Taranaki By-Products Ltd

Monitoring Programme

Annual Report

2021-2022

Technical Report 2022-26

Working with people | caring for Taranaki

Taranaki Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

Taranaki By-Products Ltd (TBP) operates an animal rendering plant located on Kohiti Road, Okaiawa in the Inaha Stream catchment. Raw material from animal processing plants and fallen farm stock are received at the plant and processed into a range of inedible products. Taranaki Bio-Extracts Ltd (TBE) is co-located at the site and manufactures edible food products from raw material (mainly bone) from the TBP plant.

TBP holds 10 resource consents which include a total of 127 conditions setting out minimum requirements to avoid or minimise adverse effects on the environment. The suite of consents authorise the discharge of contaminants to land, water, and air from a range of activities on the site. This report for the period July 2021 to June 2022 summarises the monitoring programme conducted by the Taranaki Regional Council (the Council) to assess TBP's environmental and consent compliance performance.

TBP demonstrated a good level of environmental performance, and a good level of administrative performance with the resource consents during the 2021-2022 monitoring year.

The compliance inspections and monitoring for this period concluded that the site was generally compliant with its resource consent conditions, and the consent holder's environmental performance remains good compared to previous years. However, several aspects of the operation require attention to maintain or improve environmental performance. In particular, cleanliness around areas which drain to the stormwater network and into the firewater pond.

As a result of a fire in the processing building on 26 December 2021 TBP has not been operating at full capacity over the entire monitoring period. As at 29 September 2022 the site was operating at 60% of its maximum capacity and expecting to achieve full processing capacity by late October 2022.

Discharges of odour to air from the process building, wastewater ponds and burial pits continue to extend beyond the boundary of the site, and impact the community as evidenced by comments during the community liaison meeting and two formal complaints to Council. Neither of the odour complaints were deemed to be offensive or objectionable by the Council. Odour management must continue to be a high priority for TBP, and the current management measures should be followed and reviewed regularly to ensure odour discharges are minimised as far as practicable. Current repairs and upgrades will likely improve air quality for the community in the near future.

Biological monitoring of the Inaha Stream and tributaries did not indicate any recent significant impacts from TBP operations. Most sampling locations received the same or improved rating compared to the previous year, with most rated as fair or good. The biomonitoring report concluded that discharges to the Inaha stream during the monitoring period were not likely to be having a significant adverse effect on the community of organisms.

Sampling of the groundwater wells in the irrigation areas indicated that irrigation of wastewater to paddocks is resulting in low but increasing levels of nitrogen. The concentration of nitrogen at Te Kopanga Spring during this monitoring year increased after declining for several years. Additionally, levels of *E. coli* were elevated above the relevant drinking water guidelines in five of the six samples.

This report makes the following recommendations:

1. Monitoring of consented activities at Taranaki By-Products in the 2022-2023 year continue at the same level as in 2021-2022.
2. The broken or malfunctioning groundwater bores in the vicinity of the burial pit area must be repaired or replaced to ensure compliance with condition 16 of consent 5495-1.
3. A programme of groundwater bore inspections should be undertaken to ensure all are fit for purpose.

4. A review of the site management plans should be undertaken following the completion of the building upgrades to ensure the plans are fit for purpose. The review should include, but not be limited to;
    a. The biofilter changes and operating parameters.
    b. Any changes to the waste water treatment process.
    c. Scheduled inspections and maintenance of the process building and ducting in order to avoid discharges of fugitive emissions, and ensure the building is maintained under negative pressure.
5. Closer monitoring of the nitrate and *E. coli* levels in the Northern Tributary should be undertaken, and a review of the management of activities on paddocks adjacent to the tributary should be undertaken as a precautionary measure.

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1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2021 to June 2022 by the Taranaki Regional Council (the Council) for the monitoring programme associated with resource consents held by Taranaki By-Products Ltd (TBP) and is the 29th combined annual report.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by TBP for water abstraction, discharges of process and waste water into the Inaha catchment, discharges to land, and discharges of contaminants to air from a range of activities at the site.

In accordance with the *Resource Management Act 1991* (RMA) environmental management must be integrated across all domains so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of TBP's activities on water, land and air.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites though annual programmes;
- a summary of the activities and operations conducted on TBP's site; and
- the resource consents held by TBP.

Section 2 outlines the monitoring programme during the period under review.

Section 3 details the results of the monitoring.

Section 4 discusses the results of the monitoring and the effects on the environment.

Section 5 presents recommendations to be implemented in the 2022-2023 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act 1991 and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
b. physical effects on the locality, including landscape, amenity and visual effects;
c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable management of the region's resources.

1.1.4 Evaluation of environmental performance

In addition to discussing the various details of the performance and extent of compliance by the consent holders, this report also assigns a rating as to the Company's environmental and administrative performance during the period under review. The rating categories are high, good, improvement required and poor for both environmental and administrative performance. The definitions for these ratings are found in Appendix II.

For reference, in the 2021-2022 year, consent holders were found to achieve a high level of environmental performance and compliance for 88% of the consents monitored through the Taranaki tailored monitoring programmes, while a further 10% of the consents achieved a good level of environmental performance and compliance.[1]

1.2 Location and process description

The TBP plant at Kohiti Road, Okaiawa is located adjacent to a mid-stream section of the Inaha Stream, about 13 km from the coast. Two unnamed tributaries of the Inaha Stream traverse the western (the western tributary) and northern (the northern tributary) parts of the site. The nearest residential area is Okaiawa approximately 500 m from the nearest operational area. TBP own a substantial amount of land surrounding the plant which is kept in pasture and used for irrigation of process wastewater and dairy effluent. Activities on properties surrounding the site are primarily intensive pastoral farming, mainly dairy (Figure 1).

A full description of all processes which occur at the site and the treatment of waste can be found in the relevant consent application documents and previous annual reports. In brief:

- The business was established in 1936 and is the primary animal rendering plant in Taranaki, employing approximately 60 staff. The plant operates 24 hours/day, seven days/week throughout the year except for a shutdown period over Christmas.
- Raw material is sourced from meat plants in the central and southern North Island. TBP also runs a fallen stock collection service in Taranaki and adjacent regions. Transport of raw materials and products to and from the site is undertaken by trucking firm Bulk Lines Ltd.
- There are two processing lines; a mixed abattoir material line (processing beef and mutton, hard and soft offal, and fallen stock) which has a maximum processing capacity of 18 t/h, and the blood line which has a maximum processing capacity of 100,000 L/day.
- Poultry material including; feather, blood meals, tallow and chicken oil, is no longer processed at the site.

[1] The Council has used these compliance grading criteria for more than 18 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018-

- Animal rendering is a two stage process, involving separation of fat and drying of the residual solids. The process is a continuous low temperature (less than 100˚C) dry rendering with mechanical de-watering by screw press, and some thermal de-watering. The dried product is milled, sieved and stored in bulk.
- The mechanical de-watering of the raw material creates large quantities of pressed-out animal product liquid called 'stickwater'. Waste heat exchangers dry the stickwater under vacuum to a stage where it can be incorporated back into the meal product. Washings and waste products from the stickwater system have been registered as a fertiliser (Zeal Grow) and are applied to an adjacent dairy farm owned by TBP. Recent developments within the facility have reduced the output of Zeal Grow.
- Fallen stock which cannot be processed are buried in a paddock on-site (see section 2.4.5).
- The TBE plant involves the processing of bone waste that has been separated from other raw offal at meat processing plants. The rendering and drying is carried out at lower temperatures than at the inedible products plant, resulting in less odour generation and heat emission.

Figure 1 Location of the TBP site at Kohiti Rd, Okaiawa

1.2.1 Wastewater treatment system

Wastewater from the TBP plant is generated by equipment and floor washings, condensates from treatment of gas emissions, and blood decanter liquids. There is potential for stickwater and blood losses to be put through the treatment system as well. In summary:

- All wastewater from the plant is pumped through the rotary screen, then a 100 m^3/h DAF unit to which flocculent is added to assist in recovery of solids.

- The wastewater then moves sequentially through ponds 1 to 3 where anaerobic microorganisms break it down. The condensate wastewater from the plant is pumped directly to pond 1. Ponds 1 and 2 may be operated in parallel, depending on loadings.
- Wastewater from pond 3 discharges to an aerated lagoon (pond 4). The aerators assist in the reduction of biochemical oxygen demand (BOD) and of ammonia concentration.
- The wastewater passes through a small settling pond (pond 5) and then into pond 6 which is the final treatment stage. The treated water is either used in the odour control system, irrigated to land, or discharged into the Inaha Stream.

1.2.2 Odour management

The rendering operations have potential to generate offensive odour from sources including the storage of raw materials, the rendering processes, wastewater treatment and disposal systems, fugitive odour from the processing building, biofilters and solid waste burial areas. Odour control measures used by TBP include:

- Ensuring the quality of product received at the site.
- Maintaining negative pressure in the processing building to avoid odour 'leaking' from the building.
- Diverting odorous air through biofilters which remove odour compounds from the air stream.
- Management of the wastewater treatment system.
- Minimising exposure of carcasses in the burial pit by covering them as soon as practicable.
- Applying lime to the burial pits to minimise growth of odour-causing microorganisms.

The air discharge consent requires TBP to engage an air quality specialist to certify that the works, processes, and equipment meet "*good engineering practice*". The most recent audit report from Golder and Associates (Golder and Associates, 2021) was prepared in April 2021. The next audit report must be submitted by 30 April 2023.

1.3 Resource consents

TBP holds 10 resource consents, the details of which are summarised in the table below.

Six of the site's resource consents expired in 2019 but application's to replace these were lodged in November 2018, more than six months before the expiry date. In accordance with section 124 of the RMA the site may continue to operate under the existing consents until a decision is made by Council on these applications. Activities and discharges continue to be monitored in accordance with the existing consent conditions.

Table 1 Summary of resource consents held by TBP

Consent number	Purpose	Granted	Next review date	Expiry date
Water discharge permit				
2049-4	Discharge treated wastewater to Inaha Stream	October 2006	-	2019*
5426-1	Discharge stormwater to Inaha tributary	May 1999	-	2019*
2050-4	Discharge cooling/backwash water to Inaha Stream	May 1999	-	2019*
Water take permit				
2051-4.1	Take from Inaha Stream	January 2015	-	2019*
9756-1	Take groundwater	February 2014	2023	2029

Consent number	Purpose	Granted	Next review date	Expiry date
Discharge to land permit				
3941-2	Discharge treated wastewater to land	November 2009	-	2019*
5495-1	Discharge meat wastes by burial into land	August 2000	-	2019*
Air discharge permit				
4058-4	Discharge emissions to air from rendering operations	October 2011	-	2024
10054-1	Discharge emissions to air from burning	January 2015	-	2029
Land use permits				
6431-1	Place culverts in Inaha Stream	October 2004	-	2023
* An application for a replacement consent has been received and is currently on hold.				

1.4 Monitoring programme

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

The monitoring programme for TBP consisted of five primary components.

1.4.1 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.2 Site inspections

The site was visited on six occasions during the monitoring period. With regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses. This included contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by TBP were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council.

1.4.3 Water sampling

Water samples are collected from surface water and groundwater to monitor the concentrations of a suite of contaminants discharged from on-site processes. The results of the monitoring can be found in section 2.3.

Surface water sampling of the locations in the Inaha Stream (Figure 2) assesses the likely effects of the direct discharges when the site is discharging wastewater from pond 6. When TBP is discharging to land by irrigation to paddocks, surface water sampling from locations in the Inaha Stream and tributary is undertaken to assess the likely effect of discharges from the irrigation areas (Figure 2). Surface water contamination may occur through surface runoff and/or subsurface discharges (groundwater recharge or subsurface drainage) to these watercourses. The samples are sent for laboratory analysis of the analytes listed in Table 4.

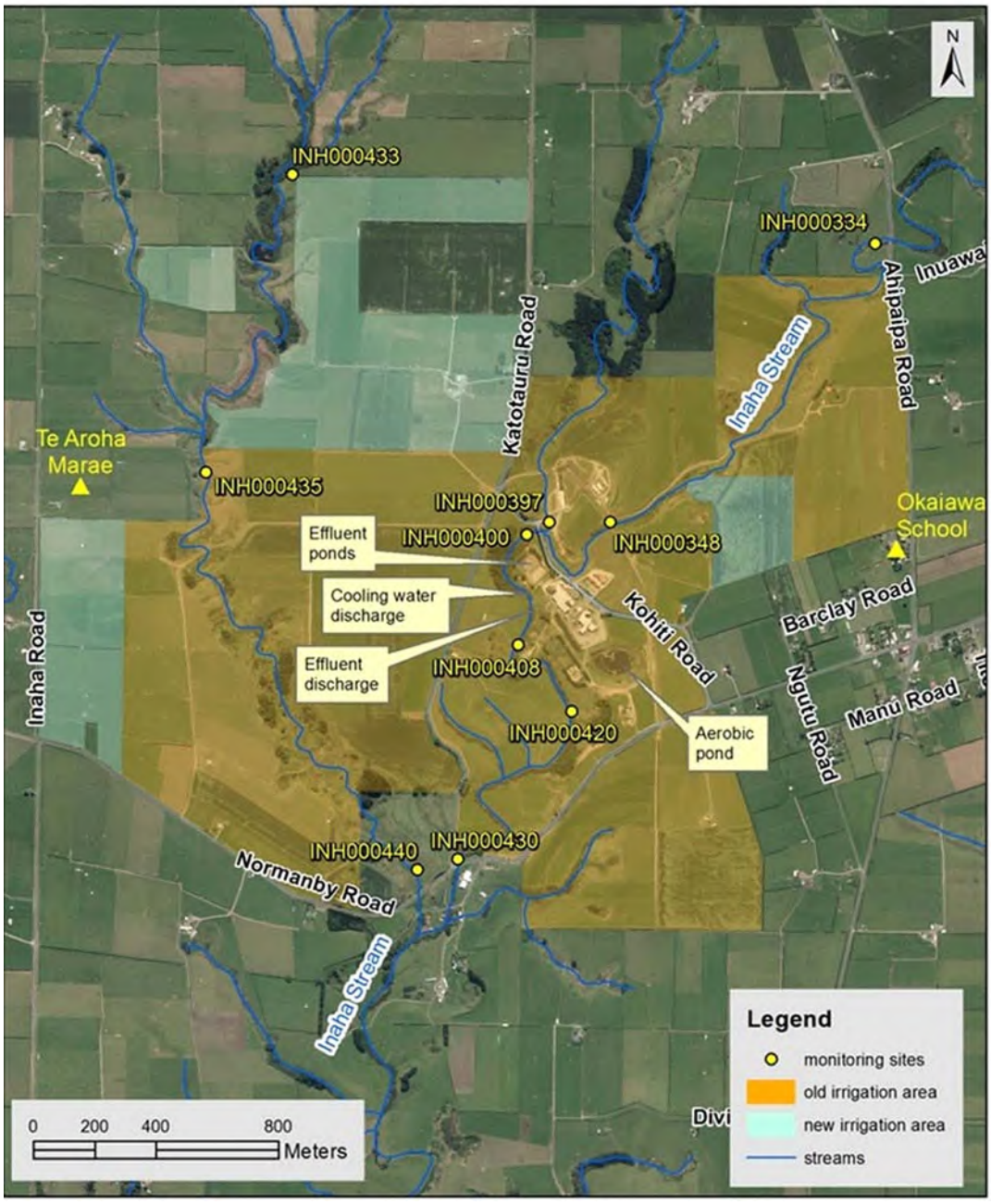

Figure 2 Wastewater irrigation areas, surface water monitoring and point source discharge locations in the Inaha Stream and tributaries

The Council collects samples from groundwater monitoring bores (Figure 3) to assess the likely effects of the wastewater irrigation and diffuse discharges from the burial pits on the groundwater across these areas. A list of groundwater analytes can be found in Table 4.

In addition, three temperature recorders (one installed in the cooling water tributary and the others upstream and downstream of the confluence of the Inaha Stream and its tributary) were run continuously and downloaded as required.

Table 2 Taranaki By-Products point source surface water monitoring sites key (Figure 2)

Site	Description	Site code
A	Aerobic pond effluent	IND004004
B	Cooling water discharge	IND002004
C	Stormwater, firewater, coolant and groundwater seepage from reservoir	IND001014
D	Stormwater, firewater, coolant and groundwater seepage to Inaha	IND001015
E	No 1 stormwater: main reception, garage and yard to firewater reservoir	STW001075

Table 3 Inaha Stream and tributaries sampling sites (Figure 2)

Description	Site code
Ahipaipa Road	INH000334
Bridge, 420 m u/s Kohiti Road	INH000348
Unnamed northern tributary at Inaha confluence	INH000397
Kohiti Road	INH000400
110 m d/s cooling water discharge and 30 m d/s pond 6 discharge	INH000408
500 m d/s pond waste discharge	INH000420
Normanby Road bridge, 1,450 m d/s discharges	INH000430
Unnamed western tributary, 3,500 m u/s Inaha confluence	INH000433
Unnamed western tributary 2,550 m u/s Inaha confluence	INH000435
Unnamed western tributary 250 m u/s Inaha confluence	INH000440
Inaha Stream, 100m d/s of 'irrigation' tributary	INH000450
Inaha Stream, State Highway 45	INH000470

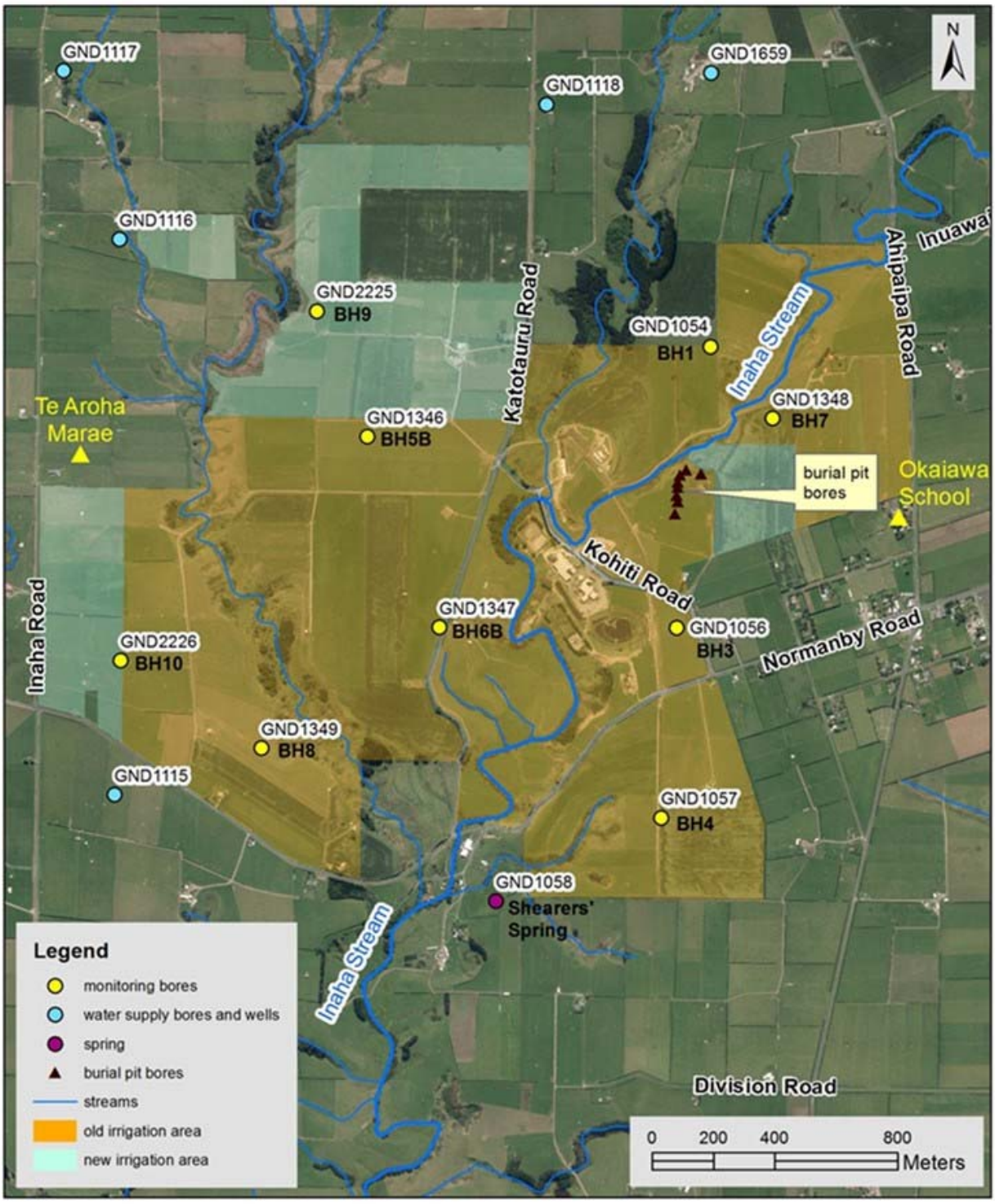

Figure 3 Locations of the groundwater monitoring wells

Table 4 Monitoring analytes by medium (SW=storm water, GW=groundwater, DS=discharge)

Parameter	Description	Units	Medium
BOD	Biochemical oxygen demand 5day	g/m^3	SW/DS
Cl	Chloride	g/m^3	DS
CONDY	Conductivity @ 25°C	mS/m@25°C	SW/GW*/DS
DO	Dissolved oxygen	g/m^3	SW/DS
DRP	Dissolved reactive phosphorous	g/m^3	
E-Coli	Escherichia. coli	MPN/100 mL or cfu/100 mL	DS
NH_3	Un-ionised ammonia	g/m^3	SW
NH_4	Ammoniacal nitrogen	g/m^3 N	SW/GW*
NNN	Nitrite+nitrate+nitrogen	g/m^3 N	SW/GW*
NO_2-N	Nitrite nitrogen	g/m^3 N	DS
NO_3-N	Nitrate nitrogen	g/m^3 N	DS
PERSAT	Dissolved oxygen saturation %	%	SW/DS
pH	pH	pH	SW/GW*/DS
Temp	Temperature	°C	SW/GW*/DS
TURBY	Turbidity	NTU	SW/DS
BODCF	Biochemical Oxygen Demand	g/m^3	SW/DS
FLOW	Flow	m^3/s	DS
Level	Water level	m	GW*
ALKT	Alkalinity total	g/m^3 $CaCO_3$	GW/DS
Ca	Calcium	g/m^3	GW/DS
COD	Chemical oxygen demand	g/m^3	GW*/DS
K	Potassium	g/m^3	GW/DS
Na	Sodium	g/m^3	GW/DS
SAR	Sodium adsorption ratio	None	DS
SS	Suspended solids	g/m^3	DS
ST	Sulphide total	g/m^3	DS
TN	Total nitrogen	g/m^3 N	DS
TP	Total phosphorus	g/m^3 P	DS
O&G	Oil and grease	g/m^3	DS

1.4.4 Biomonitoring surveys

Two seasonal biological monitoring (biomonitoring) surveys were performed at eight sites; five in the Inaha Stream and three in the tributary (Figure 4). Surveys were undertaken during spring (October) and summer (January) conditions. These surveys used standardised sampling methods to collect stream macroinvertebrates in order to asses and monitor the condition of macroinvertebrate community. A

summary of the results can be found in 2.4.6 and a discussion about the likely effects can be found in section 3.1.

