWTP and the sludge storage facility.

Policy D.2.12 of the PRP provides that in determining the term of consent, particular regard must be had to the matters discussed below.

Matter	Comment
1. the security of tenure for investment (the larger the investment, the longer the consent duration), and	It is difficult to apply this provision without a scale or definition of 'large investments' to compare the capital spend for this investment with. Financially, the upgrade is a significant investment for FNDC and for Kaitāia and Awanui residents. The consents allow for the operation of the WWTP, which is an essential and permanent activity. Security of tenure is imperative for this activity. It is relevant to note that resource consents are considered council assets and the LGA 2002 requires that all assets are depreciated. Depreciation is funded by rates. The value of a resource consent is determined by the capital cost of gaining the initial or previous consent (e.g., the application process) and the rates are set per year of the consent duration. Put simply, a five-year resource consent term will require the depreciation value of the consent to be rated over five years which will result in higher rates than if the consent has a longer year term.

2. The administrative benefits aligning the expiry date with other resource consents for the same activity in the surrounding area or catchment, and	The Council has no other wastewater treatment plants that discharge into the Awanui River, or its catchment.
3. Certainty of effects (the less certain the effects, the shorter the consent duration).	The applicant is reasonably certain about the effects of these discharges. Monitoring and reporting are recommended in the consent conditions. A Section 128 review condition is a standard provision, and it will enable the Northland Regional Council to address any issues.
4. whether the activity is associated with regionally significant infrastructure (generally longer consent durations for regionally significant infrastructure), and	The WWTP is Regionally Significant Infrastructure.
5. the following additional matters where the resource consent application is to reconsent an activity: a) the applicant's past compliance with the conditions of any previous resource consent or relevant industry guidelines or codes of practice (significant previous non-compliance should generally result in a shorter duration), and	WWTP discharge has good records of compliance with the current wastewater discharge consent and it is rare for the discharge standards set by the consent to be exceeded.

b) the applicant's voluntary adoption of good management practice (the adoption of good management practices that minimise adverse environmental effects could result in a longer consent duration).	

A long-term consent does not preclude further upgrades to the treatment plant, as the consent renewal is not the only trigger for upgrade assessments. If the WWTP is performing poorly or is non-compliant, if community expectations of levels of service change or if a condition assessment indicates that an upgrade is required, then changes can be made to the treatment processes through a Long Term Plan process.

It is also important to note that should wastewater discharge to land be viable, funding is unlikely to be approved until 2023/24 and commissioning will take several years after that. Further, while the expectation is that the design of the land-discharge system will enable 100 percent of the treated wastewater from the WWTP to be removed from the Awanui River, it may eventuate that it is only economically viable to discharge to land at less than 100%. It may also be necessary to retain the ability to discharge to water in emergency circumstances. In any event it will be necessary to retain the sludge storage facility.

Section 128 enables the Regional Council to review the conditions of consent to deal with any adverse effects on the environment that may arise from the exercise of these consents; or to require the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

14. CONCLUSION

The Kaitaia WWTP is regionally significant infrastructure as it provides wastewater and septage discharge for the Kaitaia and surrounding communities.

This function is essential for the communities social and economic wellbeing. At this time the discharge of treated wastewater from the Kaitāia WWTP to the Awanui River represents the best practicable option for disposing of the expected volume of wastewater.

The effects on Tangata Whenua and Cultural Values are understood to likely be significant and FNDC is working towards both mitigating these effects and removing the treated wastewater from the Awanui River.

Granting these resource consents in accordance with Sections 104B and 104C, is consistent with the relevant statutory documents, and the purpose and principles of the Act.