Fonterra Whareroa

Monitoring Programme

Annual Report

2019-2020

Technical Report 2020-55

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Taranaki Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

Fonterra Co-operative Group Ltd (Fonterra) operates a dairy processing complex located on Whareroa Road at Hawera, between the Tangahoe catchment and another small unnamed catchment. Fonterra holds a total of 18 resource consents related to activities undertaken at the Whareroa site to allow for the abstraction of water from the Tawhiti Stream and Tangahoe River; the discharge of river silt and sand back to those two streams; the discharge of stormwater to unnamed tributaries of the Tawhiti Stream, the Tangahoe River and an unnamed coastal stream; the discharge of stormwater and sediment to land; the discharge of dairy factory wastewater to the Tasman Sea; the discharge of laboratory waste and unprocessable wastes to waste pits; the discharge of dairy liquids to land and the discharge of emissions to air. This report for the period July 2019 to June 2020 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess Fonterra's environmental and consent compliance performance during the period under review. This report also details the results of the monitoring undertaken and assesses the environmental effects of their activities.

During the monitoring period, Fonterra demonstrated an overall level of environmental performance which required improvement.

The Council's monitoring programme for the year under review included 10 scheduled site inspections; three composite samples from the outfall discharge for inter-laboratory comparison; 30 samples of stormwater pond discharges collected for physicochemical analysis; 10 grab samples of the outfall discharge for physicochemical and microbiological analysis; freshwater inspections and biomonitoring surveys downstream of the stormwater pond discharge points; two intertidal surveys; 30 deposition gauging samples; four nitrogen oxide (NO_x) samples and two periods of fine airborne particulate (PM_{10}) monitoring in relation to air emissions, and auditing of monitoring data collected by Fonterra.

Monitoring found that the site was generally maintained in a satisfactory condition, with only minor chemical storage issues occasionally identified. However, one significant pollution event was discovered during a routine inspection, where contaminated stormwater was discharging to a tributary of the Tangahoe River. This resulted in discoloured water and sewage fungus on the stream bed. The event highlighted a number of issues around the plant that required immediate attention. Damaged wastewater infrastructure was identified as the primary source of stormwater contamination, as well as some unexpected faults with the newly commissioned stormwater monitoring and diversion system. Significant investigative and remedial works were subsequently undertaken. This incident resulted in Fonterra receiving a 14-day letter, an abatement notice and an infringement notice.

During the year, Fonterra demonstrated a level of environmental performance which required improvement, and a good level of administrative performance with the resource consents monitored in this programme.

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last five years, this report shows that the consent holder's performance has declined in the period under review.

This report includes recommendations for the 2020-2021 year.

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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 2019 to June 2020 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Fonterra Co-operative Group Ltd (Fonterra). Fonterra operates a dairy processing complex situated on Whareroa Road at Hawera.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Fonterra that relate to abstractions and discharges of water within the Tangahoe and Tawhiti catchments and discharges to the Tasman Sea. This report also covers the air discharge permits held by Fonterra to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, 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 Fonterra's use of water, land and air, and is the 27th combined annual report by the Council for Fonterra.

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;
- the resource consents held by the Fonterra relating to activities on and around the Whareroa site;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in Fonterra's site/catchment.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2020-2021 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 development of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by Fonterra, this report also assigns them a rating for their environmental and administrative performance during the period under review.

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.

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.[1]

1.2 Process description

The Whareroa dairy factory was established in 1972 and is currently operated by Fonterra. The site processes up to 14 million litres of milk a day and produces the largest volume of dairy ingredients from a single factory worldwide. Annually, the factory produces about 428,000 tonnes of milk powder, cheese, cream, protein and lactic casein ingredients (Table 1).

Table 1 Product manufactured at Fonterra annually

Generic product	Metric tonnes/season
Whole & skim milk powders	200,000
Cheese products	95,000
Cream products	88,000
Protein products	35,000

[1] The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

Generic product	Metric tonnes/season
Lactic casein	10,000
Total	428,000

The Whareroa site covers approximately 25 ha and is situated on Whareroa Road, east of Hawera (Photo 1). The site includes five milk powder dryers, two cheese plants, a casein plant, a butter plant, a whey plant, a laboratory, a tanker depot, a co-generation plant, a water treatment plant, a rail siding and storage for finished product.

Significant expansion of the factory occurred during the 1996-1997 season. Kiwi Co-operative Dairies greatly increased its milk supply area through the acquisition of small dairy companies in the South Island and the Hawke's Bay and through a merger with the Tui Dairy Company in the Manawatu. Accordingly, the construction of a number of new plants, the upgrade of several existing plants, and improvements in waste treatment systems were undertaken during the 1996-1997 monitoring period.

Currently, the site obtains its water supply from two nearby surface waterways and supplements this with water derived from the milk process (i.e. condensate). Wastewater is discharged through a long marine outfall (1,845 m). Energy is mainly sourced from two on-site gas-fired co-generation plants, operated as a joint venture with Todd Energy Ltd. The 68 Mega Watt plants provide all the steam and electricity requirements for the site.

The consolidation of the dairy processing industry in Taranaki has led to a corresponding centralisation of discharges to both air and water. In 1981 there were 22 dairy processing sites in Taranaki and the resulting discharges to air and water and abstraction of water were dispersed throughout the region. Now the environmental effects are largely confined to the activities at the Whareroa site.

In the 2014-2015 season, a new distribution centre was constructed at the Whareroa site, almost doubling the site's total dry storage capacity to 70,000 tonnes. A new rail loop and siding were constructed to enable increased load out of product by rail. Together, these developments mean a reduction in freight movements by road and more movements by rail.

In the 2015-2016 season, a new chemical storage facility was installed at the tanker workshop, and a new water treatment plant was built (commissioned in August 2016). The plant enables Fonterra to produce water that meets drinking water standards while minimising the amount of water abstracted from the two rivers. The new plant uses less water for back-flushing the filters. The construction of two settling lagoons allows for the recycling of up to 10% of the back-flushing water through the treatment plant.

In the 2016-2017 season, a Reverse Osmosis Plant was installed in the Utilities Department. This system now treats evaporator condensate so that it can be used on site; reducing the amount of water that is abstracted from the rivers. Numerous improvements were made to plants to reduce losses and maximise yield of product which has led to a decrease in fat, COD and suspended solids in the wastewater, compared with previous years. Particulate meters were installed in the dryer exhaust stacks of the Powder-2 and Whey Products powder plants; enabling real-time monitoring of the quality of the air emissions, providing assurance that emissions control measures are working correctly.

Several projects were completed during the 2017-2018 period. These projects were driven by internal targets for reducing energy use, water use and waste volumes, whilst increasing product yield. In the Casein plant, a curd "wash water" recovery project was completed which has significantly reduced the protein, fat and lactose in the plant wastewater. Condensate recovery was recommissioned in Powder 2; diverting water for use in other plants, rather than going to wastewater. Development began on the in-line stormwater monitoring and diversion system. Energy and water use was reduced in the Milk Treatment department by reducing the rinse times during CIPs (clean in place). The wastewater loss monitoring and loss reduction

programs continued with increased focus in the 2017-2018 season. Losses were reported at daily management meetings, while water and energy usage is reported on a weekly basis.

Photo 1 The Fonterra Whareroa site

In the 2018-2019, the Whareroa Stormwater Project (WSP) was completed and fully operational midway through the year. The WSP is a comprehensive stormwater monitoring and containment scheme which continuously monitors stormwater quality, alerts staff to potential stormwater contamination events in real time and automatically diverts any contaminated stormwater to newly constructed contingency ponds. The project involved the installation of inline monitoring in the five main stormwater sumps. These instruments continuously analyse the stormwater for turbidity, pH and conductivity. Any stormwater that exceeds set trigger levels for these parameters is automatically diverted to one of three stormwater contingency ponds, intended to prevent non-compliant stormwater from discharging to waterways. At the same time, the system alerts staff on site that a stormwater event has occurred. This was a significant capital investment to protect the local waterways and reduce the risk of non-compliance. Particulate meters were also installed on the three Powder 3 drier exhausts stacks during 2018-2019. These meters now provide a real time indication of the particulate concentration being emitted from the stacks. The plant has trigger limits in place which drive actions to be taken when the levels increase. This information has helped the plant better understand the effects that various plant operating conditions can have on emissions concentrations. Solid waste reduction targets have been set for the site. In the 2018-2019 season the site achieved a 3% reduction in solid waste to landfill compared to the previous season. This work is continuing into the 2019-2020 season with the reduction targets increasing each year. Lastly, a number of water and energy reduction initiatives were carried out at the site which resulted in a reduction in water abstraction by over 520 million litres for the year.

Further plant upgrades were undertaken in the 2019-2020 season, as discussed in Section 2.1.

1.3 Resource consents

Fonterra holds 18 resource consents the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in Section 3 of this report.

A summary of the various consent types issued by the Council is included in Appendix I, as are copies of all permits held by the Fonterra during the period under review.

Table 2 Summary of resource consents held by Fonterra for the Whareroa site

Consent number	Purpose	Granted	Review	Expires
Water abstraction permit				
0047-4	To take water from the Tawhiti Stream and the Tangahoe River for the purposes of processing and manufacturing dairy products, cleaning of plant, cooling, domestic use and for a co-generation plant	Nov 2017	June 2021	June 2052
Water discharge permits				
1450-3	To discharge all wastewater from dairy factory processes and associated processes undertaken at the Whareroa dairy processing site through a marine outfall into the Tasman Sea	Nov 2017	June 2021	June 2052
3902-3	To discharge stormwater from the Whareroa milk processing site into an unnamed tributary of the Tangahoe River	Feb 2014	June 2022	June 2028
3907-3	To discharge stormwater, back flushing from the sand filters and intermittent discharges of treated water from a reservoir, from the Whareroa milk processing site into an unnamed tributary of the Tawhiti Stream	Feb 2014	June 2022	June 2028
4133-3.1	To discharge stormwater, backwash and treated process water from the Whareroa milk processing site and the Water Treatment Plant into Unnamed Stream 18	Jan 2016	June 2022	June 2028
4927-2	To discharge river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tawhiti Stream	Nov 2017	June 2021	June 2052
5148-2	To discharge river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tangahoe River	Nov 2017	June 2021	June 2052
Air discharge permit				
4103-2.3	To discharge emissions into the air from the manufacture and processing of milk products and associated processes	Jul 2018	June 2020	June 2025
5044-2	To discharge emissions into the air from the disposal of laboratory wastes, and stormwater and sump cleanings onto and into land	Feb 2004	-	June 2022
6257-1.1	To discharge emissions into the air from dual fuel boilers (gas or coal) with a maximum energy output of 250 MW together with associated processes	June 2015	June 2022	June 2034
6273-1.1	To discharge emissions into the air from 'Cogen-I' and 'Cogen-II' co-generation energy generating plants with an energy output of 70 MW together with associated processes	Oct 2018	June 2020	June 2025
7465-1	To discharge emissions into the air from the combustion of waste wood packaging	Mar 2009	June 2022	June 2028

Consent number	Purpose	Granted	Review	Expires
	Discharges of waste to land			
4406-2	To discharge laboratory wastes onto and into land	Feb 2004	-	June 2022
5036-2	To discharge waste material from stormwater sumps and road sump and unprocessable dairy factory wastes onto and into land	Dec 2012	-	June 2022
9908-1	To discharge dairy liquids onto land and the associated emissions to air, in various locations throughout the Taranaki region	June 2014	June 2020	June 2034
	Land use permits			
10208-1	To construct, place and use a water intake structure in the bed of the Tangahoe River for industrial water supply purposes, including associated discharge of construction stormwater from the site	Feb 2016	June 2022	June 2028
5845-1	To remove, reconstruct, erect, place and maintain a dam structure and associated fish pass on the Tawhiti Stream for water intake purposes	July 2001	-	June 2015*
	Coastal permits			
5013-2	To occupy the Coastal Marine Area with and carry out routine maintenance on: • a marine outfall pipeline and diffuser structure approximately 1845 metres long; and • a rock wall approximately 100 metres long for the protection of the outfall, stream diversion pipelines and associated structures	Nov 2017	June 2021	June 2052

* This consent expired in June 2015 as it was wrongly classified as a permitted activity. Fonterra are currently working on a consent renewal application.

1.4 Monitoring programme

1.4.1 Introduction

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 the Whareroa site consisted of seven primary components.

1.4.2 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.

1.4.3 Site inspections

The Whareroa site was visited 10 times 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, including 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 Fonterra were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.4.4 Discharge sampling

1.4.4.1 Water

The stormwater discharge was sampled on 10 occasions (from three points) and the samples analysed for alkalinity, COD, biological oxygen demand (BOD and filtered carbonaceous BOD), conductivity, pH, free and total chlorine, oil and grease and suspended solids.

The outfall discharge was sampled on 10 occasions and analysed for *E. coli* and enterococci, oil and grease, suspended solids, COD, pH and conductivity.

Inter-laboratory comparisons of a 24 hour time-proportional sample were carried out on three occasions and analysed for conductivity, pH, fats, COD, alkalinity, BOD, suspended solids, nitrogen, phosphorus, faecal coliforms and turbidity.

1.4.4.2 Air

The Council undertook sampling of both the emissions from the site and the ambient air quality in the areas surrounding the site.

Deposition gauges were placed at five selected sites in the vicinity of the factory on six occasions. The samples collected were analysed for total deposited milk powder.

A 'DustTrak' monitor was deployed on two occasions in the vicinity of the site in order to monitor levels of inhalable particulates (PM_{10}).

Monitoring of ambient nitrogen oxide (NO_x) levels at the site was conducted on two occasions using passive absorption discs at four sampling sites.

1.4.5 Freshwater ecological surveys

A biological inspection was performed on one occasion during spring in tributaries of the Tawhiti Stream, Tangahoe Stream, and an unnamed coastal stream, to determine whether or not the discharge of stormwater from the site has had a detrimental effect upon the biological communities of the streams.

A six site biomonitoring survey was undertaken during summer in tributaries of the Tawhiti Stream (two sites), Tangahoe River (three sites) and an unnamed coastal stream (one site) to assess whether stormwater discharges had had any adverse effects on the macroinvertebrate communities of these streams. Samples were processed to provide number of taxa (richness), MCI and $SQMCI_S$ scores for each site. They were also checked for heterotrophic growths.

A fish survey is undertaken in the Tawhiti Stream every three years in order to assess if the intake, fish pass, or discharge of sediment undertaken in relation to the Fonterra Whareroa water abstraction have had any impact on the fish communities of the Tawhiti Stream. This survey was carried out in the 2016-2017 monitoring year and was due to be undertaken in 2019-2020. However, for reasons discussed in Section 2.2.2.1, this survey was postponed until the 2020-2021 monitoring year instead.

1.4.6 Marine ecological surveys

A marine ecological survey was performed on two occasions at sites on the coast surrounding the marine outfall to determine whether the discharge of wastewater through the outfall has had a detrimental effect upon the intertidal marine communities.

1.4.7 Review of Fonterra monitoring data

Fonterra routinely monitors the wastewater discharge for a number of physical, chemical and biochemical parameters. Results are forwarded to the Council along with data relating to water abstractions from the Tangahoe catchment.

Fonterra's independent consultants, CRL Energy Ltd and Verum Group, carried out powder emission measurements on drier exhaust stacks between October 2019 and January 2020. The Council undertook a review of all data upon receipt.

2 Results

2.1 Plant upgrades and improvements

The key sustainability objectives and targets at the Whareroa site in the 2019-2020 season were to reduce water use, reduce energy use and reduce waste to landfill.

Water reduction. Equipment was installed in the 2018-2019 season to enable the factory to reuse water from the processing plants in the boiler and cooling towers. During the 2019-2020 season these changes reduced water usage by more than 250 million litres and Fonterra estimate this could improve to 300 million litres as the system is optimised.

Energy reduction. Progress was made on five energy reduction projects during 2019-2020. Once complete it is estimated that these projects will reduce energy consumption by approximately 149,000 GJ per year; the equivalent to powering almost 6,000 New Zealand households for a year.

Waste reduction. The Whareroa site implemented a number of recycling and composting initiatives during the year. The biggest improvement was achieved by working with a Whanganui based composting company to compost food waste from the staff canteen and site laboratory. In the six months since establishing this connection, over 33 tonnes of food waste has been diverted from landfill to composting.

2.2 Water

2.2.1 Inspections

Routine site inspections were conducted on a monthly basis throughout the 2019-2020 dairy season. A total of ten site inspections were undertaken between August 2019 and June 2020, with each visit including an assessment of stormwater catchments, chemical storage, truck wash areas, and general site maintenance and management. The three stormwater discharges and the wastewater discharge to the Tasman Sea were also inspected and sampled during the visits.

Over the course of the year, there were a number of instances where chemical containers were encountered that were not adequately bunded, and would not hold a leak if one were to occur. Examples of these ranged from chemical containers with no bund, chemical containers with valves positioned outside of the bund, to a container stored on a bund with the outlet valve left open. Fonterra staff generally resolved these issues promptly after each inspection. Small chemical leaks from the plant, including the milk train clean in place (CIP) pipework and a concrete chemical storage bund, were also discovered during the year. These issues were promptly resolved upon discovery.

The in-line stormwater monitoring and diversion system was operating during the year under review. The value of this system was demonstrated during a number of occasions. During multiple inspections, the turbid, foamy washwater from the tanker wash was shown to have exceeded the predetermined stormwater quality threshold and was diverted to a containment pond, rather than going to the stormwater ponds to ultimately discharge to the receiving waters. At the other side of the factory, in-line monitoring at the sump near the sand filter had shown that the stormwater was consistently not meeting the quality thresholds. Fonterra subsequently undertook an investigation and discovered that there was wastewater infiltrating the stormwater network. During the year, the source of infiltration was discovered, and remedial works were undertaken during the winter shut down maintenance period. While these investigation and remedial works were ongoing, this contaminated stormwater was manually set to divert to the containment pond (and subsequently into the wastewater network). However, significant learnings also occurred during the year, when it was discovered that some of the in-line monitoring instruments had not been calibrated correctly, and the diversion valves were not sealing completely. What resulted was a significant contamination event in the eastern catchment stormwater ponds, discussed in further detail in Section 2.4.

Overall, site management was found to be good throughout the monitoring period. Based on the inspections that were undertaken, the site was largely compliant with consent conditions.

2.2.2 Water abstraction

Fonterra holds resource consent 0047-4, which authorizes a daily abstraction of up to 30,000 m^3/day of water from two locations in the Tangahoe catchment; including the Tawhiti Stream and the Tangahoe River. The exercise of this consent is monitored by both Fonterra and the Council.

Fonterra continuously measures abstraction rates for both intakes and daily abstraction rate data has been supplied on a monthly basis to the Council for review. Instantaneous abstraction data is also telemetered to the Council's database.

Photo 2 Tangahoe River intake structure

The Council maintains telemetered hydrological recorders in the Tawhiti Stream and Tangahoe Rivers, downstream of the abstraction points, to monitor compliance with flow restrictions on consent 0047-4.

Abstraction limits

Condition 1 states that the total amount of water abstracted from the Tawhiti and Tangahoe locations over 24 hours (from 06:00 to 06:00) must not exceed 30,000 m^3. A summary of the abstraction data provided by Fonterra is presented in Table 3. Compliance with the maximum daily abstraction volume has been determined in terms of number of days that limits were breached. Fonterra was found to be compliant with these conditions for the duration of the monitoring period. The maximum daily abstraction from the Tawhiti Stream was 17,151 m^3 which occurred on 18 August 2019. The maximum daily abstraction from the Tangahoe River was 23,952 m^3 which occurred on 9 December 2019. The maximum combined daily abstraction locations was 23,992 m^3 on 9 December 2019.

Table 3 Summary of abstraction rate data for 2019-2020

Month	Tawhiti Stream			Tangahoe River			Total abstraction		
	Mean m^3/day	Max m^3/day	Breach days	Mean m^3/day	Max m^3/day	Breach days	Mean m^3/day	Max m^3/day	Breach days
July	5,783	10,542	0	0	0	0	5,783	10,542	0
August	14,073	17,151	0	0	0	0	14,073	17,151	0
September	8,427	16,425	0	10,787	20,857	0	19,214	23,044	0
October	12,682	15,029	0	7,472	17,551	0	20,154	22,685	0
November	41	110	0	20,218	22,971	0	20,259	23,016	0
December	84	483	0	19,019	23,952	0	19,103	23,992	0

Month	Tawhiti Stream			Tangahoe River			Total abstraction		
	Mean m^3/day	Max m^3/day	Breach days	Mean m^3/day	Max m^3/day	Breach days	Mean m^3/day	Max m^3/day	Breach days
January	47	100	0	18,794	22,151	0	18,842	22,192	0
February	54	106	0	17,689	20,872	0	17,212	20,912	0
March	91	106	0	15,168	18,307	0	15,259	18,406	0
April	72	77	0	12,685	16,168	0	12,757	16,238	0
May	70	76	0	12,337	17,259	0	12,407	17,321	0
June	76	85	0	3,239	9,577	0	3,315	9,652	0

Condition 2 states that when the flow in the Tawhiti Stream is less than 800 L/s, the rate of taking from the Tawhiti Stream shall not exceed 184 L/s, unless the turbidity of the Tangahoe River at the take site is greater than 850 NTU, and then the rate shall not exceed 347 L/s.

In 2019-2020, the Tawhiti abstraction rate did not exceed 184 L/s at any time that the stream flow rate was less than 800 L/s. The maximum abstraction rate that occurred when the stream flow was below 800 L/s, was 171.7 L/s. The actual stream flow at this time was 795 L/s. The Tawhiti Stream flow and abstraction rate are presented in Appendix II.

Minimum flows

Condition 3 states that no abstraction shall occur when the flow immediately downstream of the Tangahoe River take site is less 450 L/s (though this can be as low as 273 L/s during an 'emergency period' of up to 48 hours under Condition 5). Additionally, for 21 days of the monitoring year, Fonterra are able to continue abstracting from the Tangahoe when the flow is between 300 and 450 L/s under Condition 4. The minimum flow was maintained above 450 L/s during 2019-2020 (Appendix II). The minimum flow recorded during the year was 808 L/s on 16 February 2020.

Condition 3 also states that no abstraction shall occur when the flow in the Tawhiti Stream is less than 240 L/s (though this can be as low as 50 L/s during an 'emergency period' of up to 48 hours under Condition 5). There were a total of 26 days in 2019-2020 between March and April where the Tawhiti Stream flow was recorded dropping below 240 L/s. The total amount of time that the stream flow was less than 240 L/s equated to just under 16 days. However, it should be noted that this river flow data has an associated level of accuracy of ±10%. Therefore, the absolute minimum flow in the Tawhiti Stream that can occur before Fonterra must cease the abstraction is 216 L/s. The minimum recorded flow was 226 L/s on 19 March 2020 (Appendix II).

2.2.2.1 Fish survey

Fish surveys were due to be carried out in the Tawhiti Stream and Tangahoe River during the period under review. However, following the ammonia spill that occurred upstream in February 2020, it was decided to postpone this monitoring until the 2020-2021 year. The spill resulted in significant fish mortalities, which would have ultimately disguised any effects from the Fonterra Whareroa water abstraction, and backwash activities. By delaying the monitoring until 2020-2021, local fish populations will have had a chance to recover and the surveys will be able to provide more meaningful results to determine the effects of Fonterra's activities.

2.2.3 Stormwater

Figure 1 Approximate stormwater catchments at the Whareroa site

There are three stormwater catchments covering the Whareroa site. The northern catchment drains to an unnamed tributary of the Tawhiti Stream (consent 3907), the eastern catchment drains to an unnamed tributary of the Tangahoe River (consent 3902), while the southern catchment drains to an unnamed coastal stream (consent 4133). The discharge to the unnamed tributary of the Tawhiti Stream can also include intermittent discharges of back flushing from sand filters and chlorinated water from the water reservoir. The approximate stormwater catchment areas at the Whareroa site are shown in Figure 1.

There is a detention pond system in place for each of the three stormwater catchments (Photo 3). These ponds are designed to contain any spillage that occurs on the site, attenuate storm flows and provide rudimentary treatment of site stormwater.

Photo 3 Southern stormwater pond following upgrade (surrounded by native riparian plantings)

Midway through the 2018-2019 season, the Whareroa Stormwater Project (WSP) was completed and became fully operational. The WSP is a comprehensive stormwater monitoring and containment scheme which continuously monitors stormwater quality, alerts staff to potential stormwater contamination events in real time and automatically diverts any contaminated stormwater away from the detention ponds and into newly constructed contingency ponds. The project involved the installation of in-line monitoring in the five main stormwater sumps. These instruments continuously analyse the stormwater for turbidity, pH and

conductivity. Any stormwater that exceeds set trigger levels for these parameters is automatically diverted to one of three stormwater contingency ponds, preventing non-compliant stormwater from discharging to waterways. At the same time, the system alerts staff on site that a stormwater event has occurred.

During the 2019-2020 reporting period, the monitoring of stormwater discharges consisted of three components; the collection of stormwater discharge samples, a freshwater biological inspection of each of the unnamed tributaries and a macroinvertebrate survey of six sites in an unnamed tributary of the Tawhiti stream, the Tangahoe River, and an unnamed coastal stream.

2.2.3.1 Discharge monitoring

Discharge samples were collected during each site inspection. The samples were analysed for temperature, conductivity, pH, alkalinity, oil and grease, total residual chlorine, free chlorine, suspended solids, turbidity, chemical oxygen demand (COD), biochemical oxygen demand (BOD) and filtered carbonaceous biochemical oxygen demand (BODCF). Parameters, with associated consent limits, are listed in Table 4. Samples were analysed by Hill Laboratories.

Table 4 Limits for stormwater composition for each parameter 2019-2020 (consents 3902, 3907, 4133)

Parameter	Units	Consent limit*		
		3902	3907	4133
Temperature	°C	25	25	25
Oil and grease	g/m^3	5	5	5
Total residual chlorine	g/m^3	0.2	0.2	0.2
pH	pH	6.0-9.0	6.0-9.0	6.0-9.0
Suspended solids	g/m^3	30	30	100
BOD	g/m^3	10	10	10
BODCF	g/m^3	2.0	2.0	2.0

* Consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period

Tributary of Tawhiti Stream

Samples of the discharge to the Tawhiti tributary are taken at the outlet of the three-pond system. Since the construction of the three-pond system, there has been a considerable decrease in the levels of BOD and suspended solids in the discharge, while temperature, conductivity and pH have remained constant. Oil and grease (O&G) and free chlorine levels have typically remained low since the site upgrade.

Samples results for the discharge to the Tawhiti tributary are presented in Table 5. A summary of previous results, since the installation of the three-pond system in 1998, is also included for comparison.

An elevated total chlorine concentration was detected on 31 October 2019 (0.27 g/m^3). No other stormwater contaminants exceeded consent thresholds during the 2019-2020 monitoring year.

Overall, no single parameter exceeded the consent limit on three occasions or more, therefore, stormwater samples in this catchment were fully compliant during the year. The contaminants not assessed against consent limits were comparable with those from previous surveys.

Table 5 Sample results for the stormwater discharge to an unnamed tributary of the Tawhiti Stream

Parameter	Alkalinity	BODCF	BOD	COD	Cond.	O&G	pH	SS	Turb.	Temp.	Total Cl_2	Free Cl_2
Unit	**g/m^3 $CaCO_3$**	**g/m^3**	**g/m^3**	**g/m^3**	**µS/cm @ 25°C**	**g/m^3**	**pH**	**g/m^3**	**NTU**	**°C**	**g/m^3**	**g/m^3**
Summary statistics previous data (November 1998 to June 2019)												
Minimum	12.1	0.06	0.25	2.5	150	0.25	6.9	1	1.0	8.0	0.005	0.005
Maximum	157	19	21	210	408	25	9.9	660	350	22.5	0.3	0.3
Median	64	0.5	1.1	10	272	0.25	7.6	8	5.6	15.6	0.05	0.05
Number	147	87	160	156	157	152	156	154	116	154	154	153
2019-2020 monitoring results												
16 Aug 2019	68	<1.0	0.6	<6	287	<4	7.3	7	5.1	11.8	<0.07	<0.07
24 Sep 2019	70	<1.0	1.8	7	293	<4	7.6	7	5.0	13.2	<0.07	<0.07
31 Oct 2019	83	<1.0	1.5	6	319	<4	7.6	7	4.2	16.9	**0.27**	<0.07
22 Nov 2019	75	<1.0	1.2	<6	283	<4	7.2	4	1.95	17.2	0.1	<0.07
13 Dec 2019	64	<1.0	<0.8	<6	248	<4	7.3	<3	2.4	20.8	0.15	<0.07
21 Jan 2020	74	<1.0	<0.8	6	307	<4	8.1	<3	1.42	21.1	<0.07	<0.07
28 Feb 2020	70	<1.0	1.3	9	298	<5	7.6	<3	1.21	19.6	0.07	0.07
20 Mar 2020	78	<1.1	<1.1	6	309	<4	7.4	<3	1.10	16.3	<0.07	<0.07
29 Apr 2020	85	<1.0	1.4	8	310	<4	7.7	4	2.8	15.4	0.10	0.07
16 Jun 2020	65	<1.0	5.1	18	272	<4	7.3	11	3.8	11.0	<0.07	<0.07
Consent limit*	**-**	**2.0**	**10**	**-**	**-**	**5**	**6.0 – 9.0**	**30**	**-**	**25**	**0.2**	**-**

Refer to glossary for an explanation of abbreviations
Consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period
'Less than values' in the summary statistics have been halved

Tributary of Tangahoe River

Samples of the discharge to the Tangahoe tributary are taken at the outlet of the two-pond system. The characteristics of the discharge have changed since the construction of the ponds. On average, the temperature, conductivity, alkalinity, BOD and O&G values recorded have decreased, while the pH and chlorine values have increased.

Samples of the discharge to the Tangahoe tributary are presented in Table 6. An additional sample was collected in May, in response to a pollution incident that was discovered in April. A summary of previous results, since the installation of the two-pond system in 1996, is also included for comparison.