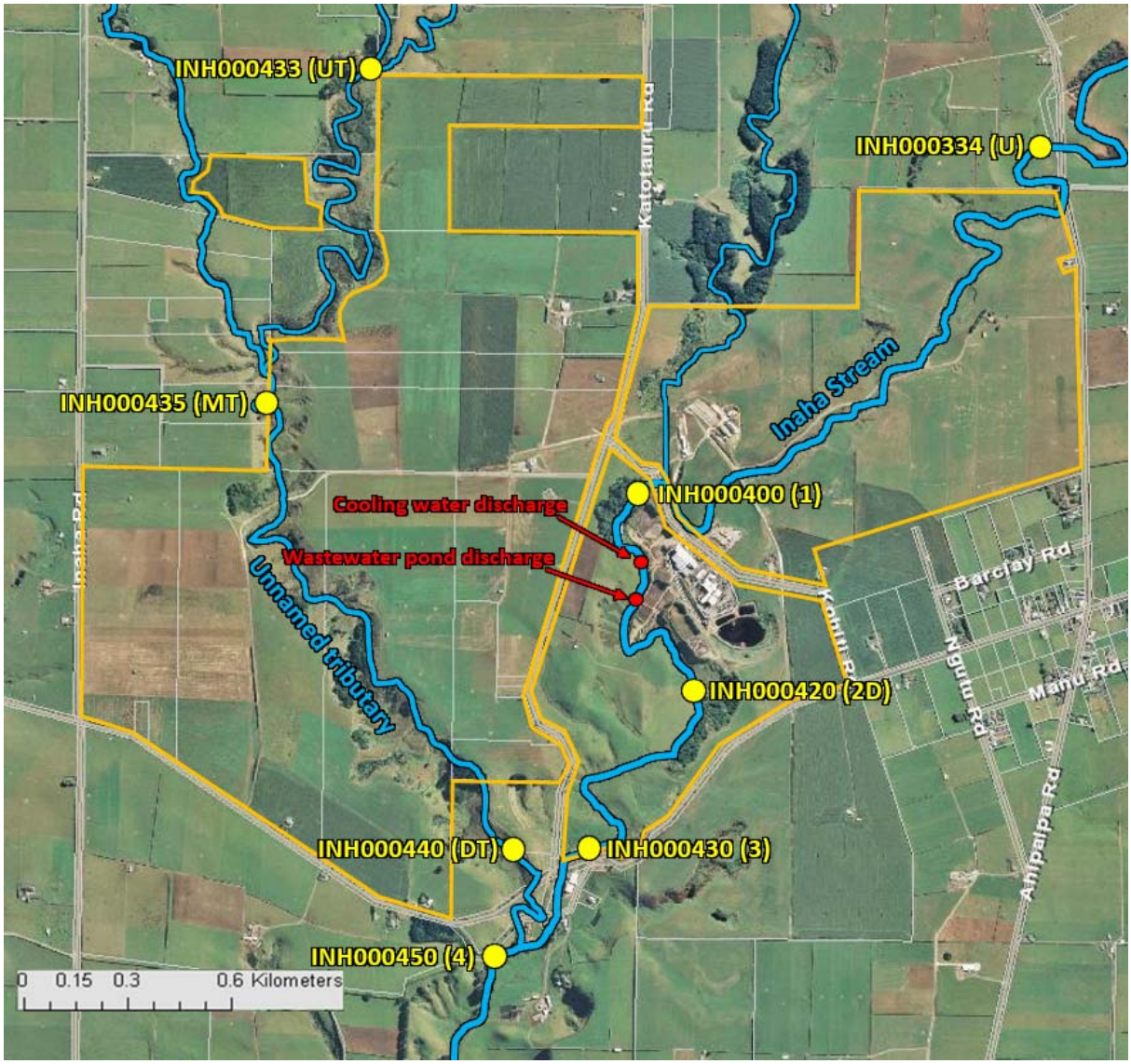

Figure 4 Location of biomonitoring sites and discharge points in the Inaha Stream and tributary. The boundaries of the site are in orange

A detailed description of the biomonitoring sampling and assessment methodologies can be found in the biomonitoring reports, in summary:

- The kick-sampling technique was used at five sites. A net is placed on the stream bed then an area upstream is disturbed with the foot to dislodge sediment. The disturbed material is collected in the net, emptied into a container, then the macroinvertebrates are collected for analysis.
- The vegetation sweep sampling method was used at site UT. This technique is similar to the kick sampling technique but involves 'jabbing' the sampling net into vegetation and collecting the material for analysis.
- The survey at sites MT and DT used a combination of kick and vegetation sweep techniques.
- Samples were preserved in ethanol so that the macroinvertebrates could be sorted and identified at a later date.
- The data were used to determine taxa (a population of a genus or species) richness and abundance which is used as an inventory of macroinvertebrates at a site.

- The data is used to calculate the Macroinvertebrate Community Index (MCI) and semi-quantitative MCI (SQMCI) scores. The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. It may be the more appropriate index if non-organic impacts are occurring.
- Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

The biomonitoring reports are available on request.

1.4.5 Monitoring by Taranaki By-Products

TBP monitor a range of processes on site and are required to report the results to Council on a monthly basis. The monthly reports contain discharge information, including: location, duration, stream flow, nitrogen wastewater strength, method of application and loading information. These reports provide information detailed in the irrigation management plan as required by consent 3941-1 condition 3.

1.4.6 Air discharges monitoring programme

The air quality monitoring programme for the TBP site consisted of the following components:

- Liaison with TBP staff;
- Site inspections to monitor the odour control systems and odour minimisation procedures, and to assess odour levels on site and beyond the boundary;
- Internal monitoring by TBP including odour surveys, recording production rates and weather data, investigating odour complaints, and maintenance work; and
- Community liaison meetings to discuss odour issues.

2 Results

2.1 Inspections

The site was inspected on six occasions during the monitoring period. These inspections assessed the site's compliance with the suite of conditions in all consents.

During inspections particular attention was given to the following items:

- rendering processes;
- air emission control systems;
- load-in and load-out areas;
- workshops;
- truck depot;
- chemical and oil/fuel storage areas;
- stormwater system;
- wastewater treatment system;
- land irrigation system; and
- waste burial areas.

7 July 2021

The compliance inspection deemed that the site was fully compliant with all consent conditions which were assessed. The inspection report noted the general tidiness of the plant with a few exceptions around the dissolved air floatation (DAF), load out bay and stormwater grates. At the time of inspection pond 1 liner had 'popped' this issue can be addressed when the ponds are decommissioned. The burn pile was observed to be tidy and compliant.

21 October 2021

At the time of inspection the site was deemed to be fully compliant with the consent conditions, however there were some housekeeping concerns. The inspection officer noted the issues of spillage around the load out bay and DAF plant, increased liner lift in pond 1 and a leaking pipe in pond 5 that is causing some erosion. The environmental manager was advised of these concerns.

24 November 2021

At the time of inspection the site was found to be fully compliant with the conditions of the consents. The plant was clean and tidy with the exception of the DAF plant where there was some spillage. This is an ongoing issue which needs addressing. The inspection officer considered that there were no exceptional odours around the biofilters and wastewater discharge.

13 January 2022

An inspection of the site was undertaken following the fire in January. The onsite managers confirmed there was approximately 30 tonnes of product buried on site, and one truck and trailer unit was arriving at the site every three days. Chicken product was being diverted to RNZ (Remediation NZ) at Uriti, other product was being diverted to other facilities in the North Island. The V CEPT (chemically enhanced primary treatment) was not in use. Pond 1 still had a bulge in the liner. Stick water irrigation had increased for the short term. TBE was operating as per usual. Suitable controls were in place to prevent discharges from the burnt/contaminated areas into waterways.

10 February 2022

At the time of inspection the plant was not operational due to extensive fire damage. The only product being accepted at the time, were home kill offal and fallen stock. There were issues around keeping buried product in the ground due to elevated groundwater levels, the officer noted that the pits appeared to be well managed. At the time of the inspection a discharge pipe to pond 1 had been damaged and product is leaking into the ground. TBP was advised that this needed to be resolved before the next inspection.

4 May 2022

At the time of the inspection, the inspecting officer was advised that heavy rain had contributed to high groundwater levels which had affected the burial pits. It appeared to be well managed. A spill from TBE had occurred prior to the inspection and was caused by a stuck ballcock. Product remained in and around the site and had migrated towards the Inaha Stream. Bunding appeared to contain the spilled material. Pond 1 was still a concern due to its bulging liner, tears and cuts. H4 and H5 treated timber was found in the burn pile (consent 10054-1) and the environmental manager was advised that these were prohibited materials and must be removed prior to burning.

2.2 Abstraction monitoring

2.2.1 Surface water abstraction – Inaha Stream

The abstraction of water from the Inaha Stream was undertaken in accordance with the conditions of consent 2051-4. During the monitoring period the abstraction was electronically monitored and data was downloaded manually by TBP. Consequently, some results represent two to three days of data (e.g., weekends and public holidays). This inconsistency in data collection has now been rectified and telemetered data collection for water abstraction commenced in July 2022.

Resource consent 2051-4 authorises a maximum daily abstraction rate of 2,160 m^3 /day or 25 L/s on average, and an instantaneous maximum of 50 L/s. As presented in Figure 5 the average daily abstraction rate from Inaha Stream appears to have been exceeded on a regular basis during this monitoring period, particularly in the period until the fire in December 2021. As discussed above, the data represents two to three days of abstraction data. The average daily abstraction between July 2021 and December 2021 was 1648 l/day which is 76% of the maximum allowable abstraction rate. Although the rate of litres abstracted per second was not recorded during this period, it is probable the average abstraction limit was complied with.

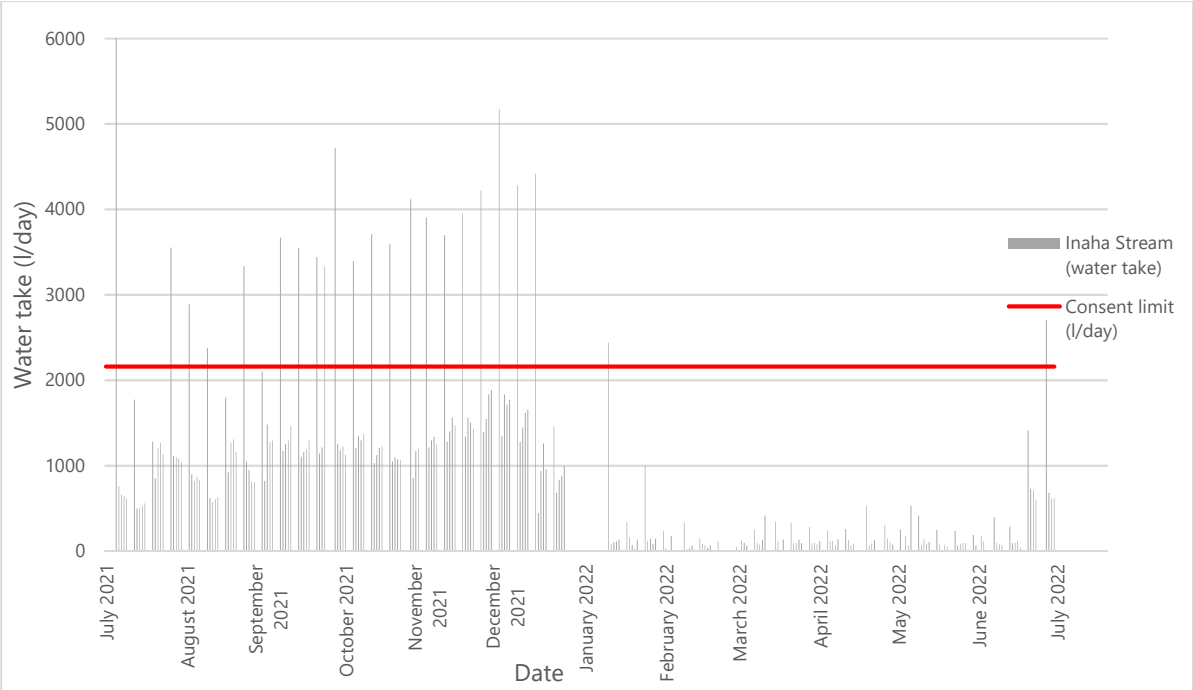

Figure 5 Water take from Inaha Stream

2.2.2 Groundwater abstraction

Consent 9756-1 authorises groundwater abstraction at a rate not exceeding 22.8 L/s (1,970 m^3/day).

As illustrated in Figure 7 the volume of groundwater taken during the monitoring period was less than the maximum permitted volume of 1,970 m^3. The maximum abstraction volume was 1,200 m^3/day and occurred in December 2021.The volume of water taken declines substantially following the fire on 26th December. In March 2022 the daily abstraction volume returned to pre-fire levels but remained well below the consent limit.

Electronic collection of the groundwater abstraction data temporarily ceased on 17th July 2021 and the reason is unknown at the time of writing this report. The rate of water abstraction from the groundwater bore was largely less than the maximum permitted rate of 22.8 L/s with one exception (Figure 6). On the 13th of July 2021 the abstraction rate data declined sharply to <0 L/s and then increases steeply to 24 L/s. The data returned to below the limit an hour later. Council did not seek an explanation from TBP for the exceedance at the time, however it's likely that there is an error in the data, or there was a brief malfunction of the monitoring instrument.

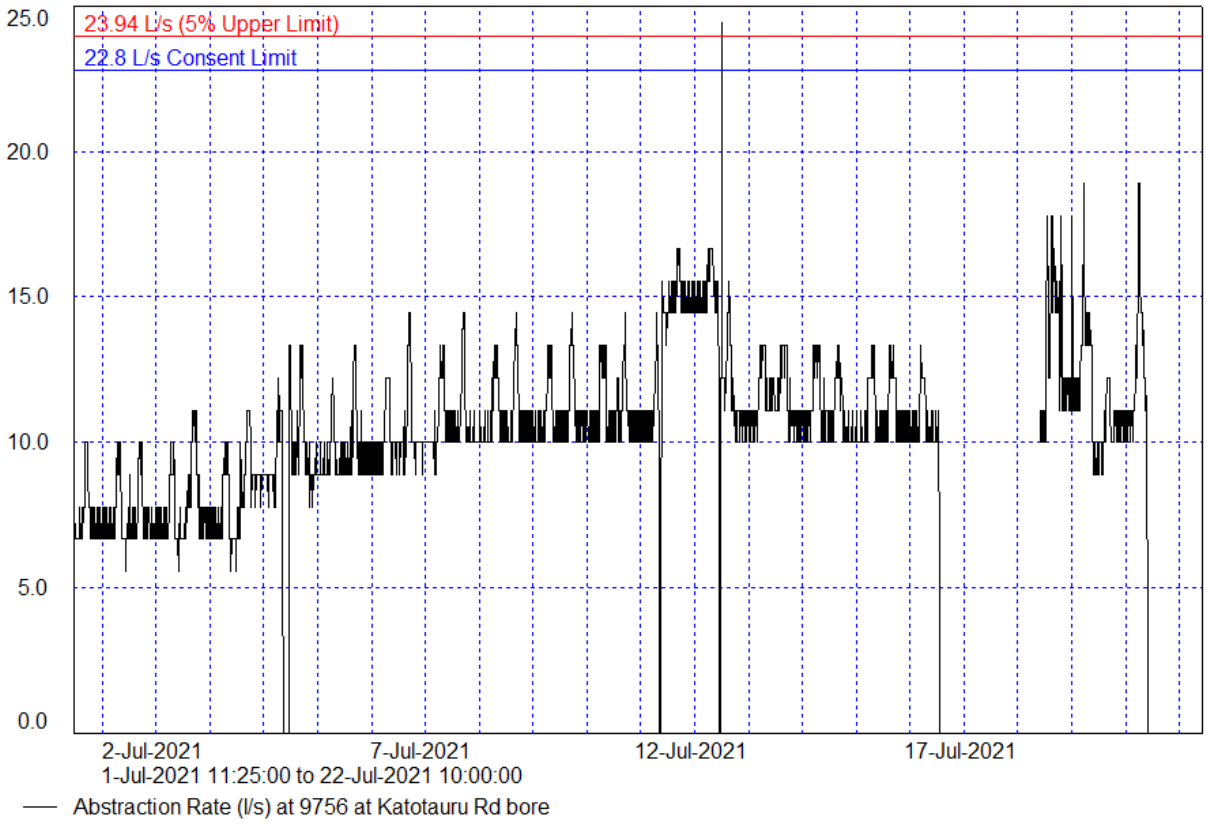

Figure 6 Groundwater daily extraction rate results for 2 – 17 July 2021

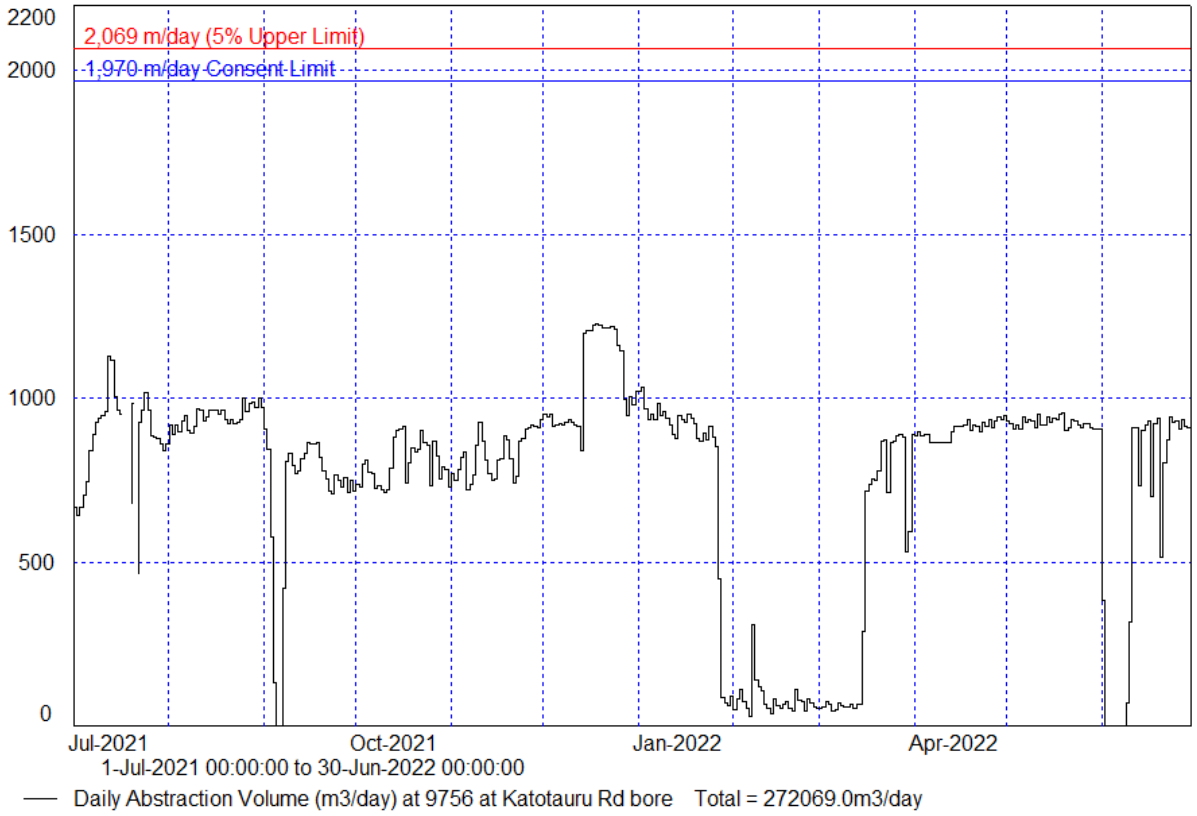

Figure 7 Groundwater daily extraction volume results for 2021-2022

2.3 Wastewater monitoring

2.3.1 Pond six sampling

Four samples were collected from the final waste water treatment pond (pond 6, IND004004) during the 2021-2022 monitoring period to assess compliance with TBP's discharge permits (2049-4 and 3941-2).

Consent 3941-2 permits the discharge of treated wastewater from pond 6 to land by spray irrigation, and imposes the following limits on waste water in pond 6:

- Dissolved oxygen (DO) shall be maintained above 1.0 g/m^3.
- Sodium absorption ratio shall not exceed 10.

The results are presented in Table 5 and show that the sodium absorption ratio ranges between 4.6 and 7.5 and are below the consent limit of 10. The samples were not analysed for dissolved oxygen but this will be added to the future wastewater analysis.

There is no limit on concentrations of total nitrogen (TN) in pond 6 however the samples have been analysed for TN since 2011 and this year's results are presented in Table 5.

Table 5 Results of pond 6 sampling for 2021-2022

Date	Sodium absorption ratio	Total nitrogen (g/m)
21 Sep 2021	5.6	210
27 Jan 2022	7.5	115
10 Mar 2022	4.6	80
29 June 2022	6.9	179

2.3.2 Cooling water analysis IND002004

The cooling water discharge (IND002004) into the firewater pond, also known as the tributary, was sampled on three occasions during this monitoring period to assess compliance with Consent 2050-4.

Conditions 2 to 4 of Consent 2050-4 require:

1. THAT the discharge shall not contain concentrations of any chemical, biological or physical contaminant (other than heat and suspended solids) greater than those found in the water abstracted from the Inaha Stream.
2. THAT the cooling water discharge to the Inaha Stream shall not exceed 35.0°C in temperature at the point of the discharge to the tributary.
3. THAT the cooling water discharge to the Inaha Stream shall not contain a concentration of suspended solids in excess of 100 g/m^3 (see section 2.3.4).

Table 6 Results of cooling water sampling at IND002004

IND002004	Temp	Electrical Conductivity (EC)	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand ($TBOD_5$)	Turbidity
Collected	°C	mS/m	pH Units	g/m^3	g O_2/m^3	NTU
21 Sep 2021	11.4	24.5	7.6	0.031	0.4	7.2
10 Mar 2022	21.9	26.2	7.4	<0.010	0.6	1.46
29 Jun 2022	12.7	29.3	7.6	1.11	3.4	74

The temperature of the cooling water prior to entering the firewater pond ranged between 11.4 and 21.9°C when sampled and complied with the consent limit of 35°C. Samples were not analysed for total suspended solids (TSS), however the cooling water remains separate from process water and therefore is not likely to contain any contaminants not already present in the surface water abstracted from Inaha Stream.

2.3.3 Stormwater analysis STW001075

Stormwater from the main yard, garage and raw material reception area is diverted into the firewater pond via an onsite drain. Samples are collected at the point where it discharges into the firewater pond at STW001075. The Council visited this location four times during this monitoring period to collect samples. The discharge of contaminated stormwater into the tributary is authorised by Consent 5426-1 which imposes the following limits on the stormwater quality:

- pH between 6 and 9.
- TSS concentration less than 100 g/m^3.

- Oil and grease concentration less than 15 g/m^3.

Laboratory analysis for oil and grease concentration in the stormwater has not been undertaken since 2018. During the three years prior to 2018 the maximum result was 10 g/m^3 and the median result was 0.65 g/m^3. On this basis laboratory analysis for oil and grease is not necessary unless there is visual evidence of it during the sampling run. Samples taken from the firewater pond are, however, analysed for oil and grease and the results can be found in Table 8 below. The results of the stormwater sample analyses are presented in Table 7 below.

Table 7 Stormwater discharge STW001075

STW001075	**Temp**	**Electrical Conductivity (EC)**	***E. coli***	**pH**	**Total Ammoniacal-N**	**Total Biochemical Oxygen Demand ($TBOD_5$)**	**Total Suspended Solids**	**Turbidity**
Collected	**°C**	**mS/m**	**MPN/100 mL**	**pH Units**	**g/m^3**	**g O_2/m^3**	**g/m^3**	**FNU**
21 Sep 2021	13.0	87.7	>2,420	7.0	1.69	5.0	46	14.8
27 Jan 2022	19.6	55.0	>2,420	7.4	11.8	44	64	20
10 Mar 2022	28.7	247	>2420	6.1	34	420	47	18.8
29 Jun 2022	12.7	27.5	>2420	7.0	3.1	55	**200**	147
Consent Limit	-	-	-	*6-9*	-	-	*100*	-

Many of the results of the stormwater sampling survey on 10 March 2022 were significantly elevated compared to the other surveys. The temperature was 28.7°C which is 9°C higher than the next highest result, and 10.2°C higher than the average (18.5°C), but lower than the limit of 35 °C. Total ammoniacal nitrogen was 34 g/m^3, three times higher than the next highest result of 11.8 g/m^3. TBOD was 420 g O_2/m^3, significantly greater that the next highest result of 11.8 g O_2/m^3. These elevated results are likely due to a high organic load from the main yard and raw materials area, and a high water temperature.

On 29 June 2022 the TSS in the stormwater was found to be 200 g/m^3, significantly higher than previous results. As shown in Table 8 the TSS concentration had reduced to 104 g/m^3 in the fire water pond on the same day, and would likely have declined further before discharging into the Inaha Stream. On this basis any adverse effects would likely have been negligible.

2.3.4 Firewater pond analysis IND001015

The Council collected four samples from the firewater pond at the point it drains to the discharge pipe. The purpose of this survey is to assess the combined discharges of the stormwater and the cooling water, as well as any seepage which may occur from the ring drain around the firewater pond, before it discharges into the Inaha Stream. The results of the analysis are presented in Table 8.

Table 8 Firewater pond IND001015

Date	Temp (°C)	Chloride (g/m^3)	Free Ammonia as N (g/m^3)	Total Ammoniacal-N (g/m^3)	Nitrate-N (g/m^3)	Nitrite-N (g/m^3)	Nitrate-N + Nitrite-N (g/m^3)	Electrical Conductivity ((g/m^3))
21 Sep 2021	13.5	35	0.00156	0.38	3.8	0.06	3.9	32.8
27 Jan 2022	18.3	33	0.0082	0.80	0.87	0.134	1.00	33.3
10 Mar 2022	21.1	230	0.144	11.2	0.06	<0.02	0.07	120.5
29 Jun 2022	12.7	34	0.0138	1.63	2.5	0.059	2.6	33.4
Date	**E.coli (MPN/100 mL)**	**Oil and Grease (g/m^3)**	**pH (Units)**	**Total Alkalinity (g/m^3 as $CaCO_3$)**	**Dissolved Reactive Phosphorus (g/m^3)**	**Total Biochemical Oxygen Demand ($TBOD_5$) (g O_2/m^3)**	**Total Suspended Solids (g/m^3)**	**Turbidity (NTU)**
21 Sep 2021	98	<4	7.2	78	0.052	1.4	<3	3.5
27 Jan 2022	980	<4	7.5	123	0.010	3.2	44	7.0
10 Mar 2022	>2420	14	7.5	177	0.96	47	**104**	59
29 Jun 2022	156	<4	7.6	97	0.079	2.3	7	14.0

The design and operation of the firewater pond results in a continuous discharge to the Inaha Stream. This includes when the discharge from pond 6 (IND004004, Section 2.3.1) has been switched to land application. The highest concentrations of several key contaminants over the monitoring period occurred on 10 March 2022. This coincides with the elevated results from the stormwater samples taken on the same day as discussed in section 2.3.3. On this basis it's likely that contaminated stormwater caused the elevated contaminants in the firewater pond.

2.4 Receiving environment monitoring

2.4.1 Inaha stream flow and discharge

Stream flow rate and wastewater discharge data are submitted to Council with the monthly monitoring report from TBP. The flow rate is used to calculate maximum water abstraction rates and wastewater dilution rates to ensure compliance with resource consents conditions. In brief, these consents specify that:

- When flow rate is less than 100 L/s discharges of wastewater from pond 6 must cease.
- A minimum dilution ratio of 1:300 must be maintained at the point where wastewater from pond 6 discharges into the Inaha Stream.
- A minimum flow rate of 25 L/s (0.025 m^3/s) must be maintained downstream of the abstraction point.

The data submitted by TBP shows that the Inaha Stream flow fell below 100 L/s on only one day during the monitoring period. This occurred on 28 February 2022 and is likely an error because it is substantially lower than all other results. No wastewater discharges occurred on this day.

Wastewater from pond 6 was discharged to the stream on 121 days over the monitoring period, the rate of discharge ranged between 1.0 L/s and 13.7 L/s. The dilution rate while the discharges were occurring was greater than 1:300 at all times.

The results of continuous monitoring of stream flow at lower Inaha Rd, downstream of TBP, show that stream flow was maintained above 25 L/s (0.025 m^3/s) as shown in Figure 8 below.

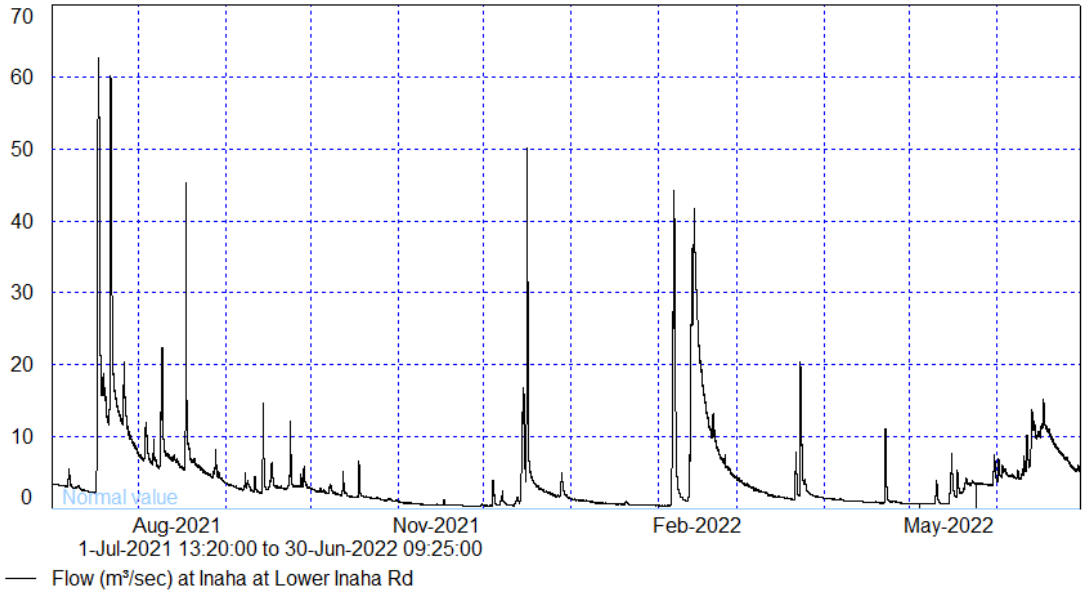

Figure 8 Inaha Stream flow at Lower Inaha Rd below TBP

2.4.2 Inaha Stream temperatures

In-stream thermometers are located within the tributary which receives the cooling water discharge and in the Inaha Stream above and below the pond 6 discharge point.

The consent conditions set out the following limits for stream temperature:

- The temperature of the cooling water discharge must not exceed 35°C where it discharges into the Inaha Stream.
- The wastewater discharge must not increase the temperature of the Inaha Stream by more than 3°C.

The maximum temperature of the cooling water which was recorded was 31°C in December 2021 (Figure 9), less than the limit of 35 C. As shown in Figure 10 the maximum temperature difference between the two instream thermometers was 0.6°in December 2021.

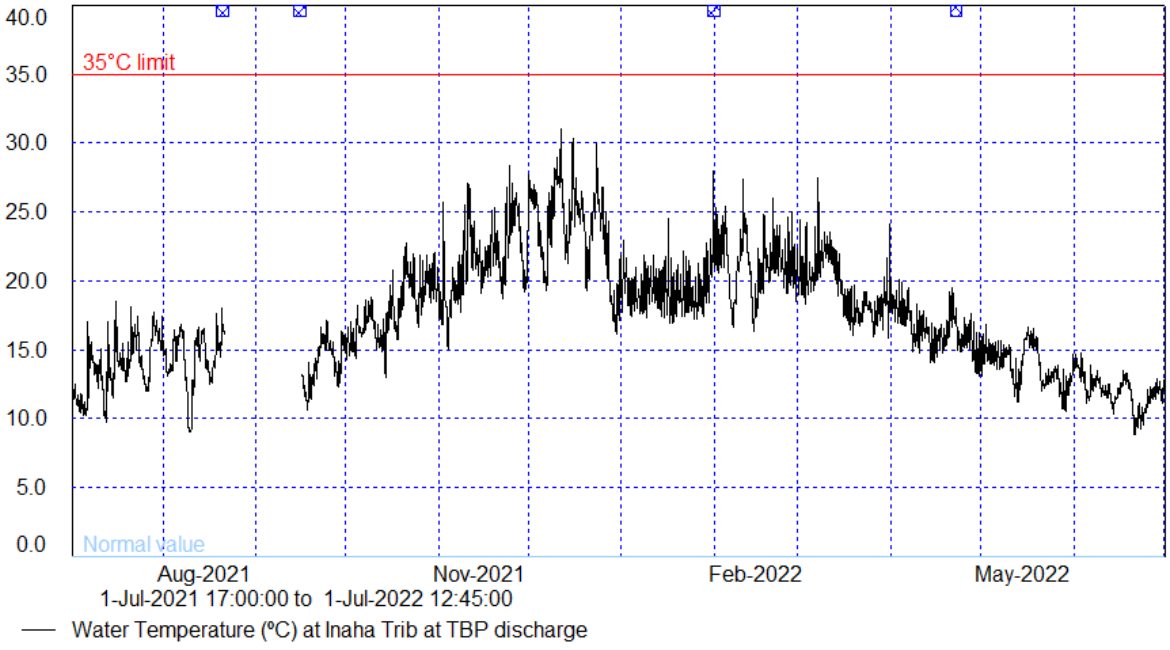

Figure 9 Temperature of cooling water entering the firewater pond/tributary

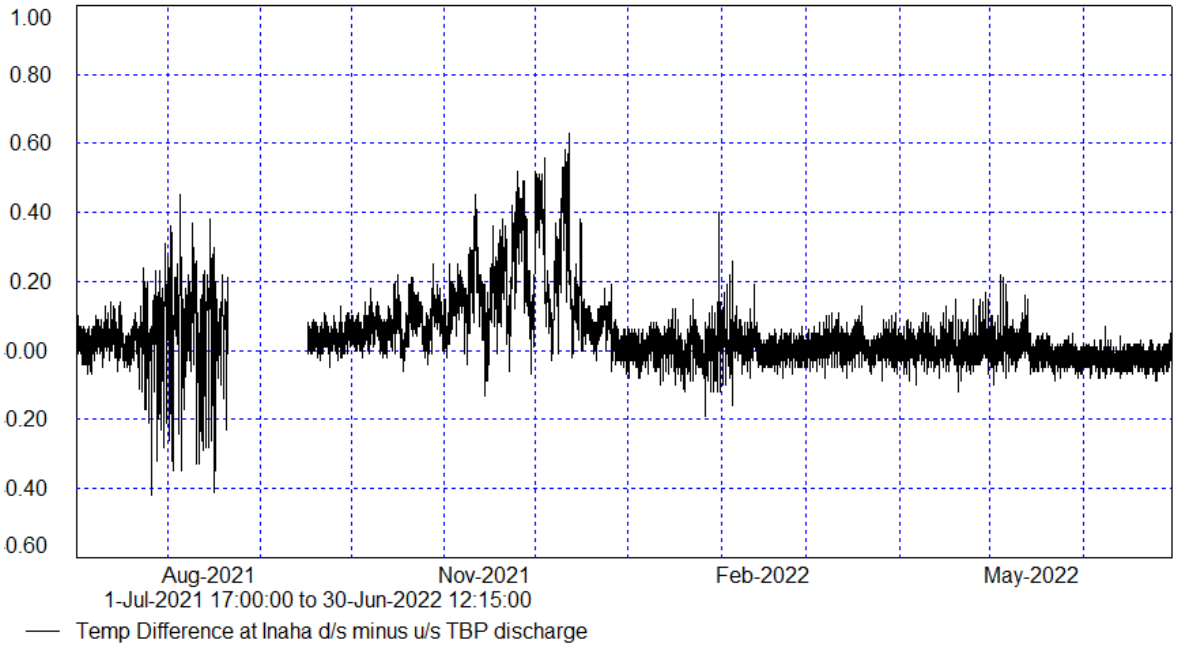

Figure 10 Temperature difference between instruments upstream and downstream of the TBP discharge

2.4.3 Water chemistry

2.4.3.1 Inaha Stream

Water quality analysis of the Inaha Stream and associated northern and western tributaries is undertaken four times per year, approximately on a quarterly basis. In this monitoring period four rounds of surface water sampling were conducted on the following dates: 21 September 2021, 27 January 2022, 10 March 2022 and 29 June 2022.

Consent 2049-4 authorises the discharge of treated wastewater to the Inaha Stream and conditions 9 and 10 state that the discharge must not result in the following measurable changes in the stream:

- A reduction in pH of greater than 0.5 units.
- An increase in dissolved carbonaceous biochemical oxygen demand (CBOD) to above 2.0 g/m^3.
- An increase in temperature of greater than 3.0 °C.
- A reduction in the dissolved oxygen (DO) concentration to below 80% (PERSAT).
- An increase in the total ammonia (NH_3) concentration below the mixing zone of 0.4/0.7/1.5 g/m^3 depending whether the pH level is <7.75/7.75-8/>8 units.

The sampling sites are listed sequentially from upstream to downstream. Sampling site INH000334 is 1 km upstream of the site and is used as a reference for the pH limit. INH000408 is the first site downstream of a discharge point and INH000450 is approximately the end of the mixing zone. INH000470 is 4 km downstream of from the site. The results of the laboratory analysis of the samples can be found in Table 9 to Table 12.

Table 9 Inaha Stream surface water monitoring on 21 September 2021

Inaha Stream SW 121 September 2021		PERSAT	Temp	Dissolved C-Biochemical Oxygen Demand ($CBOD_5$)	Total Ammoniacal-NH_3	pH
Site	Collected	%	°C	g/m^3	g/m^3	pH Units
INH000334	09:34	105.8	10.7	0.015	0.015	7.5
INH000348	09:50	110	11.1	<0.010	<0.010	7.6
INH000400	10:00	105.6	12.6	0.012	0.012	7.6
NH000408	11:02	109.6	12	0.108	0.108	7.6
INH000420	11:20	111.5	12.2	0.24	0.24	7.7
INH000430	12:25	105.5	13.1	0.21	0.21	7.8
INH000450	12:35	106.1	13.2	0.173	0.173	7.7
INH000470	12:50	98.7	13.3	-	0.015	7.6

Table 10 Inaha Stream surface water monitoring on 21 January 2022

Inaha Stream SW 121 January 2022		PERSAT	Temp	Dissolved C-Biochemical Oxygen Demand ($CBOD_5$)	Total Ammoniacal-NH_3	pH
Site	Collected	%	°C	g/m^3	g/m^3	pH Units
INH000334	08:30	104	17.3	-	0.011	7.9
INH000348	08:45	103.1	17.5	-	0.011	8
INH000400	09:00	97.2	17.5	1.1	0.013	7.9
NH000408	09:30	97.1	17.7	< 1.0	0.108	8
INH000420	09:50	97.8	17.9	< 1.0	0.079	8
INH000430	11:10	103	19.2	< 1.0	0.045	8.1
INH000450	11:25	96.7	19	< 1.0	0.034	8
INH000470	11:40	98.2	18.6	-	0.01	8

Table 11 Inaha Stream surface water monitoring round on 10 March 2022

Inaha Stream SW 121 March 2022		PERSAT	Temp	Dissolved C-Biochemical Oxygen Demand ($CBOD_5$)	Total Ammoniacal-NH_3	pH
Site	Collected	%	°C	g/m^3	g/m^3	pH Units
INH000334	08:30	109.1	15.6	-	< 0.010	7.8
INH000348	08:40	105	15.9	-	0.01	7.9

Inaha Stream SW 121 March 2022		PERSAT	Temp	Dissolved C-Biochemical Oxygen Demand ($CBOD_5$)	Total Ammoniacal-NH_3	pH
INH000400	08:55	100.2	15.9	< 1.0	< 0.010	7.8
NH000408	09:20	104	16.1	< 1.0	0.112	7.8
INH000420	09:40	101.5	16.4	< 1.0	0.076	7.8
INH000430	11:00	102.9	17.2	< 1.0	0.062	8
INH000450	11:10	104.1	17.1	< 1.0	0.045	7.9
INH000470	11:25	99.6	17.1	-	0.016	7.9

Table 12 Inaha Stream surface water monitoring round on 29 June 2022

Inaha Stream SW 121 June 2022		PERSAT	Temp	Dissolved C-Biochemical Oxygen Demand ($CBOD_5$)	Total Ammoniacal-NH_3	pH
Site	Collected	%	°C	g/m^3	g/m^3	pH Units
INH000334	09:45	91.8	11.7	-	< 0.010	7.7
INH000348	09:55	112.4	11.7	-	0.018	7.7
INH000400	10:10	100.2	11.8	< 1.0	0.013	7.6
NH000408	10:40	97.9	11.9	< 1.0	0.092	7.7
INH000420	11:10	106.9	11.9	< 1.0	0.176	7.7
INH000430	13:00	98.2	12.3	< 1.0	0.162	7.8
INH000450	13:05	98.2	12.3	< 1.0	0.126	7.8
INH000470	13:20	96.1	12.2	-	0.097	7.7

The results of all parameters listed in the consent conditions are less than the relevant limits. Total NH_3 and CBOD results are all orders of magnitude below their respective limits, while temperature and pH changes are also less than the respective consent limits. Accordingly the discharge was fully compliant with the conditions of the consent during this monitoring period.

While the remaining analytes do not have specific limits, changes in these parameters are indicative of impact on downstream water quality from the discharge. In general terms, all the results show a decreasing trend in water quality with distance from the discharge point.

2.4.3.2 Northern tributary

The Northern tributary flows for a distance of 0.64 km through a portion of the site used to irrigate wastewater, before joining the Inaha Stream immediately above Kohiti Road. The only monitoring site is at its confluence with Inaha stream at sampling site INH000397 which is upstream from the wastewater discharge point. Water quality is primarily a result of diffuse discharges from the irrigation paddocks. The results of the sample analyses collected during this monitoring period are provided in Table 13. There are no consent conditions which limit the concentration of contaminants in the tributary.

Table 13 Sampling results for the northern tributary during the monitoring period

INH000397 parameter	DO	PERSAT	Temp	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	*E. coli*	pH
Collected	g/m^3	%	°C	g/m^3	g/m^3	mS/m	MPN/100 mL	pH Units
21 Sep 2021	11.16	103.7	10.7	33	0.017	29.9	613	7.5
21 Jan 2022	8.35	90.6	17.1	35	0.011	33.2	980	7.9
10 Mar 2022	9.49	96.1	15.7	35	0.011	31.8	1046	7.7
29 Jun 2022	10.29	96.5	12	35	0.018	30	1414	7.6

INH000397 parameter	Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	Total Ammoniacal-N	Total Biochemical Oxygen Demand ($TBOD_5$)	Turbidity - ISO 7027 Method
Collected	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	$g\ O_2/m^3$	FNU
21 Sep 2021	0.00015	4.5	4.5	0.025	0.024	0.7	13.6
21 Jan 2022	< 0.0003	3.2	3.2	0.017	< 0.010	0.6	4
10 Mar 2022	0.00021	3.9	3.9	0.005	0.015	0.6	6.2
29 Jun 2022	0.00033	4.6	4.6	0.015	0.034	0.7	22

Broadly speaking there is no significant change in the concentrations of the contaminants over the monitoring period. The exception is the concentration of E.coli which more than doubled over the monitoring period from 613 MPN/100 mL to 1414 MPN/100 mL. For comparison, the maximum *E. coli* guideline recommended by the Council for contact recreation purposes is 33 MPN/100 mL. There is no guideline value for aquatic ecosystems.

Nitrite+nitrate+nitrogen (NNN) concentrations varied during the monitoring period, the highest result of 4.6 g/m^3 occurred in June 2022. Since 1999 the concentration of NNN in samples has been trending upwards (Figure 11) with three of the four results above 4.5 g/m^3 occurring since 2019. There is no contact recreation value for NNN in the Council surface water guidelines.