Table 6 Sample results for the stormwater discharge to an unnamed tributary of the Tangahoe River

Parameter	Alkalinity	BODCF	BOD	COD	Cond.	O&G	pH	SS	Turb.	Temp.	Total Cl_2	Free Cl_2
Unit	g/m^3 $CaCO_3$	g/m^3	g/m^3	g/m^3	µS/cm @ 25°C	g/m^3	pH	g/m^3	NTU	°C	g/m^3	g/m^3
Summary statistics previous data (May 1996 to June 2018)												
Minimum	28	0.25	0.4	3	40	0.25	6.8	1	0.58	8.1	0.005	0.005
Maximum	235	3.6	93	220	644	26	9.8	130	48	23.5	0.5	0.4
Median	118	1	5.15	21	368	0.25	7.9	10	5.6	16.4	0.1	0.05
Number	151	85	154	154	155	150	157	155	123	151	150	150
2019-2020 monitoring results												
16 Aug 2019	129	<1.0	0.8	<6	478	<4	7.7	<3	3.1	11.6	<0.07	<0.07
24 Sep 2019	146	<1.0	<0.8	11	509	<4	7.9	<3	0.76	13.3	<0.07	<0.07
31 Oct 2019	135	<1.0	1.5	8	450	<4	7.9	<3	1.06	17.4	0.07	<0.07
22 Nov 2019	108	1.0	3.0	12	319	<4	7.5	<3	1.14	17.1	0.08	<0.02
13 Dec 2019	83	<1.0	1.0	12	246	<4	7.9	<3	2.3	20.8	<0.07	<0.07
21 Jan 2020	176	<1.0	1.5	15	552	<4	8.0	<3	1.84	21.7	0.07	0.07
28 Feb 2020	152	<1.0	5.4	29	434	<5	8.5	9	4.4	21.0	0.15	0.19
20 Mar 2020	173	<1.0	4	19	527	<4	7.7	10	4.7	16.5	0.11	<0.07
29 Apr 2020	197	**11**	**14**	54	581	<4	7.5	15	18.5	15.6	<0.07	<0.07
22 May 2020	136	<1.0	3.9	16	469	<4	7.4	7	4.4	10.4	-	-
16 Jun 2020	160	<1.0	4.6	14	570	<4	7.4	6	2.7	10.6	<0.07	<0.07
Consent limit*	**-**	**2.0**	**10**	**-**	**-**	**5**	**6.0 – 9.0**	**30**	**-**	**25**	**0.2**	**-**

Refer to glossary for an explanation of abbreviations
Consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period
'Less than values' in the summary statistics have been halved

Filtered carbonaceous BOD (BODCF) and BOD exceeded the respective consent limits once on 29 April 2020 (11 g/m^3 and 14 g/m^3, respectively). These exceedances were associated with a pollution incident that was discovered at the time the samples were collected (discussed in further detail in Section 2.4). No other stormwater contaminants exceeded consent thresholds during the 2019-2020 monitoring year.

Despite the exceedances that occurred in April, consent compliance was maintained throughout the year, as no single parameter exceeded the consent limit on three occasions or more. The contaminants not assessed against consent limits were comparable with those from previous surveys.

Unnamed coastal stream

Samples of the discharge to the unnamed coastal stream are presented in Table 7. A summary of previous results, since November 1994, is also included for comparison.

Table 7 Sample results for the stormwater discharge to an unnamed coastal stream

Parameter	Alkalinity	BODCF	BOD	COD	Cond.	O&G	pH	SS	Turb.	Temp.	Total Cl_2	Free Cl_2
Unit	**g/m^3 $CaCO_3$**	**g/m^3**	**g/m^3**	**g/m^3**	**µS/cm @ 25°C**	**g/m^3**	**pH**	**g/m^3**	**NTU**	**°C**	**g/m^3**	**g/m^3**
Summary statistics previous data (November 1994 to June 2019)												
Minimum	16	0.5	0.8	5	36	0.25	6.6	2	1.06	7.7	0.005	0.005
Maximum	130	9.7	27	97	512	16	8.5	78	44	23.5	0.7	0.6
Median	71	1.2	6.6	28	290.5	0.25	7.4	14	7	15.7	0.05	0.05
Number	157	92	161	161	160	158	162	161	130	158	158	159
2019-2020 monitoring results												
16 Aug 2019	49	<1.0	1.2	6	244	<4	7.4	3	1.73	10.9	<0.07	<0.07
24 Sep 2019	68	<1.0	0.9	10	316	<4	7.5	3	2.0	13.1	<0.07	<0.07
31 Oct 2019	66	<1.0	1.3	10	323	<4	7.4	3	2.0	15.7	<0.07	<0.07
22 Nov 2019	60	<1.0	1.1	<6	273	<4	7.4	<3	0.82	17.4	0.19	<0.02
13 Dec 2019	60	<1.0	<0.8	11	249	<4	7.5	<3	2.5	20.9	0.11	<0.07
21 Jan 2020	88	<1.0	1.6	14	411	<4	7.5	4	2.5	21.3	<0.07	0.13
28 Feb 2020	73	<1.0	1.2	15	328	<4	7.4	4	1.91	20.2	0.13	0.26
20 Mar 2020	107	<1.0	<2	16	432	<4	7.6	7	3.8	16.0	0.12	0.07
29 Apr 2020	82	<1.0	3.6	15	389	<4	7.5	7	4.3	13.9	0.11	0.14
16 Jun 2020	61	<1.0	1.0	7	310	<4	7.4	<3	1.40	10.2	0.07	0.07
Consent limit*	**-**	**2.0**	**10**	**-**	**-**	**5**	**6.0 – 9.0**	**100**	**-**	**25**	**0.2**	**-**

Refer to glossary for an explanation of abbreviations
Consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period
'Less than values' in the summary statistics have been halved

No stormwater contaminants exceeded consent thresholds during the 2019-2020 monitoring year.

Overall, no single parameter exceeded the consent limit on three occasions or more, therefore, stormwater samples were fully compliant during the year. The contaminants not assessed against consent limits were comparable with those from previous surveys.

2.2.3.2 Freshwater biological inspections (spring survey)

A biological inspection was performed on one occasion during spring (27 November 2019), in tributaries of the Tawhiti Stream, Tangahoe Stream, and an unnamed coastal stream, to determine whether or not the discharge of stormwater from the site has had a detrimental effect upon the biological communities of the streams. They were also checked for heterotrophic growths. The presence of masses of heterotrophic organisms can be an indicator of organic enrichment within a stream.

In the Tawhiti tributary the stream flowing from the stormwater ponds had a very low water level, with a clearly defined wetted area. The water was uncoloured and clear. The stream temperature at the time of the inspection was 17.8°C. The macroinvertebrate habitat downstream of the stormwater discharge comprised macrophytes, with a small amount of woody debris present. The substrate of the stream was predominantly

silt and wood and was easily disturbed. No heterotrophic growths, periphyton or moss was noted at this partially shaded site. Iron oxide deposits were visible at the edges of the stream and a thin sheen was visible on the water surface. A macroinvertebrate sample was collected using the 'vegetation-sweep' method, which was live-sorted on site. The sample contained 'very abundant' snails (*Potamopyrgus*), 'abundant' fingernail clam (Sphaeriidae), oligochaete worms, ostracod seed shrimp and amphipods and 'common' cased caddisflies, damselfly larvae and a small number of black sand-fly larvae (*Austrosimulium*) and *Chironomus* blood worms. The presence of species such as *Chironomus* blood worms may be an indication of some organic enrichment. However, numbers were very low and the sample contained several 'sensitive' taxa such as caddisflies, amphipods and damselfly larvae. These results, together with the lack of undesirable heterotrophic growths on the bed, indicated that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed tributary of the Tawhiti Stream.

The Tangahoe tributary near the ponds had a low, steady flow that was clear and uncoloured. The stream temperature at the time of sampling was 19.0ºC. The substrate comprised predominantly hard clay covered by silt, sand and fine and coarse gravels. The site was completely shaded by steep-sided banks, dense overhanging grasses and large flaxes. No heterotrophic growths, periphyton, or moss was noted, however there was some iron oxide visible at the edges of the stream. An invertebrate sample was collected using the 'vegetation-sweep' method, which was then live-sorted on site. The sample contained 'abundant' amphipods, snails (*Potamopyrgus*), cased caddisflies, mayflies, ostracod seed shrimp, and 'common' oligochaete worms, black sand-fly larvae (*Austrosimulium*) and beetles. The live-sort results indicate a mildly eutrophic stream typical of lowland farmland. Though pollution 'tolerant' oligochaete worms were present in the sample, their numbers were low and combined with the lack of heterotrophic growths and *chironomid* blood worms suggests limited organic enrichment. In addition, the presence of 'sensitive' taxa such as mayflies, caddisflies, amphipods and beetles suggests reasonable preceding water quality and an improvement from previous inspections. Overall, these results, including the lack of undesirable heterotrophic growths on the streambed, indicate that any discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed tributary of the Tangahoe River.

The unnamed coastal stream was inspected immediately below the stormwater pond discharge, which is some way upstream of the site sampled during the full biomonitoring survey. The stream temperature at the time of sampling was 22.4ºC. At the time of the inspection, the stream had a moderate, steady flow of clear and uncoloured water. The substrate comprised predominantly fine and coarse gravels with some cobble, silt and sand. Slippery algal mats and patchy filaments were recorded growing on the streambed. There were no macrophytes observed, however the channel was covered and fully shaded by overhanging vegetation. Patchy iron oxide was noted, mainly at the edges of the stream. The live sample collected contained 'tolerant' taxa such as; oligochaete worms, snails (*Potamopyrgus*), ostracod seed shrimp and black sand-fly larvae (*Austrosimulium*) and also 'moderately sensitive' taxa such as amphipods, back-swimmers and cranefly larvae. This community is a typical result for this type of habitat. The presence of 'sensitive' taxa, and the lack of any undesirable heterotrophic growths on the streambed, indicates that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed coastal stream.

The results of this survey of tributaries of the Tawhiti Stream, Tangahoe Stream, and an unnamed coastal stream, indicated that stormwater discharges from the factory had not had recent detrimental effects upon the streambed macroinvertebrate communities of these streams.

Copies of biological inspection reports for these sites are available from the Council upon request.

2.2.3.3 Freshwater biomonitoring (summer survey)

On 26 February 2020, the Council collected streambed macroinvertebrates from six sites in tributaries of the Tawhiti Stream (two sites), Tangahoe River (three sites) and an unnamed coastal stream (one site), to investigate the effects of the Fonterra Whareroa dairy factory stormwater discharge on macroinvertebrate health. Macroinvertebrates were identified and the number of different types of taxa counted (taxa richness), and MCI and SQMCI scores were calculated for each site. Site locations are summarised in Figure 2, along with the results of this survey.

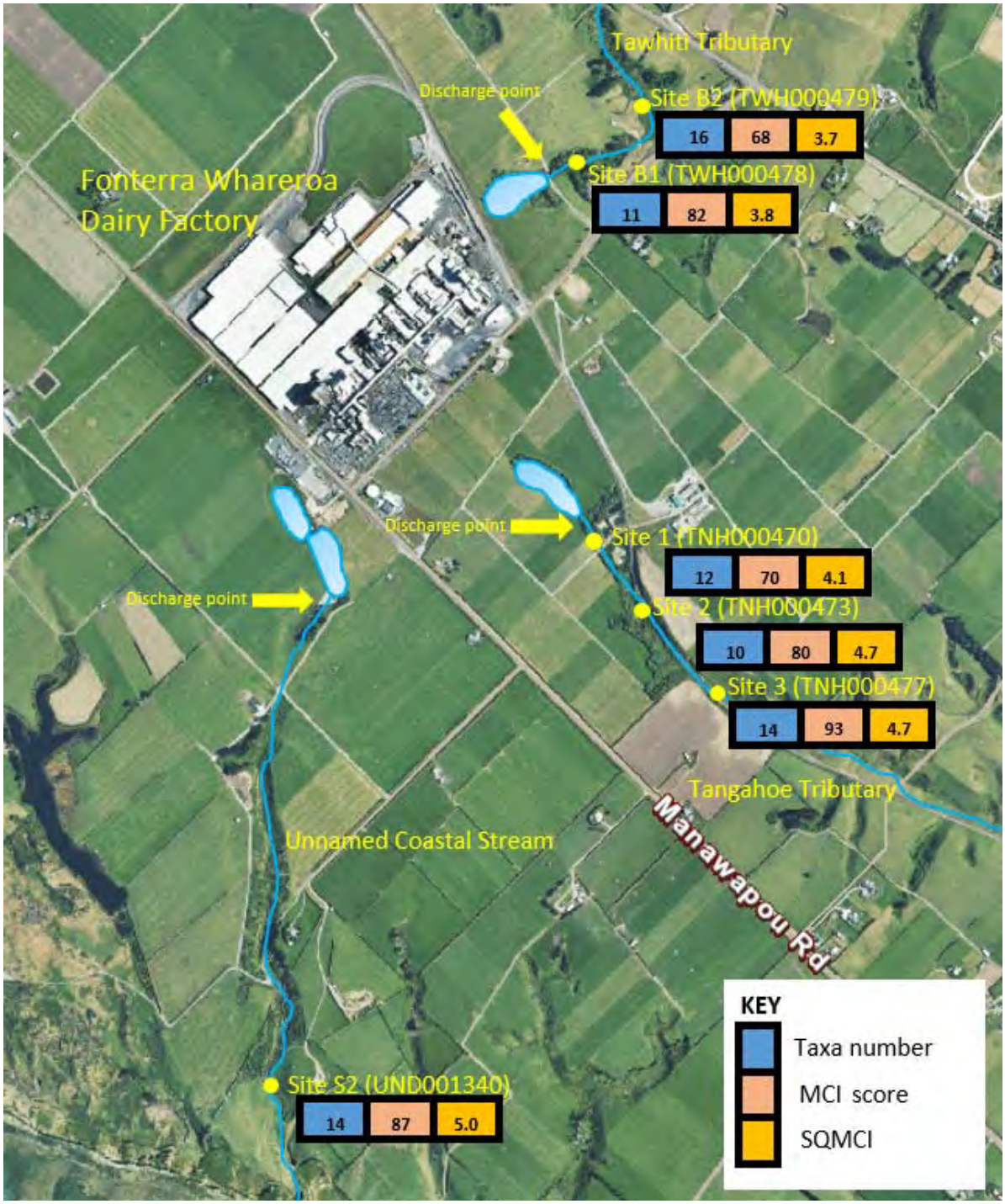

Figure 2 Biomonitoring sites related to the Fonterra Whareroa dairy factory discharges with associated taxa numbers, MCI scores and SQMCI scores from the February 2020 survey

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of nutrient pollution in streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to pollution. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored and enable the overall health of the macroinvertebrate communities to be determined.

The MCI scores categorised site B1 in the unnamed tributary of the Tawhiti Stream as having 'fair' health, and site B2 as having 'poor' health, while SQMCI scores were reflective of 'poor' health at both sites. These results were expected due to habitat. SQMCI scores were not significantly different to one another, while the MCI recorded at site B1 was significantly higher than that recorded at site B2. This could largely be attributed to habitat differences such as an increase in filamentous periphyton and macrophyte bed at the downstream site. Overall, there was no evidence that discharges into the unnamed tributary of the Tawhiti Stream were causing detrimental impacts on the macroinvertebrate communities at site B1 or site B2.

MCI scores categorised site 1 in the unnamed tributary of the Tangahoe River as having 'poor' health and sites 2 and 3 as having 'fair' health. MCI scores increased in a downstream direction, with the MCI score at site 3 significantly higher than those recorded at the two upstream sites. The MCI score recorded at site 1, was 23 units lower than that recorded downstream at site 3, which was indicative of adverse effects from the stormwater pond discharge on the 'health' of the macroinvertebrate communities at site 1 (situated 40 m downstream of the discharge). However, these effects were localised, with a substantial 10 MCI unit increase recorded between sites 1 and 2. In comparison to historic site medians, site 1 recorded a similar MCI score, while sites 2 and 3 recorded significantly higher scores. SQMCI scores were similar between sites. The results of this survey of an unnamed tributary of the Tangahoe River indicated that stormwater discharges from the factory had contributed to a decline in macroinvertebrate 'health' at site 1, however no recent significant detrimental effects upon the streambed macroinvertebrate communities were evident further downstream at site 3. Given the 'poor' MCI score recorded at site 1, it is recommended that two full biomonitoring surveys of this tributary be carried out in the next monitoring period.

The MCI score categorised site S2 in the unnamed coastal stream as having 'fair' health. This score was significantly higher than the median for the site and represented an increase in MCI score from the consecutive decline that was recorded over the previous four surveys. There was no evidence that discharges into the unnamed coastal stream were causing detrimental impacts on the macroinvertebrate communities of this stream.

Overall, these results indicate that the Fonterra Whareroa dairy factory stormwater discharge had not significantly negatively affected macroinvertebrate communities of the unnamed tributary of the Tawhiti Stream or the unnamed coastal stream. However, results from the unnamed tributary of the Tangahoe River indicated that stormwater discharges from the factory had contributed to a decline in macroinvertebrate 'health' at site 1. These effects were localised, with no recent significant detrimental effects upon the streambed macroinvertebrate communities evident further downstream at site 3.

Copies of biomonitoring reports for this site are available from the Council upon request.

2.2.4 Wastewater

Since June 1997, wastewater from the Whareroa dairy complex has been discharged through a 1,845 m long marine outfall. Previously, the wastewater was discharged at the low water mark.

A discharge of up to 40,000 m^3/day of dairy factory wastewater is provided for by consent 1450. Changes to the consent in September 2006 added specific limits on the concentrations of fats, suspended solids and COD. The consent also controls the environmental effects of the discharge by narrative standards placed on the effects of the discharge at the boundary of a mixing zone. No discharge of raw or treated milk, or milk

products, cream, whey or whey permeate is allowed, except under emergency provisions defined in a contingency plan.

Over recent monitoring years, video surveillance has found that the new, long outfall is performing according to design. The effluent field that forms above the diffuser moves parallel to the coast, and has not been observed to impinge upon the shore under standard conditions.

Although occasional surface films form, there has been no evidence of accumulation of material on the seabed near the outfall.

2.2.4.1 Discharge composite samples

Fonterra forwards monitoring results to the Council monthly. These results include daily discharge volumes, as well as the concentrations of fats and suspended solids, COD, pH and mean daily temperature of the discharge. The chemical measurements are based on 24 hour time-proportioned composite samples. A summary of wastewater volume data for the period under review is provided in Table 8.

Table 8 Summary of wastewater volume data for 2019-2020

Month	Mean volume (m^3/day)	Maximum volume (m^3/day)	No. of non-compliance days (> 40,000 m^3/day)
July	5,309	10,401	0
August	16,531	21,746	0
September	24,584	28,876	0
October	26,596	29,994	0
November	26,328	30,889	0
December	24,271	28,954	0
January	23,020	25,346	0
February	19,815	23,300	0
March	17,821	24,209	0
April	14,920	17,643	0
May	12,889	20,591	0
June	3,010	11,829	0

The highest maximum daily volume discharged was 30,889 m^3, on 17 November 2019. October 2019 had the highest average daily volume discharged (26,596 m^3), coinciding with the period of highest processing throughput. As with the previous nine monitoring periods, the maximum allowable discharge rate of 40,000 m^3/day was not exceeded.

Daily discharge volumes for the 2019-2020 monitoring period are presented in Figure 3. The wastewater composition discharged through the outfall in terms of daily values for suspended solids, COD and fat concentrations, as supplied by Fonterra, is shown in Figures 4 to 6 and summarised in Table 9 and Table 10.

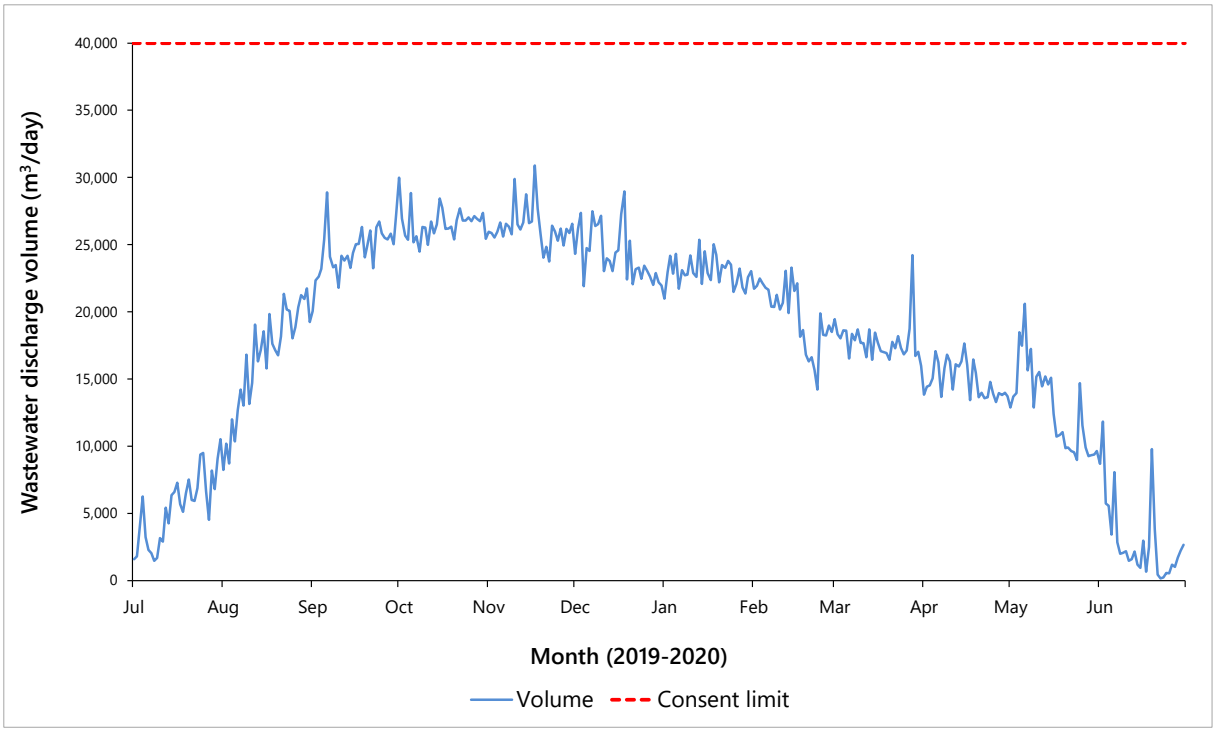

Figure 3 Daily volumes of wastewater discharged through the ocean outfall

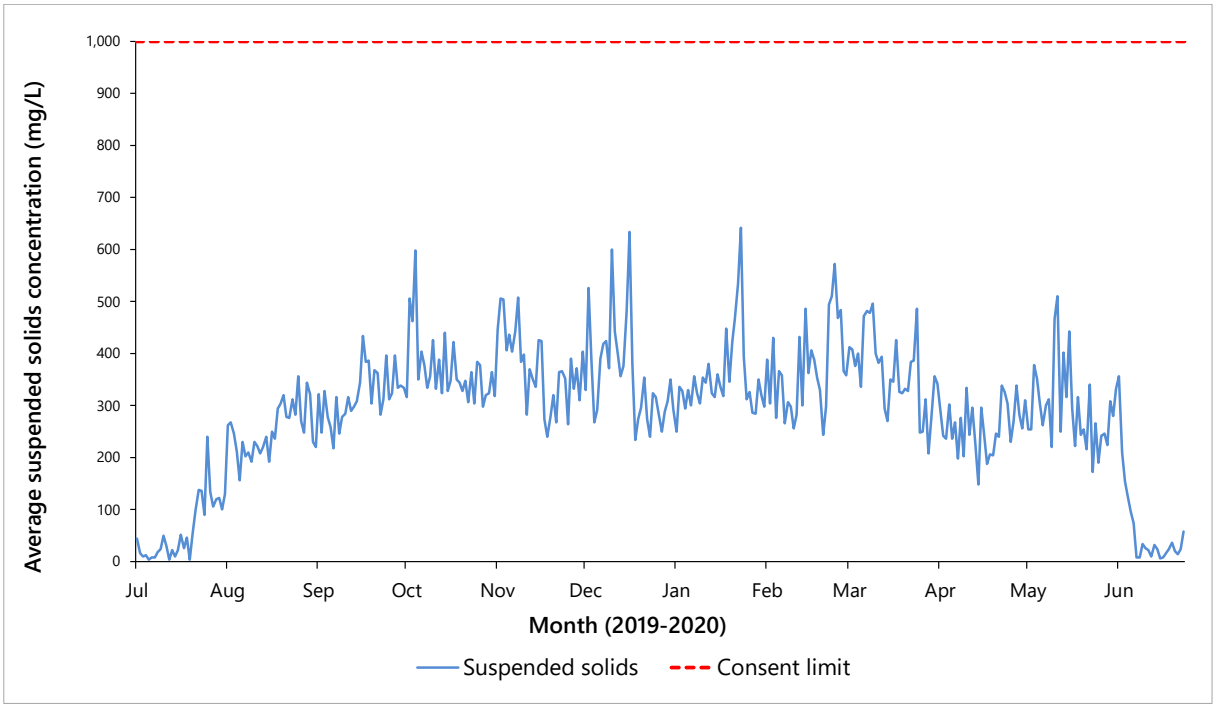

Figure 4 Daily, average concentrations of suspended solids in wastewater discharge, based on 24 hour time-proportioned composite samples

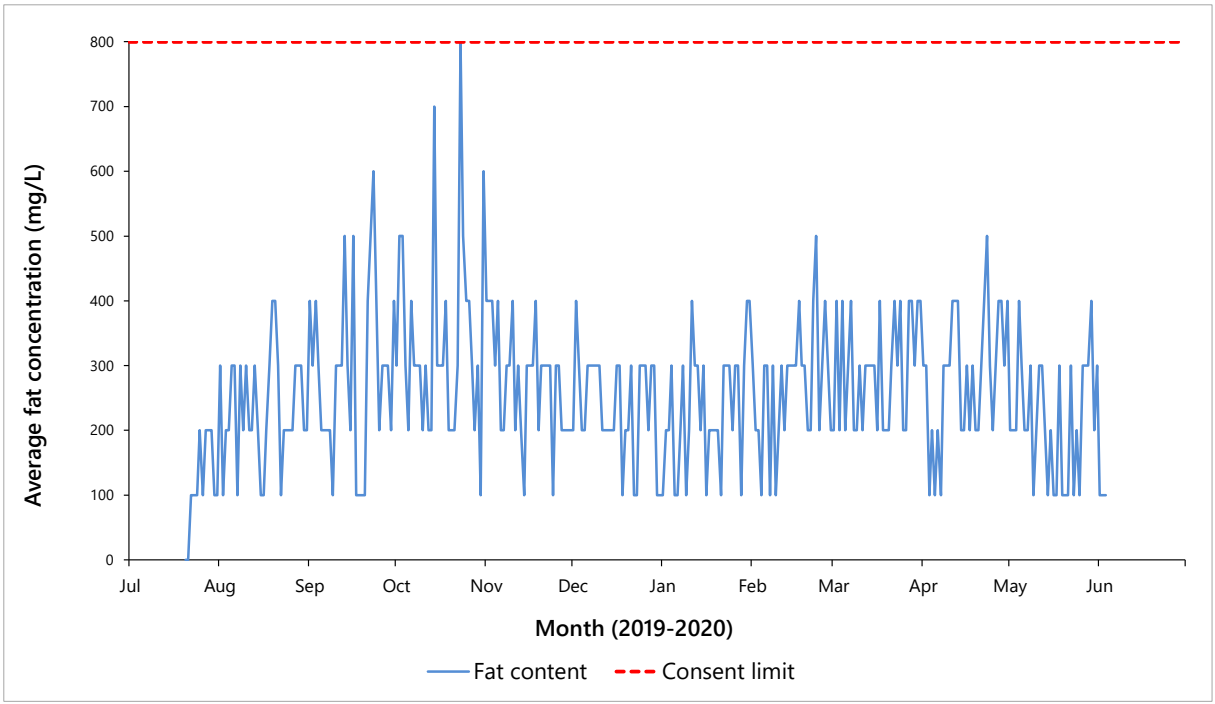

Figure 5 Daily, average concentrations of fats in wastewater discharge, based on 24 hour time-proportioned composite samples

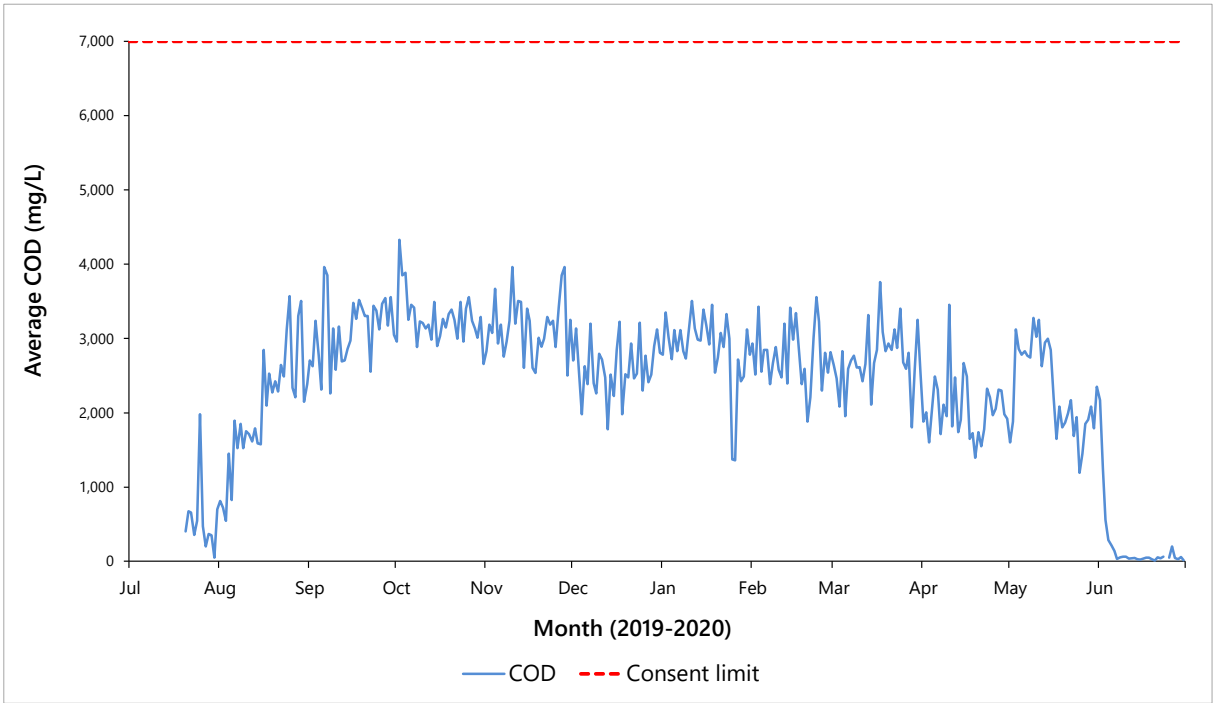

Figure 6 Daily, average COD in wastewater discharge, based on 24 hour time-proportioned composite samples

It should be noted that these data relate to 24 hour time-proportioned samples, and therefore represent daily average values. The Council analysed three 24 hour time-proportioned samples taken from the discharge of this wastewater and these results are presented in Section 2.2.4.3 (Table 12).