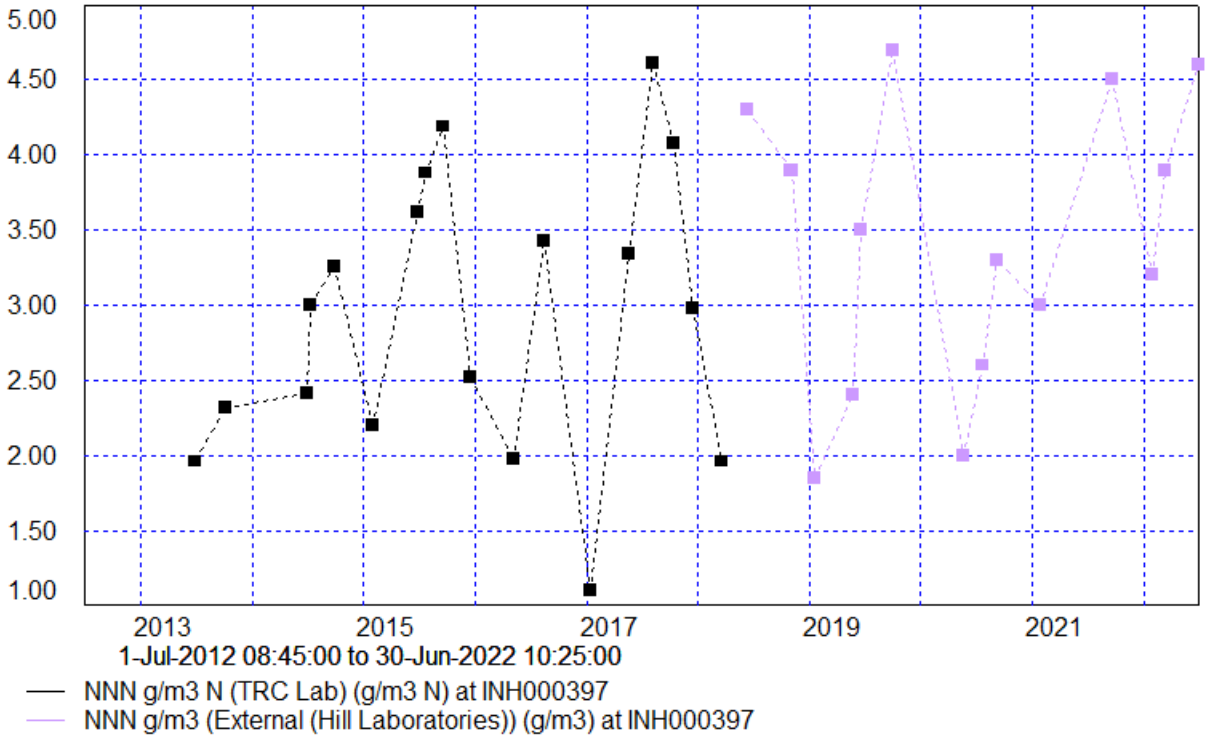

Figure 11 NNN concentrations at INH000397 2012-2022

2.4.3.3 Western tributary

The Western tributary flows for a distance of 3.5 km through paddocks which are used by TBP to irrigate wastewater, and joins the Inaha Stream at Normanby Road 900 m south of the pond 6 wastewater discharge point. The tributary is monitored at three points; INH000433 (upstream of the TBP farm), INH000435 (2.5 km above the Inaha confluence) and INH000440 (200 m before the confluence with the Inaha Stream). As with the northern tributary diffuse discharges from the irrigated paddocks are not subject to consent 2049-4 and therefore there are no limits on contaminant concentrations.

During this monitoring period four surveys were conducted at all three monitoring sites in the Western tributary.

Table 14 Surface water sampling of the Western tributary on 21 September 2021

21 September 2021	DO	PERSAT	Temp	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	*E. coli*	Free Ammonia as N
Site	g/m³	%	°C	g/m³	g/m³	mS/m	MPN /100 mL	g/m³
INH000433	9.9	98.8	12.2	35	0.013	31.2	816	< 0.00009
INH000435	10.79	104	13	38	0.011	32.9	770	< 0.00010
INH000440	11.04	105.6	12.6	43	0.011	36.8	411	< 0.00012

	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand ($TBOD_5$)	Turbidity - ISO 7027 Method
Site	g/m³	g/m³	g/m³	pH Units	g/m³	g O_2/m³	FNU
INH000433	3.4	3.4	0.004	7.6	< 0.010	0.4	16
INH000435	5	5	0.006	7.6	< 0.010	< 0.4	4.4
INH000440	8.1	8.1	0.006	7.7	< 0.010	< 0.4	10

Table 15 Surface water sampling of the Western tributary on 21 January 2022

21 January 2022	DO	PERSAT	Temp	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	*E. coli*	Free Ammonia as N
Site	g/m³	%	°C	g/m³	g/m³	mS/m	MPN /100 mL	g/m³
INH000433	8.04	82.3	16.1	35	0.011	31.2	461	< 0.0003
INH000435	8.19	86.6	17.7	43	0.012	35.9	1733	< 0.0003
INH000440	8.27	87.2	17.4	51	0.011	43.1	1986	< 0.0003

	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand ($TBOD_5$)	Turbidity - ISO 7027 Method
Site	g/m³	g/m³	g/m³	pH Units	g/m³	g O_2/m³	FNU
INH000433	1.9	1.9	< 0.002	7.9	16.1	< 0.010	0.8
INH000435	4.7	4.7	0.006	7.9	17.7	< 0.010	0.7
INH000440	9.7	9.7	0.005	7.9	17.4	< 0.010	0.6

Table 16 Surface water sampling of the Western tributary on 10 March 2022

10 March 2022	DO	PERSAT	Temp	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	*E. coli*	Free Ammonia as N
Site	g/m³	%	°C	g/m³	g/m³	mS/m	MPN /100 mL	g/m³
INH000433	8.73	88.6	15.7	38	0.009	32.4	613	< 0.00014
INH000435	8.75	90	16.5	42	0.01	34.5	1046	< 0.00017
INH000440	9.63	98.2	16.1	48	0.008	39	2420	< 0.0003

	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand ($TBOD_5$)	Turbidity - ISO 7027 Method
Site	g/m³	g/m³	g/m³	pH Units	g/m³	g O_2/m³	FNU
INH000433	2.3	2.3	0.002	7.7	15.7	< 0.010	0.6
INH000435	4.4	4.4	0.006	7.7	16.5	< 0.010	0.6
INH000440	8.2	8.2	0.005	7.9	16.1	< 0.010	0.7

Table 17 Surface water sampling of the Western tributary on 29 June 2022

29 June 2022	DO	PERSAT	Temp	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	*E. coli*	Free Ammonia as N
Site	g/m³	%	°C	g/m³	g/m³	mS/m	MPN /100 mL	g/m³
INH000433	10.16	96.1	12.2	38	0.013	31.9	613	0.00017
INH000435	10.72	102.2	12	42	0.015	34	1046	0.00018
INH000440	10.87	100.5	12	47	0.014	37.6	1046	< 0.00014

	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand ($TBOD_5$)	Turbidity - ISO 7027 Method
	g/m³	g/m³	g/m³	pH Units	g/m³	g O_2/m³	FNU
INH000433	3.4	3.4	0.006	7.7	12.2	0.017	0.7
INH000435	5.4	5.4	0.009	7.7	12	0.016	0.5
INH000440	8.2	8.2	0.008	7.8	12	< 0.010	< 0.4

Laboratory analysis of the western tributary samples indicates a progressive decline in two water quality parameters with distance downstream. Concentrations of NNN increased by between 238 and 510% between the upstream and downstream monitoring sites, up to a maximum of 9.7 g/m³ during the January 2022 survey. The results from INH000440 across all surveys range from 8.1 to 9.7 g/m³, two times higher than the NNN results for the Inaha Stream and Northern Tributary. This may be attributed to the greater

distance it travels through irrigation paddocks compared to the other streams, and therefore receives higher levels of NNN from diffuse discharges.

Long term monitoring results from sample site INH000440, the furthest downstream sampling point, show that NNN concentrations have been trending upwards since monitoring started in November 2004. However the concentrations have been trending downwards since a peak of 24 g/m³ in February 2017 (Figure 12).

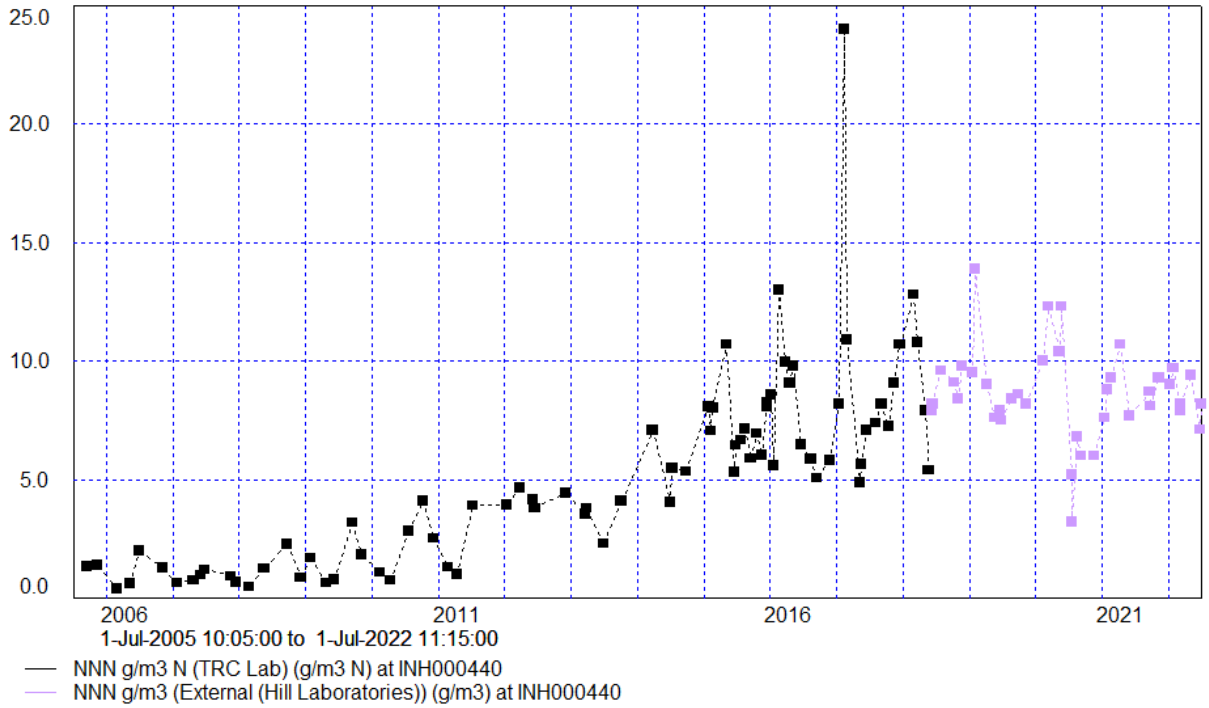

Figure 12 NNN concentrations at INH000440 2005-2022

2.4.4 Irrigation area loading and groundwater monitoring

TBP holds consent 3941-2; this consent allows for the discharge of up to 1,400 m³/day of treated wastewater from their rendering operation onto and into land in the vicinity of the Inaha Stream and its tributaries.

The wastewater is monitored by both TBP and the Council. TBP measures and records wastewater volumes discharged on each paddock daily, and analyses nitrogen constituents of the wastewater at approximately weekly intervals.

Monitoring by the Council included the following:

- inspection of the irrigation areas;
- effluent analysis;
- chemical and biological surveys of the Inaha Stream;
- sampling from the groundwater bores installed around the irrigation areas; and
- sampling of Te Kopanga spring situated near an irrigation area which is used to supply several households.

Table 18 provides a comparison of this year's wastewater and nitrogen loading rates to land compared to the previous three monitoring periods. The data was compiled by TBP and provided to the Council as monthly reports.

Table 18 2018-2022 comparison loading rates of wastewater and fertiliser

Parameter	2018-2019 loading rates	2019-2020 loading rates	2020-2021 loading rates	2021-2022 loading rates
Utilised land application area (ha)	322.76	337.91	329.05	364.15
Total nitrogen (wastewater) (kg N/pa)	43,738	36,994	34,002	14,642
Calculated average loading rate (kg N/ha pa)	167	116	106.9	40.2

The total volume of wastewater discharged to land this year reduced by 19,360 kg compared to the 2020-2021 monitoring period. There was a corresponding decrease in the nitrogen loading rate of 66.7 kg N/ha/annum compared to the previous year.

2.4.4.1 Groundwater monitoring of the irrigation areas

Monitoring of the nine groundwater wells and one spring within the vicinity of the irrigation area is undertaken to assess the effects of the land-based applications of wastewater through irrigation. NNN is the main contaminant of concern as it appears to be leading to an increase in surface water concentrations, specifically in the Western tributary which was discussed in Section 2.4.3.3. There are no standards or guidelines for ecological or cultural effects on groundwater.

During this monitoring period six rounds of groundwater monitoring were undertaken and the results for each sampling site are provided in the following tables.

GND1054: The results of sampling of this groundwater well are presented in Table 19. The results did not change substantially during the monitoring period.

Table 19 GND1054 groundwater sampling results for the 2021-2022 monitoring period

GND1054	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	**M**	6.88	7.40	7.18	6.67	7.65	6.98
Temp	**°C**	13.7	14.0	14.2	15.2	13.9	13.6
Chloride	**g/m^3**	39		43	37	39	44
Electrical Conductivity	**mS/m**	35		35.9	38.2	35.5	35.7
E. coli	**cfu/100 mL**	<1		<1	1	<1	2
Nitrate-N + Nitrite-N	**g/m^3**	11.2		11.2	13	13.3	12.8
pH	**pH Units**	6.4		7	6.5	6.5	6.6
Total Ammoniacal-N	**g/m^3**	< 0.010		<0.010	<0.010	<0.010	<0.010

GND1056: NNN results remained low overall, the highest concentrations were in September and March with a maximum concentration of 20 g/m³ (Table 20). All other results showed only slight variations throughout the monitoring period.

Table 20 GND1056 groundwater sampling results for the 2021-2022 monitoring period

GND1056	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	**m**	7.73	8.39	8.73	7.45	8.52	8.32
Temp	**°C**	14	14.8	14.4	14.2	14.3	13.8
Chloride	**g/m³**	62	43	39	47	38	41
Electrical Conductivity	**mS/m**	46	31.2	27.3	41.6	33.9	29.5
E. coli	**cfu / 100 mL**	5	<1	<1	<1	<1	<1
Nitrate-N + Nitrite-N	**g/m³**	17.7	8.4	4.4	20	12.9	7.5
pH	**pH Units**	6.3	6.4	7.0	6.5	6.5	6.6
Total Ammoniacal-N	**g/m³**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

GND1057: The results from samples collected from GND1057 returned the highest NNN levels, between 30 and 38 g/m³. The results of all other analytes varied only slightly over the monitoring period.

Table 21 GND1057 groundwater sampling results for the 2021-2022 monitoring period

GND1057	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	2 May 2022	21 Jun 2022
Level	**m**	5.58	6.14	5.97	6.34	5.45
Temp	**°C**	14.1	14.7	13.9	14.1	13.7
Chloride	**g/m³**	58	62	60	57	60
Electrical Conductivity	**mS/m**	61.6	60.9	59.6	54.5	54.3
E. coli	**cfu / 100 mL**	<1	<1	1	<1	<1
Nitrate-N + Nitrite-N	**g/m³**	33	38	33	30	30
pH	**pH Units**	6.3	6.3	6.9	6.4	6.5
Total Ammoniacal-N	**g/m³**	<0.010	<0.010	<0.010	<0.010	<0.010

GND1058: This monitoring location is at a natural spring well which supplies a number of nearby houses with water (Figure 13) and is located on a property adjacent to the TBP site. It also holds significant value for the local hapū, Ngāti Manuhiakai, which has named it Te Kopanga Spring. TBP once used the surrounding paddocks for irrigation but have not done so for several years. As this is a source of drinking water the results are compared against the Drinking Water Standards of New Zealand (DWSNZ, MfE, revised 2018).

Figure 13 Image of Te Kopanga Spring water source

The 2021-2022 results for chloride ranged between 59 and 65 g/m^3 which is significantly less than the DWSNZ guideline value for drinking water of 250 g/m^3 (Table 22). The pH levels were found to be between 6.5 and 7.2 which is generally outside the guideline range recommended by the DWSNZ. The pH of drinking water affects the taste of water only and does not have health effects except at the extreme ends of the pH range.

The results show that the presence of *E. coli* exceeded the maximum exposure value (MAV) for all samples except March 2022. *E. coli* is used as an indicatior of the presence of faecal contamination in water and can be present in human and animal wastewater discharges, and bird droppings.

Table 22 GND1058 groundwater sampling results for the 2021-2022 monitoring period (exceedances in **bold**)

GND1058	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022	DWSNZ
Temp	**°C**	13.9	14.8	15.4	16.1	15.5	13.8	N/A
Chloride	**g/m^3**	59	62	61	65	63	64	250 (taste only)
Electrical Conductivity	**mS/m**	35.3	35.3	35.4	37.4	326.6	36.8	N/A

GND1058	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022	DWSNZ
E. coli	cfu / 100 mL	**22**	**4**	**2**	<1	**4**	**2**	<1/100
Nitrate-N + Nitrite-N	g/m³	5.1	5.0	4.9	5.5	5.3	5.8	50
pH	pH Units	**6.6**	**6.5**	7.2	**6.7**	**6.7**	**6.7**	7-8.5 (taste only)
Total Ammoniacal-N	g/m³	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	N/A

Long term (10 year) monitoring data for NNN indicates that the concentrations in the spring have increased slightly (Figure 14), although there has been an overall decline in the last five years. In August 2015 the NNN present in the spring reached a maximum concentration of 7.8 g/m³. The NNN concentration peaked again in September 2017 with a concentration of 7.2 g/m³, but then declined to 3.7 g/m³ in August 2020. Since then the NNN concentrations measured during monitoring increased slightly to 5.8 g/m³ in June 2022. The lowest result for this monitoring year was 4.9 g/m³ in January 2022. Adopting the conservative assumption that all the NNN is comprised of nitrate, the results are below the DWSNZ short-term exposure MAV for nitrate of 50 g/m³.

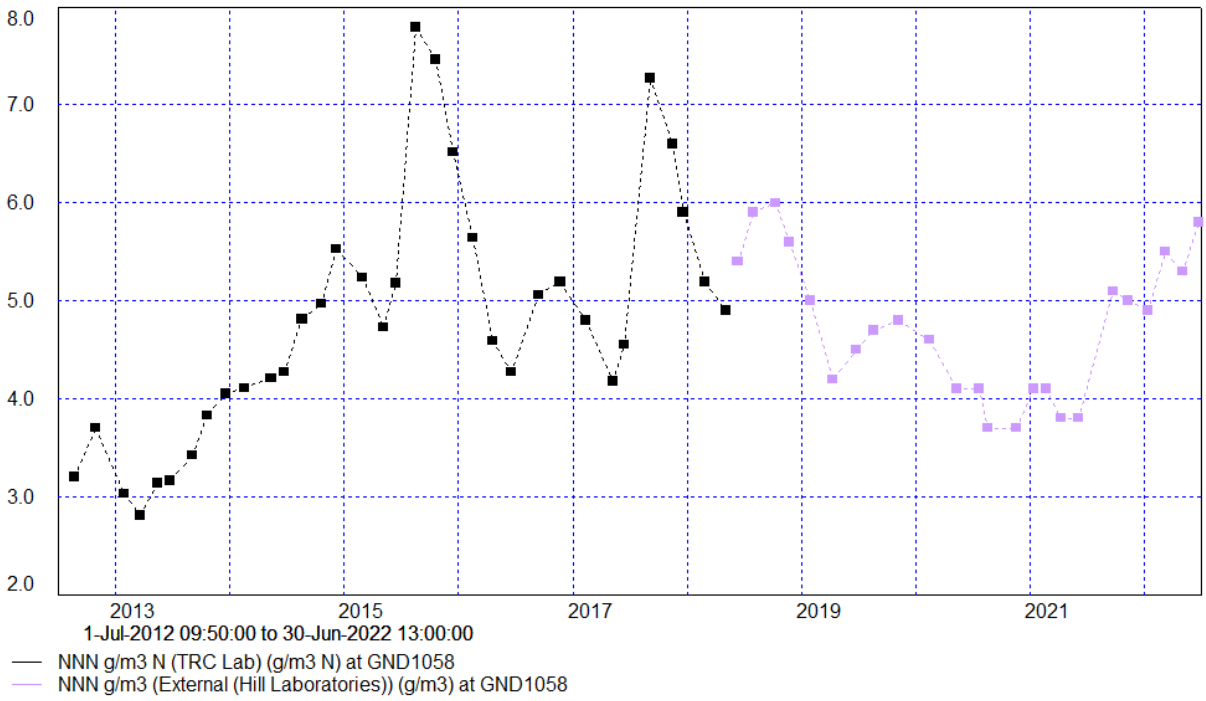

Figure 14 NNN concentration in samples 2012-2022

GND1346: The results of this monitoring period show NNN were higher than most other sites, with all results above 60 g/m^3 (Table 23) and a maximum concentration of 92 g/m^3 in June 2022. The level of *E. coli* in the samples were less than the level of detection, except for in May 2022 when the result was 3 cfu/100 mL.

Table 23 GND1346 groundwater sampling results for the 2021-2022 monitoring period

GND1346	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	**m**	3.92	4.68	4.44	3.23	4.83	2.91
Temp	**°C**	13.9	14.4	13.7	14.2	14.1	13.7
Chloride	**g/m^3**	119	117	115	130	128	146
Electrical Conductivity	**mS/m**	115.8	109.8	114.7	128.6	121.7	130.9
E. coli	**cfu / 100 mL**	<1	<1	<1	3	<1	1
Nitrate-N + Nitrite-N	**g/m^3**	72	77	77	90	86	92
pH	**pH Units**	6.2	6.2	6.6	6.3	6.3	6.3
Total Ammoniacal-N	**g/m^3**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

GND1347: The results of this monitoring period show NNN were somewhat higher than most other sites, with all results 55 g/m^3 or higher (Table 24). The level of *E. coli* in the samples were less than the level of detection, except for in June 2022 when the result was 3 cfu/100 mL.

Table 24 GND1347 groundwater sampling results for the 2021-2022 monitoring period

GND1347	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	**m**	6.92	7.71	7.28	6.68	8.23	6.83
Temp	**°C**	14	14.2	14.1	14.2	14.2	13.7
Chloride	**g/m^3**	98	105	106	84	102	99
Electrical Conductivity	**mS/m**	90.4	94.7	97.6	84	95.2	92.6
E. coli	**cfu / 100 mL**	<1	<1	<1	<1	<1	3
Nitrate-N + Nitrite-N	**g/m^3**	62	67	63	55	66	65
pH	**pH Units**	6.2	6.2	6.6	6.3	6.2	6.3
Total Ammoniacal-N	**g/m^3**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

GND1348: The results of this monitoring period show NNN was 35 g/m^3 or higher (Table 24). The concentration generally increased over the monitoring period up to a maximum of 57 g/m^3. The level of *E. coli* in the samples were less than the level of detection, except in January 2022 when the result was 2 cfu/100 mL.

Table 25 GND1348 groundwater sampling results for the 2021-2022 monitoring period

GND1348	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	**m**	9.54	10.03	10.41	9.44	10.11	10.48
Temp	**°C**	14.2	14.8	14.2	14.4	14.2	13.6

GND1348	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Chloride	g/m³	94	96	67	86	97	110
Electrical Conductivity	mS/m	76.7	79.7	76.9	78	85.5	90.1
E. coli	cfu / 100 mL	<1	<1	2	<1	<1	<1
Nitrate-N + Nitrite-N	g/m³	35	46	44	45	53	57
pH	pH Units	6.4	6.4	6.5	6.5	6.4	6.4
Total Ammoniacal-N	g/m³	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

GND1349: The NNN results for the monitoring period ranged between 62 and 73 g/m³ and generally increased over time. All other parameters fluctuated only slightly around the mean. Notably, temperature and pH varied by only 0.5°C and 0.5 units respectively.