The daily discharge volumes, average suspended solids, and average concentrations of COD complied with consent conditions during the entire monitoring period (Figures 3, 4 & 6; Table 9). The average fat

concentration reached (but did not exceed), the consent limit on one occasion during the monitoring year (Figure 5).

Table 9 Summary of daily wastewater discharge composition data (2019-2020)

Month	Suspended solids concentration			Fat concentration			COD		
	Mean (mg/L)	Max (mg/L)	Breach days	Mean (mg/L)	Max (mg/L)	Breach days	Mean (mg/L)	Max (mg/L)	Breach days
July	61	240	0	100	200	0	564	1,981	0
August	256	356	0	200	400	0	2,044	3,569	0
September	320	434	0	290	600	0	3,113	3,962	0
October	369	598	0	300	800	0	3,269	4,331	0
November	372	508	0	300	400	0	3,162	3,962	0
December	360	634	0	200	400	0	2,606	3,226	0
January	354	642	0	200	400	0	2,870	3,505	0
February	371	572	0	300	500	0	2,773	3,556	0
March	364	496	0	300	400	0	2,722	3,759	0
April	259	338	0	300	500	0	2,052	3,454	0
May	296	510	0	200	400	0	2,309	3,277	0
June	50	356	0	0	100	0	192	2,172	0
Consent limit	**≤ 1,000**			**≤ 800**			**≤ 7,000**		
Total no. of breach days	0			0			0		

Table 10 summarises the annual total wastewater discharge volumes and constituent mass loadings over the past five years. This data is also presented graphically in Appendix III, spanning back to 2009-2010. For the 2019-2020 monitoring year, 6,544,711 m^3 of wastewater was discharged through the outfall. The annual wastewater discharge volume has continued to decrease over the past five years when it peaked in 2014-2015 at 8,398,542 m^3 (Table 10, Appendix III). The estimated total mass of COD also decreased in the year under review; continuing to decline since 2014-2015. The estimated total mass of suspended solids and fats increased slightly from the previous year, but both constituent masses have remained fairly consistent since 2016-2017 (Table 10, Appendix III).

Table 10 Summary of estimated annual total masses and average concentrations of wastewater discharge constituents over the past five monitoring years, for the 11-month dairy season (July-May)

Monitoring year	Volume discharged (m^3)	Suspended solids		Fat		COD	
		Estimated total mass (tonnes)	Average mg/L	Estimated total mass (tonnes)	Average mg/L	Estimated total mass (tonnes)	Average mg/L
2015-16	8,187,622	3,677	517	2,410	297	19,829	2,422
2016-17	7,663,420	2,265	280	1,671	222	19,661	2,582

Monitoring year	Volume discharged (m^3)	Suspended solids		Fat		COD	
		Estimated total mass (tonnes)	Average mg/L	Estimated total mass (tonnes)	Average mg/L	Estimated total mass (tonnes)	Average mg/L
2017-18	7,321,210	2,410	283	1,741	246	19,555	2,447
2018-19	6,811,370	2,011	274	1,523	213	18,541	2,360
2019-20	6,544,711	2,149	324	1,707	260	17,629	2,407

Data from this monitoring period was collected between 20 July 2019 (when the first milk arrived on site), to 31 May 2020 at the end of the season.

2.2.4.2 Discharge grab samples

Grab samples of the wastewater, prior to discharge through the Fonterra outfall, were collected by the Council on 10 occasions during the 2019-2020 dairy season (Table 11). These samples were analysed for temperature, COD, conductivity, pH, suspended solids, oil and grease (O&G), *E. coli* and enterococci bacteria.

The main purpose of collecting the grab samples was to measure the microbiological quality of the discharge, which cannot be undertaken on 24-hour composite samples. These results also allow an assessment of the range of effluent component concentrations, rather than the 'average' results that are produced by composite samples.

Table 11 Results of wastewater grab sample analyses for 2019-2020

Parameter	COD	Conductivity	*E. coli*	Enterococci	pH	SS	Temp.	O&G
Unit	g/m^3	µS/cm @ 25°C	cfu/100ml	cfu/100ml	pH	g/m^3	°C	g/m^3
Summary statistics (July 2010 to June 2020)								
Minimum	50	288	0.5	2	2.1	12	16	2.5
Maximum	8,320	9,360	110,000	8,500,000	12.5	2,000	41	720
Median	1,960	2,090	80	44,500	11.1	280	30.9	101.5
2019-2020 monitoring results								
16 Aug 2019	1,400	2,930	<18	<10	2.5	250	22.8	240
24 Sep 2019	2,900	3,100	<180	120,000	12.1	290	24.3	210
31 Oct 2019	2,200	1,646	<18	>100,000	11.4	200	27.3	153
22 Nov 2019	2,700	3,360	<2	79,000	11.9	230	29.5	156
13 Dec 2019	2,200	1,894	<18	58,000	11.2	230	31.1	197
21 Jan 2020	2,100	4,460	<18	100,000	12.1	270	32.8	130
28 Feb 2020	3,300	2,030	<18	36,000	11.3	290	29.8	320
20 Mar 2020	3,600	1,163	<18	40,000	11.1	600	29.4	420
29 Apr 2020	1,800	7,950	<18	1,700	12.5	340	28.7	400
16 Jun 2020	28	336	<18	<10	7.6	3	13.2	<4

High concentrations of faecal indicator bacteria, in particular enterococci, were recorded in the grab samples (Table 11). The discharge of domestic wastes in the dairy wastewater itself is specifically prohibited, and this condition was complied with. It is not unusual for high numbers of faecal indicator bacteria to be found in dairy factory wastewater in the absence of domestic wastes, as has been found elsewhere in the country e.g. at Clandeboye and Westland Milk Hokitika (Palliser *et al*., 2013 and referenced therein). In most grab samples, enterococci counts were significantly higher than those for *E. coli* (which were below the limit of detection on every occasion in 2019-2020). Enterococci are more tolerant of extreme growth conditions than faecal coliforms (including *E. coli*), with the high temperatures and variable pH occurring in the wastewater potentially depressing the growth of the latter (Palliser *et al*., 2013).

The three parameters with consent limits (that are applicable to the 24 hour time-proportioned composite samples); SS, COD and fat (O&G), remained well below those limits in all ten grab samples collected during the year. As is often seen in the grab samples, wastewater pH levels fluctuated about the historical median during the monitoring period. Nearly all of the results from samples collected during the year were within the range of previous results. COD and suspended solids recorded the lowest results to date; as this sampling round was postponed due to a pollution incident (see Section 2.4), and took place in June when no milk was being processed.

2.2.4.3 Discharge inter-laboratory comparisons

An inter-laboratory comparison was performed on three occasions during the 2019-2020 monitoring period on the 24 hour time-proportioned samples taken from the wastewater discharge. The results obtained by both laboratories are presented in Table 12.

Table 12 includes an agreements column which summarises the acceptability of the difference in each result for the two laboratories. Differences of less than 10% of the mean of the two values are considered acceptable. Differences of 10-25% are considered to constitute a difference between the two laboratories and differences of greater than 25% are considered significantly different.

Table 12 Inter-laboratory comparisons performed on 24 hour composite wastewater samples (2019-2020)

Parameter	Unit	24 September 2019			21 January 2020			29 April 2020		
		Council	Fonterra	Agree	Council	Fonterra	Agree	Council	Fonterra	Agree
COD	g/m^3	3,200	3,378	✓	2,500	3,073	*	1,700	1,918	✓
pH	pH	11.0	11.0	✓	8.2	9.5	✓	11.6	11.7	✓
Suspended solids	g/m^3	300	396	*	390	466	✓	270	310	✓

Note: ✓ = acceptable agreement

* = within 10% - 25% difference from the mean

** = significantly different (i.e. > 25% difference from the mean)

Of the nine comparisons, seven were within the acceptable agreement range. The two suspended solids results from 24 September were within 14% of the mean, and the two COD results from 21 January were within 10% of the mean. Overall, a high level of consistency was demonstrated between the two laboratories during the year under review.

2.2.4.4 Marine ecological surveys

In order to assess the effects of the Fonterra dairy factory and Hawera Wastewater Treatment Plant combined outfall discharge on the nearby intertidal communities, a spring survey was conducted in October-November 2019 (peak season) at four sites, and a summer survey was carried out in March 2020 (post-peak season) at two sites (Figure 7). The spring survey included three potential impact sites either side

of the outfall (two southeast and one northwest) and one control site (further northwest), whereas the summer survey included just one potential impact site and the control site (as a consequence of the COVID-19 Level 4 restrictions). It was expected that adverse effects of the marine outfall discharge on intertidal communities would have been evident as a significant decline in species richness and diversity at the potential impact sites, relative to the control site. The main findings of these surveys are summarised below, and presented in Figures 8 to 11.

Figure 7 Map of sampling sites in relation to the outfall

The spring survey results were very similar to those from the previous year. The most pronounced change was seen at the site 200 m SE of the outfall, where the mean number of species and Shannon-Weiner index increased notably (Figure 8, Figure 9). These increases are indicative of this rocky reef community's ongoing recovery, following its burial by a slip in October 2015. The mean number of species at the potential impact site 350 m NW of the outfall was the highest ever recorded for this site during a spring survey (Figure 8).

The results from the two-site summer survey were also very similar to those from the previous summer. The largest change was the decrease in the mean number of species found at the control site, Waihi Reef, from the previous year (Figure 10). Despite this decrease, the mean number of species at this site remained higher than any summer survey at this site between 1997 and 2018.

There were no apparent trends in the spring or summer survey data to indicate a decline in species richness or diversity over time at the potential impact sites, relative to the control site. Overall, neither survey provided evidence to suggest that the outfall was having any detectable adverse effects on nearby intertidal reefs. Natural environmental factors, including coastal erosion, exposure and substrate mobility, appear to remain the dominant drivers of species richness and diversity at the sites surveyed. However, given that two of the potential impact sites were unable to be surveyed in summer, the next round of surveys will be important for making an up to date, wider assessment of the reef communities along the South Taranaki coast.

Copies of these intertidal ecological survey reports are available from the Council upon request.

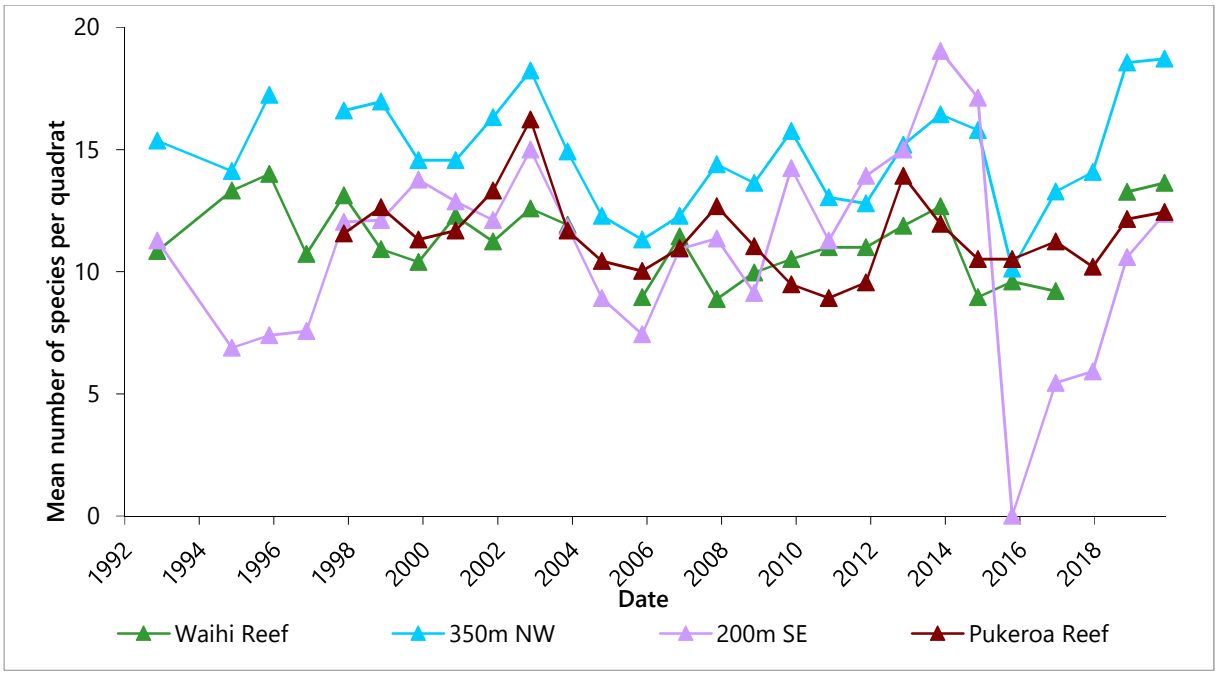

Figure 8 Mean number of species per quadrat for spring surveys (1992-2019)

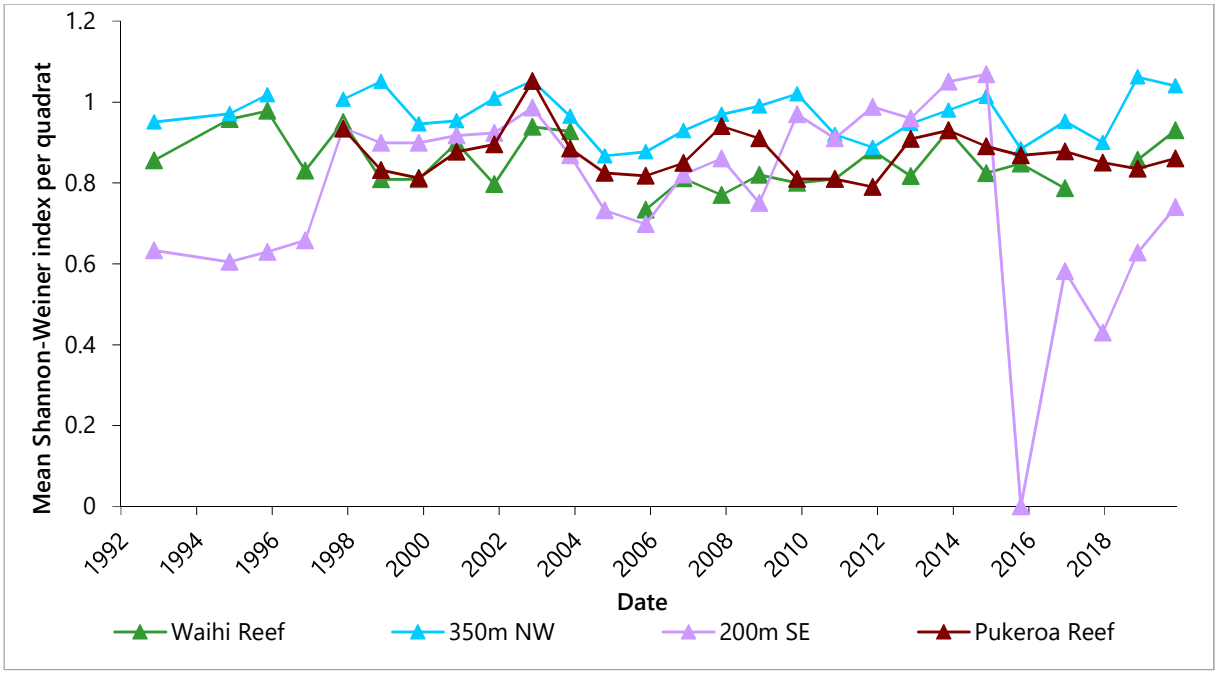

Figure 9 Mean Shannon-Weiner indices per quadrat for spring surveys (1992-2019)

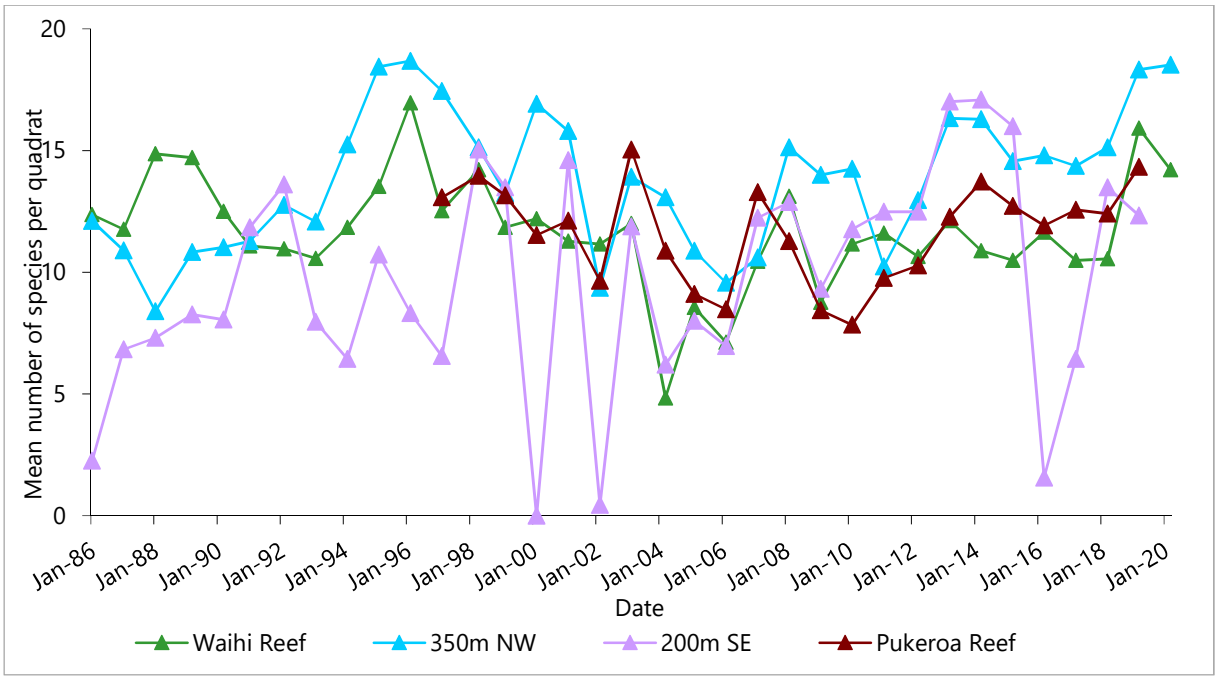

Figure 10 Mean number of species per quadrat for summer surveys (1986-2020)

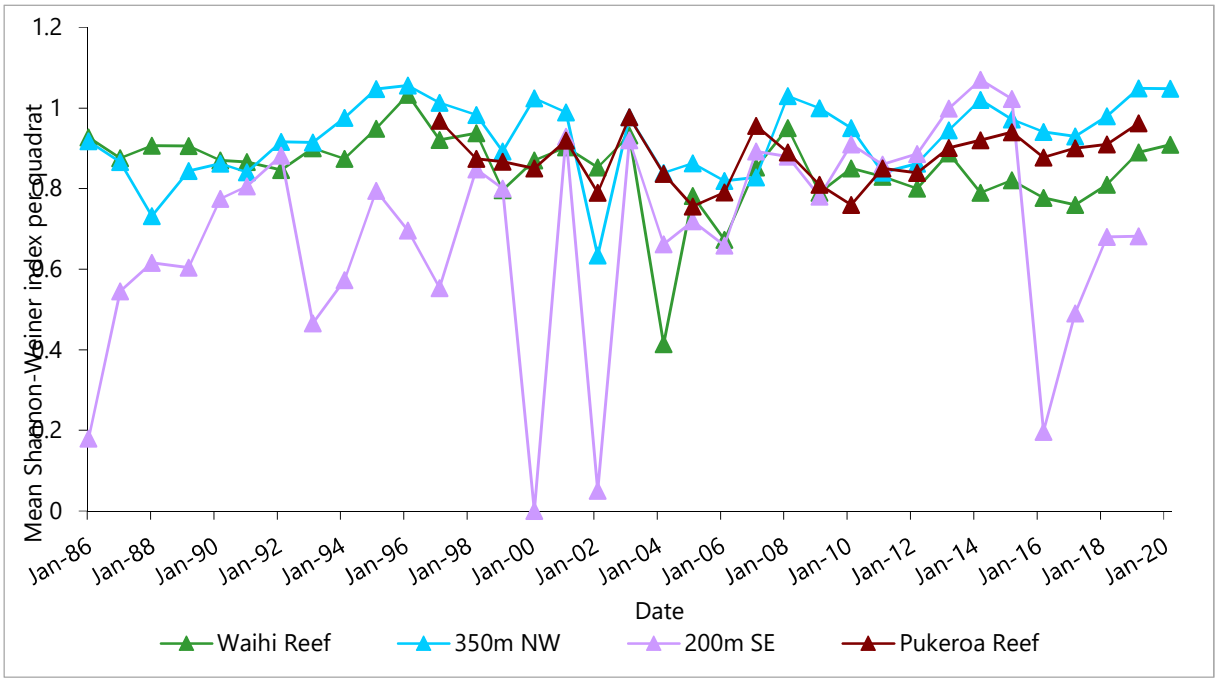

Figure 11 Mean Shannon-Weiner Indices per quadrat for summer surveys (1986-2020)

2.3 Air

2.3.1 Inspections

During each monthly site visit, a good standard of housekeeping was observed and no unusual emissions to air were noticed. Milk odour was occasionally noted around the site, but the odour was never objectionable or offensive and it was not detected beyond the boundaries of the site. Onsite milk powder deposition ranged from negligible to moderate over the monitoring period.

2.3.2 Emission source analysis

Consent 4103-2.3 limits powder emissions to the atmosphere from the spray drying process cyclone exhausts to 125 mg/m^3. A separate limit is in place for Powder-3, whereby powder emissions from this facility shall not exceed 150 mg/m^3.

Fonterra's independent consultants, CRL Energy Ltd and Verum Group, carried out powder emission measurements on drier exhaust stacks (Powders 2, 3, 5, whey products, and casein) between October 2019 and January 2020. These results are presented in Table 13. All results for Powder-3 are presented separately in Table 14. Powder-1 is no longer in use and has been removed from resource consent 4103.

Table 13 Emission source analysis results for 2019-2020 (special condition 7)

Date	Plant		Emission concentration (mg/m^3 0°C, 1 atm, dry gas)	Emission control
11 December 2019	WPC drier	Exhaust	1	Baghouse
8 January 2020	Alamin	Exhaust	1	Baghouse
11 December 2019	Casein	Drier stack 1	30	Dual cyclones
8 January 2020		Drier stack 2	31	Dual cyclones
8 January 2020	Powder-2	Exhaust	3	Baghouse
	Powder-4*	North stack	-	-
		South stack	-	-
		Wet scrubber	-	Wet scrubber
31 October 2019	Powder-5	North stack	62	Dual cyclones
		South stack	51	Dual cyclones
		East stack	41	Dual cyclones
		West stack	48	Dual cyclones
Consent limit		**125**		

* The Powder-4 facility was unable to be included in the 2019-2020 stack testing round due to a refurbishment project which prevented safe access to the testing locations.

Table 14 Emission source analysis results for 2019-2020 (special condition 8)

Date	Plant (product)		Emission concentration (mg/m^3 0°C, 1 atm, dry gas)	Emission control
10 December 2019	Powder-3 (buttermilk)	East stack	60	Cyclone
		West stack	59	
		Fluid Bed Exhaust	96	
12 December 2019	Powder-3 (whole milk powder)	East stack	30	
		West stack	38	
		Fluid Bed Exhaust	15	
9 January 2020	Powder-3 (high fat whey)	East stack	140	
		West stack	140	
		Fluid Bed Exhaust	100	
Consent limit		**150**		

The results from all of the driers were below the emissions concentration limit based on the testing that was undertaken (Table 13, Table 14). High results were recorded at Powder-3 from the east and west stacks on 9 January 2020, whilst drying high fat whey powder. However, these results remained below the emissions concentration limit of 150 mg/m^3.

2.3.3 Deposition gauging

Many industries emit dust from various sources during operational periods. In order to assess the effects of the emitted dust, industries are monitored using deposition gauges.

Deposition gauges are modified buckets, elevated on a stand to approximately 1.6 m. The buckets contain deionised water to ensure that any dust that settles out of the air is not re-suspended by wind. A copper sulphate solution at a concentration of 5 g/L acts as a preservative to prevent the growth of algae and bacteria.

Deposition gauges were deployed at five sampling sites on six occasions around the Whareroa site for periods of approximately three weeks, between August and December 2019. The contents of the gauges were analysed for COD. The COD results are compared with the theoretical COD value for dry milk powder and a "total deposited milk powder" (TDMP) value is calculated.

The locations of the five air deposition monitoring sites are provided in Figure 12.

Figure 12 Location of air deposition sites

TDMP values for each monitoring site are presented in Table 15. The Council's nuisance guideline value for total deposited particulate is 130 mg/m^2/day. The Council does not have a specific guideline value for milk powder deposition. The Fonterra deposition survey determines deposition due to milk powder only, rather than total deposition.

Table 15 Total deposited milk powder values (mg/m^2/day) for each monitoring site during 2019

Site ID	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6
	2 August to 22 August	22 August to 17 September	17 September to 15 October	15 October to 7 November	7 November to 27 November	27 November to 17 December
AIR002409	48.50	**156.5**	**287.2**	56.25	**427.3**	**320.0**
AIR002416	15.07	31.14	95.07	37.80	**173.2**	**278.9**
AIR002422	17.7	11.18	22.28	41.73	11.48	65.88
AIR002424	16.7	10.78	9.66	94.35	32.00	64.84
AIR002426	44.53	11.97	20.80	25.70	54.56	71.11
Council guideline	**130 mg/m^2/day**					

As expected, the highest TDMP values were recorded at the staff car park entrance (AIR002409) for five of the six runs in the duration of the monitoring period (Table 15; Figure 13). This is the closest site to the powder drying facilities and is where previous monitoring results have typically been the highest. Just outside the site boundary, at the corner of Manawapou Road and Whareroa Road (AIR002416), two elevated results were recorded across November and December. The high result in run 4 recorded at the sampling site near the corner of Whareroa Road and South Road (AIR002424) is indicative of potential contamination from local sources (e.g. vegetation, insects, fertilizer), given the comparatively low deposition values from the remaining sites during this period.

Overall, the results indicate that the majority of the powder fallout occurred in the immediate vicinity of the powder plants and did not extend far beyond the site boundaries. Deposition of milk powder on the site is not of great environmental concern, provided that the stormwater management systems perform satisfactorily.

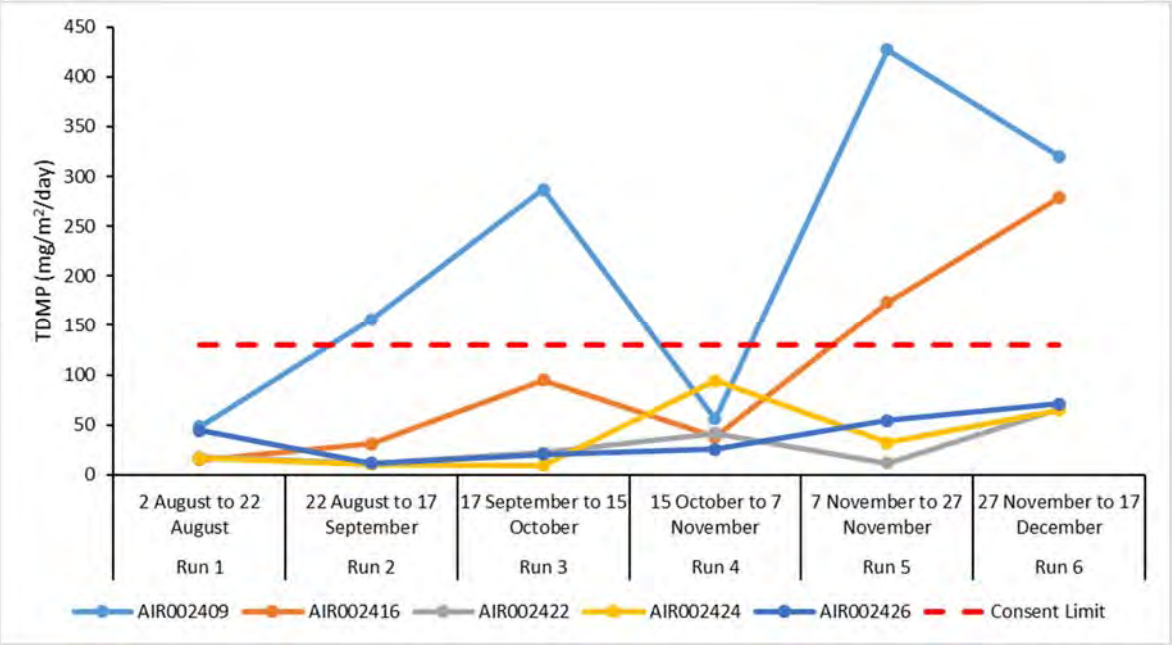

Figure 13 Milk powder fallout at air deposition sites surrounding Whareroa (August to December 2019)

2.3.4 Inhalable particulate (PM_{10}) monitoring

Special condition 10 of consent 4103 sets a limit on the emissions of PM_{10} to the atmosphere from the site to a maximum of 50 µg/m³ (24-hour average).

During the reporting period, a "DustTrak" PM_{10} monitor was deployed on two occasions in the vicinity of the dairy complex. The deployments lasted from approximately 24 to 53 hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM_{10} concentrations. The results from the sampling runs are shown in Figure 14.

During the first 24-hour run, from 20 to 21 November 2019, the average recorded PM_{10} concentrations for the 24-hour periods was 8.0 µg/m³. This daily mean equates to 16%, of the 50 µg/m³ value that is set by both the National Environmental Standard and the resource consent.

During the second 53-hour run, from 4 to 6 May 2020, the average recorded PM_{10} concentrations for the first and second 24-hour periods were 18.3 µg/m³ and 9.1 µg/m³, respectively. These daily means equate to 36.6% and 18.2%, respectively, of 50 µg/m³.

The regional background PM_{10} level has been determined to be approximately 11 µg/m³.