Table 26 GND1349 groundwater sampling results for the 2021-2022 monitoring period

GND1349	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	m	9.37	10.31	10.33	9.32	10.11	
Temp	°C	14.1	14.2	13.9	13.9	14.1	13.7
Chloride	g/m³	88	75	79	67	79	92
Electrical Conductivity	mS/m	101.6	96.3	92.2	92.3	97	100.3
E. coli	cfu / 100 mL	<1	<1	<1	<1	<1	2
Nitrate-N + Nitrite-N	g/m³	62	69	62	64	72	73
pH	pH Units	6.7	6.2	6.7	6.3	6.3	6.3
Total Ammoniacal-N	g/m³	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

GND2225: The NNN concentration results from the monitoring period were within the range of other groundwater results. The concentration ranged between 49 g/m³ in June 2022 and 56 g/m³ in November 2021. Conversely, two *E. coli* results were the highest recorded in the irrigation area groundwater during this monitoring period. In September 2021 the concentration was 7 cfu/100 mL, and in Jun 2022 the concentration was 27 cfu/100 mL.

Table 27 GND2225 groundwater sampling results for the 2021-2022 monitoring period

GND2225	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	m	5.55	5.88	5.77	5.25	6	5.02
Temp	°C	14	14.2	13.9	14.3	14	13.7
Chloride	g/m³	89	96	87	87	93	88
Electrical Conductivity	mS/m	89	87.0	83.9	80.4	84.8	77.1
E. coli	cfu / 100 mL	7	<1	2	<1	<1	27
Nitrate-N + Nitrite-N	g/m³	53	56	53	50	55	49
pH	pH Units	6.2	6.2	6.8	6.4	6.3	6.3
Total Ammoniacal-N	g/m³	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

GND2226: The NNN concentration results from the monitoring period were at the upper end of the range of groundwater results. The lowest recorded concentration was 82 g/m³ in January 2022 and the highest result was 88 g/m³ in March 2022.

Table 28 GND2226 groundwater sampling results for the 2021-2022 monitoring period

GND2226	Unit/Date	20 Sep 2021	9 Nov 2021	12 Jan 2022	8 Mar 2022	2 May 2022	21 Jun 2022
Level	**m**	5.22	6.00	5.73	10.42	6.23	5.41
Temp	**°C**	13.9	14.2	14.2	14.1	14	13.6
Chloride	**g/m³**	161	154	152	149	138	157
Electrical Conductivity	**mS/m**	130	128.3	130.5	131.8	126.6	124.3
E. coli	**cfu / 100 mL**	<1	<1	<1	<1	<1	<1
Nitrate-N + Nitrite-N	**g/m³**	84	87	82	88	87	85
pH	**pH Units**	6.1	6.1	6.5	6.3	6.2	6.2
Total Ammoniacal-N	**g/m³**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

2.4.5 Solid waste burial

The burial of dead stock is authorised under consent 5495-1. This consent allows for the discharge of up to 200 tonnes per day of wastes from meat and rendering operations by burial into land in the vicinity of the Inaha Stream. The consent provides a contingency in the event of a significant disruption to the rendering process when dead stock cannot be processed.

In order to monitor impacts on ground and surface water a network of groundwater wells (Figure 15) is sampled quarterly. The results for each well can be found in Table 29 to Table 33 below.

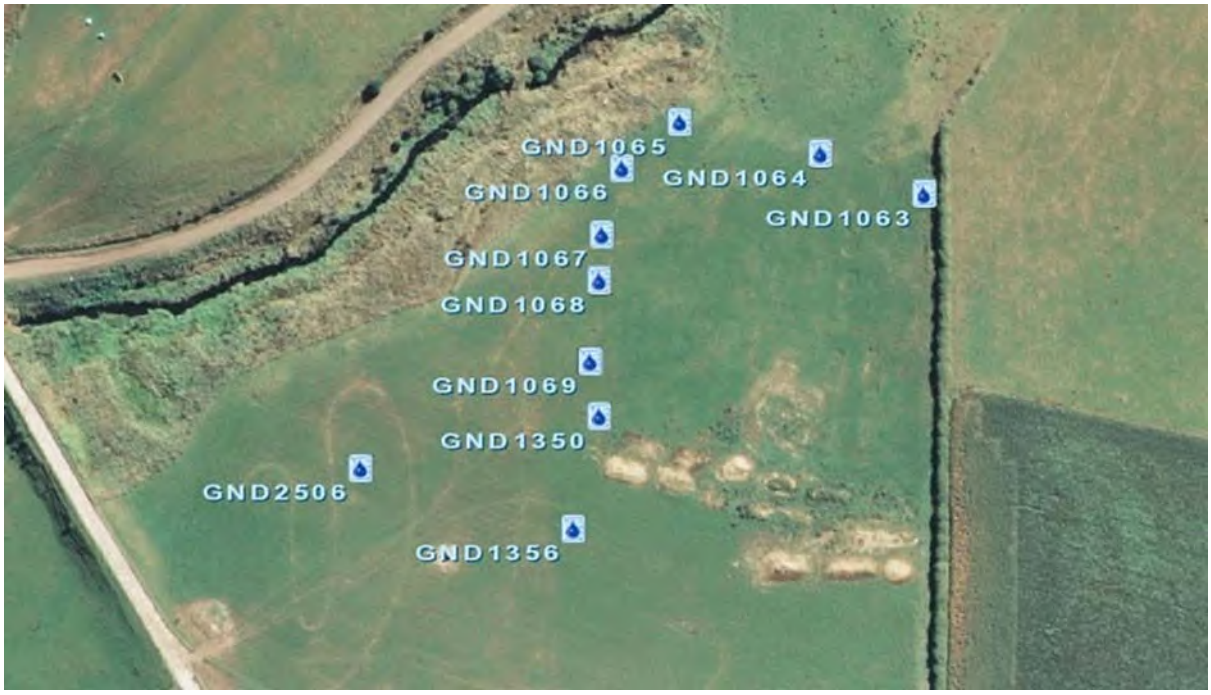

Figure 15 Burial groundwater monitoring well locations

Table 29 Burial pit monitoring well GND1063 groundwater sampling results for 2021-2022

GND1063	Unit/Date	29 Sep 2021	2 Dec 2021	23 Feb 2022	20 Jun 2022
Level	m	7.07	7.84	6.33	7.62
Temp	°C	13.7	14.6	14	13.6
Chemical Oxygen Demand (COD), trace level	g O_2/m^3	<6	<6	<6	<6
Electrical Conductivity (EC)	mS/m	42.8	41.6	43.8	42.7
Nitrate-N + Nitrite-N	g/m^3	15.7	18.4	19.8	20
pH	pH Units	6.5	6.7	6.6	6.4
Total Ammoniacal-N	g/m^3	<0.010	<0.010	<0.010	<0.010

Table 30 Burial pit monitoring well GND1066 groundwater sampling results for 2021-2022

GND1066	Unit/Date	29 Sep 2021	2 Dec 2021	23 Feb 2022	20 Jun 2022
Level	m	5.65	5.8	5.25	5.11
Temp	°C	14.8	15	14.8	14.3
Chemical Oxygen Demand (COD), trace level	g O_2/m^3	49	36	20	<6
Electrical Conductivity (EC)	mS/m	320	284	104.3	181.7
Nitrate-N + Nitrite-N	g/m^3	23	36	27	80
pH	pH Units	7.2	7.2	6.5	6.5
Total Ammoniacal-N	g/m^3	210	156	26	63

Table 31 Burial pit monitoring well GND1067 groundwater sampling results for 2021-2022

GND1067	Unit/Date	29 Sep 2021	2 Dec 2021	23 Feb 2022	20 Jun 2022
Level	m	5.64	5.92	5.06	4.945
Temp	°C	14.7	15.3	14.7	14.2
Chemical Oxygen Demand (COD), trace level	g O_2/m^3	59.3	8	<6	<7
Electrical Conductivity (EC)	mS/m	59.3	68	42.2	55.1
Nitrate-N + Nitrite-N	g/m^3	4.5	3.1	3.9	3
pH	pH Units	6.4	6.7	6.6	6.4
Total Ammoniacal-N	g/m^3	<0.010	0.032	0.027	0.174

Table 32 Burial pit monitoring well GND1069 groundwater sampling results for 2021-2022

GND1069	Unit/Date	29 Sep 2021	2 Dec 2021	23 Feb 2022	20 Jun 2022
Level	m	5.6	6.05	4.85	4.83
Temp	°C	14.9	15.9	14.7	14.8
Chemical Oxygen Demand (COD), trace level	g O_2/m^3	18	28	28	22
Electrical Conductivity (EC)	mS/m	141.1	195.3	152.1	193.5
Nitrate-N + Nitrite-N	g/m^3	40	18.5	33	40
pH	pH Units	6.7	7.1	6.9	6.7
Total Ammoniacal-N	g/m^3	45	95	58	71

Table 33 Burial pit monitoring well GND2506 groundwater sampling results for 2021-2022

GND2506	Unit/Date	29 Sep 2021	2 Dec 2021	23 Feb 2022	20 Jun 2022
Level	m	4.65	5.27	4.24	4.41
Temp	°C	13.9	14.2	14.7	15.5
Chemical Oxygen Demand (COD), trace level	g O_2/m^3	7	<6	16	<6
Electrical Conductivity(EC)	mS/m	88.1	105.2	87.9	146.8
Nitrate-N + Nitrite-N	g/m^3	5.9	5.5	0.041	0.066
pH	pH Units	6.6	6.9	6.7	6.9
Total Ammoniacal-N	g/m^3	<0.010	<0.010	<0.010	0.21

Groundwater well GND1063 is sited uphill from the burial pits and unaffected by discharges from them. It provides a baseline to compare results from the other groundwater bores against. The NNN concentration in GND1063 ranged from 15.7 to 20 g/m^3 over the monitoring period. The results from the remaining groundwater wells ranged between <1 (GND2506) and 80 g/m^3 (GND1066) over the same period.

2.4.6 Biomonitoring

Biological surveys were conducted on 19 October 2021 and 11 January 2022, a combination of the 'vegetation sweep' and 'kick-sampling' techniques was used at eight sites to collect streambed macroinvertebrates from the Inaha Stream and tributary. This was to assess whether discharges (via point source and irrigation to land) from TBP's rendering plant had had any adverse effects on the macroinvertebrate communities in the streams. Samples were processed to provide number of taxa (richness), MCI and SQMCI scores for each site. The locations of the biomonitoring sites are shown in Figure 4.

2.4.6.1 Biomonitoring survey, 19 October 2021

The spring biomonitoring survey was conducted on 19 October 2021. The survey followed a 35-day period without substantial rainfall as described in the biomonitoring report. According to operational records treated wastewater from the site was discharging into the stream at the time of the survey.

Taxa richness was described as moderate in the Inaha Stream with between 17 and 23 taxa collected from the sites (Table 34). Site U, the furthest upstream monitoring site, recorded the lowest taxa count of 17, and Site 4, the downstream site furthest from the site's discharges, returned the highest taxa count of 23. Only site U reported fewer taxa than the previous survey (-5), while the remaining sites reported small increase (+2 - +4). The results are comparable to the long term median number of taxa from all sites which range between 20 (site 3) and 25 (site 4).

The biomonitoring report describes the taxa richness in the tributary as "moderate" based on the results of the survey of three monitoring sites. The number of taxa recorded at sites UT (15) and DT (17) showed no significant change since the previous survey (both 15) (Table 34).

Table 34 Results of the biomonitoring survey for total taxa, MCI and SQMCI scores. Red= poor, orange=fair, green=good/very good, *italics=increase*, **bold=decline**

Site	Number of taxa		MCI value		SQMCI value	
	Previous Survey	Current Survey	Previous Survey	Current Survey	Previous Survey	Current Survey
U	22	**17**	95	*109*	5.8	*6.1*
1	20	*22*	102	**100**	5.4	5.4
2d	17	*19*	92	*105*	4.6	*5.4*
3	15	*18*	101	*104*	5.7	**5.4**
4	19	*23*	104	**101**	5.5	*5.8*
UT	15	15	84	*93*	5.3	**5.1**
MT	13	*18*	94	**79**	5.0	*5.1*
DT	15	*17*	104	**96**	5.1	**4.9**

The MCI scores for three of the Inaha Stream monitoring sites increased by between 3 and 14 points, and the scores for the remaining two sites decreased by 2 and 3 points (Table 34). Despite the decreases, all five monitoring sites fell within the 'good' category and sites U and 2d improved from a 'fair' rating for the previous monitoring survey. The results of sampling the four sites downstream from the processing plant (and therefore most impacted by discharges) reported a higher proportion of taxa classified as 'sensitive' than taxa classified as 'tolerant'. The MCI scores for the monitoring sites within the tributary changed substantially since the previous survey. The MCI score for site UT was 9 points higher, however sites MT and DT scores declined by 15 and 8 points respectively (Figure 16). The sites fell into the fair or poor categories. The biomonitoring report states that MCI results are not significantly different from the long term median results at any of the three tributary sites.

Site U, upstream from the site discharges, received the highest SQMCI score of 6.1 which placed it in the 'very good' category for macroinvertebrate health (Figure 17), this was the only monitored site to obtain this classification. During the previous survey the site received a 'good' classification which represents an improvement. Most of the remaining monitoring sites received a higher SQMCI score than their previous survey but remained within the 'good' category. Site 2d improved from 'fair' to good'. Despite the MCI results for the three sites in the tributary the SQMCI scores changed very little, and sites UT and MT remained in the 'good' category while site DT was downgraded to fair.

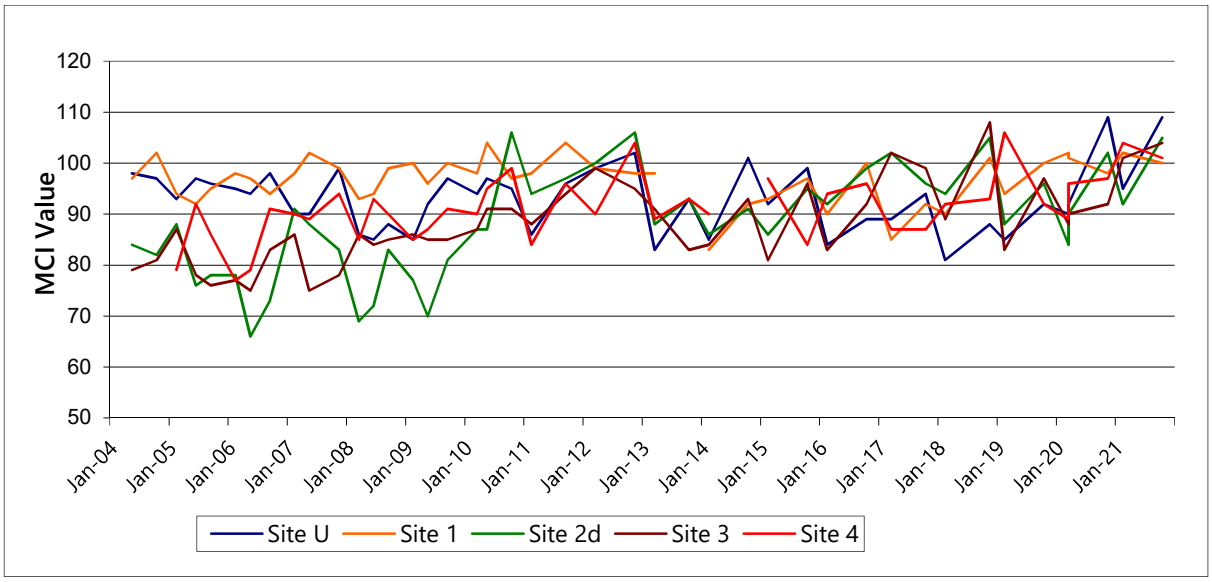

Figure 16 MCI scores at sites in the Inaha Stream, 2004-2021

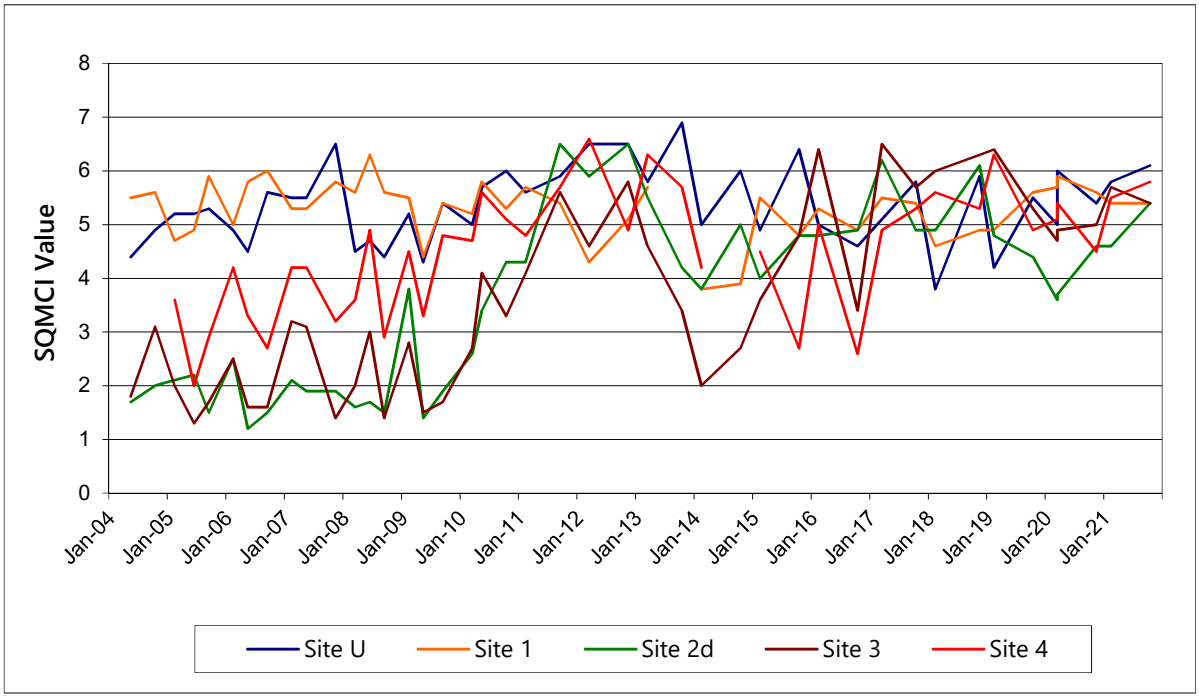

Figure 17 SQMCI scores at sites in the Inaha Stream, 2004-2021

The biomonitoring report states that the SQMCI scores for all five Inaha Stream monitoring sites were higher than the long term median scores, and highlights sites 2d, 3 and 4 as recording "significantly higher scores" (Figure 16 and Figure 17). The biomonitoring report concludes;

> *"Overall, there was no evidence that discharges from Taranaki By-Products have significantly affected the freshwater macroinvertebrate communities present in the Inaha Stream or unnamed tributary of the Inaha Stream."*

2.4.6.2 Biomonitoring survey, 11 January 2022

The summer biomonitoring survey was conducted on 11 January 2022. The survey followed a 26-day period without substantial rainfall as described in the biomonitoring report.

Taxa richness was described as moderate in the Inaha Stream with between 14 and 21 taxa collected from the sites (Table 35). Site U and site 4 recorded the equal highest taxa count of 21, these being the furthest upstream and downstream of site discharges. The results of sites 1, 2d and 3 reported decreases in the number of taxa of between 1 and 5. The results are comparable to the long term median number of taxa from all sites which range between 20 (site 3) and 25 (site 4).

The biomonitoring report also describes the taxa richness in the tributary as "moderate" based on the results of the survey of three monitoring sites. There was a negligible change in taxa recorded at sites MT (-2) and DT (no change), while site UT taxa increase by 3.

Table 35 Results of the biomonitoring survey for total taxa, MCI and SQMCI scores. Red= poor, orange=fair, green=good/very good, italics=increase, bold=decline

Site	Number of taxa		MCI value		SQMCI value	
	Previous Survey	Current Survey	Previous Survey	Current Survey	Previous Survey	Current Survey
U	17	*21*	109	**102**	6.1	**6.0**
1	22	**17**	100	*101*	5.4	*5.5*
2d	19	**14**	105	**96**	5.4	**4.7**
3	18	**17**	104	**92**	5.4	*5.9*
4	23	**21**	101	**93**	5.8	*6.1*
UT	15	*18*	93	**83**	5.1	**5.0**
MT	18	**16**	79	**86**	5.1	**4.8**
DT	17	17	96	**96**	4.9	*5.1*

Four out of the eight biomonitoring sites sampled showed a decline in the MCI rating compared to the previous monitoring survey (Table 35). Sites 2d, 3, 4 and DT declined from 'good' to 'fair' and site UT remained in the 'fair' category. Site MT was the only site to improve its rating, from 'poor' to 'fair'. The other three sites remained in the same classification as the previous survey.

Under the SQMCI rating most monitoring locations were classified as 'good'. Only sites 2d in Inaha Stream and MT in the tributary declined from good to fair, while site DT improved from 'fair' to 'good'.

A qualitative assessment of the Inaha stream noted an absence of heterotrophic growth on the stream bed at all monitoring locations downstream from the discharges. Heterotrophic growth was last observed in the 2009 survey. Heterotrophic growth is an indicator of poor stream health because it can be a result of organic wastewater input at a rate which exceeds the streams ability to assimilate the nutrient load.

Copies of biomonitoring reports are available from the Council on request.

2.5 Air monitoring

2.5.1 Inspections

The site was inspected on six occasions during this monitoring period and a summary of these can be found in section 2.1 of this report. During the inspections odour levels were assessed at the biofilters, pond 6 discharge point, and the burial pits. The inspector reported that when odour was observed at these locations it was "no more than would be expected". There are no records of odour observations beyond the boundary of the site.

2.5.2 Complaints

In the 2021-2022 monitoring period, the Council responded to two odour complaints (Table 36).

Table 36 Summary of odour complaints received during the 2021-2022 monitoring period

Date	Details	Compliant (Y/N)	Enforcement action taken?
25 February 2022 13:39	A complaint was received concerning odour emanating from a rendering plant near Okaiawa	Yes	No
18 May 2022 08:02	A complaint was received concerning odour coming from Taranaki By-Products at 30 Kohiti Road, Okaiawa. Caller has described the odour as smelling like rotten offal and effluent between 0500 and 0600.	Yes	No

A monitoring officer attended both complaints and conducted odour assessments. During both assessments weak odour was detected offsite, however it was not deemed to be offensive or objectionable and therefore complied with the requirements of the air discharge consent conditions. On both occasions work was being done at the burial pits which were most likely the source of the odour. The site was advised of the complaints.

On 25 February the complainant first noticed the odour at 5:30 pm and reported it to Council at 7:30 pm. The officer arrived at the site at 9:01 pm, 1.5 hours after the complaint was received. The complaint on 18 May was received at 5:30 am and the officer arrived sometime before 8:00 am. The location of TBP and the time of the complaints present a limitation to prompt attendance by council officers. I consider it possible that the odour was strong at the time of the complaint but had partially dissipated by the time the officer arrived.

2.5.3 Community liaison meeting

One community liaison meeting was held on 14 December 2021 and was attended by representatives from TBP, TBE, the Council and eight members of the community. Concerns from the community were about odour in general, particularly when there is a westerly wind, and specifically near the Normanby Dam which is a public attraction. TBP explained that a range of measures had been undertaken recently to address the odour including interlocking the plant so that it shuts down when certain parameters are exceeded, more water was being recycled in the plant, and stickwater had not been produced for several months It was noted the biofilters were scheduled for an upgrade.