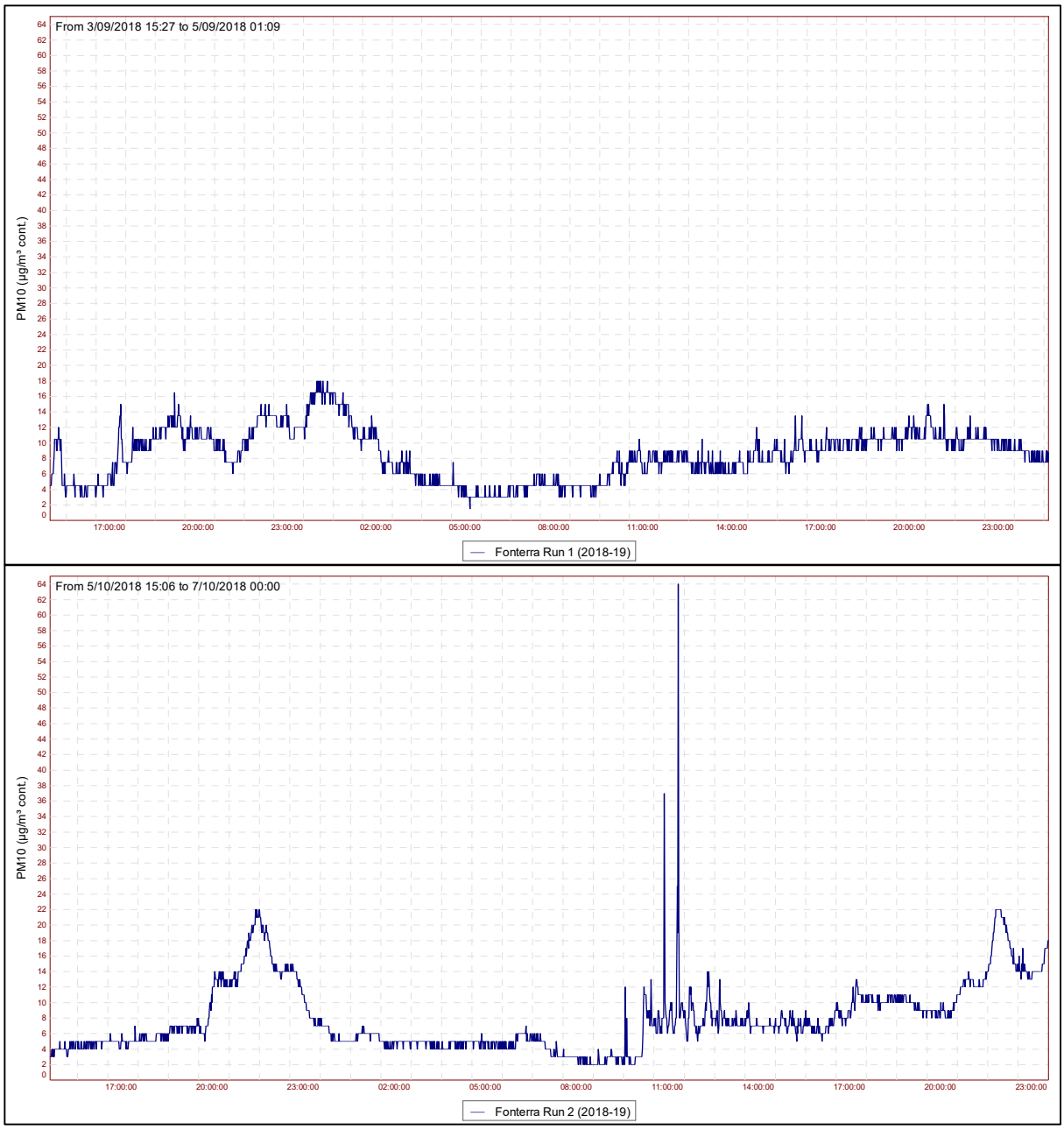

Figure 14 PM_{10} concentrations (µg/m^3) at the Whareroa dairy complex

Copies of PM_{10} monitoring reports for the Whareroa site are available from the Council upon request.

2.3.5 Nitrogen oxide (NO_x) monitoring

NOx, any mixture of nitrous oxide (N_2O), nitric oxide (NO) and nitrogen dioxide (NO_2), are produced from soil, motor vehicles and industrial fuel combustion processes. Indoor domestic appliances (gas stoves, gas or wood heaters) are significant localised sources of nitrogen oxides.

Ambient NO_x monitoring was incorporated into the monitoring programme in 1996-1997, to monitor the effects of the co-generation plant at the site. In October 1997, Fonterra commissioned a second co-generation plant (Co-gen 2) in response to increased milk coming to the site. NO_x is the main emission of concern associated with Fonterra's co-generation plants, from the perspective of potential environmental effects. Special condition 7 of consent 6273 set limits for nitrogen dioxide emissions:

"The consent holder shall control all emissions of nitrogen dioxide or its precursors to the atmosphere from the site, so as to ensure that the maximum ground level concentration of nitrogen dioxide measured under ambient conditions does not exceed 200 micrograms per cubic metre [µg/m^3] [one-hour average], or 100 µg/m^3 [twenty-four hour average], at or beyond the boundary of the site."

The Council uses passive absorption discs to monitor ambient NO_x. The gases diffuse into the discs and any target gases are captured. These discs are deployed for periods of approximately three weeks and are then sent to an external laboratory for analysis.

Passive NO_x discs were placed in four locations surrounding the Fonterra site (Figure 16) on one occasion during the 2019-2020 monitoring year.

Figure 15 NO_x sample site locations around the Fonterra plant

From the average concentration measured, it is possible to calculate a theoretical maximum daily concentration that may have occurred during the exposure period. There are mathematical equations used by air quality scientists to predict the maximum concentrations over varying time periods. These are somewhat empirical, in that they take little account of factors such as local topography, micro-climates and diurnal variation. Nevertheless, they are applied conservatively and have some recognition of validity.

One formula generally used is:

$$C(t2) = C(t_1) \times \left(\frac{t_1}{t_2}\right)^P$$

where C(t) = the average concentration during the time interval t, and p = a factor lying between 0.17 and 0.20. When converting from longer time periods to shorter time periods, using p = 0.20 gives the most conservative estimate (i.e. the highest calculated result for time period t2, given a measured concentration for time period t1). Using the 'worst case' factor of p = 0.20, the monitoring data reported above has been converted to equivalent 'maximum' 24 hour exposure levels.

Table 16 presents the actual levels found, theoretical maximum 1 hour and 24 hour concentrations of NO_x, and consent 6273 limits.

Table 16 NO_x levels and theoretical 1 hour and 24 hour maximums for each air monitoring site at Fonterra (2019-2020)

Monitoring period	NO_x concentration µg/m^3											
	AIR002410			AIR002411			AIR002412			AIR002413		
	NOx (Lab)	1 h (Cal)	24 h (Cal)	NOx (Lab)	1 h (Cal)	24 h (Cal)	NOx (Lab)	1 h (Cal)	24 h (Cal)	NOx (Lab)	1 h (Cal)	24 h (Cal)
11/01/2019 – 1/02/2019	6.9	23.7	12.6	7.1	24.4	12.9	3.4	11.7	6.2	2.5	8.6	4.5
Consent limit		**200**	**100**		**200**	**100**		**200**	**100**		**200**	**100**

1 h = 1 hour theoretical maximum

24 h = 24 hour theoretical maximum

Throughout the 2019-2020 monitoring period NO_x concentrations remained well below consent condition limits (consent 6273, special condition 7 – 200 mg/m^3 one hour average, 100 mg/m^3 24 hour average).

Variation in NO_x concentration values can be explained in terms of distance from possible NO_x sources, namely the plant and road traffic, as well as wind speed and direction.

Since 2014, the Council has coordinated a region-wide monitoring programme to measure NO_x, not only at individual compliance monitoring sites near industries that emit NO_x, but simultaneously at urban sites (from the Council's regional state of the environment programme) to determine exposure levels for the general population. The programme involves deploying all measuring devices on the same day, with retrieval three weeks later. This approach enables the Council to further evaluate the effects of local and regional emission sources and ambient air quality in the region.

Figure 16 presents the average NO_x levels (theoretical 1 hour concentrations) from 11 industrial sites monitored around the region from 2014 to 2020. The results from Figure 16 show that NO_x levels at Fonterra are comparable with some of the larger hydrocarbon production stations around Taranaki.

Copies of regional NO_x monitoring reports are available from the Council upon request.

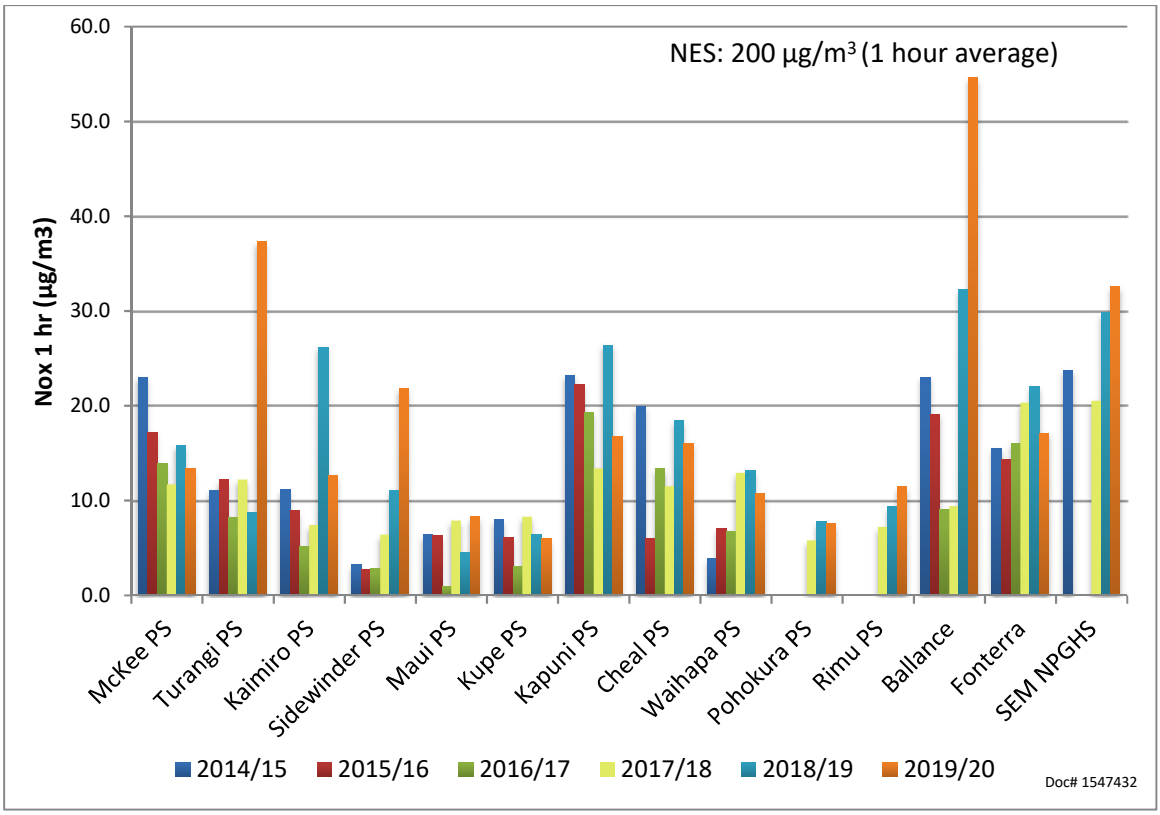

Figure 16 Average NO_x levels at 11 monitored industrial sites throughout the region

2.4 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with Fonterra. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where Fonterra has itself notified the Council. The register contains details of any investigation and corrective action taken.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified company is indeed the source of the incident (or that the allegation cannot be proven).

Table 17 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to Fonterra's activities during the 2019-2020 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

Table 17 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
27/08/19	Milk overflow from a tanker on Mangawhero Road. Approximately	N	Overflow was due to a mechanical failure of the tanker computer system. Fonterra responded	The tanker on-boarding software was reviewed to

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
	1,000 L of milk overflowed from a tanker during milk collection. It was estimated that approximately 400 L discharged into an unnamed tributary of the Mangapapa Stream.		quickly to remedy the issue and remediate the area. Stream inspections undertaken following the spill found no evidence of milk or any effects from the spill. No enforcement action required.	ensure similar incidents don't occur in the future. The tanker driver was involved in the investigation and re-trained. All drivers at Whareroa were made aware of this incident to avoid similar occurrences in the future.
19/01/20	A complaint was received regarding milk fat along the shoreline for approximately 1 km between Waihi Road and Ohawe Beach. An inspection found fat globules on the high tide mark and an 'off / stale' milk odour along the beach. Laboratory analysis confirmed that the fat globules were most likely of dairy origin.	Y	A review of wastewater sample results leading up to the event from each of the plants failed to find any abnormal fat levels. The fat concentrations in the 24-hour wastewater composite samples for the entire plant were also well below the consent limit in the days leading up to 19 January. However, the investigation highlighted an equipment breakdown on 15 January that led to the loss of a small volume (400 L) of anhydrous milk fat into the wastewater system. It was noted that there were strong onshore winds occurring preceding this incident. Another possibility that could not be ruled out was that the milk fat on the beach was the consequence of an illegal release of milk into a stream from a nearby dairy farm. Based on an assessment of all of this information, it was considered that there was insufficient evidence to conclusively link the milk fat on the beach to a discharge from the Fonterra Whareroa ocean outfall. No further enforcement action was taken.	Following notification of this event on 20/1/20, Fonterra deployed a clean-up team to scrape all visible fat off the beach using shovels. Approximately three bucket loads of sand removed. A minor amount of fat granules were discovered (but were barely visible) on 22/01/20, indicating that residual fat was still being brought ashore and breaking down two days later. No lasting effects were observed. Fonterra have commited to checking the Cream Plant wastewater sump on a daily basis to ensure the fat levels are kept at a minimum.
14/02/20	A 250,000 L silo of raw milk was contaminated with caustic CIP solution. This milk could not be processed into product for consumption. Because the milk had already been distributed to various plants throughout the	N	Approximately 30,000 L of skim milk, 4,500 L of 10-15% solids skim milk, and 115,000 L of whole milk (149,500 L total) were disposed of to the ocean outfall as per the Whareroa Wastewater Management Plan, as it could not otherwise be accessed and removed from the plant. A	Council has clarified the intent of special condition 3, resource consent 9908-1 to Fonterra. Fonterra are now aware of the expectation to notify Council.

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
	Whareroa site, various methods of disposal had to be exercised, including the ocean outfall (resource consent 1450-3) and land spreading (resource consent 9908-1). Approximately 50,000 L of buttermilk and 20,000 L of serum were able to be removed from the factory and transported for use as stock food.		controlled discharge was carried out over three days in order to minimise the likelihood of adverse environmental effects. The additional loading of fat, protein, suspended solids and COD associated with the disposal event was shown to have a minimal effect on the overall wastewater composition over this period (a ratio of 582:1 (average outfall flow to milk waste) was achieved). Consent compliance was maintained. Approximately 160,000 L of skim milk was able to be transported to a storage pond at Fonterra Kapuni, and subsequently spread to land. This activity was carried out in alignment with the requirements of resource consent 9908-1 to ensure minimal environmental impact. However, the Council were not notified prior to exercising this consent, which constitutes a non-compliance with special condition 3. Fonterra were not aware of this consent requirement, as they had misinterpreted the condition wording. No enforcement action taken.	
29/04/20	An unauthorised discharge of contaminated stormwater was discovered during a routine monitoring inspection. The discharge was black in colour and had a strong sewage-type odour. The receiving waters appeared grey / black with sewage fungus on the stream bed for at least 50 metres downstream of the discharge. These impacts would have manifested sometime between 29 April and 20 March, when the last inspection was carried out.	N	Due to the conspicuous adverse effects on the receiving waters, including its discolouration and the presence of sewage fungus, this discharge was non-compliant with special conditions 5 and 6 of resource consent 3902-3. Fonterra were issued with a 14-day letter, an abatement notice and an infringement notice.	Fonterra sealed the stormwater pond outlet to prevent any further discharge into the tributary. The remaining water in the pond was then pumped out and disposed of at the Hawera WWTP. All site stormwater in this part of the catchment was manually diverted to a containment pond while an investigation was carried out. A summary of the investigation findings and

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
				remedial actions are presented below.

Fonterra undertook an investigation into the sources of contaminants related to the incident discovered on 29 April. Two contaminant sources were discovered early in the investigation. These were a blocked and overflowing wastewater drain outside of the laboratory, and a leaking CIP pipeline. Additional sources were discovered following extensive CCTV drain inspections, namely two damaged wastewater drains beneath the Casein and Powder-5 plants. All of these issues would have resulted in process wastewater, containing dairy liquids of varying concentrations, infiltrating the stormwater network. Various sections of damaged stormwater pipework were discovered during the investigation which could have facilitated the infiltration.

The investigation also discovered some problems with the stormwater monitoring and diversion system, which, if working correctly could have served as a backstop to prevent the contaminated stormwater from leaving site. Two pH probes were faulty and required replacing. Also, one of the diversion valves was not closing properly, which could have allowed contaminated stormwater to bypass the contingency pond and enter the stormwater pond.

No damage or other issues were identified following an extensive inspection of the site's sewerage network. Based on all of the investigation findings, process wastewater from various sources was identified as the primary source of contamination. This contamination likely led to excessive organic enrichment in the stormwater pond, which ultimately caused it to become anoxic. This would cause the water to turn black and would generate a sulphuric odour (similar to sewage). As seen in the sample results from 29 April, the elevated organic content in the pond discharge (BOD, BODCF) would have provided a food source for sewage fungus to proliferate in the receiving tributary.

Four days after this pollution was discovered and the pond outlet was sealed, there was heavy rainfall in the area, which would have helped to flush the tributary of wastewater contamination and sewage fungus (64 mm between 3 and 7 May recorded at the Council's "Tawhiti at Duffy's" rain gauge). A follow up inspection was carried out on 22 May to ensure the Abatement Notice was being complied with, and to check on the condition of the tributary. The pond outlet was still sealed, so a sample of the pond water was collected for analysis. The sample results indicated that the pond water would be compliant with resource consent 3902-3 if it were to discharge. Levels of organic content (BOD, BODCF) had reduced considerably. The tributary flow was low at this time and it looked in much better condition. No sewage fungus was visible. The pond outlet was reopened on 16 June 2020. An inspection was undertaken on this day which found that the pond's appearance had returned to normal, and this was supported by the discharge sample results. The pond was discharging at an extremely high rate, due to the high water level in the pond. This meant that the receiving tributary was in flood and the stream bed could not be visually assessed.

As a result of this incident and subsequent investigation, substantial repairs and corrective actions have been completed at the Whareroa site. All of the damaged wastewater lines and other pipes that were discovered have since been repaired. Furthermore, the asset management system has been updated so that these drains will now be inspected on three yearly basis. The faulty monitoring probes were replaced and calibration frequency for these instruments has been increased. Repairs were undertaken on the malfunctioning stormwater diversion valve. Fonterra is also now undertaking routine monitoring of DO in the stormwater ponds, as another means of preventing any similar occurrences in the future.

3 Discussion

3.1 Discussion of site performance

3.1.1 Inspections

Routine inspections found the site was generally maintained in a satisfactory condition, with only minor chemical storage issues occasionally identified. However, one significant pollution event was discovered during a routine inspection carried out in April. This event highlighted a number of issues around the plant that required immediate attention. Damaged wastewater infrastructure was identified as the primary source of stormwater contamination. Significant investigative and remedial works were actioned to resolve this. Critically, the site's asset management system was updated to ensure these parts of the wastewater network are monitored on a routine basis going forward. The secondary issue that was discovered as a result of this event was that the in-line stormwater monitoring and diversion system was not performing as expected. Some of the monitoring equipment was faulty, and calibration frequencies needed to be revised. Also, a stormwater diversion valve was not closing properly, rendering it ineffective. In light of these issues, there have been various learning opportunities. The incident highlighted the importance of the commissioning phase for large capital projects, in order to test the systems thoroughly, check they're working as designed, and work through any unforeseen issues.

3.1.2 Provision of data and reports

0047-4, 1450-3

Fonterra were late to provide the self-monitoring data for 2019-2020 (i.e. abstraction and wastewater volume and composition information). The last of this data was provided to Council on 22 October 2020, nearly two months later than required in the consents (31 August 2020).

6273-1

Special condition 4 of consent 6273 requires:

The consent holder shall provide to the Council within five years from the granting of this consent and every six years thereafter a written report:

> *a) Reviewing any technological advances in the reduction or mitigation of emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances;*
> *b) Detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder;*
> *c) Detailing any measures that have been taken by the consent holder to improve the energy efficiency of the Whareroa site; and*
> *d) Addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive, Taranaki Regional Council, considers should be included.*

The last report was produced in July 2014, with the next report due in July 2020.

4103-2.3

Special condition 4 of consent 4103 requires that:

The consent holder shall provide to the Taranaki Regional Council within five years from the granting of this consent, and every six years thereafter a written report:

> *a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of milk powder and other particulate emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances; and*

b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder; and
c) addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive, Taranaki Regional Council, considers should be included.

The latest report was produced in August 2018, however, this was only received by Council in December 2020. The report has since been reviewed and has been assessed as not meeting the requirements of the consent. Specifically, there has been no further review of technological advances in accordance with special condition 4(a). An Abatement Notice has now been issued requiring Fonterra to comply with this special condition. This will be discussed in detail in the next annual monitoring report (covering the 2020-2021 monitoring year).

3.1.3 Monitoring and management plans

Resource consents 0047-4 (water abstraction) and 1450-3 (wastewater discharge) contain four special conditions relating to Tangata Whenua Involvement Plans (TWIPs).

0047-4

Condition 12 requires Fonterra to submit to Council a TWIP, developed in consultation with Te Runanga o Ngati Ruanui and Te Korowai o Ngāruahine (collectively referred to as "Tangata Whenua" for the purposes of this consent). Conditions 13, 14 and 15 provide further details around the purpose, processes and requirements of the TWIP.

The TWIP was finalised during the 2018-2019 monitoring year, with the last Kaitiaki Group (KG) meeting held in November 2018. The TWIP outlines that KG meetings are to be held every six months, and that the KG may be terminated if the members have failed to meet for a period of more than two years. At the time of writing this report, it has been over two years since the full KG met. However, a reduced meeting was held in October 2020, between Fonterra and Tangata Whenua representatives. A key action from this meeting was to re-engage with the wider KG and to schedule a hui for early 2021.

Conditions 16 and 17 outline Monitoring Plan requirements.

A monitoring regime was developed during the year under review in consultation with Tangata Whenua. The monitoring is to focus on fish and macroinvertebrate communities within the Tangahoe River and Tahwiti Stream, as required by condition 16 (in addition to conditions in resource consents 4927-2 and 5148-2).

These surveys were due to be carried out in the Tawhiti Stream and Tangahoe River in the 2019-2020 monitoring year. However, following the ammonia spill that occurred up-catchment in February 2020, it was decided to postpone this monitoring until the 2020-2021 year. The spill resulted in significant fish mortalities, which would have ultimately disguised any effects from the Fonterra Whareroa water abstraction, and backwash activities. By delaying the monitoring until 2020-2021, local fish populations will have had a chance to recover and the surveys will be able to provide more meaningful results to determine the effects of Fonterra's activities.

1450-3

Condition 11 requires STDC and Fonterra to submit to Council a TWIP, developed in consultation with Te Runanga o Ngati Ruanui and Te Korowai o Ngāruahine (collectively referred to as "Tangata Whenua" for the purposes of this consent). Conditions 12, 13 and 14 provide further details around the purpose, processes and requirements of the TWIP.

A separate TWIP for the wastewater discharge consent was finalised during the 2018-2019 monitoring year, with the last KG meeting held in November 2018. The TWIP also requires regular KG meetings, and these are

held in conjunction with those required by the water abstraction TWIP. As discussed earlier in this section, Fonterra are re-engaging with the KG in order to schedule a hui for early 2021.

Conditions 15 and 16 outline Monitoring Plan requirements.

In addition to the current monitoring programme, an additional monitoring regime began development during the year under review in consultation with Tangata Whenua. The monitoring is to focus on the Taonga intertidal species which inhabit Pukeroa Reef, as required by condition 15. This survey was due to be carried out in the 2019-2020 monitoring year. However, COVID Level-4 restrictions prevented this field work from being completed. It is now intended to complete this survey during the 2020-2021 summer period.

3.2 Environmental effects of exercise of consents

3.2.1 Abstractions

Fonterra were compliant with all water abstraction consent conditions during the year. Maximum daily abstraction volumes weren't exceeded and minimum flows were maintained. There was no monitoring of environmental effects undertaken in 2019-2020. This work occurs on a triennial basis, however it was postponed until 2020-2021 due to the ammonia spill that occurred up-catchment in February 2020.

3.2.2 Stormwater

Discharge sampling from the Tawhiti, Tangahoe and coastal stormwater ponds was undertaken on ten occasions over the 2019-2020 monitoring year. At the discharge from the Tawhiti ponds, one parameter (total chlorine), exceeded the consent limit on one occasion. As three or more exceedances are required for consent non-compliance, this discharge is deemed to have been compliant throughout 2019-2020. During the year, Fonterra staff had set the stormwater diversion system to redirect stormwater from part of this catchment to containment ponds, due to a known wastewater infiltration issue. At the discharge from the Tangahoe ponds, two parameters (filtered carbonaceous BOD and total BOD) exceeded the consent limit on one occasion. As there were no parameters that exceeded the consent limit more than twice during the year; the discharge was deemed to be compliant with this consent condition (condition 7). However, the discharge was non-compliant regarding the effects in the receiving waters, including the presence of sewage fungus that was discovered in April 2020 (discussed further in the next paragraph). The discharge from the coastal stormwater ponds remained compliant with the consent limit throughout the year, with no exceedances recorded.

The stormwater contamination issue that was discovered on 29 April 2020 adversely impacted the unnamed tributary of the Tangahoe River. Because the stormwater entering the detention ponds was contaminated with various dairy waste liquids, the elevated organic content and associated oxygen demand caused the ponds to become anoxic, with the water turning black and sulphurous odours being generated as a result. Anoxic, black pond water still containing elevated levels of organic content was then discharged into the tributary. The water in the tributary turned black, and sewage fungus was visible on the bed for 50 metres downstream of the discharge. It is not known when these symptoms began to manifest, but it would have occurred sometime after the previous inspection which was undertaken on 20 March 2020. Upon its discovery, Fonterra took immediate action to stop the discharge by plugging the pond outlet. Heavy rain fell four days later, which would have helped to flush the residual contaminants from the tributary. A follow up inspection was undertaken on 22 May by which time the condition of the tributary appeared to have returned to normal, with no sewage fungus visible on the bed.

During the year, a spring biological inspection was undertaken on 27 November 2019 in the tributaries that receive stormwater from the Tawhiti, Tangahoe and coastal pond systems. In the summer (26 February 2020), biomonitoring surveys were carried out in the same three tributaries. In summary, the results from the surveys and inspections indicated that stormwater discharges from the factory had not had recent

detrimental effects upon the streambed communities in the tributaries of the Tawhiti Stream or the unnamed coastal stream. However, there was evidence of limited organic enrichment in the unnamed tributary of the Tangahoe River, in the vicinity of the discharge.

These results were similar to those from two years ago in 2017-2018, which were also indicative of a low level of organic enrichment in the vicinity of the Tangahoe stormwater pond discharge. In response to those findings, the Council increased the level of monitoring that was carried out in this tributary during 2018-2019. The monitoring then reverted back to the original programme for the year under review, after the 2018-2019 results demonstrated a recovery in in-stream health.

Given the monitoring history, and what is now known regarding the sources of stormwater contamination at the Whareroa site, it is plausible that low levels of dairy contaminants have been discharging from the ponds into the tributary of the Tangahoe River for a number of years. However, it is unclear whether the condition of the stormwater ponds had been gradually deteriorating over time, to a point where they flipped and entered an anoxic state, or if there was a more recent increase in organic loading which lead to a sudden shift in state. BOD results from discharge samples over the last five years have been variable, with only two instances where the consent limit was exceeded (Figure 17; 17 January 2018 and 29 April 2020).

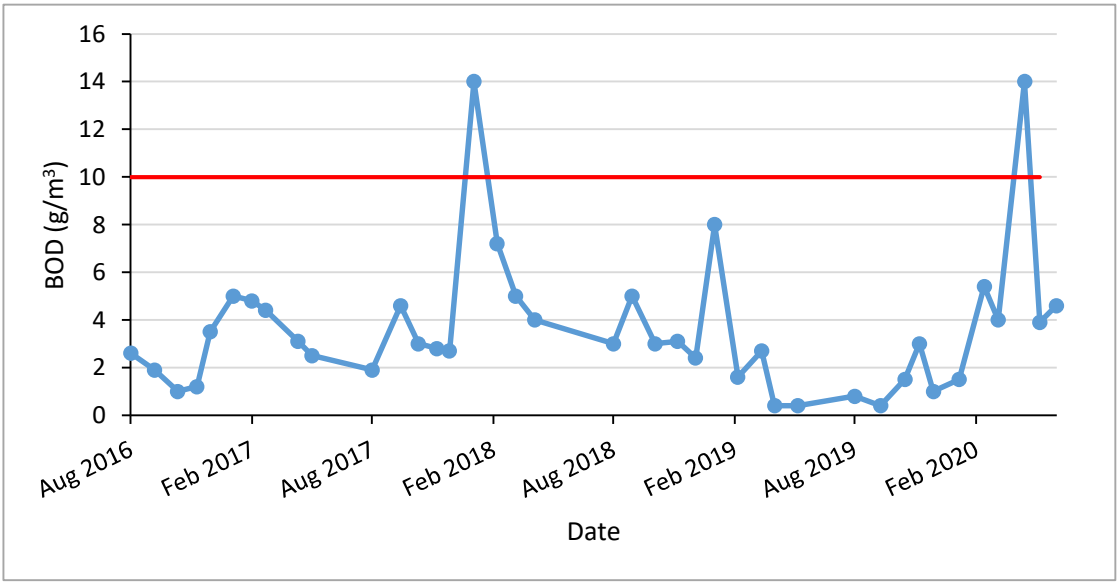

Figure 17 BOD concentrations in the Fonterra Whareroa stormwater discharge from 2016 to 2020

In light of these results, the Council has decided to increase the in-stream monitoring again for the 2020-2021 year. Fonterra staff are also carrying out an internal monitoring regime, including dissolved oxygen spot checks, to better ensure their pond systems are maintained in an optimal condition.

3.2.3 Wastewater

A number of routine monitoring components were used to assess the wastewater discharge and its environmental effects. Fonterra measured effluent outflow and collected 24-hour composite samples to analyse the wastewater composition. The Council collected ten wastewater grab samples and undertook three inter-laboratory comparisons of 24-hour composite samples with Fonterra. In terms of environmental effects, the marine outfall was visually inspected from the coastal look out during each Council inspection, and two intertidal ecological surveys were undertaken.

The limit on the daily volume of wastewater discharged was not exceeded during the 2019-2020 season. Results of composite monitoring by Fonterra found that suspended solids, COD and fat concentrations remained compliant throughout the year. Compliance with discharge limits was maintained when 149,500 L of skim milk was discharged to the outfall in a controlled release over three days in February 2020. The

outfall discharge was the only feasible option for disposal due to the location of the milk within the plant, and was carried out in accordance with the site's Wastewater Management Plan. No adverse environmental impacts were observed.

Fonterra's wastewater performance showed an improvement from the previous year, where there was one fat exceedance (Table 18).

Table 18 Wastewater discharge compliance history 2016-2020

Month	Discharge volume	Suspended solids	Fat	COD	Number of non-compliance days
2015-2016	-	12	2	-	14
2016-2017	-	-	-	-	0
2017-2018	-	1	2	-	2
2018-2019	-	-	1	-	1
2019-2020	-	-	-	-	0

Wastewater grab samples were collected by the Council on 10 occasions during the monitoring period. All of the results complied with consent limits. As the consent limits in special condition 5 of consent 1450 apply to the composite samples and not the grab samples, any exceedances would not have constituted a breach of consent.

Visual inspections of the outfall discharge undertaken from the coastal lookout during routine inspections found no evidence of the discharge adversely affecting the coastal environment beyond the mixing zone designated in resource consent 1450.

Spring and summer intertidal ecological surveys were undertaken in the year under review. Neither survey provided evidence to suggest that the outfall was having any adverse effects on the intertidal reef communities of South Taranaki. Natural environmental factors, including coastal erosion, exposure and substrate mobility, appeared to be dominant drivers of species richness and diversity at the sites surveyed.

There was one incident during there year which resulted in milk fat washing ashore between Denby Road and Ohawe Beach. However, there was a lack of evidence to conclusively link the milk fat to a discharge from the outfall. The milk fat globules were first observed along the high tide line on 19 January, at which time some of the globules were as wider as 50 mm in diameter, and there was a distinct stale milk odour on the beach. Initially, there was evidence of milk fat up to 1 km along the shoreline. A Fonterra clean up team removed all visible fat from the beach when notified the following day. By this time, the fat had been re-suspended and broken down between tides, and the residual volume was much less. Very small, sparsely distributed fat globules were still present on the beach two days later on 22 January. The milk fat had a clear impact on the amenity values of the beach, by detracting from the visual appeal and due to the unpleasant odours. The ecological impacts were anticipated to be short-lived, due to the low volume and sparse distribution of fat on the shore, its relatively fast degradation between tides and the highly exposed nature of the coast.

3.2.4 Air discharges

Throughout the 2019-2020 monitoring period, emissions to air were monitored with visual inspections, odour surveys, testing of particulate emissions, gauging of milk powder deposition, measurement of ambient nitrogen concentration and PM_{10} monitoring.

Onsite milk powder deposition ranged from negligible to moderate during the year, however, no environmental impacts were detected beyond the site boundary with visual inspections or odour observations.

Emission source analysis (stack testing) results found that particle emissions from all drier facilities were compliant during the year.

Consistent with previous years, milk powder deposition was high at the staff car park throughout the monitoring period, suggesting that the majority of the powder fallout occurred in the immediate vicinity of the powder plants. Deposition of milk powder on the site is not of great environmental concern, provided that the stormwater management systems perform satisfactorily. There were also two elevated results recorded immediately south of the site boundary on the corner of Whareroa and Manawapou Roads during November and December. When considering the elevated results at this site, it should be noted that deposited milk powder levels appeared typical during the site inspections, and no complaints were received regarding high volumes of deposited milk powder on neighboring properties. The Council will continue to monitor milk powder deposition to ensure the impacts from the dryer emissions do not worsen.

Fonterra remained compliant with NO_x limits stipulated in consent 6273 during the 2019-2020 monitoring period. Ambient NO_x concentrations at Fonterra Whareroa were comparable with those at some of Taranaki's larger hydrocarbon production stations.

Monitoring indicated that PM_{10} concentrations at Fonterra Whareroa remained below the consent limit and National Environmental Standard.

3.3 Evaluation of performance

A summary of Fonterra's compliance record for the year under review is set out in Tables 19-36.

3.3.1 Water abstraction

Table 19 Summary of performance for Consent 0047-4.1

Purpose: ***To take water from the Tawhiti Stream and the Tangahoe River for various plant purposes***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Combined total abstraction limit of 30,000 m^3 over 24 hours	Fonterra monitor compliance. Abstraction data is also telemetered to the Council and reviewed by Council officers	Yes
2. Maximum abstraction rate in Tawhiti Stream when flow is less than 800 L/s	Fonterra monitor compliance. Abstraction data is also telemetered to the Council and reviewed by Council officers	Yes
3. Maintenance of minimum flows	Council's telemetered sites	Yes
4. Reduced minimum flow in Tangahoe River for maximum of 21 days	Council's telemetered site	N/A
5. Maintenance of minimum flows during an emergency situation of no more than 48 hours	Council's telemetered sites	N/A
6. Report requirement following an emergency situation	Council review	N/A
7. Requirements for measuring and recording flow	Equipment inspected by Council. Data telemetered to Council	Yes
8. Requirements for installation of water meters, data loggers, and turbidity meters	Equipment inspected by Council. Data telemetered to Council	Yes

Purpose: *To take water from the Tawhiti Stream and the Tangahoe River for various plant purposes*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
9. Requirement for installation of fish screens at intakes	Screens have been installed at Tangahoe intake. Consent variation has extended deadline for Tawhiti to 30 April 2022.	Yes
10. Certification of water meters and data loggers	Equipment inspected by Council	Yes
11. Preparation, implementation and compliance with all plans required by consent	Kaitiaki Group meetings, self-reporting, Council monitoring	Yes
12. Preparation and submission of Tangata Whenua Involvement Plan (TWIP)	Tangata Whenua Involvement Plan (version 2) provided to Council	Yes
13. Purpose of the TWIP	Council review	Yes
14. Minimum requirements of the TWIP	Council review	Yes
15. Provision for consent holder review and amendment of TWIP	Review not undertaken during monitoring period	N/A
16. Monitoring Plan requirement	Monitoring Plan revisions underway	Yes
17. Provision of Monitoring Plan to Fish and Game for review	Monitoring Plan revisions underway	N/A
18. Implementation and compliance with Monitoring Plan	Monitoring Plan revisions underway	N/A
19. Preparation of Low Flow Contingency Plan	Plan received April 2018	Yes
20. Recording and reporting of turbidity, abstraction volumes and river flow in accordance with consent	Council review	Yes
21. Consent holder to notify Council if measuring or recording equipment malfunctions	No issues during monitoring year	N/A
22. Equipment to be readily accessible for Council Officers to inspect and verify	Council inspection	Yes
23. Provision of Annual Performance Data Summary Report by 31 August	Report received October 2020	**No**
24. Water Efficiency BPO Report	First report due 1 June 2021	N/A
25. Provision of financial contribution for the mitigation of adverse environmental effects	Payment received August 2020	Yes
26. Specification for financial contribution	Council review	Yes

Purpose: *To take water from the Tawhiti Stream and the Tangahoe River for various plant purposes*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
27. Annual provision of Financial Contribution and Environmental Enhancement Report (FCEER)	No enhancement projects completed yet	N/A
28. Council review provision	Next optional review in June 2021	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** **Good**

N/A = not applicable

3.3.2 Water discharges

Table 20 Summary of performance for Consent 1450-3.0

Purpose: *To discharge dairy factory wastewater into the Tasman Sea*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Discharge to only occur through outfall and diffuser	Diving inspections	Yes
2. Discharge volume not to exceed 40,000 m^3 over 24 hours	Council review of Fonterra monitoring data	Yes
3. Discharge shall not include sewage	Council wastewater sampling and review of Fonterra monitoring data	Yes
4. Constituent limits for wastewater discharge	Council wastewater sampling and review of Fonterra monitoring data	Yes
5. No adverse effects on receiving environment beyond mixing zone	Council monitoring	Yes
6. Measure, record and report rate and volume of wastewater data	Council review of Fonterra monitoring data	Yes
7. Installation and commission of Dissolved Air Flotation (DAF) Unit	DAF Unit to be commissioned by 1 August 2021	N/A
8. Provision of DAF Performance Report	Report due by 1 June 2022	N/A
9. Preparation, implementation and compliance with all plans required by consent	Kaitiaki Group meetings, self-reporting, Council monitoring	Yes
10. Preparation and submission of Tangata Whenua Involvement Plan (TWIP)	Tangata Whenua Involvement Plan (version 2) provided to Council	Yes
11. Purpose of the TWIP	Council review	Yes
12. Minimum requirements of the TWIP	Council review	Yes

Purpose: *To discharge dairy factory wastewater into the Tasman Sea*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
13. Provision for consent holder review and amendment of TWIP	Review not undertaken during monitoring period	N/A
14. Monitoring Plan requirement	Monitoring Plan revisions underway	Yes
15. Implementation and compliance with Monitoring Plan	Monitoring Plan revisions underway	Yes
16. Preparation of Contingency Plan	Fonterra Whareroa Wastewater Discharge Management Plan February 2019 (version 3) – supplied to Council	Yes
17. Provision of Annual Performance Data Summary Report by 31 August	Report received October 2020	**No**
18. Wastewater Management BPO Report	First report due 1 June 2021	N/A
19. Council review provision	Next optional review in June 2021	N/A
20. Provision for review of condition 4, upon receipt of DAF Performance Report	Report due by 1 June 2022	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** **Good**

Table 21 Summary of performance for Consent 3902-3.0

Purpose: *To discharge stormwater into Tangahoe River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Site inspections	Yes
2. Catchment area not to exceed 10 ha	Consent holder liaison	Yes
3. Consent holder to prepare and maintain contingency plan	Whareroa Underground Services and Water Discharge Management Plan August 2020 (version 3) - supplied to Council	Yes
4. Consent holder to prepare and maintain stormwater management plan	Whareroa Underground Services and Water Discharge Management Plan August 2020 (version 3) - supplied to Council	Yes
5. Effects on receiving waters	Site inspections, physicochemical analysis, freshwater biomonitoring surveys	**No**
6. No visible bacterial and/or fungal growths downstream	Site inspections and freshwater biomonitoring surveys	**No**

Purpose: *To discharge stormwater into Tangahoe River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
7. Limits on chemical composition of discharge	Physicochemical analysis	Yes
8. Maintenance of fencing and planting of riparian margin	Site inspections	Yes
9. Optional review provision re. environmental effects	Next optional review in June 2022	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 22 Summary of performance for Consent 3907-3.0

Purpose: *To discharge stormwater into Tawhiti Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Site inspections	Yes
2. Catchment area not to exceed 13 ha	Consent holder liaison	Yes
3. Consent holder to prepare and maintain contingency plan	Whareroa Underground Services and Water Discharge Management Plan August 2020 (version 3) - supplied to Council	Yes
4. Consent holder to prepare and maintain stormwater management plan	Whareroa Underground Services and Water Discharge Management Plan August 2020 (version 3) - supplied to Council	Yes
5. Effects on receiving waters	Site inspections, physicochemical analysis, freshwater biomonitoring surveys	Yes
6. No visible bacterial and/or fungal growths downstream	Site inspections and freshwater biomonitoring surveys	Yes
7. Limits on chemical composition of discharge	Physicochemical analysis	Yes
8. Optional review provision re. environmental effects	Next optional review in June 2022	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 23 Summary of performance for Consent 4133-3.1

Purpose: *To discharge stormwater to the unnamed coastal stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Site inspections	Yes
2. Catchment area not to exceed 21 ha	Consent holder liaison	Yes
3. Consent holder to prepare and maintain contingency plan	Whareroa Underground Services and Water Discharge Management Plan August 2020 (version 3) - supplied to Council	Yes
4. Consent holder to prepare and maintain stormwater management plan	Whareroa Underground Services and Water Discharge Management Plan August 2020 (version 3) - supplied to Council	Yes
5. Effects on receiving waters	Site inspections, physicochemical analysis, freshwater biomonitoring surveys	Yes
6. No visible bacterial and/or fungal growths downstream	Site inspections and freshwater biomonitoring surveys	Yes
7. Limits on chemical composition of discharge	Physicochemical analysis	Yes
8. Maintenance of fencing and planting of riparian margin	Site inspections	Yes
9. Optional review provision re. environmental effects	Next optional review in June 2022	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 24 Summary of performance for Consent 4927-2.0

Purpose: *To discharge river silt and sand to the Tawhiti Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. No adverse effects beyond mixing zone	Implementation of Monitoring Plan	N/A
2. Preparation of a Monitoring plan	Monitoring plan under revision	Yes
3. Implementation and compliance with Monitoring plan	Monitoring plan yet to be established	N/A
4. Optional review provision re. environmental effects	Next review due in June 2021	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		**N/A** **N/A**

Table 25 Summary of performance for Consent 5148-2.0

Purpose: *To discharge river silt and sand into the Tangahoe River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. No adverse effects beyond mixing zone	Implementation of Monitoring Plan	N/A
2. Preparation of a Monitoring plan	Monitoring plan under revision	Yes
3. Implementation and compliance with Monitoring plan	Monitoring plan yet to be established	N/A
4. Optional review provision re. environmental effects	Next review due in June 2021	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		**N/A** **N/A**

N/A = not applicable

3.3.3 Coastal permits

Table 26 Summary of performance for Consent 5013-2.0

Purpose: *To occupy CMA with, and maintain, a rock wall, outfall and diffuser structure*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Structures to be maintained so that they function effectively	Structures were deemed to be functioning effectively during period under review	Yes
2. Annual outfall inspection and report	Annual inspection report received July 2019	Yes
3. Provision of Maintenance Work Plan, if necessary	Maintenance work plan received January 2020	Yes
4. Confirmation of completion of works, if undertaken	Maintenance carried out between 14 Jan 2020 – 16 Feb 2020, report received Oct 2020	Yes
5. Outfall pipeline shall not be visible at any time	Intertidal ecological inspections	Yes
6. Optional review provision re. environmental effects	Next review option in June 2021	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

3.3.4 Air discharges

Table 27 Summary of performance for Consent 4103-2.3

Purpose: *To discharge emissions to air from the manufacture and processing of milk products*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Review of contingency and management plans and air quality monitoring	Yes
2. Measures representing best practicable option may be reviewed	Provision of BPO report	Yes
3. Any alterations to the plant, processes or operations must be approved by Council	WPC drying in Powder-3 authorised by Council through consenting processes	Yes
4. Written report with regard to emissions, improvements and mitigation within five years and every six thereafter	Report produced in August 2018, provided to Council in December 2020. Does not fulfil requirements of condition.	**No**
5. Consent authorises discharges to air according to application	Consent holder liaison	Yes
6. Use of most appropriate process equipment and controls to minimise emissions and impacts	Emissions technology report overdue	N/A
7. Powder emissions to atmosphere <125 mg/m^3 (subject to condition 8)	Emission source analysis (stack testing)	Yes
8. Powder emissions to atmosphere from Powder-3 <150 mg/m^3	Emission source analysis (stack testing)	Yes
9. Limits on depositions beyond boundary	Inspections, deposition gauging. Two elevated results immediately south of the site boundary. No impacts observed visually, no complaints received. Will continue to monitor.	Yes
10. PM_{10} not to exceed 50 µg/m^3	Air quality monitoring	Yes
11. No odour at or beyond boundary	Inspections	Yes
12. Monitoring of emissions	Air quality monitoring	Yes
13. Annual meeting with Council and submitters	No community meeting held during 2019-2020, partly due to COVID disruption. A catch up meeting will be scheduled for early 2021.	**No**
14. Powder-5 can only process skim milk powder if Council are given five days' notice and a monitoring programme for the emissions is developed	No skim milk powder processed in Powder-5	N/A
15. Review of conditions if Condition 14 activated	No skim milk powder processed in Powder-5	N/A

Purpose: *To discharge emissions to air from the manufacture and processing of milk products*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
16. Council may review consent for the purpose of dealing with any adverse effects	Next optional review remaining	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** **Good**

N/A = not applicable

Table 28 Summary of performance for Consent 5044-2.0

Purpose: *To discharge emissions into the air from the disposal of laboratory wastes, and stormwater and sump cleanings onto and into land*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of BPO to minimise adverse effects on the environment	Set out in management plan and emission report submitted to Council	Yes
2. Exercise of consent in accordance with application	Site inspections, consent holder liaison	Yes
3. Approval of a management plan	Air Management Plan March 2019 (version 4) – supplied to Council, Whareroa Land Disposal Management Plan July 2019 (version 8) – supplied to Council	Yes
4. Discharges resulting in no objectionable odours at site boundary	Site inspections.	Yes
5. Characteristics of an objectionable odour		N/A
6. Optional review	No further reviews available, expires June 2022	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 29 Summary of performance for Consent 6257-1.1

Purpose: *To discharge emissions to air from dual fuel boilers*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Best practicable option to prevent or minimise adverse environmental effects	Consent not yet exercised	N/A

Purpose: *To discharge emissions to air from dual fuel boilers*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. Exercise of consent in accordance with application	Consent not yet exercised	N/A
3. Characteristics of coal similar to that described in application	Consent not yet exercised	N/A
4. Report on best practicable option within three months of commissioning	Consent not yet exercised	N/A
5. Review of measures relating to best practicable option	Consent not yet exercised	N/A
6. Minimisation of emissions	Consent not yet exercised	N/A
7. Minimum height of discharges 60 m	Consent not yet exercised	N/A
8. Approval from Council prior to plant alterations	Consent not yet exercised	N/A
9. Discharges not to exceed 20% obscuration	Consent not yet exercised	N/A
10. Discharges of particulate not to exceed 100 mg/Nm^3	Consent not yet exercised	N/A
11. Sulphur dioxide discharges not to exceed 385 kg/hr	Consent not yet exercised	N/A
12. Discharges of particulate not to exceed 43 kg/hr	Consent not yet exercised	N/A
13. Discharges of nitrogen oxides not to exceed 319 kg/hr	Consent not yet exercised	N/A
14. Maximum ground level concentration of sulphur dioxide not to exceed 350 mg/m^3	Consent not yet exercised	N/A
15. Maximum ground level concentration of nitrogen dioxide not to exceed 350 mg/m^3	Consent not yet exercised	N/A
16. Maximum ground level concentration of PM_{10} not to exceed 50 mg/m^3	Consent not yet exercised	N/A
17. Maximum ground level concentration of each or any metal not to exceed guideline values	Consent not yet exercised	N/A
18. Maximum ground level concentration of other contaminants not to exceed workplace exposure standards	Consent not yet exercised	N/A
19. Discharges not to give rise to significant ecological effects	Consent not yet exercised	N/A

Purpose: *To discharge emissions to air from dual fuel boilers*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
20. Analysis of coal on a monthly basis	Consent not yet exercised	N/A
21. Consent holder to install and maintain various measuring devices	Consent not yet exercised	N/A
22. Consent holder to undertake annual source emission monitoring	Consent not yet exercised	N/A
23. Monitoring programme prepared	Provisional programme in place	Yes
24. Reporting regarding advances in technology	Consent not yet exercised	N/A
25. Reporting regarding emissions	Due 12 months from exercise of consent	N/A
26. Cultural impact report	Due 12 months from exercise of consent	N/A
27. Consent holder to undertake annual liaison meetings	Within 12 months of commissioning of energy centre	N/A
28. Consent lapse	Consent will lapse 1 June 2034 unless given effect to earlier	N/A
29. Review of conditions	Next optional review in June 2022	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		**N/A** **N/A**

N/A = not applicable

Table 30 Summary of performance for Consent 6273-1.1

Purpose*: To discharge emissions into the air from 'Cogen I' and 'Cogen II' co-generation energy generating plants*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Best practical option to minimise adverse effects on environment	Site inspections, air quality monitoring, report as required by condition 4	Yes
2. Review of best practical option measures	No review undertaken	N/A
3. Approvals to be obtained for alterations	No alterations during period under review	N/A
4. Report on emissions and new technologies	Initial report submitted July 2014. Next report deadline July 2020.	Yes
5. Specified circumstances under which diesel may be used to heat boilers	Diesel boilers used for testing purposes on two occasions during the year	Yes
6. Notification requirement	Notification provided to Council	Yes

Purpose: *To discharge emissions into the air from 'Cogen I' and 'Cogen II' co-generation energy generating plants*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
7. Diesel specifications	Not assessed	N/A
8. Sulphur dioxide < 350 µg/m^3 (1 hour exposure) or < 125 µg/m^3 (24-hour exposure)	Not monitored during period under review	N/A
9. Carbon monoxide < 10 mg/m^3 (8 hour exposure) or <30 mg/m^3 (one-hour exposure)	Not monitored during period under review	N/A
10. Sum of nitrogen oxides not to exceed 48 g/s	Not monitored during period under review	N/A
11. Nitrogen dioxide not to exceed 200 µg/m^3 (one-hour average) or 100 µg/m^3 (24-hour average)	Air quality monitoring	Yes
12. PM_{10} not to exceed 50 µg/m^3 (24-hour average)	Air quality monitoring	Yes
13. Control of emissions so that max concentration of any contaminant is not increased by more than 1/30th of the relevant Workplace Exposure Standard	Not monitored during period under review	N/A
14. Minimum height of discharge 17.5 m above ground	Structure has not been altered	Yes
15. Minimisation of emissions and impacts by selection of most appropriate equipment etc.	Air quality monitoring, as discussed in report required by condition 4	Yes
16. Consent holder to undertake monitoring of emissions and their effects	Monitoring plan in place	Yes
17. No emissions of visible smoke or plume of water vapour	Inspections	Yes
18. Water treatment regime to the satisfaction of Council	Inspections	Yes
19. Optional review of consent	No optional reviews remaining	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 31 Summary of performance for Consent 7465-1.0

Purpose: *To discharge emissions into the air from the combustion of waste wood packaging*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Only untreated timber packaging to be burned	Consent no longer exercised	N/A
2. Total volume not to exceed 4 m^3	Consent no longer exercised	N/A
3. Best practicable option to minimise environmental effects	Consent no longer exercised	N/A
4. Regard to wind and weather conditions	Consent no longer exercised	N/A
5. Discharge not to give rise to contaminants beyond boundary	Consent no longer exercised	N/A
6. Discharge not to give rise to odour beyond the boundary	Consent no longer exercised	N/A
7. Records to be maintained of burning events	Consent no longer exercised	N/A
8. Consent lapse if not given effect before 2014	Consent no longer exercised	N/A
9. Optional review of consent	Next scheduled optional review in June 2022	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		**N/A** **N/A**

N/A = not applicable

3.3.5 Discharges of waste to land

Table 32 Summary of performance for Consent 4406-2.0

Purpose: *To discharge laboratory wastes onto and into land*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of action likely to minimise adverse effects on the environment	Consent no longer exercised	N/A
2. Enacted in accordance with the terms of the application	Consent no longer exercised	N/A
3. Limitations on size of discharge	Consent no longer exercised	N/A
4. Management plan for discharge site provided	Consent no longer exercised	N/A
5. Siting of discharge pits	Consent no longer exercised	N/A
6. Limitations on placing of discharge sites	Consent no longer exercised	N/A
7. Disposal pits cannot intercept water table	Consent no longer exercised	N/A

Purpose: *To discharge laboratory wastes onto and into land*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. Contaminants entering other bodies of water not permitted	Consent no longer exercised	N/A
9. Cannot lead to adverse impacts on surrounding bodies of water	Consent no longer exercised	N/A
10. Items permitted to be discharged	Consent no longer exercised	N/A
11. Earth cover over discharge	Consent no longer exercised	N/A
12. Soil and vegetation cover over pits	Consent no longer exercised	N/A
13. Maintenance of soil cover	Consent no longer exercised	N/A
14. Records to be kept on pit usage	Consent no longer exercised	N/A
15. Optional review provision re environmental effects	No further reviews available, expires June 2022	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		**N/A** **N/A**

N/A = not applicable

Table 33 Summary of performance for Consent 5036-2.0

Purpose: *To discharge waste material onto land*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of action likely to minimise adverse effects on the environment	Site inspections and liaison with consent holder	Yes
2. Disposal of unprocessable wastes via irrigation to comply with nitrogen and COD loading limits	Not exercised during year under review	N/A
3. Exercise of consent in accordance with applications	Site inspections and liaison with consent holder	Yes
4. Limits on discharge of stormwater sump cleanings and unprocessable dairy waste	Site inspections and liaison with consent holder	Yes
5. Consent holder to provide management plan	Whareroa Land Disposal Management Plan July 2019 (version 8) – supplied to Council	Yes
6. Discharge not within 50 m of bore, 25 m of surface water, 100 m from cliff	Site inspections and liaison with consent holder	Yes
7. Disposal pit(s) not to intercept the water table	Site inspections and liaison with consent holder	Yes

Purpose: *To discharge waste material onto land*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. Exercise of consent not to lead to contaminants entering a water body via overland surface flows	Site inspections and liaison with consent holder	Yes
9. Exercise of consent not to result in adverse impacts on groundwater	Not monitored during period under review; no incidents reported	N/A
10. Discharged material to be covered by 50 mm soil	Site inspections and liaison with consent holder	Yes
11. Liquid to be removed from disposal pits prior to covering	Site inspections and liaison with consent holder	Yes
12. Only materials outlined in application to be discharged	Site inspections, liaison with consent holder and requirements in management plan	Yes
13. Disposal pits to be reinstated and re-vegetated	No pits reinstated during the year	N/A
14. Cover layer to be suitably maintained	No pits reinstated during the year	Yes
15. Disposal not to give rise to objectionable or offensive odours beyond boundary	Site inspections and liaison with consent holder; no complaints received	Yes
16. Consent holder to maintain records of discharge	Records of dates and volume of discharges available	Yes
17. Discharge of unprocessable wastes to occur only after all other options have been exhausted	Site inspections, liaison with consent holder	Yes
18. Optional review provision re. environmental effects	No further reviews available, expires June 2022	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 34 Summary of performance for Consent 9908-1.0

Purpose: *To discharge dairy liquids onto land and the associated emissions to air, in various locations throughout the Taranaki region*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Dairy liquids to be discharged; limited to dairy by-products, unprocessable dairy products and surplus dairy products	Consent holder liaison, data review	Yes
2. Exercise of consent in accordance with Dairy Liquids Spreading Management Plan	Dairy Liquids Spreading Management Plan July 2019 (version 8) – supplied to Council	Yes

Purpose: *To discharge dairy liquids onto land and the associated emissions to air, in various locations throughout the Taranaki region*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
3. Notify the Council of the intent to discharge dairy liquids to land	Notification not provided to Council	**No**
4. Discharge shall not result in any liquids ponding for more than 30 minutes	Not monitored during year under review, no complaints received	N/A
5. Discharge shall not result in any liquids reaching surface water, any subsurface drainage system or any adjacent property	Not monitored during year under review, no complaints received	N/A
6. Best practicable option to minimise environmental effects	Not monitored during year under review, no complaints received	N/A
7. No spray drift beyond the boundary of the property	Not monitored during year under review, no complaints received	N/A
8. Sodium adsorption ratio not exceeding 15	Consent holder liaison, data review	Yes
9. Nitrogen loading rate shall not exceed limits provided in consent	Consent holder liaison, data review	Yes
10. Discharge shall not occur within the minimum buffer distances provided in consent	Consent holder liaison, farm register and data review	N/A
11. No discharge within, adjacent to or directly impacting on any Statutory Acknowledgement Area	Consent holder liaison, farm register and data review	N/A
12. No offensive or objectionable odour beyond property boundary	Not monitored during year under review, no complaints received	N/A
13. Notify the Council within 48 hours of any accidental discharge	No accidental discharges during the year	N/A
14. Maintain a complaints register	No complaints received during the year	N/A
15. Notify the Council of event having significant adverse effect on water quality	No such events occurred during the year	N/A
16. Record of application sites	Record supplied to Council	Yes
17. Farm register	Appendix 1 of Dairy Liquids Spreading Management Plan July 2019 (version 8)	Yes
18. Consent shall lapse 2019 if not exercised	Consent has been exercised	N/A
19. Optional review of consent	Next scheduled optional review in 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** **Good**

N/A = not applicable

3.3.6 Land use permits

Table 35 Summary of performance for Consent 10208-1.0

Purpose: *To construct, place and use a water intake structure in the bed of the Tangahoe River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Structure shall be constructed in accordance with specified documentation	Site inspections and liaison with consent holder (construction now complete)	N/A
2. Signage requirements	Site inspections and liaison with consent holder (construction now complete)	N/A
3. Meet with a Council Officer prior to commencement of works	Site inspections and liaison with consent holder (construction now complete)	N/A
4. Erosion control requirements	Site inspections and liaison with consent holder (construction now complete)	N/A
5. Sediment control requirements	Site inspections and liaison with consent holder (construction now complete)	N/A
6. Earthwork stabilisation requirements	Site inspections and liaison with consent holder (construction now complete)	N/A
7. Works notification requirement	Notification received (construction now complete)	N/A
8. Concrete work to be isolated from running water	Site inspections and liaison with consent holder (construction now complete)	N/A
9. Concrete to remain isolated from running water for 48 hours	Site inspections and liaison with consent holder (construction now complete)	N/A
10. Bank protection structures shall be installed following the installation of the coffer dam (in accordance with specified documentation)	Site inspections and liaison with consent holder (construction now complete)	N/A
11. No instream works between 1 May and 31 October inclusive	Site inspections and liaison with consent holder (construction now complete)	N/A
12. Streambed disturbance to be minimised and reinstated as far as practicable	Site inspections and liaison with consent holder (construction now complete)	N/A
13. Reasonable steps taken to minimise instream effects from sediment	Site inspections and liaison with consent holder (construction now complete)	N/A
14. Adopt best practicable option to prevent/ minimise adverse effects	Site inspections and liaison with consent holder (construction now complete)	N/A
15. Water flow shall not be adversely affected	Site inspections and liaison with consent holder (construction now complete)	N/A
16. Following works, river banks shall not be steeper than the existing natural banks	Site inspections and liaison with consent holder (construction now complete)	N/A

Purpose: *To construct, place and use a water intake structure in the bed of the Tangahoe River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
17. Works to remain responsibility of consent holder (and subsequent erosion, etc)	No issues noted during monitoring period	N/A
18. Protocols adopted if archaeological remains are discovered	Liaison with consent holder (construction now complete)	N/A
19. Consent lapse clause	Consent has been exercised	N/A
20. Consent review clause	Next optional review in June 2022	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		**N/A** **N/A**

N/A = not applicable

Table 36 Evaluation of overall environmental performance over time

Year	High	Good	Improvement required	Poor
2014-15	-	✓	-	-
2015-16	-	-	✓	-
2016-17	-	✓	-	-
2017-18	-	-	✓	-
2018-19	-	✓	-	-
2019-20	-	-	✓	-
Totals	0	3	3	0

During the year, Fonterra demonstrated a level of environmental performance which required improvement, and a good level of administrative performance with the resource consents as defined in Section 1.1.4.

3.4 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance monitoring of air emissions from the Whareroa plant in the 2019-2020 year continues at the same level as in 2018-2019.
1. THAT, monitoring of water discharges (including stormwater) and abstractions for the Whareroa plant in the 2019-2020 year continues at the same level as in 2018-2019.
2. THAT, subject to recommendations 4 and 5, freshwater and marine ecological monitoring in the 2019-2020 year continues at the same level as in 2018-2019.
3. THAT, the spring biomonitoring survey undertaken in the unnamed tributary of the Tangahoe River reverts back to a biological inspection.
4. THAT, further monitoring components, including a Taonga species survey on Pukeroa Reef, and biomonitoring surveys in the Tawhiti Stream and Tangahoe River will also be trialled, as required by resource consents 1450, 0047, 4927 and 5148.