2.5.4 Outdoor burning

TBP holds an air discharge consent to burn untreated wood, sawdust, paper and wood in a burn pile. The inspections did not note any prohibited material in the burn pile. There are not likely to be any adverse amenity effects or exceedances of the deposited or suspended particulate limits beyond the site boundary during the fires due to the considerable distance to the boundaries.

2.6 Provision of reports, management plans and certifications

TBP is required to provide to the Council various management plans, contingency procedures, certifications and monitoring reports under five consents, as summarised in Table 37.

Table 37 Requirement for reports and plans imposed by consent

Requirement	Consent Number (and Condition Numbers)	Dates(s) required	Compliance achieved
Emissions to air			
Certification that works, processes and equipment are operated according to good engineering practice	4058-4 (6)	Biennially from 30 April 2013	Audit report received 23 December 2021
Air discharge management plan	4058-4 (7)(9)	2 February 2012, annual review by 31 May, including contingency procedures	Initial plan received 3 July 2012. Annual review received, dated May 2022
Monthly report under section 3.2 of management plan on daily activities log, weather, bio-filter performance	4058-4 (7)	Monthly	Reports received, late on occasion
Wastewater to Inaha Stream			
Wastewater disposal management plan	2049-4 (13)(15)	31 December 2000, annual review from 31 May 2007	Annual review received 10 February 2022
Monthly report under section 5.2 of management plan on wastewater characteristics, flows and irrigated areas	2049-4 (13)(15)	Monthly	Reports received, late on occasion
Wastewater to land			
Spray irrigation management plan	3941-2 (1)(3)	31 December 2000 annual review from 31 May 2006	Annual review received 10 February 2022
Annual report under section 4.3 of management plan on wastewater characteristics, flows and irrigated areas	3941-2 (1)(3)	Annually	Nitrogen budget supplied monthly
Burial pits			
(Solid) Waste burial management plan	5495-1 (1)(3)	1 November 2000, subject to review on two months' notice	Review received 2 May 2014
Stormwater to Inaha Stream			
Contingency plan for spillage or accidental discharge	5426-1 (4)	31 August 1999	Review received 28 May 2014

3 Discussion

3.1 Discussion of site performance

3.1.1 Water takes

The abstraction of water from both groundwater and the Inaha stream was undertaken in full accordance with the conditions of the relevant resource consents. In complying with the abstraction limits set out in the consents the water flows, quantities and levels are maintained which safeguards the life-supporting capacity of the water and protects instream uses and values of the Inaha Stream and its tributaries.

3.1.2 Discharges to water

The wastewater treatment system was generally well managed and the volume of wastewater discharged from pond 6 into the Inaha Stream has significantly reduced compared to previous years even allowing for the shut down after the fire. A couple of matters were raised during inspections relating to product spillage around the plant and damaged pond liners which both have the potential to result in contaminants entering waterways. TBP have generally been responsive in addressing these issues, although bulges in one of the pond liners still occur. Based on the results of sampling this doesn't appear to result in unauthorised discharges of wastewater to the environment. The results of the surface water quality monitoring of the Inaha Stream complied with limits in the resource consents and indicated that discharges are not having adverse effects beyond those authorised by the consents.

Contaminants in the firewater pond were less than the relevant consent limits for each of the monitoring surveys, with the exception of TSS on one occasion. Although this pond discharges continuously into the Inaha Stream there was no evidence from stream monitoring that the combined stormwater and cooling water discharge is having any notable effect beyond localised elevated levels of contaminants. This is supported by the biomonitoring survey which concluded that there was no evidence that the discharges were having a significant adverse effect on the instream community of organisms.

3.1.3 Discharges to land

The volume of wastewater and dairy effluent irrigated to the paddocks on site decreased this monitoring year. The results of groundwater monitoring showed that while contaminant levels fluctuated, they were relatively low compared to the relevant consent limits. When considered alongside the results from water quality surveys of the northern and western tributaries, the environmental effects on ground and surface water arising from irrigation are not significant with the exception of water quality at Te Kopanga Spring. Levels of nitrate appear to be increasing after a period of decline, and this year's *E. coli* results indicate faecal contamination of the water. TBP plans to continue reducing the volume of wastewater irrigated to land which will likely further reduce the impact on freshwater quality in the future. In accordance with the Water Services Act 2021 the registered supplier of drinking water is responsible for ensuring that drinking water complies with the DWSNZ standards.

Production stopped for an extended period as a result of the plant fire in December 2021. Consequently burial of fallen stock which could not be diverted to other plants resumed this monitoring year. Monitoring of the groundwater wells around the burial pits indicate that NNN is elevated in groundwater but this has not yet affected the Inaha Stream water quality.

3.1.4 Discharges to air

The most likely sources of odour from the TBP site are fugitive odours from the processing building and exposed burial pits, the wastewater storage ponds and to a lesser extent application of wastewater to land.

The character of the odour from these TBP activities can be categorised as extremely unpleasant and accordingly the odour may only need to be weak or distinct to cause a significant nuisance effect if experienced by residents living nearby. This is evidenced by the extent of historical complaints about the site before significant improvements were made to both the emissions control systems and management measures several years ago.

The building, and particularly the ducting of the emissions control system of the plant, was extensively damaged during the fire in December 2021. The emissions control system relies on negative pressure to extract odour to the biofilters for treatment and prevent fugitive odour from 'leaking' out of the building. Biofilters are usually very effective at removing odour from an air stream.

Two complaints about odour discharges from the site were received by Council during this monitoring year. These complaints were attended but at the time of the assessment the odour was not considered to be offensive or objectionable and no further action was taken, other than to advise TBP of the complaints. The strength of the odour is likely to have changed in the time it took for the officer to conduct the assessments and therefore it cannot be ruled out that the odour may well have been offensive or objectionable at the time of the complaint.

3.2 Evaluation of performance

A summary of the consent holder's compliance record for the year under review is set out in Table 38 to Table 47.

Table 38 Summary of performance for consent 2050-4.

Purpose: ***To discharge treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream (2049-4)***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Mixing zone 30 m downstream of discharge	Site inspection and monitoring results	Yes
2. Boundaries of mixing zone to be determined by Council	Site inspection	Yes
3. Point of discharge to enter channel directly to ensure mixing	Site inspection	Yes
4. Advise Council before making changes to alter nature of discharge	Site inspection, monitoring results and liaison	N/A
5. TBP to undertake self-monitoring	Review of monthly monitoring of effluent for nitrogen. Some monitoring in management plan undertaken by Council	Yes
6. Minimum discharge dilution rate	Monitoring results	Yes
7. No discharge of stickwater, and consult with Council before increasing cow herd	Site inspection	Yes
8. Discharge to cease when flows in the Inaha Stream drops below 100 L/s	Monitoring of Kohiti Road flow gauge results	Yes
9. Control on effect of discharge in receiving water	Inspection, chemical sampling and bio-monitoring	Yes
10. Limits on receiving water ammonia concentration	Chemical sampling	Yes

Purpose: *To discharge treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream (2049-4)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
11. Recording and reporting of discharge rate	Inspection and review of records	Yes
12. Inaha Stream flow measurement device	Inspection, gaugings by Council	Yes
13. Provision of wastewater disposal plan	Plan received by Council and approved December 2000	Yes
14. Plan to be implemented	Inspections and liaison and receipt of TBP reports	Yes
15. Optional and annual reviews of wastewater plan	Annual review undertaken by TBP, provided February 2022	Yes
16. Designated staff member	Part of TBP's Environmental Manager's job description, also Plant and Operations Manager's	Yes
17. Training of staff on wastewater disposal	Liaison and inspection	Yes
18. Donation to Taranaki Tree Trust	Confirmation with Council finance department that donation received	Yes
19. Optional review provision	Application for replacement consent lodged 2018. S.124 protection	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 39 Summary of performance for consent 2050-4

Purpose: *To discharge cooling water to Inaha tributary (2050-4)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Activity monitoring by TBP as required	Continuous temperature monitoring undertaken by Council from September 2013, at TBP's request	Yes
2. Composition not to be different to Inaha Stream, other than heat and solids	Chemical sampling by Council	Yes
3. Maximum temperature limit on discharge	Continuous temperature recording by Council	Yes
4. Limit on suspended solids in discharge	Sampling by Council	No
5. Controls on effect of discharge in receiving water	Continuous temperature monitoring, and chemical and biological sampling, by Council	Yes

Purpose: *To discharge cooling water to Inaha tributary (2050-4)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
6. Discharge temperature measurement and recording	Monitoring carried out by Council	Yes
7. Optional review provision	Application for replacement consent lodged 2018. S.124 protection	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**Good** **High**

Table 40 Summary of performance for consent 2051-4.1

Purpose: *To take water from the Inaha Stream for a rendering operation (2051-4.1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Means of take satisfactory to Council	Inspection and monitoring	Yes
2. Minimum flow of 25 L/s downstream of point of abstraction	Monitoring of flow	Yes
3. Operation of an abstraction measurement device, maintain records of the dates and daily quantities of water abstracted	Review of data	Yes
4. Operation of a flow recorder at Kohiti Road, level gauge from Jan 2015	Staff gauge in stream, rated by Council. Daily level record and monthly report by TBP	Yes
5. Report on use of treated wastewater as cooling water by 31 March 2000	Report produced 13 October 2000 and recommendations implemented	N/A
6. Provision for review	Application for replacement consent lodged 2018. S.124 protection	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

Table 41 Summary of performance for consent 5426-1

Purpose: *To discharge stormwater to Inaha tributary (5426-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Notification prior to changing processes that may significantly alter discharge	Inspection by Council	Yes

Purpose: *To discharge stormwater to Inaha tributary (5426-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. Limits on discharge composition	Chemical sampling of firepond by Council	No Minor suspended solids exceedance.
3. Controls on effect of discharge in receiving water	Chemical and biological sampling by Council	Yes
4. Provision of spillage contingency plan by 31 August 1999	Plan produced in November 2000	N/A
5. Optional review provision	Application for replacement consent lodged 2018. S.124 protection	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**Good** **High**

Table 42 Summary of performance for consent 4058-4

Purpose: *To discharge emissions to air (4058-4)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option (bpo) to prevent or minimise adverse effects	Checking that standard operating procedures to achieve compliance with consent conditions are followed. Liaison with TBP and inspection by Council.	No BPO not possible after the fire burned down the building
2. No offensive or objectionable odour beyond boundary	Odour surveys undertaken by Council during inspections and by TBP	Yes
3. Definition of noxious, offensive or objectionable odour		N/A
4. Designated staff member for emissions management	Part of TBP Environmental Manager's job description. Also Plant and Operations Manager's responsibility	Yes
5. Prohibition of fish rendering	Inspection by Council, no fish rendering undertaken	Yes
6. Certification processes and equipment operated according to good engineering practice biennially from 30 April 2013	Biennial certification by suitably qualified independent person. Next report due April 2023	Yes
7. Preparation of Air Discharge Management Plan	Submission of Plan, on 3 July 2012, reviewed plan received February 2022	Yes

Purpose: *To discharge emissions to air (4058-4)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. Operation in accordance with Air Discharge Management Plan	Inspection by Council	Yes
9. Annual review of Air Discharge Management Plan by 31 May	Liaison. Reviewed by TBP and submitted to Council February 2022	Yes
10. Limits on dust deposition rate	Inspections disused dust in the JTL, no specific dust monitoring undertaken	N/A
11. Newsletter production, and community liaison meetings	No meeting held.	No
12. Optional review provision to deal with significant adverse effects	Review	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**Good** **Good**

Table 43 Summary of performance for consent 3941-2

Purpose: *To discharge treated wastewater to land (3941-2)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Irrigation to defined area	Inspection by Council	Yes
2. Provision and maintenance of spray irrigation management plan	Plan received by Council and approved in October 2000	Yes
3. Plan to be followed	Liaison, inspection and provision of monitoring reports	Yes
4. Optional, and mandatory annual reviews of management plan	Not exercised	N/A
5. Designated staff member	Part of TBP Environmental Manager's job description. Also Plant and Operations Manager's responsibility	Yes
6. Adopt best practicable option to minimise adverse effects, including total nitrogen minimisation	Reduced volume of discharges	Yes
7. Seek permission for Inaha Stream discharge when cannot irrigate, and Inaha Stream in low flow	Liaison and inspection. Not required this period	N/A

Purpose: *To discharge treated wastewater to land (3941-2)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. Limit on dissolved oxygen in final pond	Not tested for.	N/A
9. No offensive or objectionable odour beyond boundary	Inspection and complaint register	Yes
10. No spray drift beyond boundary	Inspection and complaint register	Yes
11. Limit on sodium absorption ratio	Chemical sampling indicated compliance with this limit	Yes
12. Prohibition of ponding and run-off	Inspection and complaint register	Yes
13. Spray buffer zones	Inspection and complaint register	Yes
14. Limit on nitrogen application rate	Monitoring by TBP and review of irrigation records. Record also kept of fertiliser application to establish total nitrogen loading	Yes
15. Report on reducing ammonia concentration by 15 December 2000	Report received by Council on 2 April 2001	N/A
16. Limit on application rate	Inspection	Yes
17. Limit on return period	Inspection and provision of records	Yes
18. Installation and maintenance of monitoring bores	Liaison and inspection.	Yes
19. Baseline and operational monitoring by TBP	Results of wastewater, irrigation and soil monitoring by/for TBP reviewed by Council	Yes
20. Consultation meetings with interested parties	Ongoing consultation through consent renewal	Yes
21. Council and Ngāti Manuhiakai Hapū to be advised of discharge to Inaha Stream under consent 2049	Ongoing consultation	N/A
22. Provisions for contamination of groundwater or water supply	Monitoring and sampling of groundwater	No. Elevated nitrogen and *E. coli*.
23. Optional review provision for operational requirements	Not exercised	N/A
24. Optional review provision upon receipt of ammonia reduction report	Not exercised	N/A

Purpose: *To discharge treated wastewater to land (3941-2)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
25. Optional review provision for nitrogen treatment and disposal	Not exercised	Yes
26. Optional review provision for environmental effects	Not exercised	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**Improvement required** **High**

Table 44 Summary of performance for consent 5495-1

Purpose: *To discharge wastes from meat rendering by burial (5495-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Provision of waste burial management plan by 1 November 2000	Plan received by Council and approved in October 2000	N/A
2. Waste burial management plan to be followed	Inspection by Council, and review of TBP records.	Yes
3. Optional provision for review of waste burial management plan	Not sought by TBP or Council. Will be reviewed for the consent replacement.	N/A
4. Designated staff member	Part of TBP Environmental Manager's job description. Also Plant and Operations Managers' responsibility	Yes
5. Disposal pits not to intercept groundwater	Inspection by Council	Yes
6. Disposal pits to be constructed as prescribed in consent application	Inspection by Council	Yes
7. Notification of commencement of pit construction outside nominated area	Inspection by Council	Yes
8. All constructed disposal pits to be inspected by Council prior to use	Inspection by Council	Yes
9. Conditions 1-4 to apply to new disposal pits	Inspection by Council	Yes
10. Discharged material to be covered within 4 hours	Controlled by consent holder	Yes
11. Soil cover requirements upon completion of each disposal operation	Controlled by consent holder	Yes
12. Cover material and surrounding land to be contoured to direct stormwater away	Inspection by Council	Yes
13. Site rehabilitation and pasture re-establishment	Inspection by Council	Yes

Purpose: *To discharge wastes from meat rendering by burial (5495-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
14. No irrigation of effluent onto disposal area	Controlled by consent holder	Yes
15. No direct discharge of contaminants to surface water	Inspection and chemical/biological survey by Council	Yes
16. Installation of monitoring bores	Inspection and sampling by Council. Currently five bores active, while five bores have been destroyed. Three additional bores required	No
17. Optional review provision for operational requirements	Not sought by TBP	N/A
18. Optional review provision for environmental effects	Will be reviewed for consent replacement.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**Improvement required** **High**

Table 45 Summary of performance for consent 6431-1

Purpose: *To place culverts in Inaha Stream (6431-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option to minimise adverse environmental effects	Liaison, and inspection by Council	Yes
2. Consent to be exercised in accordance with documentation submitted	Inspection by Council	N/A
3. Notification prior to commencement and upon completion of works	Liaison with Council. No work undertaken	N/A
4. Subsequent works prohibited between May and October, without permission	Inspection by Council.	Yes
5. Adoption of best practicable option to minimise discharges, bed disturbance and water quality effects	Liaison, inspection and bio-monitoring by Council	Yes
6. Minimisation of bed disturbance	Inspection by Council	Yes
7. Structure removal and area reinstatement upon redundancy	Inspection by Council	N/A

Purpose: *To place culverts in Inaha Stream (6431-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. Fish passage not to be restricted	Inspection by Council	Yes
9. Erection of stock-proof riparian fences on consent holders property above Kohiti Road	Implementation of riparian plan RMP938 and inspection by Council	Yes. Fencing completed June 2009
10. Planting of riparian margins within four years from 4 October 2004	Implementation of riparian plan RMP938 and inspection by Council.	Yes. Planting completed June 2009
11. Placement of culvert inverts and headwall protection structures	Inspection by Council	Yes
12. Lapse of consent if not exercised	Consent was exercised	N/A
13. Optional review provision for environmental effects	Not exercised	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

Table 46 Summary of performance for consent 9756-1

Purpose: *To take and use groundwater for industrial water supply (9756-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limit on maximum take	Water measuring and recording required by consent conditions	Yes
2. Labelling of bore	Inspection by Council	Yes
3. Access to bore for manual measurement of water levels	Inspection by Council	Yes
4. Installation of metering and logging equipment	Inspection by Council and certification under condition 5	Yes
5. Certification of water measuring equipment	Provision of certificate on 29 May 2014	Yes
6. Installation of water level measuring equipment	Inspection by Council	Yes
7. Telemetry of monitoring data to Council	Inspection by Council	Yes
8. Access to monitoring equipment	Inspection by Council	Yes

Purpose: *To take and use groundwater for industrial water supply (9756-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
9. Notification of equipment failure	Inspection by Council and checking of records	N/A
10. Adoption of best practicable option	Liaison and inspection	Yes
11. Lapse of consent if not exercised	Consent was exercised	N/A
12. Optional review provision for environmental effects	Next review date available is June 2023.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

Table 47 Summary of performance for consent 10054-1

Purpose: *To discharge emissions into the air from the burning of pallets, paper and cardboard (10054-1)*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option to minimise adverse environmental effects	Liaison, and inspection by Council	Yes
2. Restrict on materials combusted	Inspection by Council	Yes
3. Prohibition of objectionable odour	Inspection by Council	Yes
4. Supervision of burning	Inspection by Council	Yes
5. Limit on dust deposition rate	Inspection by Council	N/A
6. Control of airborne dust components and particulate concentration	Inspection by Council	Yes
7. Prohibition of toxic components beyond boundary	Inspection by Council	Yes
8. Lapse of consent if not exercised	Consent was exercised	N/A
9. Optional review provision for environmental effects	Next review date available is June 2023	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

Table 48 Compliance, Environmental and administrative ratings 2021-2022

Year	Consent no	Compliance and Environmental Rating	Administrative Rating
2021-2022	2051-4	High	High
	2049-4	High	High
	2050-4	Good	High
	5426-1	Good	High
	4058-4	High	Good
	3941-2	Improvement required	High
	5495-1	Improvement required	High
	6431-1	High	High
	9756-1	High	High
	10054-1	High	High

TBP demonstrated a good level of environmental performance, except for two areas requiring improvements, and a good level of administrative performance with the resource consents during the 2021-2022 monitoring year as defined in Appendix II.

3.3 Recommendations from the 2020-2021 Annual Report

1. THAT in the first instance, monitoring of consented activities at Taranaki By-Products in the 2021-2022 year continue at the same level as in 2020-2021.
2. THAT should there be issues with environmental or administrative performance in 2021-2022, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

The scheduled monitoring continued this monitoring year, notwithstanding the impact of the plant fire. There was no requirement to adjust the monitoring as a result of investigations or interventions.

3.4 Alterations to monitoring programmes for 2022-2023

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

It is proposed that for 2022-2023 that the monitoring programme remain unchanged from that undertaken in the 2021-2022 monitoring period.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme

from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2022-2023.

4 Recommendations

1. Monitoring of consented activities at Taranaki By-Products in the 2022-2023 year continue at the same level as in 2021-2022.
2. The broken or malfunctioning groundwater bores in the vicinity of the burial pit area must be repaired or replaced to ensure compliance with condition 16 of consent 5495-1.
3. A one-off programme of groundwater bore inspections should be undertaken to ensure all are fit for purpose.
4. A review of the site management plans should be undertaken following the completion of the building upgrades to ensure the plans are fit for purpose. The review should include, but not be limited to:
    a. The biofilter changes and operating parameters.
    b. Any changes to the waste water treatment process.
    c. Scheduled inspections and maintenance of the process building and ducting in order to avoid discharges of fugitive emissions, and ensure the building is maintained under negative pressure.
5. Closer monitoring of the nitrate and *E. coli* levels in the Northern Tributary should be undertaken, and a review of the management of activities on paddocks adjacent to the tributary should be undertaken as a precautionary measure.

Glossary of common terms and abbreviations

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in µS/cm.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	Escherichia coli, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
FNU	Formazin nephelometric units, a measure of the turbidity of water
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident register	The incident register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Metres squared.
m^3	Cubic metres
MAV	Maximum Acceptable Value
MCI	Macroinvertebrate Community Index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.

Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
MPN	Most Probable Number. A method used to estimate the concentration of viable microorganisms in a sample.
mS/m^3	Millisiemens per cubic metre
µS/cm	Microsiemens per centimetre.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act 1991* and including all subsequent amendments.
TSS	Total suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU or FNU.

*an abbreviation for a metal or other analyte may be followed by the letters 'As', to denote the amount of metal recoverable in acidic conditions. This is taken as indicating the total amount of metal that might be solubilised under extreme environmental conditions. The abbreviation may alternatively be followed by the letter 'D', denoting the amount of the metal present in dissolved form rather than in particulate or solid form.

For further information on analytical methods, contact an Environment Quality Manager.

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Appendix I

Resource consents held by Taranaki By-Products Ltd

(For a copy of the signed resource consent
please contact the TRC Consents department)

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited P O Box 172 HAWERA
Change to Conditions/Review Completed Date:	4 October 2006 [Granted: 31 May 1999]

Conditions of Consent

Consent Granted:	To discharge up to 940 cubic metres/day of treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream at or about GR: Q21:118-858
Expiry Date:	1 June 2019
Review Date(s):	June 2001, June 2003, June 2005, June 2007, June 2011, June 2017
Site Location:	Kohiti Road, Okaiawa
Legal Description:	Lots 1 & 2 DP 6457 Blk IV Waimate SD
Catchment:	Inaha

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

Special conditions 1 – 5 (unchanged]

1. The mixing zone in each condition of this consent shall extend for a distance of 30 metres downstream of the point of discharge of treated wastewater.

2. The boundaries of the mixing zone and site of discharge shall be as physically determined by the Chief Executive, Taranaki Regional Council.

3. The point of discharge into the Inaha Stream shall be such that the discharge enters directly into a channel of the Inaha Stream in order to ensure that complete mixing occurs.

4. The consent holder shall advise the Taranaki Regional Council prior to making any change in the processes undertaken at the site which could significantly alter the nature of the discharge.

5. The consent holder shall undertake such monitoring of the activities licensed by this consent, as deemed reasonably necessary by the Chief Executive, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the Chief Executive, Taranaki Regional Council, upon request.

Special condition 6 [amended]

6. A minimum dilution rate of 1:300 shall be maintained at the point of discharge to the Inaha Stream at all times.

Special condition 7 [replaced]

7. a) No stick-water shall be discharged under this consent. Stick-water is defined as juices squeezed out of products that are rendered.

   b) This consent allows the discharge of wastewater from up to 1,200 cows. Prior to this number being increased the consent holder must demonstrate, in writing, to the satisfaction of the Chief Executive Officer, Taranaki Regional Council, that the wastewater treatment system can treat the wastewater without breaching condition 9 of this consent.

Special conditions 8- 12 [unchanged]

8. The discharge shall cease when flows decrease in the Inaha Stream, as measured at the Kohiti Road gauging site, to below 100 litres/second.

9. The discharge [in conjunction with any other discharges pertaining to the same property], shall not cause or give rise to any of the following effects, at any point in the receiving waters below the mixing zone:

   (a) a fall of more than 0.5 pH units;
   (b) an increase in filtered carbonaceous biochemical oxygen demand [20 degrees Celsius, 5-day test] to above 2.00 gm^{-3};
   (c) a temperature rise of more than 3.0 degrees Celsius;
   (d) a reduction in the dissolved oxygen concentration to below 80% of saturation concentration;
   (e) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   (f) any conspicuous change in the colour or visual clarity;
   (g) any emission of objectionable odour;
   (h) the rendering of fresh water unsuitable for consumption by farm animals;
   (i) any significant adverse effects on aquatic life, habitats or ecology;
   (j) any visible bacterial and/or fungal growths in the receiving water.

10. The discharge, in conjunction with any other discharges pertaining to the same property, shall not raise the total ammonia concentration [expressed as NH_3] in the receiving waters at any point below the mixing zone above 1.5 gm^{-3} if the pH of the receiving water is below 7.75, or above 0.7 gm^{-3} if the pH of the receiving water lies between 7.75 and 8.00, or above 0.4 gm^{-3} if the pH of the receiving water is above 8.00.

11. The consent holder shall install a metal control gate on the discharge outlet, and install and operate a v-notch weir and stage board on the outlet, to the satisfaction of the Chief Executive, Taranaki Regional Council; and shall keep records of the discharge rate during the exercise of this consent; such records to be made available to the Chief Executive, Taranaki Regional Council, upon request.

12. The consent holder shall install and maintain a stage board on the Kohiti Road Bridge and shall gauge the site for the purpose of providing a stream flow monitoring site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

Special condition 13 [amended)

13. The consent holder shall maintain a wastewater disposal management plan [the management plan] for the wastewater treatment system, to the approval of the Chief Executive, Taranaki Regional Council, outlining the management of the system, particularly the use of the spray irrigation system in combination with the pond discharge, which shall demonstrate the ability to comply with consent conditions and shall address the following matters:

    (a) monitoring of the discharge wastewater;
    (b) monitoring of the receiving water;
    (c) management of the wastewater treatment system;
    (d) minimisation of nutrients in the discharge wastewater;
    (e) treatment and disposal of stickwater;
    (f) mitigation of the effects of the discharge;
    (g) guidelines for use of spray irrigation or discharge to surface water; and
    (h) reporting on the exercise of the consent.

    An objective of the plan shall be to minimise discharges to surface water and to maximise discharges to land under consent 3941.

Special condition 14 [unchanged]

14. The consent shall be exercised in accordance with the procedures set out in the wastewater disposal management plan, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, except by the specific agreement of the Chief Executive, Taranaki Regional Council. In case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

Special condition 15 [amended]

15. The consent holder shall advise the Taranaki Regional Council two months prior to any changes being made to the wastewater disposal management plan. Should the Taranaki Regional Council wish to review the wastewater disposal management plan, two months notice shall be provided to the consent holder. The consent holder shall review the plan annually and shall provide the reviewed plan to the Chief Executive, Taranaki Regional Council, by 31 May each year.

Special conditions 16-18 [unchanged]

16. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the wastewater treatment system.

17. The consent holder shall ensure that:

    (a) the operation of the wastewater treatment system shall be carried out at all times in accordance with the requirements of the wastewater disposal management plan prepared as required in condition (13) above or subsequent version of that document which does not lessen environmental protection standards;

    (b) all relevant site staff are to be regularly trained on the content and implementation of the wastewater disposal management plan, the maximum period between training sessions being 12 months. New staff are to be trained on recruitment and the training record made available to the Chief Executive, Taranaki Regional Council, upon request; and

    (c) all relevant site staff are advised immediately of any revision or additions to the wastewater disposal management plan.

18. By the agreement of the consent holder, the consent holder shall mitigate the effects of the discharge by donating annually to the Taranaki Tree Trust $2100 [goods and services tax exclusive] for the purpose of providing riparian planting and management in the Inaha Stream catchment. The amount shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation.

Special condition 19 [amended]

19. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2007, June 2011, and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 4 October 2006

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited P O Box 172 HAWERA
Change to Conditions/Review Completed Date:	4 October 2006 [Granted: 31 May 1999]

Conditions of Consent

Consent Granted:	To discharge up to 940 cubic metres/day of treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream at or about GR: Q21:118-858
Expiry Date:	1 June 2019
Review Date(s):	June 2001, June 2003, June 2005, June 2007, June 2011, June 2017
Site Location:	Kohiti Road, Okaiawa
Legal Description:	Lots 1 & 2 DP 6457 Blk IV Waimate SD
Catchment:	Inaha

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

Special conditions 1 – 5 (unchanged]

1. The mixing zone in each condition of this consent shall extend for a distance of 30 metres downstream of the point of discharge of treated wastewater.

2. The boundaries of the mixing zone and site of discharge shall be as physically determined by the Chief Executive, Taranaki Regional Council.

3. The point of discharge into the Inaha Stream shall be such that the discharge enters directly into a channel of the Inaha Stream in order to ensure that complete mixing occurs.

4. The consent holder shall advise the Taranaki Regional Council prior to making any change in the processes undertaken at the site which could significantly alter the nature of the discharge.

5. The consent holder shall undertake such monitoring of the activities licensed by this consent, as deemed reasonably necessary by the Chief Executive, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the Chief Executive, Taranaki Regional Council, upon request.

Special condition 6 [amended]

6. A minimum dilution rate of 1:300 shall be maintained at the point of discharge to the Inaha Stream at all times.

Special condition 7 [replaced]

7. a) No stick-water shall be discharged under this consent. Stick-water is defined as juices squeezed out of products that are rendered.

   b) This consent allows the discharge of wastewater from up to 1,200 cows. Prior to this number being increased the consent holder must demonstrate, in writing, to the satisfaction of the Chief Executive Officer, Taranaki Regional Council, that the wastewater treatment system can treat the wastewater without breaching condition 9 of this consent.

Special conditions 8- 12 [unchanged]

8. The discharge shall cease when flows decrease in the Inaha Stream, as measured at the Kohiti Road gauging site, to below 100 litres/second.

9. The discharge [in conjunction with any other discharges pertaining to the same property], shall not cause or give rise to any of the following effects, at any point in the receiving waters below the mixing zone:

   (a) a fall of more than 0.5 pH units;
   (b) an increase in filtered carbonaceous biochemical oxygen demand [20 degrees Celsius, 5-day test] to above 2.00 gm^{-3};
   (c) a temperature rise of more than 3.0 degrees Celsius;
   (d) a reduction in the dissolved oxygen concentration to below 80% of saturation concentration;
   (e) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   (f) any conspicuous change in the colour or visual clarity;
   (g) any emission of objectionable odour;
   (h) the rendering of fresh water unsuitable for consumption by farm animals;
   (i) any significant adverse effects on aquatic life, habitats or ecology;
   (j) any visible bacterial and/or fungal growths in the receiving water.

10. The discharge, in conjunction with any other discharges pertaining to the same property, shall not raise the total ammonia concentration [expressed as NH_3] in the receiving waters at any point below the mixing zone above 1.5 gm^{-3} if the pH of the receiving water is below 7.75, or above 0.7 gm^{-3} if the pH of the receiving water lies between 7.75 and 8.00, or above 0.4 gm^{-3} if the pH of the receiving water is above 8.00.

11. The consent holder shall install a metal control gate on the discharge outlet, and install and operate a v-notch weir and stage board on the outlet, to the satisfaction of the Chief Executive, Taranaki Regional Council; and shall keep records of the discharge rate during the exercise of this consent; such records to be made available to the Chief Executive, Taranaki Regional Council, upon request.

12. The consent holder shall install and maintain a stage board on the Kohiti Road Bridge and shall gauge the site for the purpose of providing a stream flow monitoring site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

Special condition 13 [amended)

13. The consent holder shall maintain a wastewater disposal management plan [the management plan] for the wastewater treatment system, to the approval of the Chief Executive, Taranaki Regional Council, outlining the management of the system, particularly the use of the spray irrigation system in combination with the pond discharge, which shall demonstrate the ability to comply with consent conditions and shall address the following matters:

    (a) monitoring of the discharge wastewater;
    (b) monitoring of the receiving water;
    (c) management of the wastewater treatment system;
    (d) minimisation of nutrients in the discharge wastewater;
    (e) treatment and disposal of stickwater;
    (f) mitigation of the effects of the discharge;
    (g) guidelines for use of spray irrigation or discharge to surface water; and
    (h) reporting on the exercise of the consent.

    An objective of the plan shall be to minimise discharges to surface water and to maximise discharges to land under consent 3941.

Special condition 14 [unchanged]

14. The consent shall be exercised in accordance with the procedures set out in the wastewater disposal management plan, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, except by the specific agreement of the Chief Executive, Taranaki Regional Council. In case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

Special condition 15 [amended]

15. The consent holder shall advise the Taranaki Regional Council two months prior to any changes being made to the wastewater disposal management plan. Should the Taranaki Regional Council wish to review the wastewater disposal management plan, two months notice shall be provided to the consent holder. The consent holder shall review the plan annually and shall provide the reviewed plan to the Chief Executive, Taranaki Regional Council, by 31 May each year.

Special conditions 16-18 [unchanged]

16. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the wastewater treatment system.

17. The consent holder shall ensure that:

    (a) the operation of the wastewater treatment system shall be carried out at all times in accordance with the requirements of the wastewater disposal management plan prepared as required in condition (13) above or subsequent version of that document which does not lessen environmental protection standards;

    (b) all relevant site staff are to be regularly trained on the content and implementation of the wastewater disposal management plan, the maximum period between training sessions being 12 months. New staff are to be trained on recruitment and the training record made available to the Chief Executive, Taranaki Regional Council, upon request; and

    (c) all relevant site staff are advised immediately of any revision or additions to the wastewater disposal management plan.

18. By the agreement of the consent holder, the consent holder shall mitigate the effects of the discharge by donating annually to the Taranaki Tree Trust $2100 [goods and services tax exclusive] for the purpose of providing riparian planting and management in the Inaha Stream catchment. The amount shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation.

Special condition 19 [amended]

19. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2007, June 2011, and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 4 October 2006

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

TRK992050

DISCHARGE PERMIT

Pursuant to the RESOURCE MANAGEMENT ACT 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	TARANAKI BY-PRODUCTS LIMITED PO BOX 172 HAWERA
Renewal Granted Date:	31 May 1999

CONDITIONS OF CONSENT

Consent Granted:	TO DISCHARGE UP TO 2,160 CUBIC METRES/DAY OF COOLING WATER AND BACKWASH WATER FROM A RENDERING OPERATION INTO AN UNNAMED TRIBUTARY OF THE INAHA STREAM AT OR ABOUT GR: Q21:118-858
Expiry Date:	1 June 2019
Review Date[s]:	June 2001, June 2003, June 2005, June 2011 and June 2017
Site Location:	KOHITI ROAD OKAIAWA
Legal Description:	LOTS 1 & 2 DP6457 BLK IV WAIMATE SD
Catchment:	INAHA 351.000
Tributary:	UNNAMED TRIBUTARY

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK992050

General conditions

a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special Conditions

1. THAT the consent holder shall undertake such monitoring of the activities licensed by this consent, as deemed reasonably necessary by the General Manager, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the General Manager, Taranaki Regional Council, upon request.

2. THAT the discharge shall not contain concentrations of any chemical, biological or physical contaminant [other than heat and suspended solids] greater than those found in the water abstracted from the Inaha Stream.

3. THAT the cooling water discharge to the Inaha Stream shall not exceed 35.0 degrees Celsius in temperature at the point of the discharge to the unnamed tributary of the Inaha Stream.

4. THAT the cooling water discharge to the Inaha Stream shall not contain a concentration of suspended solids in excess of 100 gm^{-3}

5. THAT after allowing for a mixing zone of 45 metres extending downstream of the confluence of the unnamed tributary with the Inaha Stream, the discharge [in conjunction with any other discharge pertaining to the same property], shall not give rise to any of the following effects in the receiving waters:

(a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;
(b) any conspicuous change in the colour or visual clarity;
(c) any emission of objectionable odour;
(d) the rendering of fresh water unsuitable for consumption by farm animals;
(e) any significant adverse effects on aquatic life, habitats or ecology;
(f) any visible bacterial and/or fungal growths; and
(g) an increase in temperature of more than 3.0 degrees Celsius.

6. THAT the consent holder shall operate and maintain, to the satisfaction of the General Manager, Taranaki Regional Council, a discharge temperature measuring device and shall keep records of the discharge temperature during the exercise of this consent; such records to be made available to the General Manager, Taranaki Regional Council, upon request.

TRK992050

7. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001, June 2003, June 2005, June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 31 May 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

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DIRECTOR—RESOURCE MANAGEMENT

Water Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited PO Box 172 Hawera 4640
Decision Date (Change):	21 January 2015
Commencement Date (Change):	21 January 2015 (Granted: 31 May 1999)

Conditions of Consent

Consent Granted:	To take up to 2,160 cubic metres/day (50 litres/second) of water from the Inaha Stream for a rendering operation
Expiry Date:	1 June 2019
Review Date(s):	June 2017
Site Location:	Kohiti Road, Okaiawa
Legal Description:	Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457 (Site of take)
Grid Reference (NZTM)	1701884E-5624101E
Catchment:	Inaha

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

    i) the administration, monitoring and supervision of this consent; and
    ii) charges authorised by regulations.

Special conditions

1. That the means of taking water shall be maintained to the satisfaction of the Chief Executive, Taranaki Regional Council.

2. That a minimum flow of at least 25 litres/second shall be maintained in the stream at all times downstream of the point of abstraction.

3. That the consent holder shall install and operate to the satisfaction of the Chief Executive, Taranaki Regional Council, an abstraction rate measuring device and shall keep records of the dates and daily quantities of water abstracted during the exercise of this consent; such records to he made available to the Chief Executive, Taranaki Regional Council, upon request.

4. That the consent holder shall to the satisfaction of the Chief Executive, Taranaki Regional Council, monitor and keep daily records of the flows in the lnaha Stream at the Kohiti Road Bridge; such records to be made available to the Chief Executive, Taranaki Regional Council, upon request.

5. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 21 January 2015

For and on behalf of
Taranaki Regional Council

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A D McLay
Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited P O Box 172 HAWERA 4640
Change To Conditions Date:	9 November 2009 [Granted: 15 December 1999]

Conditions of Consent

Consent Granted:	To discharge up to 1400 cubic metres/day of treated wastewater from a rendering operation and from a farm dairy via spray irrigation onto and into land, and to discharge emissions into the air, in the vicinity of the Inaha Stream and its tributaries
Expiry Date:	1 June 2019
Review Date(s):	June 2011, June 2014, June 2017
Site Location:	Kohiti Road, Okaiawa
Legal Description:	Existing areas: Lot 1 DP 6457 Pt Sec 93 Blk IV Waimate SD [factory site], Lot 1 DP 378038, Pt Sec 93 Lots 2 & 3 DP 6457 Ngatimanuhiakai 17B2 17A2 17A3 Sec 88 Pt Sec 90 Lot 1 DP 10174 Lot 1 DP 11864 Pt Secs 90 & 94 DP SO219 Pt Sec 8 Sec 9 Pt Sec 154 Pt Sec 87 & Sec 89 Lot 2 DP 10412 Sec 92 Ngatimanuhiakai 3B Pt Sec 149 Ngatimanuhiakai 17B1 Lots 1 & 2 DP 4415 Sec 151 Blk IV Waimate SD New areas: Ngatimanuhiakai 3A Blk IV Waimate SD, Ngatimanuhiakai 2A & 2B Blk, Ngatimanuhiakai 4A Blk IV Waimate SD, Ngatimanuhiakai 10A2 Blk IV Waimate SD, Lot 1 DP 5153 Sec 86 Blk Waimate SD, Lot 1 DP 10412 Lot 2 DP 11864 Pt Sec 94 Blk IV Waimate SD, Ngatimanuhiakai 7C1 Blk IV Waimate SD [between the following points; NW (1700589E-5625245N), NE (1700909E-5625245N), SW (1700631E-5625092N), SE (1700921E-5625046N)
Catchment:	Inaha

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

Condition 1 – new

1. The discharge authorised by this consent shall only occur on the land shown in the map labelled Figure 1 attached.

Conditions 2 to 12 [previously conditions 1 to 11] – unchanged

Management plan

2. Prior to the exercise of the consent, the consent holder shall provide, and subsequently shall maintain, a spray irrigation management plan, to the approval of the Chief Executive, Taranaki Regional Council, outlining the management of the system, which shall demonstrate ability to comply with consent conditions and shall address the following matters:

a) designated application areas;
b) selection of appropriate irrigation methods for different types of terrain;
c) application rate and duration;
d) application frequency;
e) farm management and operator training;
f) soil and herbage management;
g) prevention of runoff and ponding;
h) minimisation and control of odour effects offsite;
i) operational control and maintenance of the spray irrigation system;
j) monitoring of the effluent [physicochemical];
k) monitoring of soils and herbage [physicochemical];
l) monitoring of groundwater beneath the irrigated area [physicochemical];
m) monitoring of drainage water downslope of the irrigated area [physicochemical];
n) monitoring of Inaha Stream and relevant tributaries;
o) remediation measures;
p) liaison with submitters to the consent, and interested parties;
q) reporting monitoring data;
r) procedures for responding to complaints; and
s) notification to the Council of non-compliance with the conditions of this consent.

An objective of the plan shall be to maximise discharges to land and to minimise discharges to surface water under consent 2049.

3. The consent shall be exercised in accordance with the procedures set out in the spray irrigation management plan, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and other matters specified in the management plan, except by the specific agreement of the Chief Executive, Taranaki Regional Council. In case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

4. The spray irrigation management plan described in special condition 2 of this consent shall be subject to review upon two months notice by either the consent holder or the Taranaki Regional Council. Further, the consent holder shall review the spray irrigation management plan annually and shall provide the reviewed plan to the Chief Executive, Taranaki Regional Council, by 31 May each year.

5. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the spray irrigation system. The officer shall be regularly trained on the content and implementation of the spray irrigation management plan, and shall be advised immediately of any revision or additions to the spray irrigation management plan.

6. The consent holder shall at all times adopt the best practicable option or options, as defined in Section 2 of the Resource Management Act 1991, to prevent or minimise the adverse effects of the discharges on the environment. This shall include, but not be limited to the minimisation of total nitrogen concentration in the treated effluent.

7. In circumstances where spray irrigation of wastewater is not possible, and where a dilution rate of 1:200 in the Inaha Stream cannot be maintained, the consent holder shall seek the permission of the Chief Executive, Taranaki Regional Council, prior to discharging wastewater to the Inaha Stream.

Odour and spray effects

8. The level of dissolved oxygen within the wastewater pond from which irrigation water is drawn shall be maintained above 1.0 gm^{-3} at all times.

9. There shall be no offensive or objectionable odour as a result of the irrigation of treated wastewater at or beyond the boundary of the property or properties on which spray irrigation is occurring.

10. There shall be no spray drift as a result of the irrigation of treated wastewater at or beyond the boundary of the property or properties on which spray irrigation is occurring.

Land effects

11. The sodium adsorption ratio [SAR] of the wastewater shall not exceed 15.

12. There shall be no ponding of wastewater, and/or any direct discharge to a watercourse due to the exercise of this consent.

Condition 13 [previously condition 12 - changed]

13. The edge of the spray zone shall be at least:

    a) 25 metres from the banks of any watercourse;
    b) 50 metres from any bore, well or spring used for water supply purposes;
    c) 20 metres from any public road, except as detailed in f) and g) of this condition;
    d) 20 metres from any property boundary;
    e) 150 metres from any dwellinghouse or place of public assembly unless the written approval of the occupier has been obtained to allow the discharge at a lesser distance;
    f) 200 metres from Normanby Road adjacent to the property described as Lots 3 & 4, Pt Lot 1 DP 2707, Lot 1 DP 3731, Blk IV, Waimate SD, unless the written approval of the occupier has been obtained to allow the discharge at a lesser distance; and
    g) 50 metres from Ahipaipa Road adjacent to the properties described as Pt Lot 1 and Lot 2 DP 3322, Lot 2 DP12129, Blk IV, Waimate SD.

Conditions 14 to 26 [previously conditions 13 to 25] – unchanged

14. The effluent application rate shall not exceed 300 kg nitrogen/hectare/year except on land described as Pt Sec 154 Blk IV Waimate SD, where the effluent application rate shall not exceed 200 kg/nitrogen/hectare/year.

15. The consent holder shall investigate, and report in writing on, options for upgrading the wastewater treatment system to reduce the concentration of ammonia in the wastewater prior to discharge; the report to be received by the Chief Executive, Taranaki Regional Council, not later than twelve months from the date the consent is granted. Any necessary works associated with the report on reduction of ammonia concentrations shall be completed within twelve months after the receipt of the report.

16. The average application rate shall not exceed 5 mm/hour.

17. The return period between applications shall be at least seven days and the application depth shall not exceed 25 mm at each application.

Monitoring and liaison

18. The consent holder shall site, install and maintain to the satisfaction of the Chief Executive, Taranaki Regional Council, a minimum of nine monitoring bores for the purpose of determining groundwater quality in the vicinity of the discharge. The bores are to be sited in the following locations: upslope of the Kohiti Road and Katotauru Road irrigation areas (2), at the southern boundary of the western Normanby Road irrigation area (2), within the Normanby Road, Kohiti Road and Katotauru Road irrigation areas (3), at the southern boundary of the Katotauru irrigation area, and at the southern boundary of the Ahipaipa Road irrigation area. The spring downslope of the Normanby Road irrigation area, and three bores in the vicinity of Inuawai Road shall also be monitored.