5. THAT combined inspections of the Whareroa plant for monitoring of air emissions and water discharges in the 2019-2020 year continues at the same level as in 2018-2019.
6. THAT, Fonterra initiates a review of the current oil and grease stormwater consent limit, given the recent change in test method.
7. THAT should there be issues with environmental or administrative performance in 2018-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

With the exceptions of 4 and 6, these recommendations were all implemented during the 2019-2020 monitoring period. The additional monitoring in recommendation 4 was postponed for reasons discussed within the report. There has been no review of the oil and grease limit to date, however, there were also no compliance issues during the year.

3.5 Alterations to monitoring programmes for 2020-2021

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 2020-2021, the spring biological inspection undertaken in the unnamed tributary of the Tangahoe River reverts back to a biomonitoring survey. Spring biomonitoring surveys will continue in this tributary on an annual basis until the Council deems them to be no longer necessary, based on monitoring results and the performance of the stormwater system in the Tangahoe catchment. In the remaining two tributaries it is proposed that the spring biological inspections be discontinued, given the absence of any detectable impacts in recent years. The Council's ten stormwater samples, visual inspections and annual biomonitoring survey is considered a reasonable level of monitoring for these two tributaries.

New monitoring components, including a Taonga species survey on Pukeroa Reef, and biomonitoring surveys in the Tawhiti Stream and Tangahoe River will be trialled in 2020-2021, as required by resource consents 1450, 0047, 4927 and 5148.

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 2020-2021.

A recommendation to this effect is attached to this report.

4 Recommendations

1. THAT in the first instance monitoring of air emissions from the Whareroa plant in the 2020-2021 year continues at the same level as in 2019-2020.
2. THAT, monitoring of water discharges (including stormwater) and abstractions for the Whareroa plant in the 2020-2021 year continues at the same level as in 2019-2020.
3. THAT, subject to recommendations 4, 5 and 6, freshwater and marine ecological monitoring in the 2020-2021 year continues at the same level as in 2019-2020.
4. THAT, the spring biological inspection undertaken in the unnamed tributary of the Tangahoe River reverts back to a biomonitoring survey.
5. THAT, the spring biological inspections undertaken in the unnamed tributary of the Tawhiti Stream and the unnamed coastal stream be discontinued.
6. THAT, new monitoring components, including a Taonga species survey on Pukeroa Reef, and biomonitoring surveys in the Tawhiti Stream and Tangahoe River will also be trialled, as required by resource consents 1450, 0047, 4927 and 5148.
7. THAT combined inspections of the Whareroa plant for monitoring of air emissions and water discharges in the 2020-2021 year continues at the same level as in 2019-2020.
8. THAT, Fonterra initiates a review of the current oil and grease stormwater consent limit, given the recent change in test method.
9. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

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.
BODCF	Biochemical oxygen demand of a filtered sample.
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 in µS/cm.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
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.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
$g/m^2/day$	grams/$metre^2$/day.
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	Square metres.
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.
µS/cm	Microsiemens per centimetre
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.
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.
PM_{10}	Relatively fine airborne particles (less than 10 micrometre diameter, respectively).
$PM_{10,}$ $PM_{2.5,}$ $PM_{1.0}$	Relatively fine airborne particles (less than 10 or 2.5 or 1.0 micrometre diameter, respectively).
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.
Shannon-Wiener index	An ecological diversity measure which factors in the number of species present and their relative abundance.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.

For further information on analytical methods, contact a Science Services Manager.

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Appendix I

Resource consents held by Fonterra

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

Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

Water Permit

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

Name of Consent Holder:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	17 October 2017
Commencement Date:	8 November 2017

Conditions of Consent

Consent Granted:	To take water from the Tawhiti Stream and the Tangahoe River for the purposes of processing and manufacturing dairy products, cleaning of plant, cooling, domestic use and for a co-generation plant
Expiry Date:	1 June 2052
Review Date(s):	June 2021 and at 5-yearly intervals thereafter
Site Location:	Main South Road & 135 Hicks Road, Hawera
Grid Reference (NZTM)	1712861E-5616233N (Tawhiti) 1715769E-5612503N (Tangahoe)
Catchment:	Tangahoe
Tributary:	Tawhiti

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

Rate of taking

1. The total amount of water taken from the Tawhiti Stream and the Tangahoe River in any 24 hour period ending at 6.00am (New Zealand Standard Time) shall not exceed 30,000 cubic metres.

2. When the flow in the Tawhiti Stream is less than 800 litres per second, as measured at the 'Tawhiti at Duffys' flow recorder site (Grid Ref NZTM 1714275-5615594), the rate of taking from the Tawhiti Stream shall not exceed 184 litres per second, unless the turbidity of the Tangahoe River at the take site (Grid Ref NZTM 1715770-5612494) is greater than 850 NTU, then the rate shall not exceed 347 litres per second.

   Advice Note:
   For the avoidance of doubt, this condition does not limit the amount of water that may be taken from the Tangahoe River, provided the amount does not exceed 30,000 cubic metres in accordance with condition 1.

Minimum flows

3. Except as provided for by conditions 4 and 5, no taking shall occur:
   (a) when the flow immediately downstream of the Tangahoe River take site is less than 450 litres per second; or
   (b) from the Tawhiti Stream when the flow, as recorded at the 'Tawhiti at Duffys' flow recorder site, is less than 240 litres per second.

4. On no more than 21 days during any period commencing 01 July and ending 30 June of the following year, taking may occur from the Tangahoe River if its flow is between 300 litres per second and 450 litres per second.

5. During an emergency situation, taking in accordance with condition 1 may occur for a period not exceeding 48 hours from the:
   (a) Tawhiti Stream when the flow at the 'Tawhiti at Duffys' flow recorder site is more than 50 litres per second; and
   (b) Tangahoe River when the flow immediately downstream of the intake is more than 273 litres per second.

   For the purposes of this condition, an emergency situation is the inability of the consent holder to take, pump, or treat the water taken, due to an event beyond the control of the consent holder, including: failure of power supply; contamination of river water, and damage to infrastructure (pumping station, pipeline, treatment plant).

6. On each occasion that condition 5 is exercised, the consent holder shall within seven working days of the emergency ceasing provide a written report to the Chief Executive, Taranaki Regional Council giving reasons for the emergency, the volumes of water abstracted, the minimum flows that occurred, the water conservation measures adopted during the emergency and any measures that can be adopted to prevent a reoccurrence. A copy of each report shall also be provided to Tangata Whenua and Fish & Game New Zealand (Taranaki).

7. The consent holder shall ensure that the flow in the river downstream of each take site is measured and recorded at intervals not exceeding 15 minutes to an accuracy of +10% for flows less than:

   (a) 2000 litres per second for the Tangahoe River; and
   (b) 1000 litres per second for the Tawhiti Stream.

   Advice Note:
   For the avoidance of doubt, the river flow gauging stations downstream of each take site, and any associated data telemetry, is owned and operated by the Taranaki Regional Council. This flow data shall be provided to the consent holder so it can manage the takes from each take site in accordance with the conditions of this consent.

Installation of Monitoring Equipment and Screens

8. Before exercising this consent the consent holder shall:

   (a) install, and thereafter maintain a water meter and a datalogger at each site of taking (or a nearby site in accordance with Regulation 10 of the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*. Water meters and dataloggers shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of ± 5% at intervals not exceeding 15 minutes;

   (b) install, and thereafter maintain equipment that records the turbidity of the Tangahoe River at the take site to an accuracy of ± 5% at intervals not exceeding 15 minutes;

9. Within two years of the commencement date of this consent, the consent holder shall install screens on each water intake structure for the purpose of preventing fish from entering the intake. The screens shall have a mesh aperture not exceeding 2 mm and the sweep velocity shall exceed the approach velocity.

10. Within 30 days of the commencement date of this consent, the consent holder shall provide the Taranaki Regional Council with a document from a suitably qualified person certifying that the water meter and datalogger at each site of taking required by condition 8(a) of this consent:

    (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 also be provided:

    (c) at other times when reasonable notice is given by the Chief Executive, Taranaki Regional Council who has reasonable evidence that the equipment may not be functioning as required by this consent; and
    (d) no less frequently than once every five years.

Monitoring and Management Plans

11. The consent holder shall prepare, implement and comply with its obligations under all plans required by the conditions of this consent.

Tangata Whenua Involvement Plan

12. Within 3 months of the commencement date of this consent, the consent holder shall prepare and submit to the Taranaki Regional Council a Tangata Whenua Involvement Plan ("TWIP"). The TWIP shall be developed in consultation with Te Runanga o Ngati Ruanui Trust and Te Korowai o Ngaruahine Trust (collectively referred to as "Tangata Whenua" for the purposes of this consent).

13. The purpose of the Plan is to recognise Tangata Whenua's kaitiakitanga responsibilities and to identify the process and extent of involvement by Tangata Whenua in:

    (a) the development, implementation and review of the Monitoring Plan (condition 16) and Water Efficiency BPO Report (condition 24);
    (b) the development and implementation of environmental enhancement projects in accordance with condition 25.
    (c) monitoring the conditions of this consent.
    (d) the establishment of a Kaitiaki Group.

14. As a minimum the TWIP shall detail:

    (a) *Development of Plans* - A process for Tangata Whenua to have input into and provide feedback to the consent holder and Taranaki Regional Council on the development of the Monitoring Plan (condition 16) and Water Efficiency BPO Report (condition 24) prior to each being lodged with the Taranaki Regional Council.

    (b) *Implementation and review of Plan*s - A process for Tangata Whenua to have input into and provide feedback on the implementation and reviews of:
        (i) the Monitoring Plan;
        (ii) monitoring of the effects of the takes;
        (iii) the Annual Performance and Data Summary Reports; and
        (iv) the Water Efficiency BPO Report.

    (c) *Information Sharing* - A process for ongoing information sharing between Tangata Whenua and the consent holder to enable an improved understanding of the relevant cultural values that may be affected by the activities authorised by this consent and the traditional/cultural uses of the Tawhiti Stream and Tangahoe River.

    (d) *Kaitiaki Group* - A process to establish and maintain a Kaitiaki Group (KG), which shall include:
        (i) the process by which the Taranaki Regional Council, Te Runanga o Ngati Ruanui Trust, Te Korowai o Ngaruahine Trust and the consent holder will be invited to become members of the KG;
        (ii) the process by which membership may be amended and advisers appointed and/or engaged by the KG;

(iii) the terms of reference for the KG, which shall be:
- the conditions of this consent and their implementation; and
- the environmental enhancement projects to be carried out pursuant to condition 25;

(iv) the way the KG will operate, including frequency of meetings and methods of communication between members; and

(v) the reasons the KG may cease to function and the process for that.

15. The consent holder may review and amend the TWIP from time to time in consultation with Tangata Whenua. A copy of the amended plan shall be provided to the Taranaki Regional Council.

Monitoring Plan

16. Within 6 months of the date of commencement of this consent, the consent holder shall ensure a Monitoring Plan is prepared. The purpose of the Monitoring Plan is to identify the techniques, methodologies and procedures that will be employed to acquire data in relation to, and monitor compliance with the conditions of this consent, and the effects of the taking authorised by this consent on:

(a) instream habitat values and macroinvertebrate communities within the Tawhiti Stream and Tangahoe River; and

(b) native fish populations within the Tawhiti Stream and Tangahoe River.

Advice Note:
The Taranaki Regional Council assumes responsibility for the preparation and implementation of the Monitoring Plan for annual compliance purposes.

17. The consent holder shall provide a copy of the Monitoring Plan to Fish and Game New Zealand for comment prior to it being approved by the Taranaki Regional Council.

18. At all times, the consent holder shall implement and comply with those aspects of the Monitoring Plan that the consent holder is responsible for (as detailed in the Monitoring Plan).

Low Flow Contingency Plan

19. Within 6 months of the commencement date of this consent, the consent holder shall prepare a Low Flow Contingency Plan and provide a copy of the plan to the Taranaki Regional Council, Tangata Whenua and Fish and Game New Zealand. The purpose of the Low Flow Contingency Plan is to identify the techniques, methods and procedures that will be employed by the consent holder to reduce the amount of water taken from the Tawhiti Stream and Tangahoe River to the greatest extent that is practicable during periods when the flow downstream of the Tangahoe River take site is between 300 litres per second and 450 litres per second and abstraction is occurring in accordance with conditions 4 and 5.

Reporting

20. Within 6 months of the commencement date of this consent, the consent holder shall begin recording turbidity, the volumes of water taken and river flow in accordance with the conditions of this consent. The records taken shall:

    (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing;
    (b) specifically record the water taken as 'zero' when no water is taken;
    (c) be transmitted to the Taranaki Regional Council's computer system within 2 hours of being recorded.

21. If any measuring or recording equipment required by the conditions of this consent, which is owned and operated by the consent holder, breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council as soon as is reasonably practicable after the consent holder becomes aware of the breakdown or malfunction, by emailing hydro@trc.govt.nz. Any repairs or maintenance to the equipment must be undertaken by a suitably qualified person.

22. All measuring or recording equipment required by the conditions of this consent shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval. In addition the data logger shall be designed and installed so that Taranaki Regional Council officers can readily verify that it is accurately recording the required information.

Annual Performance Data Summary Report

23. Each year by 31 August, the consent holder shall prepare an Annual Performance Data Summary Report and provide a copy of the report to the Chief Executive, Taranaki Regional Council. The Annual Performance Data Summary Report shall relate to the preceding 12 month period ending 30 June and summarise:

    (a) Data relating to the performance of major components within the water take systems and compliance with the conditions of this consent; and
    (b) Any results of monitoring undertaken in accordance with the Monitoring Plan.

Water Efficiency BPO Report

24. Before 1 June 2021 and at 5 yearly intervals thereafter, the consent holder shall undertake a water efficiency study that assesses the overall water use efficiency on site, identifies the best practicable options ("BPO") to improve water use efficiency and makes recommendations about the implementation of any BPOs. The study shall also include a review of hydrological records to determine whether the minimum flows specified in conditions 3(a), 4, 5 and 19 should be increased. The consent holder shall then prepare a Water Efficiency BPO Report which summarises the study and its findings and recommendations and provide a copy of it to the Chief Executive, Taranaki Regional Council, Tangata Whenua and Fish and Game New Zealand within 30 working days of the study being completed.

For the purposes of the consent, best practicable option means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to—

(a) the nature of the taking and the sensitivity of the receiving environment to adverse effects; and
(b) the financial implications, and the effects on the environment, of that option when compared with other options; and
(c) the current state of technical knowledge and the likelihood that the option can be successfully applied.

Financial Contributions

25. The consent holder shall make a $10,000 (plus GST and adjusted for inflation) payment to the Taranaki Regional Council for each year of this consent as a financial contribution for the purpose of mitigating the adverse environmental effects of the taking. The first payment shall be made within 30 days of the commencement date of this consent and subsequent payments shall be made annually before 1 September.

26. The contribution that is to be made in accordance with condition 25 shall only be used for specific environmental enhancement projects within the Tangahoe River catchment that have been agreed to by the Kaitiaki Group and the Chief Executive, Taranaki Regional Council including, but not limited to:

(a) Riparian planting and fencing of waterbodies;
(b) Enhancement, fencing and protection of wetlands;
(c) Enhancement of the native fishery;
(d) Enhancement of the Tangahoe River mouth/estuary; and
(e) Removal of fish barriers.

Advice Note:
If the financial contributions paid pursuant to this consent accumulate with the Taranaki Regional Council over a period of 5 years or more without being spent and/or there are no agreed projects pursuant to condition 26 that the fund is to be applied to, the consent holder may make an application under section 127 of the RMA, to change, suspend or waive the contributions required under this condition or to otherwise modify this condition.

27. Annually before 1 August the consent holder shall submit a "Financial Contribution and Environmental Enhancement Report" ("FCEER") to the Chief Executive, Taranaki Regional Council. The purpose of the FCEER shall be to document the environmental enhancement project(s) that have occurred in the previous year pursuant to conditions 26, and it shall include as a minimum:

(a) the projects initiated and completed; and
(b) the total cost of each project.

Review

28. 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 2021 and at 5-yearly intervals thereafter, for the purposes of:

    (a) 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; or

    (b) implementing a best practicable option with respect to improving water use efficiency identified in a Water Efficiency BPO Report prepared in accordance with condition 24;

    (c) increasing the flows specified in conditions 3(a), 4, 5 and 19 in accordance with any recommendation as a result of the Tangahoe River hydrological data review required by condition 24.

Signed at Stratford on 17 October 2017

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Coastal Permit

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

Name of Consent Holder:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	17 October 2017
Commencement Date:	8 November 2017

Conditions of Consent

Consent Granted:	To discharge all wastewater from dairy factory processes and associated processes undertaken at the Whareroa dairy processing site through a marine outfall into the Tasman Sea
Expiry Date:	1 June 2052
Review Date(s):	June 2021 and at 5-yearly intervals thereafter
Site Location:	Tasman Sea, Rifle Range Road, Hawera
Grid Reference (NZTM)	Between 1711371E-5612940N & 1710410E-5611381N
Catchment:	Tasman Sea

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

Discharge requirements

1. The discharge shall only occur through the outfall and diffuser located between the points defined by map references (NZTM) 1711371E-5612940N and 1710410E-5611381N.

2. The discharge over any 24-hour period ending at 6.00am New Zealand Standard Time (NZST) shall not exceed 40,000 cubic metres.

3. The discharge may include any wastewater from dairy factory processes and associated processes undertaken at the Whareroa dairy processing site and site stormwater, but shall not include any sewage.

4. The discharge, as determined by any 24 hour composite time-proportioned sample taken as the discharge leaves the Whareroa dairy processing site shall meet the standards below

   (a) suspended solids concentration no greater than 1,000 milligrams/litre;
   (b) total fats concentration no greater than 800 milligrams/litre; and
   (c) Chemical Oxygen Demand [COD] concentration no greater than 7000 milligrams/litre.

5. The discharge authorised by this consent shall not give rise to any of the following effects in the Tasman Sea beyond a mixing zone of 200 metres from the centre line of the outfall diffuser:

   (a) the production of conspicuous oil or grease films, scums or foams, or floatable suspended materials;
   (b) any conspicuous change in the colour or visual clarity;
   (c) any emission of objectionable odour; or
   (d) any significant adverse effects on marine life, in particular: benthic communities; and intertidal aquatic life in and around Pukeroa Reef.

6. The consent holder shall measure and record the rate and volume of wastewater discharged to an accuracy of ± 5%. Records of the date, time, rate and cumulative volume of discharge from 6.00am (NZST), taken at intervals not exceeding 15 minutes shall be transmitted to the Taranaki Regional Council's computer system within 2 hours of being recorded.

7. Before 1 August 2021 the consent holder shall install and commission a Dissolved Air Flotation Unit (DAF) to treat all wastewater from the Cream, Cheese and Milk Treatment processing plants prior to its discharge.

8. By 1 June 2022 the consent holder shall submit to the Taranaki Regional Council a report that:

   (a) summarises the performance of the DAF unit required by condition 7,including the wastewater characteristics to and discharging from the DAF unit;
   (b) summarises any change in the wastewater characteristics discharged pursuant to this consent post installation and commissioning the DAF unit; and
   (c) includes an analysis of whether it is appropriate to amend the discharge standards specified in condition 4 (a)-(c) of this consent to more accurately reflect any ongoing reductions of suspended solids, total fats or COD concentrations in the discharge which are occurring as a result of higher levels of treatment by the DAF unit, and makes any recommendations to that effect.

Monitoring and Management Plans

9. The consent holder shall prepare, implement and comply with its obligations under all plans required by the conditions of this consent.

Tangata Whenua Involvement Plan

10. Within 3 months of the commencement date of this consent, the consent holder in conjunction with South Taranaki District Council shall prepare and submit to the Taranaki Regional Council a Tangata Whenua Involvement Plan ("TWIP"). The TWIP shall be developed in consultation with Te Runanga o Ngati Ruanui Trust and Te Korowai o Ngāruahine Trust (collectively referred to as "Tangata Whenua" for the purposes of this consent).

11. The purpose of the TWIP is to recognise Tangata Whenua's kaitiakitanga responsibilities and to identify the process and extent of involvement by Tangata Whenua in:

   (a) the development, implementation and reviews of the Monitoring Plan, Contingency Plan, and Wastewater Management BPO Report;
   (b) monitoring the conditions of this consent; and
   (c) the establishment of a Kaitiaki Group.

12. As a minimum the TWIP shall detail:
   (a) *Development of Plans* - A process for Tangata Whenua to have input into and provide feedback to the consent holder and Taranaki Regional Council on the development of the Monitoring Plan (condition 14), Contingency Plan (condition 16) and Wastewater Management BPO Report (condition 18) prior to each being lodged with the Taranaki Regional Council.

   (b) *Implementation and review of Plans* - A process for Tangata Whenua to have input into and provide feedback on the implementation and reviews of:
      (i) the Monitoring Plan;
      (ii) the Contingency Plan;
      (iii) monitoring of the effects of the discharge;
      (iv) the Annual Performance and Data Summary Reports; and
      (v) Wastewater Management BPO Reports.

(c) *Information Sharing* - A process for ongoing information sharing between Tangata Whenua and the consent holder to enable an improved understanding of the relevant cultural values that may be affected by the activities authorised by this consent.

(d) *Kaitiaki Group* - A process to establish and maintain a Kaitiaki Group (KG), which shall include:
   (i) the process by which the Taranaki Regional Council, Te Runanga o Ngati Ruanui Trust, Te Korowai o Ngāruahine Trust, South Taranaki District Council and the consent holder will be invited to become members of the KG;
   (ii) the process by which membership may be amended and advisers appointed and/or engaged by the KG;
   (iii) the terms of reference for the KG, which shall be the conditions of this consent and any other consent authorising a discharge from the same outfall, and their implementation;
   (iv) the way the KG will operate, including frequency of meetings and methods of communication between members; and
   (v) the reasons the KG may cease to function and the process for that.

13. The consent holder may review and amend the TWIP from time to time in consultation with Tangata Whenua. A copy of the amended plan shall be provided to the Taranaki Regional Council.

Monitoring Plan

14. Within 6 months of the commencement date of this consent, the consent holder shall ensure a Monitoring Plan is prepared The purpose of the Monitoring Plan is to identify the techniques, methodologies and procedures that will be employed to acquire data in relation to, and to monitor compliance with the conditions of this consent, and the effects of the discharge authorised by this consent and any other consent authorising a discharge from the same outfall on:

    (a) Benthic sediments and marine ecology; and
    (b) Pukeroa Reef.

    Advice Note: *The Taranaki Regional Council assumes responsibility for the preparation and implementation of the Monitoring Plan for annual compliance purposes.*

15. At all times, the consent holder shall implement and comply with those aspects of the Monitoring Plan that the consent holder is responsible for (as detailed in the Monitoring Plan).

Contingency Plan

16. The consent holder shall maintain and regularly update a 'Contingency Plan' that details measures and procedures that will be undertaken to prevent and remedy any environmental effects from a spillage or any discharge of contaminants not authorised by this consent. The plan and any amended versions shall be provided to the Chief Executive of the Taranaki Regional Council.

Reporting

Annual Data and Performance Report

17. Each year by 31 August, the consent holder shall prepare an Annual Data and Performance Report and forward a copy of the report to the Chief Executive, Taranaki Regional Council. The Annual Data and Performance Report shall relate to the preceding 12 month period ending 30 June and summarise:

    (a) Data relating to the performance of major components within the consent holder's wastewater system and compliance with the conditions of this consent;
    (b) Any results of monitoring undertaken in accordance with the Monitoring Plan; and
    (c) Any incidents involving spills or accidental discharges and the measures taken to avoid, remedy or mitigate the adverse environmental effects of such a spill or discharge.

Wastewater Management BPO Report

18. Before 1 June 2021 and at 5-yearly intervals thereafter, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, a 'Wastewater Management BPO Report' reviewing relevant best practicable options ("BPO") in dairy wastewater management and how these might be applicable at the Whareroa site, and detailing any measures taken by the consent holder to improve or minimise the wastewater discharge.

    For the purposes of the consent, **best practicable option** means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to-

    (a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
    (b) the financial implications, and the effects on the environment, of that option when compared with other options; and
    (c) the current state of technical knowledge and the likelihood that the option can be successfully applied.

Review

19. 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 2021 and at 5-yearly interval thereafter, for the purposes of:

    (a) 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; or

    (b) implementing a best practicable option in dairy wastewater management as identified in the Wastewater Management BPO Report prepared in accordance with condition 18.

20. 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 condition 4 of this resource consent by giving notice of review within 6 months of receipt of the report required by condition 8, for the purposes of setting discharge standards more appropriate for the higher level of treatment.

Signed at Stratford on 17 October 2017

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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	14 February 2014
Commencement Date:	14 February 2014

Conditions of Consent

Consent Granted:	To discharge stormwater from the Whareroa milk processing site into an unnamed tributary of the Tangahoe River
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	89 Whareroa Road, Hawera
Legal Description:	Lot 1 DP 12929 Lots 1 & 2 DP 13689 Lot 1 DP 17308 Lot 1 DP 17686 Lots 1-3 DP 19722 Pt Sec 234 Blk X Hawera SD (Discharge source) Lot 2 DP 2777 Blk X Hawera SD (Discharge site)
Grid Reference (NZTM)	1711975E-5614565N
Catchment:	Tangahoe

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.

2. The stormwater discharged shall be from a catchment area not exceeding 10 hectares.

3. Before 31 August 2014, the consent holder shall prepare and maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. Before 31 August 2014, the consent holder shall prepare and maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to:

   a) cleaning procedures for the site catchments discharging to the Eastern Pond; and
   b) details of maintenance and cleaning programmes to remove the accumulated sediment from the ponds.

   A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

5. After allowing for reasonable mixing, within a mixing zone extending 10 metres below the discharge point, the discharge 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 emissions of objectionable odour;
   d. the rendering of fresh water unsuitable for consumption by farm animals; and
   e. any significant adverse effects on aquatic life, habitats or ecology.

6. There shall be no visible bacterial and/or fungal growths downstream of the discharge.

7. Constituents of the discharge shall meet the standards shown in the following table for eight of ten consecutive samples taken at least two weeks apart over the course of an annual monitoring period:

Constituent	Standard
Oil and grease	Concentration not greater than 5 gm^{-3}
pH	Within the range 6.0 to 9.0
Suspended solids	Concentration not greater than 30 gm^{-3}
BOD	Concentration not greater than 15 gm^{-3} for the first two years following the date of issue of this consent, and 10 gm^{-3} thereafter
Filtered carbonaceous BOD	Concentration not greater than 3.5 gm^{-3} for the first two years following the date of issue of this consent, and 2 gm^{-3} thereafter
Temperature	Not greater than 25°C
Total residual chlorine	Concentration not greater than 0.2 gm^{-3}

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

8. The consent holder shall maintain the existing fencing and planting of the riparian margins of the receiving water body for a distance of 500 metres downstream of the discharge point for the purpose of mitigating the effects of the discharge.

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 2016 and/or June 2022, 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.

Transferred at Stratford on 13 April 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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	14 February 2014
Commencement Date:	14 February 2014

Conditions of Consent

Consent Granted:	To discharge stormwater, back flushing from the sand filters and intermittent discharges of treated water from a reservoir, from the Whareroa milk processing site into an unnamed tributary of the Tawhiti Stream
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	89 Whareroa Road, Hawera
Legal Description:	Lot 1 DP 12929 Lots 1 & 2 DP 13689 Lot 1 DP 17308 Lot 1 DP 17686 Lots 1-3 DP 19722 Pt Sec 234 Blk X Hawera SD (Discharge source) Pt Lot 2 DP 15204 Blk X Hawera SD (Discharge site)
Grid Reference (NZTM)	1711919E-5615318N
Catchment:	Tangahoe
Tributary:	Tawhiti

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.

2. The stormwater discharged shall be from a catchment area not exceeding 13 hectares.

3. Before 31 August 2014, the consent holder shall prepare and maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. Before 31 August 2014, the consent holder shall prepare and maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to:

   a) cleaning procedures for the site catchments discharging to the Northern Pond; and
   b) details of maintenance and cleaning programmes to remove the accumulated sediment from the ponds.

   A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

5. After allowing for reasonable mixing, within a mixing zone extending 10 metres below the discharge point, the discharge 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 emissions of objectionable odour;
   d. the rendering of fresh water unsuitable for consumption by farm animals; and
   e. any significant adverse effects on aquatic life, habitats or ecology.

6. There shall be no visible bacterial and/or fungal growths downstream of the discharge.

7. Constituents of the discharge shall meet the standards shown in the following table for eight of ten consecutive samples taken at least two weeks apart over the course of an annual monitoring period:

Constituent	Standard
Oil and grease	Concentration not greater than 5 gm^{-3}
pH	Within the range 6.0 to 9.0
Suspended solids	Concentration not greater than 30 gm^{-3}
BOD	Concentration not greater than 10 gm^{-3}
Filtered carbonaceous BOD	Concentration not greater than 2 gm^{-3}
Temperature	Not greater than 25°C
Total residual chlorine	Concentration not greater than 0.2 gm^{-3}

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

8. 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 2016 and/or June 2022, 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.

Transferred at Stratford on 13 April 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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date (Change):	24 July 2018
Commencement Date (Change):	24 July 2018 (Granted Date: 2 August 2017)

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the manufacture and processing of milk products and associated processes
Expiry Date:	1 June 2025
Review Date(s):	June 2020
Site Location:	Whareroa Road, Hawera
Grid Reference (NZTM)	1711450E-5614870N (Powder 3) 1711600E-5614624N (DAF plant)

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 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 into the environment from the site.

2. The measures representing the best practicable option may be reviewed in accordance with the procedure provided for in condition 16.

3. Prior to undertaking any alterations to the plant, processes or operations, as specified in the information provided in support of the original application for this consent, and with any subsequent application to change consent conditions which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and any amendments.

4. The consent holder shall provide to the Taranaki Regional Council within five years from the granting of this consent, and every six years thereafter a written report:
   a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of milk powder and other particulate emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances; and
   b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder; and
   c) addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive, Taranaki Regional Council, considers should be included.

5. The consent holder shall be permitted to discharge into the air emissions of contaminants arising from the spray drying processes in the facilities known as WPC, Alamin, Powder-2, Powder-3, Powder-4, Powder-5, Casein-1 and Casein-2, together with other milk processing facility and supporting utility services (including the dissolved air floatation plant), as described in the information provided in support of the original application for this consent, and with any subsequent application to change consent conditions. Where there is conflict between applications the later application shall prevail, and where there is conflict between an application and consent conditions the conditions shall prevail.

6. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

7. Subject to condition 8, powder emissions to the atmosphere from the spray drying process cyclone exhausts shall not exceed 125 milligrams per cubic metre (mg/m^3) of gas flow, adjusted to 0 degrees Celsius, 1 atmosphere pressure, and dry gas basis.

8. Powder emissions to the atmosphere from the Powder-3 cyclone exhausts shall not exceed 150 milligrams per cubic metre (mg/m^3) of gas flow, adjusted to 0 degrees Celsius, 1 atmosphere pressure, and dry gas basis.

9. 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 purposes of this condition, effects in excess of the following limits are deemed to be offensive or objectionable:

    a) deposition of milk powder equivalent to 0.13 grams total deposited milk powder per square metre per day ($g/m^2/day$); and/or
    b) a suspended milk powder level of 1 milligram per cubic metre (mg/m^3).

10. The consent holder shall control all emissions of fine particulates (PM_{10}) to the atmosphere from the site, in order that the maximum ground level concentration of fine particulates (PM_{10}) arising from the exercise of this consent measured under ambient conditions does not exceed 50 micrograms per cubic metre ($\mu g/m^3$) (twenty-four hour average), at or beyond the boundary of the site.

11. The discharges authorised by this consent shall not give rise to an odour 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.

12. The consent holder, in conjunction with the Taranaki Regional Council, shall undertake monitoring of emissions and their effects upon the environment as required by the Chief Executive, Taranaki Regional Council.

13. The consent holder shall convene an annual meeting of representatives of the Taranaki Regional Council, and interested submitters to application 2747, to discuss any matter relating to the exercise of this consent.

14. The Powder-5 facility may process skim milk powder only if the consent holder has:

    a) given five (5) days prior notice to the Chief Executive, Taranaki Regional Council; and
    b) developed a monitoring programme for the emissions and their effects upon the environment as required by the Chief Executive, Taranaki Regional Council.

15. The Taranaki Regional Council shall, within six (6) months of notice under condition 14, serve notice that it intends to review the conditions of this consent, in accordance with section 128(1)(a) of the Resource Management Act 1991, for the purpose of dealing with any significant adverse effect on the environment arising from the use of the Powder-5 plant for skim milk powder production.

16. 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 within six months of receiving a report prepared by the consent holder pursuant to condition 4 of this consent, or in any case in June 2010 and/or June 2015 and/or June 2020, for the purposes of:

    a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review; and/or
    b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or
    c) to alter, add, or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants; and/or
    d) taking into account any Act of Parliament, regulation, national policy statement, national environmental standard, regional policy statement or regional rule which relates to limiting, recording, or mitigating airborne contaminants and which is relevant to emissions from the milk and milk product processing plants and/or associated processes.

Signed at Stratford on 24 July 2018

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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date (Change):	12 January 2016
Commencement Date (Change):	12 January 2016 (Granted Date: 14 February 2014)

Conditions of Consent

Consent Granted:	To discharge stormwater, backwash and treated process water from the Whareroa milk processing site and the Water Treatment Plant into Unnamed Stream 18
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	89 Whareroa Road, Hawera
Legal Description:	Lot 2 DP 2777 Blk X Hawera SD (Discharge source) Lot 1 DP 18056 Blk X Hawera SD (Discharge site)
Grid Reference (NZTM)	1711420E-5614456N
Catchment:	Tangahoe
Tributary:	Unnamed Stream 18

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.

2. The storm water, backwash and treated process water discharged shall be from a catchment area not exceeding 22 hectares.

3. Before 31 August 2014, the consent holder shall prepare and maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. Before 31 August 2014, the consent holder shall prepare and maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to:

   a) cleaning procedures for the site catchments discharging to the Western Pond; and
   b) details of maintenance and cleaning programmes to remove the accumulated sediment from the ponds.

   A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

5. Prior to commissioning the Water Treatment Plant, the consent holder shall update and maintain the stormwater management plan required under condition 4 that documents how the site is to be managed to minimise the additional contaminants that became entrained in the stormwater. This plan shall be followed at all time, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to cleaning procedures for the site catchments discharging to the Pond.

6. After allowing for reasonable mixing, within a mixing zone extending 10 metres below the discharge point, the discharge 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 emissions of objectionable odour;
   d. the rendering of fresh water unsuitable for consumption by farm animals; and
   e. any significant adverse effects on aquatic life, habitats or ecology.

7. There shall be no visible bacterial and/or fungal growths downstream of the discharge.

8. Constituents of the discharge shall meet the standards shown in the following table for eight of ten consecutive samples taken at least two weeks apart over the course of an annual monitoring period:

Constituent	Standard
Oil and grease	Concentration not greater than 5 gm^{-3}
pH	Within the range 6.0 to 9.0
Suspended solids	Concentration not greater than 100 gm^{-3}
BOD	Concentration not greater than 15 gm^{-3} for the first two years following the date of issue of this consent, and 10 gm^{-3} thereafter
Filtered carbonaceous BOD	Concentration not greater than 3.5 gm^{-3} for the first two years following the date of issue of this consent, and 2 gm^{-3} thereafter
Temperature	Not greater than 25ºC
Total residual chlorine	Concentration not greater than 0.2 gm^{-3}

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

9. The consent holder shall maintain the existing fencing and planting of the riparian margins of the receiving water body for a distance of 500 metres downstream of the discharge point for the purpose of mitigating the effects of the discharge.

10. 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 2016 and/or June 2022, 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 12 January 2016

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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	3 February 2004
Commencement Date:	3 February 2004

Conditions of Consent

Consent Granted:	To discharge laboratory wastes onto and into land
Expiry Date:	1 June 2022
Review Date(s):	June 2016
Site Location:	Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 Blks IX & X Hawera SD
Grid Reference (NZTM)	1711450E-5613270N
Catchment:	Tangahoe Waihi

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 consent.

2. The exercise of this resource consent shall be undertaken generally in accordance with the documentation submitted in support of application 2746. In the case of any contradiction between the documentation submitted in support of application 2746 and the conditions of this consent, the conditions of this resource consent shall prevail.

3. The discharge authorised by this consent shall not exceed 1 m^3/day.

4. The consent holder shall provide a management plan for the discharge site to the Chief Executive, Taranaki Regional Council, for written approval within three months of the granting of this consent, and regularly updated as required, to ensure that the conditions of this consent can be met, including but not limited to:

   i) means of pit excavation;
   ii) pit preparation;
   iii) dimensions of each pit;
   iv) placement and covering of wastes;
   v) stormwater control;
   vi) site control;
   vii) nature of wastes;
   viii) location of all present and previous pits; and
   ix) an outline of the site options for future pit use.

5. The siting of each discharge pit shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.

6. The discharge shall not occur within 50 metres of any bore, well or spring used for water supply purposes, nor within 25 metres of any surface water body, nor within 100 metres from the coastal cliff edge.

7. The disposal pit(s) shall not intercept the water table.

8. The exercise of this consent, including the design and management of the disposal pit(s), shall not lead to or be liable to lead to contaminants entering a water body from overland surface flows.

9. The exercise of this consent shall not result in any adverse impacts on groundwater as a result of leaching, or surface water including aquatic ecosystems, and/or result in a change to the suitability of use of the receiving water as determined by the Chief Executive, Taranaki Regional Council.

10. The only wastes to be discharged shall be petri dishes, their content and the plastic which they are wrapped in.

11. The discharged material shall be covered with up to 50 millimetres of earth or other suitable cover, within a period of four hours or less following each disposal.

12. Each disposal pit shall be reinstated with a low permeability, clean, compacted soil cover with a minimum thickness of 0.5 metre to be placed over the material, and vegetation re-established to the satisfaction of the Chief Executive, Taranaki Regional Council.

13. The consent holder shall compact, contour, and maintain the cover layer of soil so as to ensure its integrity at all times to the satisfaction of the Chief Executive, Taranaki Regional Council.

14. The consent holder shall keep records of all uses of the pits including date, volume discharged, and product type, and make these available to the Chief Executive, Taranaki Regional Council, upon request.

15. 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 2010 and/or June 2016, 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.

Transferred at Stratford on 13 April 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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	17 October 2017
Commencement Date:	8 November 2017

Conditions of Consent

Consent Granted:	To discharge river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tawhiti Stream
Expiry Date:	1 June 2052
Review Date(s):	June 2018 and at 3-yearly intervals thereafter
Site Location:	Main South Road, Hawera
Grid Reference (NZTM)	1712861E-5616233N
Catchment:	Tangahoe
Tributary:	Tawhiti

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. After allowing for reasonable mixing within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not give rise to all or any of the following effects in the receiving water of the Tawhiti Stream:

   (a) the production of any conspicuous oil or grease films, scums or foams, or
   (b) floatable or suspended materials;
   (c) any conspicuous change in the colour or visual clarity;
   (d) any emission of objectionable odour;
   (e) the rendering of fresh water unsuitable for consumption by farm animals;
   (f) any significant adverse effects on aquatic life, habitats, or ecology;
   (g) an increase in turbidity of more than 50% (as determined using NTU - nephelometric turbidity units).

2. Within 6 months of the commencement date of this consent, the consent holder shall ensure a Monitoring Plan is prepared (the "Monitoring Plan"). The purpose of the Monitoring Plan is to identify the techniques, methods and procedures that will be employed to acquire data in relation to, and monitor compliance, with:

   (a) the conditions of this consent; and
   (b) the effects of the discharge authorised by this consent on:
      (i) instream habitat values, water quality and macroinvertebrate communities within the Tawhiti Stream; and
      (ii) native fish populations within the Tawhiti Stream.

   Advice Note:
   The Taranaki Regional Council assumes responsibility for the preparation and implementation of the Monitoring Plan for annual compliance purposes.

3. At all times, the consent holder shall implement and comply with those aspects of the Monitoring Plan for which the consent holder is responsible (as detailed in the Monitoring Plan).

4. 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 2018 and at 3-yearly intervals thereafter for the purposes 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 17 October 2017

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

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

Name of Consent Holder:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	17 October 2017
Commencement Date:	8 November 2017

Conditions of Consent

Consent Granted:	To occupy the Coastal Marine Area with and carry out routine maintenance on: • a marine outfall pipeline and diffuser structure approximately 1845 metres long; and • a rock wall approximately 100 metres long for the protection of the outfall, stream diversion pipelines and associated structures
Expiry Date:	1 June 2052
Review Date(s):	June 2021 and at 5-yearly intervals thereafter
Site Location:	Tasman Sea, Rifle Range Road, Hawera
Grid Reference (NZTM)	Between 1711294E-5612963N & 1711437E-5612906N
Catchment:	Tasman Sea

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 consent holder shall maintain the outfall and diffuser structures and the rock wall so that they continue to function effectively for their intended purpose.

2. The consent holder shall undertake a visual inspection of the outfall pipeline and diffuser each year. A report shall be submitted to the Taranaki Regional Council before 30 June each year (the "Annual Inspection Report") and shall include as a minimum:

   (a) the date and time of the inspection;
   (b) the condition of the outfall pipeline and diffuser; and
   (c) a description of any maintenance work required.

3. In the event, the Annual Inspection Report identifies that maintenance work is required, the consent holder shall prepare and submit to the Taranaki Regional Council a Maintenance Work Plan which describes the maintenance work to be carried out, how the work will be undertaken and the programme for completion of the work. The Maintenance Work Plan shall be approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity as being adequate to ensure the maintenance works will avoid, remedy or mitigate the environmental effects of any such works, prior to any of the identified maintenance works being carried out.

4. Within 20 working days of the completion of any maintenance works being carried out in accordance with an approved Maintenance Work Plan, the consent holder shall provide written confirmation of the completion of works to the Taranaki Regional Council.

5. The outfall pipeline shall not be visible on the foreshore at any time.

6. 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 2021 and at 5-yearly intervals thereafter for the purposes 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 17 October 2017

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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date (Change):	19 December 2012
Commencement Date (Change):	19 December 2012 (Granted Date: 03 February 2004)

Conditions of Consent

Consent Granted:	To discharge waste material from stormwater sumps and road sump and unprocessable dairy factory wastes onto and into land
Expiry Date:	1 June 2022
Review Date(s):	June 2016
Site Location:	Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 Blks IX & X Hawera SD (Discharge source & site)
Grid Reference (NZTM)	1711451E-5613271N
Catchment:	Unnamed catchment 18

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 consent.

2. Wherever practicable, the consent holder shall seek to dispose of unprocessable dairy factory wastes as authorised by this consent by irrigation to land in accordance with the following application loading limits:

   Nitrogen (N) – 250 kg/ha/year

   Chemical Oxygen Demand (COD) – 4500 kg/ha/day

3. The exercise of this resource consent shall be undertaken generally in accordance with the documentation submitted in support of applications 2748, 3326 and 7284. In the case of any contradiction between the documentation submitted in support of applications 2748, 3326 and 7284 and the conditions of this consent, the conditions of this resource consent shall prevail.

4. The discharge of stormwater sump cleanings and road sump cleanings authorised by this consent shall not exceed 120 cubic metres per week. The discharge of unprocessable dairy wastes authorised by this consent shall not exceed 250 cubic metres per day.

5. The consent holder shall provide a management plan for the discharge site to the Chief Executive, Taranaki Regional Council, for written approval within three months of the granting of this consent, and regularly updated as required, to ensure that the conditions of this consent can be met, including but not limited to:

   For Pit Disposal;

   i) Means of pit excavation;
   ii) Pit preparation;
   iii) Dimensions of each pit;
   iv) Placement and covering of wastes;
   v) Stormwater control;
   vi) Site control;
   vii) Nature of wastes
   viii) Location of all present and previous pits;
   ix) An outline of site options for future pit use;

   For Irrigation Disposal;

   x) Location and area (ha) of area used for irrigation;
   xi) Volume of material applied;
   xii) Application loading rates (N and COD);
   xiii) Mitigation measures for odour control.

6. The discharge shall not occur within 50 metres of any bore, well or spring used for water supply purposes, nor within 25 metres of any surface water body, nor within 100 metres from the coastal cliff edge.

7. The disposal pit(s) shall not intercept the water table.

8. The exercise of this consent, including the design and management of the burial pit(s), shall not lead to or be liable to lead to contaminants entering a water body from overland surface flows.

9. The exercise of this consent shall not result in any adverse impacts on groundwater as a result of leaching, or surface water including aquatic ecosystems, and/or result in a change to the suitability of use of the receiving water as determined by the Chief Executive, Taranaki Regional Council.

10. Where the discharge is to pits, the discharged material shall be covered with up to 50 millimetres of earth or other suitable cover, within a period of 7 days or less following each discharge.

11. All liquid shall be removed from the disposal pit prior to the application of covering material as required in special condition 9.

12. Only those materials as authorised by this consent and outlined in applications 2748, 3326 and 7284 shall be discharged of to the disposal pits or irrigated to land. Prior to each discharge operation the consent holder shall remove all non-biodegradable material entrained in the material to be discharged, as far as is practicable to the satisfaction of the Chief Executive, Taranaki Regional Council.

13. Each disposal pit shall be reinstated with a low permeability, clean, compacted soil cover with a minimum thickness of 0.5 metre to be placed over the material, and vegetation re-established to the satisfaction of the Chief Executive, Taranaki Regional Council.

14. The consent holder shall compact, contour, and maintain the cover layer of soil so as to ensure its integrity at all times to the satisfaction of the Chief Executive, Taranaki Regional Council.

15. The disposal of wastes as authorised by this consent shall not give rise to objectionable or offensive odours beyond the property boundary.

16. The consent holder shall keep records of all discharges to land including date, volume discharged, disposal method, disposal location, product type, and the reason for discharge and make these available to the Chief Executive, Taranaki Regional Council, upon request.

17. The discharge of unprocessable dairy waste under this consent shall only occur after all other reasonable waste disposal options have been exhausted, and the consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing of the options assessed.

18. 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 2010 and/or June 2016, 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.

Transferred at Stratford on 13 April 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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	3 February 2004
Commencement Date:	3 February 2004

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the disposal of laboratory wastes, and stormwater and sump cleanings onto and into land
Expiry Date:	1 June 2022
Review Date(s):	June 2016
Site Location:	Rifle Range Road, Hawera
Legal Description:	Lot 13 DP 2625 Blks IX & X Hawera SD
Grid Reference (NZTM)	1711450E-5613270N

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 resource consent shall be undertaken generally in accordance with the documentation submitted in support of application 2749. In the case of any contradiction between the documentation submitted in support of application 2749 and the conditions of this resource consent, the conditions of this resource consent shall prevail.

3. The consent holder shall provide a management plan for the discharge site to the Chief Executive, Taranaki Regional Council, for written approval within three months of the granting of this consent, and regularly updated as required, outlining methods to adopt the best practicable option to prevent or minimise adverse effects on the environment with respect to discharges to air.

4. That the discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

5. For the purposes of condition 4, without restriction, an odour shall be deemed to be offensive or objectionable if:

   (a) it is held to be so in the opinion of an 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 three (3) hours continuously, or it occurs frequently during a single period of more than six (6) hours; and/or
   (c) no less than three individuals from at least two different properties that are affected at the time, 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 as specified in (b). Each declaration shall include the individuals' names and addresses, the date and time the objectionable or offensive odour was detected, the location of the individual when it was detected and the prevailing weather conditions during the event. The declarations shall be signed and dated.

6. 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 2010 and/or June 2016, 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.

Transferred at Stratford on 13 April 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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	17 October 2017
Commencement Date:	8 November 2017

Conditions of Consent

Consent Granted:	To discharge river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tangahoe River
Expiry Date:	1 June 2052
Review Date(s):	June 2018 and at 3-yearly intervals thereafter
Site Location:	135 Hicks Road, Hawera
Grid Reference (NZTM)	1715769E-5612503N
Catchment:	Tangahoe

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. After allowing for reasonable mixing within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not give rise to all or any of the following effects in the receiving water of the Tangahoe River:

   (a) the production of any conspicuous oil or grease films, scums or foams, or
   (b) floatable or suspended materials;
   (c) any conspicuous change in the colour or visual clarity;
   (d) any emission of objectionable odour;
   (e) the rendering of fresh water unsuitable for consumption by farm animals;
   (f) any significant adverse effects on aquatic life, habitats, or ecology;
   (g) an increase in turbidity of more than 50% (as determined using NTU - nephelometric turbidity units).

2. Within 6 months of the commencement date of this consent, the consent holder shall ensure a Monitoring Plan is prepared (the "Monitoring Plan"). The purpose of the Monitoring Plan is to identify the techniques, methods and procedures that will be employed to acquire data in relation to, and monitor compliance, with:

   (a) the conditions of this consent; and
   (b) the effects of the discharge authorised by this consent on:
      (i) instream habitat values, water quality and macroinvertebrate communities within the Tangahoe River; and
      (ii) native fish populations within the Tangahoe River.

   Advice Note:
   The Taranaki Regional Council assumes responsibility for the preparation and implementation of the Monitoring Plan for annual compliance purposes.

3. At all times, the consent holder shall implement and comply with those aspects of the Monitoring Plan for which the consent holder is responsible (as detailed in the Monitoring Plan).

4. 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 2018 and at 3-yearly intervals thereafter for the purposes 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 17 October 2017

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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date (Change):	9 June 2015
Commencement Date (Change):	9 June 2015 (Granted: 7 December 2005)

Conditions of Consent

Consent Granted:	To discharge emissions into the air from dual fuel boilers (gas or coal) with a maximum energy output of 250 MW together with associated processes
Expiry Date:	1 June 2034
Review Date(s):	June 2016, June 2022, June 2028
Site Location:	Whareroa Road, Hawera
Legal Description:	Pt Lot 2 DP 15204 Lot 1 DP 15204 Lot 3 DP 19882 Blk X Hawera SD
Grid Reference (NZTM)	1711850E-5615170N

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

Best practicable option and mitigation

1. The consent holder shall 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 into the environment from the site.

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 2785. In the case of any contradiction between the documentation submitted in support of application 2785 and the conditions of this consent, the conditions of this consent shall prevail.

3. Other than as set out within this consent, the characteristics of any coal burned in the exercise of this consent shall be as generally described and/or achieve a similar level of environmental performance as set out in the documentation supporting the application for this consent.

4. A general outline of the methods, specifications, operating guidelines or other measures which represent the best practicable option at the time of commissioning shall be supplied by the consent holder to the Chief Executive, Taranaki Regional Council, within three months of the commissioning of the energy centre, and thereafter attached to this consent as Schedule A. Matters to be addressed in Schedule A shall include, but not be limited to: preferred fuel type and specification; air pollution abatement systems; combustion temperatures; definitions of 'cold start' and 'warm start'; measures to be used in the case of sudden loss of boiler capacity; minimum operating temperatures for baghouses; air fuel ratios; discharge (stack exit) velocities; and protocols for measuring the sulphur content of fuel on an on-going basis. This schedule can be amended by the consent holder at any time during the term of this consent to reflect changes in the methods, specifications, operating guidelines or other measures.

5. The measures representing the best practicable option may be reviewed in accordance with the procedure provided for in condition 29.

6. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control

equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

7. The minimum height of discharges to the atmosphere from the energy centre boiler stack shall be 60 metres above the ground level prevailing at the time of lodging the application for this consent.

8. Prior to undertaking any alterations to the plant, processes or operations, as specified in application 2785, which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and any amendments.

Emission limits

9. Discharges to the atmosphere from the energy centre boiler stack shall not exceed 20% obscuration, as measured by the photoelectric obscuration gauge and corrected for path length and temperature as set out in Addendum No. 1 (1972) to 2BS2742:1969, or any replacement measurement standard, for any continuous period of 2 minutes or for more than 4 minutes cumulative in any 60 minute period, except:

   (a) for up to 120 hours (cumulative) per boiler for initial commissioning of each boiler; and

   (b) for up to 250 hours (cumulative) per year for the purpose of lighting up all boilers from cold; and

   (c) for up to 100 hours (cumulative) per year for the purpose of lighting up all boilers from warm.

10. Discharges to the atmosphere of particulate from the energy centre boiler stack shall not exceed 100 milligrams per cubic metre (mg/Nm^3) adjusted to 12% carbon dioxide (CO_2) on a dry gas basis, except during those circumstances described in special condition 9(a), 9(b), and 9(c).

11. The sum of all discharges to the atmosphere of sulphur dioxide from the energy centre boiler stack shall not exceed 385 kilograms per hour (kg/hr).

12. The sum of all discharges to the atmosphere of particulate from the energy centre boiler stack shall not exceed 43 kilograms per hour (kg/hr).

13. The sum of all discharges to the atmosphere of nitrogen oxides from the energy centre boiler stack shall not exceed 319 kilograms per hour (kg/hr).

Ambient and workplace limits

14. The consent holder shall control all discharges of sulphur dioxide to the atmosphere from the site, in order that the maximum ground level concentration of sulphur dioxide arising from the exercise of this consent measured under ambient conditions on land does not exceed 350 micrograms per cubic metre (one-hour average exposure) or 120 micrograms per cubic metre (twenty-four hour average exposure) at or beyond the boundary of the site.

15. The consent holder shall control all discharges of nitrogen dioxide or its precursors to the atmosphere from the energy centre boiler stack, whether alone or in conjunction with any other discharges to the atmosphere from the site, in order that the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 200 micrograms per cubic metre (one hour average exposure), or 100 micrograms per cubic metre (twenty-four hour average exposure), at or beyond the boundary of the site.

16. The consent holder shall control all discharges of particulate of effective diameter of less than 10 micrometres (PM_{10}) to the atmosphere from the energy centre boiler stack, whether alone or in conjunction with any other discharges to the atmosphere from the site, in order that the maximum ground level concentration of PM_{10} arising from the exercise of this consent measured under ambient conditions does not exceed 50 micrograms per cubic metre (twenty-four hour average exposure), at or beyond the boundary of the site, or at points within the site boundary where non-occupational exposure is likely to occur (such as residential dwellings).

17. The consent holder shall control all discharges of metals to the atmosphere from the energy centre boiler stack, whether alone or in conjunction with any other discharges to the atmosphere from the site, in order that the maximum ground level concentration of each or any metal arising from the exercise of this consent measured under ambient conditions does not exceed their respective guideline value set out in the 'Ambient Air Quality Guidelines 2002 Update', Air Quality Report No 32, Prepared by the Ministry for the Environment and the Ministry of Health, May 2002.

18. The consent holder shall control discharges to the atmosphere from the energy centre boiler stack of contaminants other than carbon dioxide and those addressed in conditions 10 to 17 above, whether alone or in conjunction with any discharges to the atmosphere from the site, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the site, is not increased above background levels:

    (a) by more than $1/30^{th}$ of the relevant Workplace Exposure Standard-Time Weighted Average, or by more than the Workplace Exposure Standard-Short Term Exposure Limit at any time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour); or

    (b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour).

19. The discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora and microfauna.

Recording and reporting

20. Analysis of the coal (including but not limited to the sulphur and ash content of the coal) shall be undertaken on a monthly basis during the processing season. This shall be undertaken upon the coal blend that is supplied to the consent holder. The sampling of the coal blend shall be a composite sample generated by daily sub-sampling of the coal blend that is delivered to the consent holder. The information shall be provided to the Chief Executive, Taranaki Regional Council, upon request.

21. The consent holder shall install, operate, maintain and calibrate:

    (a) opacity meters;
    (b) sulphur dioxide meters;
    (c) temperature meters;
    (d) oxygen meters; and
    (e) carbon monoxide meters.

    for the measuring and recording of the respective parameters in the discharge stack from the boilers, to the satisfaction of the Chief Executive, Taranaki Regional Council.

22. The consent holder shall annually undertake source emission monitoring to the satisfaction of the Chief Executive, Taranaki Regional Council. The monitoring shall include a determination of the exhaust concentrations of sulphur dioxide, total suspended particulates, and PM_{10} particulates, in the manner set out in condition F1 within the application lodged for this consent, or to an equivalent standard. In addition, the consent holder shall monitor for mercury and arsenic, and the temperatures of the exhaust gases together with the generation loads prevailing at the time giving rise to those concentrations and mass emissions as determined in monitoring of the emissions. The results of the monitoring shall be provided to the Chief Executive, Taranaki Regional Council, and shall be made available annually to those invited to the liaison meeting convened under special condition 27.

23. A monitoring programme agreed between the consent holder and the Taranaki Regional Council, and provided to the Taranaki District Health Board and interested submitters to application 2785, shall be prepared within three months of the granting of this consent. The monitoring programme shall cover (at a minimum): monitoring for ground level ambient concentrations of sulphur dioxide; soil and vegetation levels of mercury, arsenic, and sulphates at reference sites; levels of mercury and arsenic within aquatic species; and a model validation monitoring survey for PM_{10} (monitoring to be carried out to a recognised standard, by an accredited laboratory).

24. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, within two years from the granting of this consent and again at four years from the granting of this consent and every six years thereafter a written report:

    (a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of sulphur dioxide, dioxins, and heavy metals, how these might be applicable and/or implemented at the energy centre, and the costs and benefits of these advances; and

    (b) addressing any other issue relevant to the minimisation or mitigation of emissions from the site that the Chief Executive, Taranaki Regional Council, reasonably considers should be included.

25. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, within twelve months from the exercising of this consent and again every 12 months thereafter while the consent is being exercised, a written report:

    (a) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify (in accordance with the emissions identified in the application) following consultation with the consent holder;

    (b) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the energy centre; and

    (c) detailing average sulphur content and maximum sulphur content (based on monthly analyses of daily representative samples) of all fuel consumed at the site and volume of fuel consumed, during the previous twelve months.

26. The consent holder shall develop or procure a cultural impact report within 12 months of the granting of this consent.

Liaison meeting

27. The consent holder shall invite staff of the Taranaki Regional Council and interested submitters to application 2785 to meet annually to discuss any matter relating to the exercise of this consent. The first liaison meeting shall be held within 12 months of the commissioning of the energy centre.

Lapse and review

28. This consent shall lapse on 1 June 2034, 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.

29. 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 within two months of receiving a report prepared by the consent holder pursuant to conditions 24, 25, and 26 of this consent, or following non-compliance with special condition 14, or in any case in June 2010 and/or June 2016 and/or June 2022 and/or June 2028, for the purposes of:

    (a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was either not foreseen at the time the application was considered or which it is appropriate to deal with at the time of the review;

    (b) requiring the holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge;

    (c) altering, adding, or deleting limits on discharge, receiving environment or ambient concentrations of any contaminant or contaminants, for the purpose of dealing with any significant adverse ecological effect on any ecosystem; or

    (d) taking into account any Act of Parliament, regulation, national policy statement or national environmental standard which relates to setting maximum discharge or ambient concentrations of any air contaminant, and/or limiting, recording, or mitigating emissions of carbon dioxide, PM_{10} particulate, heavy metals, sulphur dioxide, and/or nitrogen dioxide, and which is relevant to the air discharge from the consent holder's energy centre if it is the express intention of any such mechanism to apply retrospectively to existing activities.

Signed at Stratford on 9 June 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:	Fonterra Limited PO Box 444 Hawera 4640	
Decision Date (Change):	23 October 2018	
Commencement Date (Change):	23 October 2018	(Granted Date: 4 October 2006)

Conditions of Consent

Consent Granted:	To discharge emissions into the air from 'Cogen-I' and 'Cogen-II' co-generation energy generating plants with an energy output of 70 MW together with associated processes
Expiry Date:	1 June 2025
Review Date(s):	June 2020
Site Location:	Whareroa Road, Hawera
Grid Reference (NZTM)	1711450E-5614870N

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 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 into the environment from the site.

2. The measures representing the best practicable option may be reviewed in accordance with the procedure provided for in condition 19.

3. Prior to undertaking any alterations to the plant, processes or operations, as specified in the original application and any subsequent applications to change consent conditions which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, and shall obtain any necessary approvals under the Resource Management Act 1991 and any amendments.

4. The consent holder shall provide to the Taranaki Regional Council within five years from the granting of this consent and every six years thereafter a written report:
   a) reviewing any technological advances in the reduction or mitigation of emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances; and
   b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, may from time to time specify following consultation with the consent holder; and
   c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the Whareroa site; and
   d) addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive considers should be included.

5. The boilers shall only be heated using natural gas, except that diesel may be used in the following circumstances:
   a) for temporary emergency heat/steam supply in the event of natural gas supply interruption; and
   b) for short duration testing purposes.

6. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing on each occasion that diesel combustion is used in the co-generation plants. The notification shall include the date and duration of the activity, the reason for the use of diesel, and shall be emailed to worknotification@trc.govt.nz.

7. Diesel combusted in the boilers shall comply with Schedule 2 of the Engine Fuel Specifications regulations 2011, or subsequent amendments.