19. The consent holder shall undertake such baseline and operational monitoring of the activities licensed by this consent, as deemed reasonably necessary by the Chief Executive, Taranaki Regional Council.

20. The consent holder and staff of the Regional Council shall meet as appropriate, quarterly or at such other frequency as the parties may agree, with representatives of Ngati Manuhiakai Hapu and other interested submitters to the consent, and any other interested party at the discretion of the Chief Executive, Taranaki Regional Council, to discuss any matter relating to the exercise of the resource consent, in order to facilitate ongoing consultation.

21. The consent holder shall, where practicable, advise the Chief Executive, Taranaki Regional Council, and representatives of Ngati Manuhiakai Hapu, prior to discharge to Inaha Stream under consent 2049.

Mitigation

22. Should monitoring of the discharge under conditions 14 and 18 indicate contamination of local groundwater as a result of the exercise of this consent, the consent holder shall:

    a) undertake appropriate remedial action as soon as practicable as described in the spray irrigation management plan prepared under condition 2, or such action reasonably required by the Chief Executive, Taranaki Regional Council;
    b) shall review the spray irrigation management plan and incorporate such reasonable modifications as are considered necessary by the Chief Executive, Taranaki Regional Council; and
    c) where water supplies are significantly affected, immediately provide alternative supplies as reasonably required by the Chief Executive, Taranaki Regional Council.

Review

23. The consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the results of monitoring.

24. The Taranaki Regional Council may review conditions 7 and 14 of this consent within two weeks after the completion of works to be investigated under condition 15 of this consent, for the purpose of evaluating the appropriateness of the required dilution rate and application rate, and the effects of the discharge on the Inaha Stream and soil.

25. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2001, and/or June 2007, for the purpose of assessing the need to increase the land area for wastewater disposal, reduce nitrogen loading to land and/or increase treatment at the wastewater treatment system to reduce the nitrogen concentration of the effluent.

26. The Taranaki Regional Council may, pursuant to section 128 of the Resource Management Act 1991, review any or all of the conditions of this consent by giving notice of review during June 2001, June 2003, June 2005, June 2007, June 2009, June 2011, June 2014 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at that time.

Signed at Stratford on 9 November 2009

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

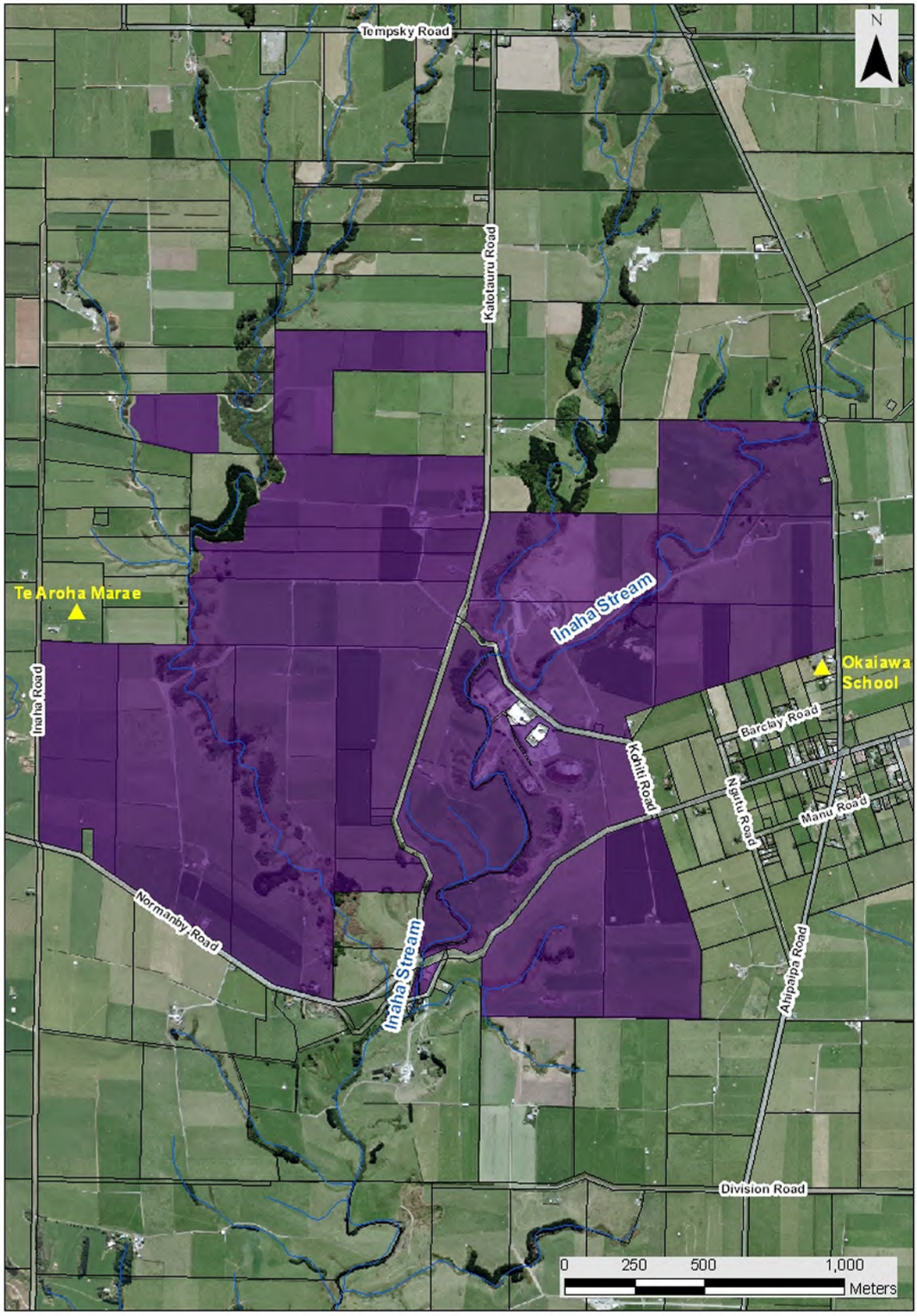

Figure 1 Location of the authorised area to receive wastewater, via spray irrigation, onto and into land

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited P O Box 172 HAWERA 4640
Decision Date:	11 October 2011
Commencement Date:	11 October 2011

Conditions of Consent

Consent Granted:	To discharge emissions into the air from rendering operations and associated processes including wastewater treatment at or about (NZTM) 1701965E-5624119N and burial of material at or about (NZTM) 1702416E-5624339N
Expiry Date:	1 June 2024
Review Date(s):	June 2013, June 2015, June 2017, June 2019, June 2021, June 2023
Site Location:	Kohiti Road, Okaiawa
Legal Description:	Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457, Lot 1 DP 6457 Blk IV Waimate SD, Lot 1 DP 410593 [TBE], Lot 1 DP 10174 Lot 1 DP 11864 Sec 88 Pt Sec 90 Blk IV Waimate SD

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.

2. The discharge authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

   Note: With respect to this condition, the consent holder's site is defined as the areas shown in the map attached.

3. For the purposes of condition 2, an odour shall be deemed to be offensive or objectionable if:

   a. it is held to be so in the opinion of an enforcement officer of the Taranaki Regional Council, having regard to the duration, frequency, intensity and nature of the odour; and/or
   b. an officer of the Taranaki Regional Council observes that an odour is noticeable, and either it lasts longer than two (2) hours continuously, or it occurs frequently during a single period of more than four (4) hours; and/or
   c. no less than two individuals from at least two different properties, each declare in writing that an objectionable or offensive odour was detected beyond the boundary of the site, provided the Council is satisfied that the declarations are not vexatious and that the objectionable or offensive odour was emitted from the site at the frequency and duration specified in (b). Each declaration shall be signed and dated and include:

      1. the individuals' names and addresses;
      2. the date and time the objectionable or offensive odour was detected;
      3. details of the duration, frequency, intensity and nature of the odour that cause it to be considered offensive or objectionable;
      4. the location of the individual when it was detected; and
      5. the prevailing weather conditions during the event.

4. The consent holder shall continue to employ a suitably qualified and experienced person in the role of Environmental Manager, whose responsibilities shall include ensuring compliance with the conditions of this consent.

5. No fish or fish parts shall be received or processed on the premises.

6. By 30 April 2013, and every two years thereafter, the consent holder shall provide certification by a suitably qualified independent person that the works , processes and equipment relevant to all discharges to air from the site are operational in accordance with good engineering practice.

7. Before 2 February 2012, the consent holder shall prepare an Air Discharge Management Plan for the site that, to the satisfaction of the Chief Executive of the Taranaki Regional Council, details how discharges to air from the site will be managed to ensure compliance with conditions of this consent. The plan shall include but not necessarily be limited to;

    a. A description of the air quality objectives sought by the plan;

    b. The identification of key personnel responsible for managing air discharges and implementing the Management Plan;

    c. A description of the activities on the site and the main potential sources of odour emissions;

    d. A description of storage and treatment procedures (including specification of storage times and preservative dosing concentrations) for ensuring that only high quality raw material is processed;

    e. The identification and description of the odour and dust mitigation measures in place;

    f. The identification and description of relevant operating procedures and parameters that need to be controlled to minimise emissions;

    g. A description of contingency procedures for addressing situations, such as equipment failure or spillage of raw material or chemicals, which could result in a discharge to air of odorous emissions that are offensive or objectionable beyond the boundary of the plant;

    h. A description of monitoring and maintenance procedures for managing the odour mitigation measures including record keeping of control parameters and maintenance checks; and

    i. Details of staff training proposed to enable staff to appropriately manage the odour mitigation measures.

8. Operations on site shall be undertaken in accordance with the Air Discharge Management Plan, required by condition 7 above.

9. The Air Discharge Management Plan described in special condition 7 of this consent shall be subject to review upon two months notice by either the consent holder or the Taranaki Regional Council. Further, the consent holder shall review the management plan annually and provide the reviewed plan to the Taranaki Regional Council, by 31 May each year.

10. The discharges authorised by this consent shall not give rise to suspended or deposited dust at or beyond the boundary of the site that, in the opinion of at least one enforcement officer of the Taranaki Regional Council, is offensive or objectionable. For the purpose of this condition, discharges in excess of the following limits are deemed to be offensive or objectionable:

    a. dust deposition rate 0.13 g/m^2/day; and/or

    b. suspended dust level 3 mg/m^3.

11. The consent holder shall consult and inform the local community about activities on the site, specifically those relating to the exercise of this consent, by:

    a. Four times per year, providing a newsletter to all landowners and/or occupiers of properties within 3 kilometres of the site; and

    b. Convening a meeting with the Director - Resource Management, Taranaki Regional Council (or their delegate), and the local community annually or at such other frequency as the parties may agree.

12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2013 and/or every two years thereafter. The purpose of any review would be to ensure that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time. When determining if any review is required the Council will take into account any expressed views of the Okaiawa community.

Signed at Stratford on 11 October 2011

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

TRK995426

DISCHARGE PERMIT

Pursuant to the RESOURCE MANAGEMENT ACT 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	TARANAKI BY-PRODUCTS LIMITED PO BOX 172 HAWERA
Consent Granted Date:	31 May 1999

CONDITIONS OF CONSENT

Consent Granted:	TO DISCHARGE UP TO 1,095 LITRES/SECOND OF STORMWATER FROM AN ANIMAL RENDERING SITE INTO AN UNNAMED TRIBUTARY OF THE INAHA STREAM AT OR ABOUT GR: Q21:119-858, Q21:120-858 AND Q21:121-858
Expiry Date:	1 June 2019
Review Date[s]:	June 2001, June 2003, June 2005, June 2011 and June 2017
Site Location:	KOHITI ROAD OKAIAWA
Legal Description:	LOTS 1 & 2 DP6457 BLK IV WAIMATE SD
Catchment:	INAHA 351.000
Tributary:	UNNAMED TRIBUTARY

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK995426

General conditions

a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the consent holder shall advise the Taranaki Regional Council prior to making any change in the processes undertaken at the site which could significantly alter the nature of the discharge.

2. THAT the discharge shall not exceed the following parameters:

Component	Concentration
pH range	6-9
oil and grease	15 gm^{-3}
suspended solids	100 gm^{-3}

This condition shall apply prior to the entry of the discharge into the receiving water at designated sampling point[s] approved by the General Manager, Taranaki Regional Council.

3. THAT after allowing for reasonable mixing, within a mixing zone extending 45 metres from the confluence of the unnamed tributary with the Inaha Stream, the discharge [in conjunction with any other discharges pertaining to the same property], shall not give rise to any of the following effects in the receiving waters:

(a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

(b) any conspicuous change in the colour or visual clarity;

(c) any emission of objectionable odour;

(d) the rendering of freshwater unsuitable for consumption by farm animals;

(e) any significant adverse effects on aquatic life, habitats or ecology; and

(f) any visible bacterial and/or fungal growths.

4. THAT within three months of the granting of this consent, the consent holder shall prepare a contingency plan outlining measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not licensed by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

5. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001, June 2003, June 2005, June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 31 May 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

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DIRECTOR—RESOURCE MANAGEMENT

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited P O Box 172 HAWERA
Change To Conditions Date:	4 August 2000 [Granted: 30 March 2000]

Conditions of Consent

Consent Granted:	To discharge up to 200 tonnes/day of wastes from meat rendering operations by burial into land in the vicinity of the Inaha Stream at or about GR: Q21:121-859
Expiry Date:	1 June 2019
Review Date(s):	June 2001, June 2003, June 2005, June 2011, June 2017
Site Location:	Kohiti Road, Okaiawa
Legal Description:	Lot 1 DP 10174 Lot 1 DP 11864 Sec 88 Pt Sec 90 SO 268 Blk IV Waimate SD
Catchment:	Inaha

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

special condition 1 [amended]

1. THAT by 1 November 2000, the consent holder shall provide a waste burial management plan, to the approval of the General Manager, Taranaki Regional Council, outlining the management of the system, which shall demonstrate ability to comply with consent conditions and shall address the following matters:

a) nature of wastes discharged;
b) discharge control;
c) waste cover;
d) addition of hydrated lime to stabilise the wastes;
e) minimisation and control of odour effects offsite;
f) stormwater control;
g) leachate management;
h) monitoring of groundwater beneath the burial area [physicochemical];
i) site re-instatement and after care (including maintaining the integrity of the cover material);
j) site contouring;
k) reporting monitoring data;
l) procedures for responding to complaints; and
m) notification to the Council of non-compliance with the conditions of this consent.

special conditions 2-5 [unchanged]

2. THAT the consent shall be exercised in accordance with the procedures set out in the waste burial management plan, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and other matters specified in the management plan, except by the specific agreement of the General Manager, Taranaki Regional Council. In case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

3. THAT the waste burial management plan described in special condition 1 of this consent shall be subject to review upon two months notice by either holder the Taranaki Regional Council.

4. THAT the consent holder shall designate an officer with the necessary qualifications and/or experience to manage the waste burial site. The officer shall be regularly trained on the content and implementation of the burial management plan, and shall be advised immediately of any revision or additions to the burial management plan.

5. THAT the disposal pit[s] shall not intercept shallow groundwater.

special conditions 6 – 7 [amended]

6. THAT the disposal pits shall be constructed when required in general accordance with the information supplied by the applicant in support of application 1084.

7. THAT the consent holder shall notify the Council of the commencement to construct additional disposal pits outside of the disposal area indicated in the map supporting the application.

special condition 8 [unchanged]

8. THAT an officer of the Council is to inspect all constructed disposal pits prior to disposal operations.

special condition 9 [amended]

9. THAT special conditions 1 to 4 shall apply after 1 November 2000 when the disposal pit required by special condition 6 is constructed and also for all subsequent disposal pits.

special conditions 10 – 15 [unchanged]

10. THAT the discharged material shall be covered within a period of four hours or less so as to avoid the generation of offensive offsite odours.

11. THAT at the completion of the disposal operation a low permeability, clean, compacted soil cover with a minimum thickness of 1.0m be placed over the discharged wastes.

12. THAT the cover material and surrounding land shall be contoured such that all stormwater is directed away from the disposal area to the satisfaction of the General Manager, Taranaki Regional Council.

13. THAT the disposal site shall be rehabilitated and pasture re-established to the satisfaction of the General Manager, Taranaki Regional Council.

14. THAT there shall not be any irrigation of effluent under resource consent 3941 or resource consent 2466 onto the disposal area.

15. THAT the exercise of this consent shall not lead, or be liable to lead, to a direct discharge of contaminants to a surface water body.

special condition 16 [amended]

16. THAT the consent holder shall install and maintain, to the satisfaction of the General Manager, Taranaki Regional Council, a minimum of eight monitoring bores for the purpose of determining groundwater quality in the vicinity of the discharge.

special condition 17-18 [unchanged]

17. THAT the consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the resources of monitoring.

18. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001, June 2003, June 2005, June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent, which was either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 4 August 2000

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Consent 6431-1

Land Use Consent

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited P O Box 172 HAWERA
Consent Granted Date:	4 October 2004

Conditions of Consent

Consent Granted:	To erect, place and maintain two culverts in the Inaha Stream for farm access purposes at or about GR: Q21:121-860 and Q21:125-863
Expiry Date:	1 June 2023
Review Date(s):	June 2011, June 2017
Site Location:	Kohiti Road, Hawera
Legal Description:	Secs 89 & 90 Blk IV Waimate SD
Catchment:	Inaha

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

   i) the administration, monitoring and supervision of this consent; and
   ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this resource consent.

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3271. In the case of any contradiction between the documentation submitted in support of application 3271 and the conditions of this consent, the conditions of this consent shall prevail.

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the river bed or discharges to water.

4. Once initial work is complete, any further instream works shall take place only between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.

5. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.

6. The consent holder shall ensure the area and volume of riverbed disturbance shall, so far as practicable, be minimised and any areas which are disturbed shall, so far as practicable, be reinstated.

7. The structures authorised by this consent shall be removed and the area reinstated, if and when the structures are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to removal and reinstatement.

8. The structures which are the subject of this consent shall not restrict the passage of fish.

9. The consent holder shall prevent stock at all times from accessing all water bodies, including wetlands, on or bordering the consent holder's property, upstream of Kohete Road bridge, by constructing and maintaining fences or other controls, located to provide for the establishment of riparian margins; such means of prevention to be established within four years of the granting of this consent.

10. The consent holder shall undertake planting and subsequent maintenance of the riparian margins of the water bodies within the fenced or controlled area(s) as required by special condition 9, to the satisfaction of the Chief Executive, Taranaki Regional Council, within four years of the granting of this consent, for the purpose of enhancing water quality and aquatic habitat.

11. The invert of the culverts shall be not less than 50 mm below the bed of the stream. Appropriate headwall structures shall be constructed to protect the intake and outlet of the culverts from erosion.

12. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 4 October 2004

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Water Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited P O Box 172 HAWERA 4640
Decision Date:	3 February 2014
Commencement Date:	3 February 2014

Conditions of Consent

Consent Granted:	To take and use groundwater for industrial water supply purposes
Expiry Date:	1 June 2029
Review Date(s):	June 2017, June 2023
Site Location:	179 Katotauru Road, Okaiawa
Legal Description:	Ngatimanuhiakai 2B (Site of take & use)
Grid Reference (NZTM)	1701636E-5624804N
Catchment:	Inaha

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act 1991.

Special conditions

1. The total volume of water taken from the 'Bore 3' (GND2380) at a rate not exceeding 22.8 litres per second (1,970 cubic metres per day)

2. The bore shall be easily identifiable by a permanent label, which may be welded or engraved on the casing, or on the equivalent fixed part of the well construction or associated building. The bore shall be labelled with the bore number assigned by Taranaki Regional Council - GND2380.

3. The consent holder shall ensure that there is access into the well that enables the manual measurement of static and pumping water levels.

4. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking (or a nearby site in accordance with Regulation 10 of the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of ± 5%. Records of the date, the time (in New Zealand Standard Time) and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

   Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.

5. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):

   (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or

   (b) has been tested and shown to be operating to an accuracy of ± 5%.

   The documentation shall be provided:

   (i) within 30 days of the installation of a water meter or datalogger;

   (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and

   (iii) no less frequently than once every five years.

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Taranaki By-Products Limited PO Box 172 Hawera 4640
Decision Date:	21 January 2015
Commencement Date:	21 January 2015

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the burning of pallets, paper and cardboard
Expiry Date:	01 June 2029
Review Date(s):	June 2017, June 2023
Site Location:	Kohiti Road, Okaiawa
Legal Description:	Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457 (Discharge source & site)
Grid Reference (NZTM)	1701917E-5623971N

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent and shall include as a minimum:
    - having regard to the prevailing and predicted wind speed and direction at the time of burning in order to minimise offsite effects;
    - allowing the waste material to dry before burning;
    - starting a small fire with the driest material and adding further material once it is blazing, as opposed to igniting a large stack and leaving it unattended.

2. The materials for combustion are restricted to untreated wood or sawdust, paper and cardboard.

3. There shall be no objectionable or offensive odour to the extent that it causes an adverse effect at or beyond the boundary of the site.

    Note: For the purposes of this condition:

    - The site is defined as Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457; and
    - Assessment under this condition shall be in accordance with the *Good Practice Guide for Assessing and Managing Odour in New Zealand, Air Quality Report 36, Ministry for the Environment, 2003.*

4. The consent holder, or an authorised agent, shall supervise burning at all times.

5. The dust deposition rate beyond the property boundary arising from the discharge shall be less than 0.13 $g/m^2/day$ or 4.0 $g/m^2/30$ days.

6. Any discharge to air from the site shall not give rise to any offensive, objectionable, noxious or toxic levels of dust at or beyond the boundary of the property, and in any case, suspended particulate matter shall not exceed 3 mg/m^3 (measured under ambient conditions) beyond the boundary of the site.

7. The discharges authorised by this consent shall not give rise to a level of a contaminant or contaminants at or beyond the boundary of the site that is noxious or toxic.

8. This consent shall lapse on 31 March 2020, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 21 January 2015

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

6. Before exercising this consent, the consent holder shall install and subsequently maintain equipment to measure and record the water level within Bore 3 to an accuracy of ± 0.05 metres at intervals not exceeding 15 minutes.

7. The measurements made in accordance with condition 4 and 6 of this consent, shall be transmitted to the Taranaki Regional Council's computer system, in a format to be advised by the Chief Executive, Taranaki Regional Council, to maintain a 'real time' record of the water taken and bore water levels.The records of water taken and the water level within each bore shall:

   (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and

   (b) specifically record the water taken as 'zero' when no water is taken.

8. The water meter, level monitoring device and datalogger shall be accessible to Taranaki Regional Council officer's at all reasonable times for inspection and/or data retrieval. The data logger shall be designed and installed so that Council officers can readily verify that it is accurately recording the required information.

9. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.

10. At all times the consent holder shall adopt the best practicable option (BPO) to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of groundwater, including, but not limited to, the efficient and conservative use of water.

11. This consent shall lapse on 31 March 2019, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 3 February 2014

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

Good: Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

Poor: Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

High: The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively

adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

Improvement required: Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

Poor: Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.