8. The consent holder shall control all emissions of sulphur dioxide to the atmosphere from the site, in order that the maximum ground level concentration of sulphur dioxide arising from the exercise of this consent measured under ambient conditions on land does not exceed 350 micrograms per cubic metre (one-hour average exposure) or 125 micrograms per cubic metre (twenty-four hour average exposure) at or beyond the boundary of the site.

9. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre (mg/m^3) (eight- hour average exposure), or 30 milligrams per cubic metre (mg/m^3) (one-hour average exposure) at or beyond the boundary of the site.

10. The sum of all discharges to the atmosphere of nitrogen oxides from the cogeneration plant shall not exceed 48 grams per second (g/s).

11. The consent holder shall control all emissions of nitrogen dioxide or its precursors to the atmosphere from the site, so as to ensure that the maximum ground level concentration of nitrogen dioxide measured under ambient conditions does not exceed 200 micrograms per cubic metre ($\mu g/m^3$) (one-hour average), or 100 micrograms per cubic metre ($\mu g/m^3$) (twenty-four hour average), at or beyond the boundary of the site.

12. The consent holder shall control all emissions of fine particulates (PM_{10}) to the atmosphere from the site, in order that the maximum ground level concentration of fine particulates (PM_{10}) arising from the exercise of this consent measured under ambient conditions does not exceed 50 micrograms per cubic metre ($\mu g/m^3$) (twenty-four hour average), at or beyond the boundary of the site.

13. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the site is not increased above background levels:

    a) by more than $1/30^{th}$ of the relevant Workplace Exposure Standard-Time Weighted Average, or by more than the Workplace Exposure Standard Short Term Exposure Limit at any time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour); or
    b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour).

14. The minimum height of discharge of products of combustion from the Cogen I plant shall be 15 metres above ground level, and from Cogen II plant shall be 17.5 metres above ground.

15. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

16. The consent holder, in conjunction with the Taranaki Regional Council, shall undertake monitoring of emissions and their effects upon the environment as required by the Chief Executive.

17. Notwithstanding conditions 1 and 15 above, the co-generation plants shall not be operated so as to generate emissions of visible smoke, nor shall any plume of visible water vapour from the cooling towers cross the boundary of the site.

18. The water treatment regime used in the cooling water system associated with Cogen I and Cogen II shall be to the satisfaction of the Chief Executive.

19. 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 within six months of receiving a report prepared by the consent holder pursuant to condition 4 of this consent, or in any case in June 2010 and/or June 2015 and/or June 2020, for the purposes of:

    a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review; and/or
    b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or
    c) to alter, add, or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants; and/or
    d) taking into account any Act of Parliament, regulation, national policy statement, regional policy statement or regional rule which relates to limiting, recording, or mitigating products of combustion and which is relevant to emissions from the co-generation plants.

Signed at Stratford on 23 October 2018

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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	31 March 2009
Commencement Date:	31 March 2009

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the combustion of waste wood packaging
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 Blks IX & X Hawera SD
Grid Reference (NZTM)	1711447E-5613278N

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 only authorises the combustion of untreated timber packing waste originating from the Whareroa Dairy Factory site.

2. The total volume of waste that can be burned in calendar month shall not exceed 4 cubic metres.

3. 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 by ensuring proper and effective methods of control and supervision of the discharge at all times.

4. The consent holder, prior to lighting any fire, shall have regard to wind direction and speed so as to minimise adverse effects upon neighbours. No burning shall occur during foggy conditions.

5. The discharges authorized 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.

6. The discharges authorized by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

7. The consent holder shall maintain a record of each burning event, including: the date, time and duration; the wind conditions [strength and direction] over the duration of the burning; any problems or issues that occurred; and details of any complaints received about the burning. This record shall be made available to the Chief Executive, Taranaki Regional Council upon request.

8. This consent shall lapse on 31 March 2014, 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 2016 and/or June 2022 for the purpose or purposes 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.

Transferred at Stratford on 13 April 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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	03 June 2014
Commencement Date:	03 June 2014

Conditions of Consent

Consent Granted:	To discharge dairy liquids onto land and the associated emissions to air, in various locations throughout the Taranaki region
Expiry Date:	01 June 2034
Review Date(s):	June 2017, June 2020, June 2023, June 2026, June 2029, June 2032
Site Location:	Various locations throughout the Taranaki region
Legal Description:	Various locations throughout the Taranaki region
Grid Reference (NZTM)	Various locations throughout the Taranaki region
Catchment:	Various locations throughout the Taranaki region

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 dairy liquids to be discharged shall be limited to the following:

   (a) ***Dairy by-products***, which typically include, but are not limited to biomass or biosolids (drawn off from biological treatment plants); unused intermediate product of residue streams (such as stockfood and whey) and dissolved air flotation (DAF) sludge (fat and protein skimmed off liquid streams);

   (b) ***Unprocessable dairy products***, which typically include, but are not limited to silo and tank sediments; raw milk not accepted at the manufacturing site and other dairy products either contaminated or unfit for further processing; and

   (c) ***Surplus dairy products***, such as raw milk, permeate (PM18 and PM30) and buttermilk (including secondary skim and beta serum) that the consent holder is unable to process.

2. The exercise of this consent shall be in accordance with a Dairy Liquids Spreading Management Plan (DLSMP), prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The DLSMP shall detail how the discharge activity will be managed to achieve compliance with the conditions of this consent and shall include, but not limited to, the following:

   (a) storage of dairy liquids;
   (b) designated application areas and buffer zones for streams and property boundaries;
   (c) selection of appropriate irrigation methods for different types of terrain;
   (d) application rate and duration;
   (e) application frequency and nitrogen loading rate;
   (f) farm management and operator training;
   (g) soil and herbage management;
   (h) prevention of runoff and ponding;
   (i) minimisation and control of odour and spray drift effects off site;
   (j) operational control and maintenance of the spray irrigation system;
   (k) monitoring of the effluent (physicochemical);
   (l) recording of application sites, discharge volumes, rates, frequency, duration, dates and equipment operator details;
   (m) remediation measures;
   (n) mitigation measures including screening of any storage facilities and riparian planting;
   (o) reporting monitoring data;
   (p) procedures for responding to complaints; and
   (q) notification to the Taranaki Regional Council of non-compliance with conditions of this consent.

3. Before July 15 each year, the consent holder shall notify the Taranaki Regional Council, by sending an email to worknotification@trc.govt.nz of the intent to discharge dairy liquids to land, including details of the locations and Farm IDs onto which the discharges will occur (as shown in the register). If dairy liquids are subsequently intended to be discharged onto any other land in that season, the consent holder shall notify the Taranaki Regional Council of that intention at least 2 working days in advance of such discharge occurring.

4. The discharge shall not result in any liquids ponding for more than 30 minutes.

5. The discharge shall not result in any liquids reaching surface water, any subsurface drainage system or any adjacent property.

6. 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.

7. There shall be no spray drift as a result of the irrigation of dairy liquids at or beyond the boundary of the property or properties on which spray irrigation is occurring.

8. The dairy liquids for discharge shall not have a sodium adsorption ratio (SAR) exceeding 15.

9. The nitrogen loading rate on land irrigated with dairy liquids, as a consequence of:

   (a) the exercise of this consent; and/or
   (b) the disposal of dairy farm effluent; and/or
   (c) the disposal of any other waste or fertilizer;

   shall not exceed a combined total of:

   (d) 200 kilograms of nitrogen per hectare per year on land used for grazing; or
   (e) 300 kilograms of nitrogen per hectare per year where a crop such as maize, silage or hay is harvested from the land in the same season that dairy liquids are applied.

10. The discharge shall not occur within the following minimum buffer distances:

    (a) 25 metres from the banks of any watercourse;
    (b) 20 metres from any public road;
    (c) 20 metres from any property boundary, unless the written approval of the adjoining occupier has been obtained to allow the discharge at a lesser distance;
    (d) 50 metres from any bore, well or spring used for water supply purposes;
    (e) 150 metres from any dwelling house or place of public assembly unless the written approval of the occupier has been obtained to allow the discharge at a lesser distance; and
    (f) 300 metres from any school property.

11. There shall be no discharge within, adjacent to or directly impacting on any Statutory Acknowledgment Area.

12. There shall be no offensive or objectionable odour at or beyond the boundary of the property or properties on which a discharge occurs.

13. The consent holder shall notify the Taranaki Regional Council as soon as practicable and, as a minimum, within 48 hours, of any accidental discharge, equipment breakdown or other event which is likely to result in a breach of the conditions of this consent.

14. The consent holder shall maintain a complaints register for all aspects of the dairy liquids application activity. The register shall detail the date, time and type of complaint, cause of the complaint and action taken by the consent holder in response to the complaint. The register shall be available to the Taranaki Regional Council at all reasonable times. The consent holder shall forward a copy of each complaint received regarding odour, runoff or spray drift to the Taranaki Regional Council as soon as practicable but in any event within 48 hours of the complaint being made.

15. If, as a consequence of the activities authorised by these consents, an event occurs that may have a significant adverse effect on water quality at any registered drinking-water supply abstraction point, the consent holder shall, as soon as reasonably practicable, telephone the Taranaki Regional Council and the water supply operator and notify them of the event.

16. The consent holder shall keep a record of the application sites for the discharge of dairy liquids, including , but not limited to the following information:

    (a) Type/characteristics of dairy liquids discharged;
    (b) Date of discharge;
    (c) Time/ duration of discharge;
    (d) Volume and rate of discharge;
    (e) Method of discharge;
    (f) Name of equipment operator; and
    (g) Location of the nearest watercourse, bore, property boundary; dwelling house; school, community halls, marae, and public road.

    This record shall be kept and made available to the Chief Executive, Taranaki Regional Council, on request.

17. The following details of all farms used for dairy liquids spreading shall be recorded in a Farm Register, which shall be submitted to the Taranaki Regional Council:

    (a) Name of the farm/property;
    (b) Owner of the property;
    (c) Physical address, Legal description and NZTopo50 map reference;
    (d) Area available for irrigation (ha);
    (e) General soil type, if known;
    (f) Distance to any sensitive neighbours if closer than 300 metres from the farm, e.g. schools, community halls, marae.

    Any new farms that become available for dairy liquids spreading shall be added the Farm Register, and the updated Register shall be provided to the Taranaki Regional Council.

18. This consent shall lapse on 30 June 2019, unless the consent is given effect to before the end of that period, of the Taranaki Regonal Council fixes a longer period pursuant to Section 125(1)(b) of the Resource Management Plan 1991.

19. 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 2020, and/or June 2023, and/or June 2026, and/or June 2029, and/or June 2032 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 03 June 2014

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

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:	Fonterra Limited PO Box 444 Hawera 4640
Decision Date:	25 February 2016
Commencement Date:	25 February 2016

Conditions of Consent

Consent Granted:	To construct, place and use a water intake structure in the bed of the Tangahoe River for industrial water supply purposes, including associated discharge of construction stormwater from the site
Expiry Date:	1 June 2034
Review Date(s):	June 2022, June 2028
Site Location:	135 Hicks Road, Hawera
Legal Description:	Lot 2 DP 372563 (Site of structure)
Grid Reference (NZTM)	1715770E-5612494N
Catchment:	Tangahoe

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 water intake structure shall be constructed in accordance with information provide with the application, specifically:
   - The Assessment of Environmental effects prepared by *Planz Consultants Limited*, referenced *14425* and dated *December 2015*;
   - *Intake Screen Concept Plans* prepared by *Beca Consultants Limited*, referenced *3253783-CE*, drawing numbers *5000; 5001 & 5002* and dated *16/11/15*; and
   - *Fonterra Water Intake – Tangahoe Stream Crossing Sections*, prepared by *BTW Consultants Limited*, drawing number and dated *19/01/15*.

   In the case of any contradiction between the drawing(s) and the conditions of this consent, the conditions of this consent shall prevail.

2. Prior to the commencement of the works, the consent holder shall install suitable signage at the upstream and downstream approach of the site, advising the public of the potential navigation hazard. The signage shall be maintained throughout the life of the water-intake structure.

3. Before commencing any earthworks, the consent holder shall ensure that they (or their representatives) meet on site with a Taranaki Regional Council officer who is directly responsible for monitoring compliance with the conditions of this consent. The purpose of the meeting shall be to obtain specific advice from the Taranaki Regional Council about the measures required to ensure compliance with conditions 5 and 6.

4. The consent holder shall ensure that prior to the commencement of earthworks, the erosion control measures are installed in accordance with the *Erosion and Sediment Control Plan* prepared by *Fulton Hogan Limited*, titled, *Tangahoe Intake Upgrade: Erosion and Sediment Control: Stream Control / Construction Methodology*, referenced *ESC #001* and dated *25 January 2016*.

5. The sediment control measures necessary to comply with the conditions of this consent shall be constructed before soil is exposed at the site and shall remain in place, in respect of any particular area, until that area is stabilised. The obligation described in this condition shall cease to apply, and accordingly the erosion and sediment control measures may be removed, in respect of any particular area only when the site is stabilised.

   Note: For the purpose of conditions 5 and 6, 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Taranaki Regional Council's Guidelines for Earthworks in the Taranaki Region, 2006. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.

6. All earthworked areas shall be stabilised vegetatively or otherwise as soon as is practicable and no longer than 6 months after the completion of soil disturbance activities.

7. At least 7 working days prior to the commencement of works the consent holder shall notify the Taranaki Regional Council of the proposed start date for the work. Notification shall include the consent number and a brief description of the activity consented and shall be emailed to worknotification@trc.govt.nz.

8. Any concrete work carried out in the river bed shall be completely separated from running water, by a temporary coffer-dam and/or diversion using sand bags or some other form of contained fill.

9. The consent holder shall ensure that any concrete placed in the channel is not exposed to flowing water for a period of 48 hours after it has been placed.

10. The consent holder shall ensure that the placement of the bank protection structures (gabions and/or mass block) proposed in Stage 3 of the Erosion and Sediment Control Plan (ESCP) is undertaken when the coffer dam proposed under Stage 2 of the ESCP is in place. The bank protection structures shall be embedded in the bed of the stream by at least 500 mm.

11. No instream works shall take place between 1 May and 31 October inclusive.

12. The consent holder shall ensure that the area and volume of stream bed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.

13. The consent holder shall take all reasonable steps to:

    a. minimise the amount of sediment discharged to the stream;
    b. minimise the amount of sediment that becomes suspended in the stream; and
    c. mitigate the effects of any sediment in the stream.

14. 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.

15. During the exercise of this consent, and on completion of the works, no stockpiles, mounds, depressions, trees/vegetation, holes or surplus material shall be left in a position where it may adversely affect the flow of water.

16. On completion of works, the banks of the Tangahoe River shall be no steeper than the existing natural banks. Where the bank consists of fill, the fill must be well compacted with batter slopes no steeper than 2 horizontal to 1 vertical.

17. The works shall remain the responsibility of the consent holder and be maintained so that any erosion, scour or instability of the stream bed or banks that is attributable to the works carried out as part of this consent is remedied by the consent holder.

18. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.

19. This consent shall lapse on 31 March 2021, 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.

20. 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 2022 and/or June 2028, 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 25 February 2016

For and on behalf of
Taranaki Regional Council

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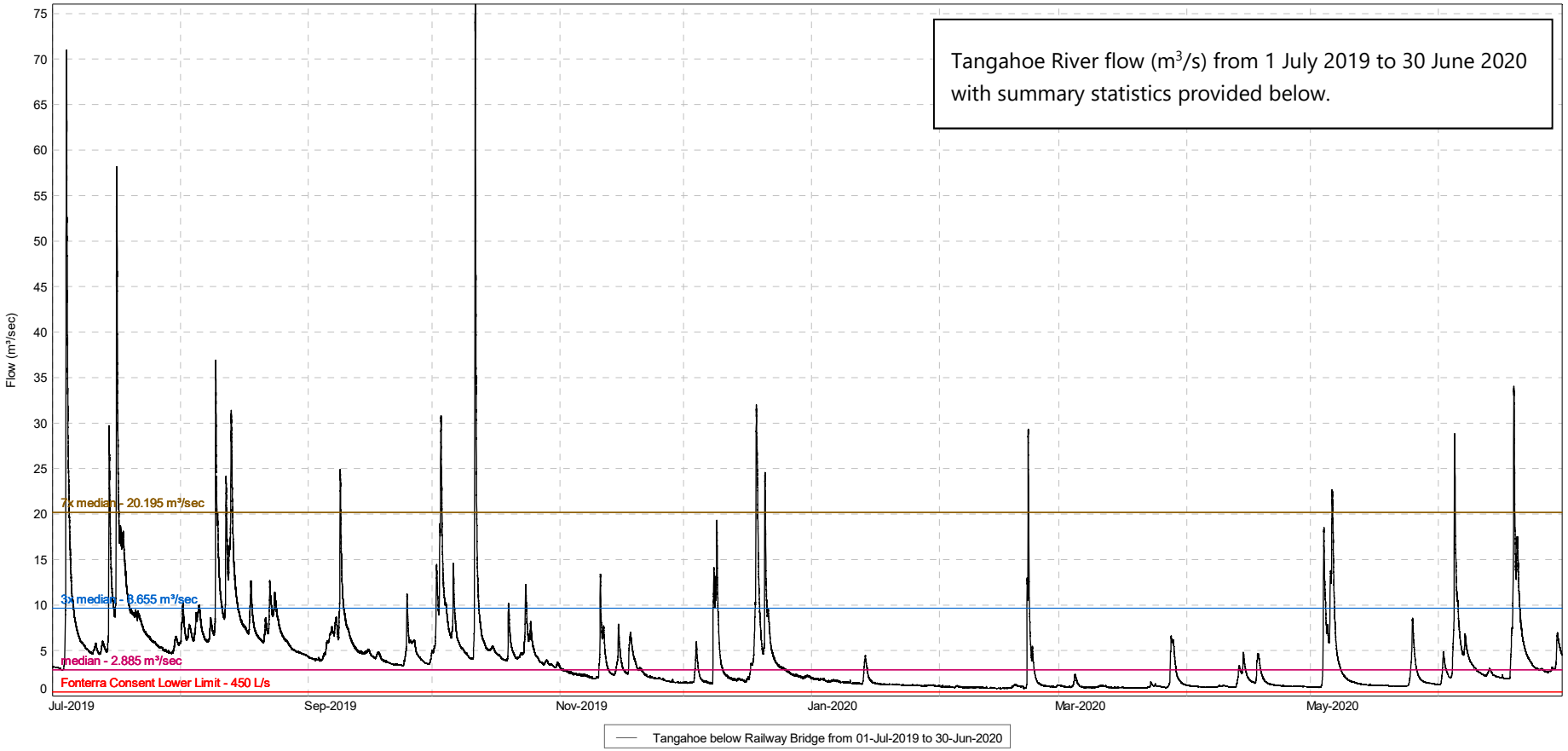
A D McLay
Director - Resource Management

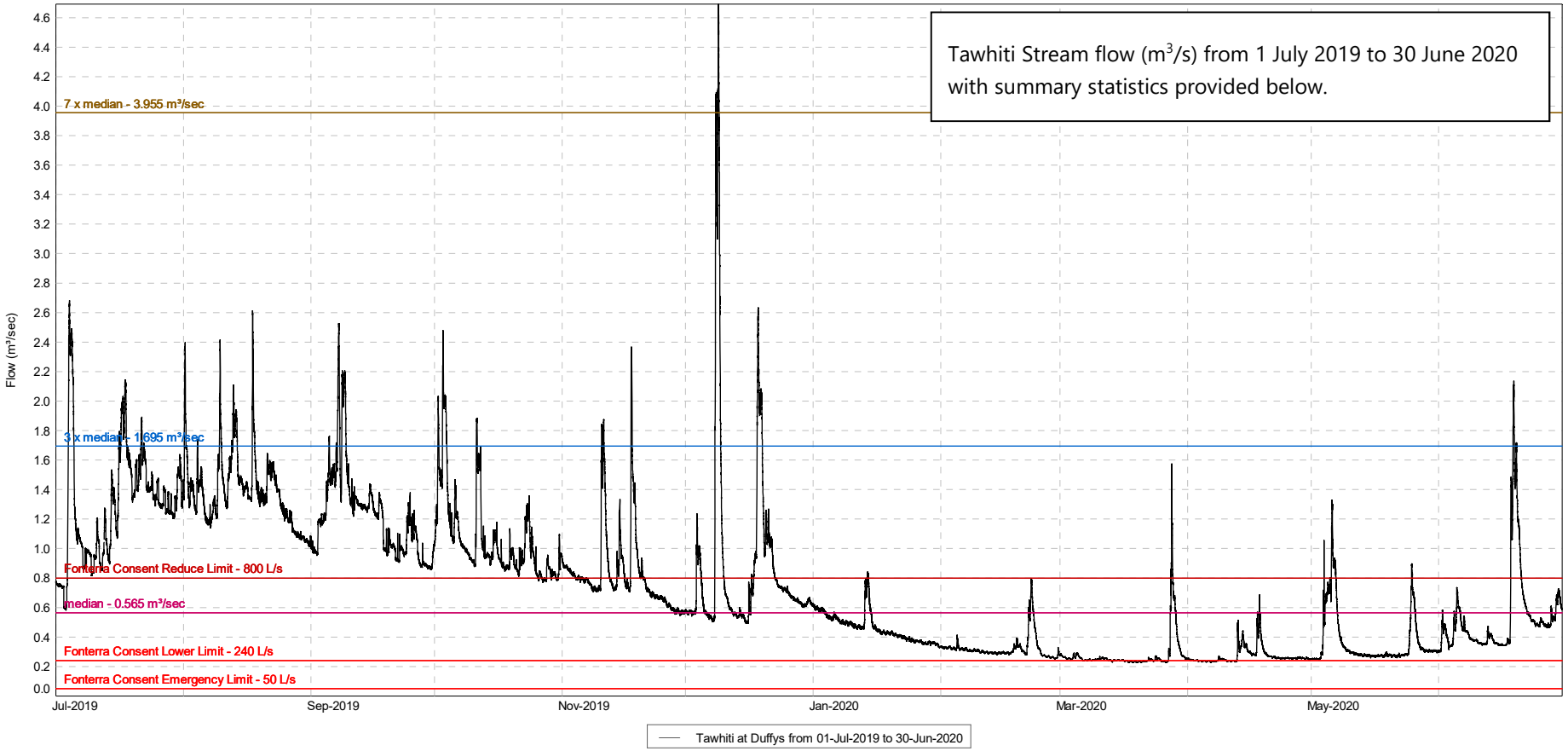
Appendix II

Fonterra Whareroa water abstraction: Hydrographs and summary statistics 2019-2020



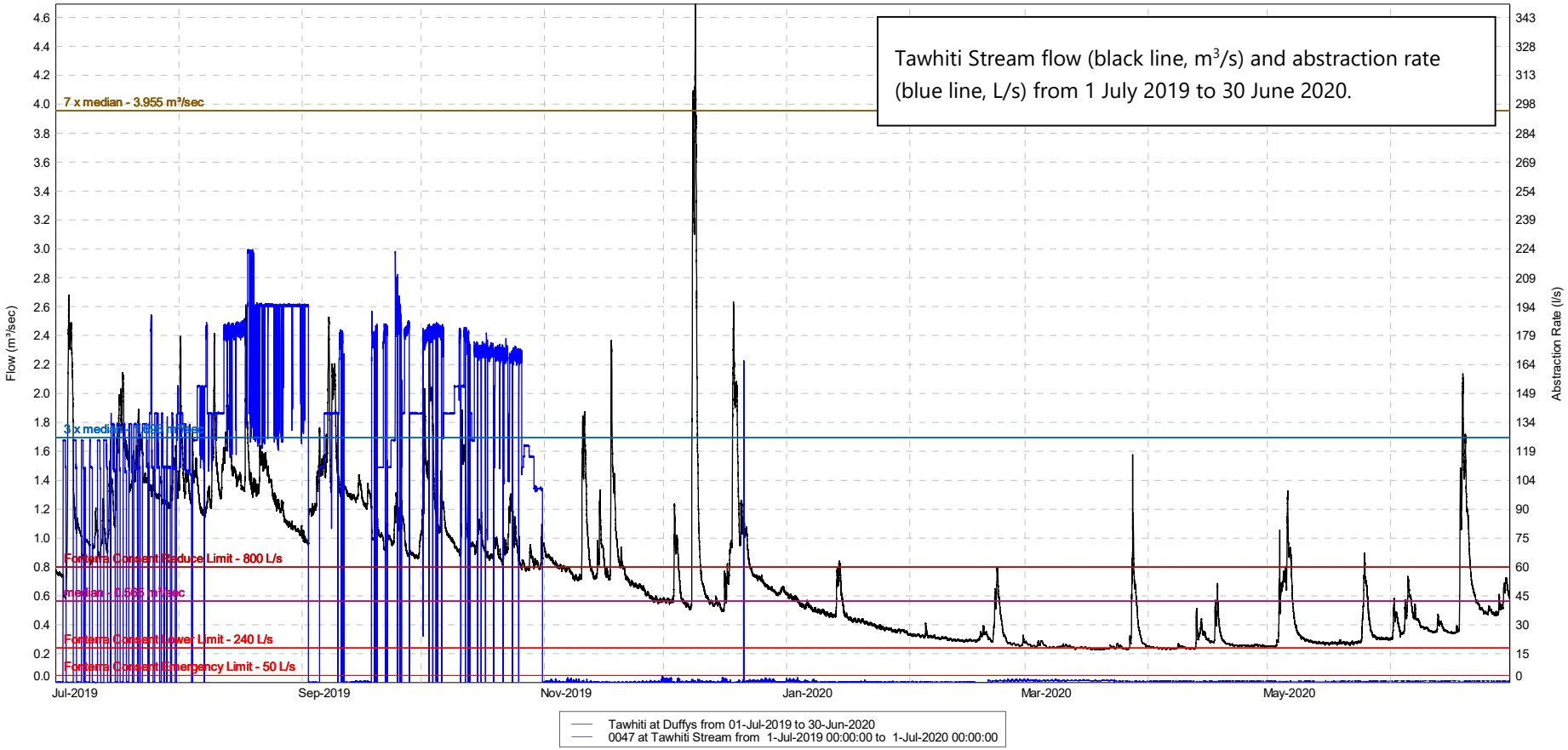
Flow (m³/sec) at Tangahoe below Railway Bridge
From 1-Jul-2019 00:00:00 to 1-Jul-2020 00:00:00

Minimum is	0.808	at 16-Feb-2020 20:45:00
Maximum is	76.025	at 11-Oct-2019 11:45:00
Mean	4.131	
Median	2.570	
Std Deviation	4.877	
COV	1.181	



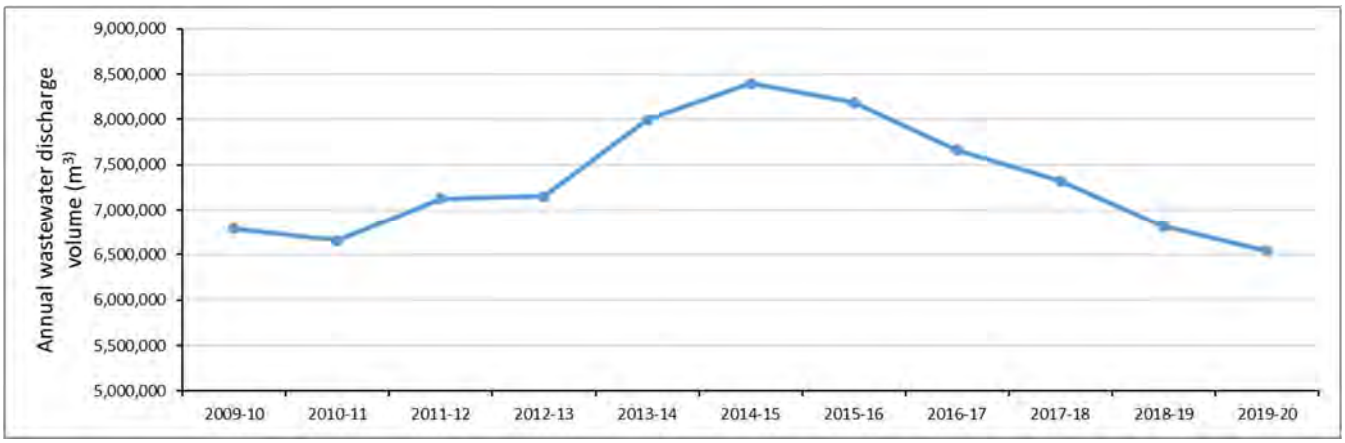
Flow (m³/sec) at Tawhiti at Duffys
From 1-Jul-2019 00:00:00 to 1-Jul-2020 00:00:00

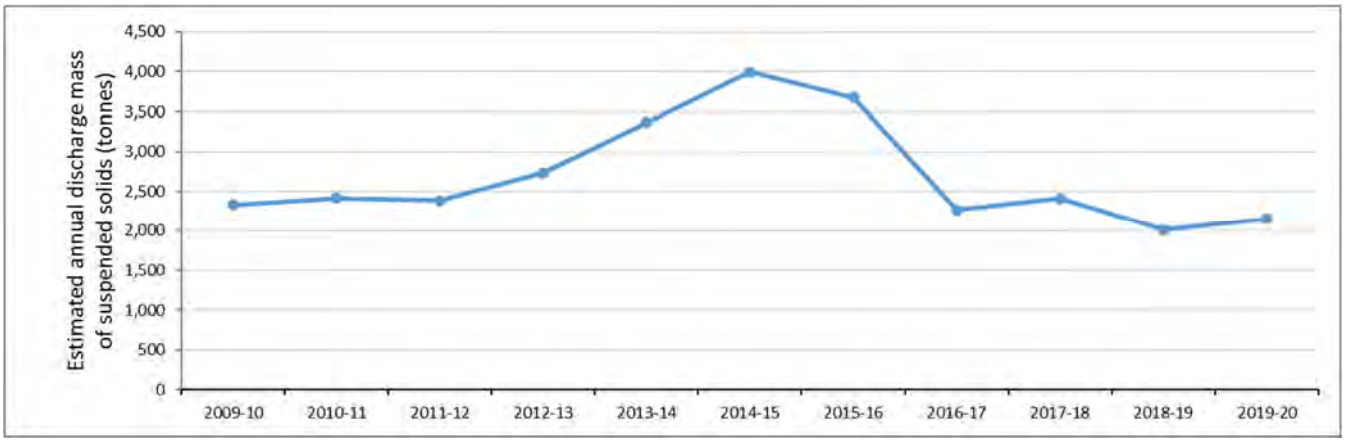
Minimum is	0.226 at 19-Mar-2020 14:10:00
Maximum is	4.691 at 9-Dec-2019 00:05:00
Mean	0.745
Median	0.602
Std Deviation	0.498
COV	0.668

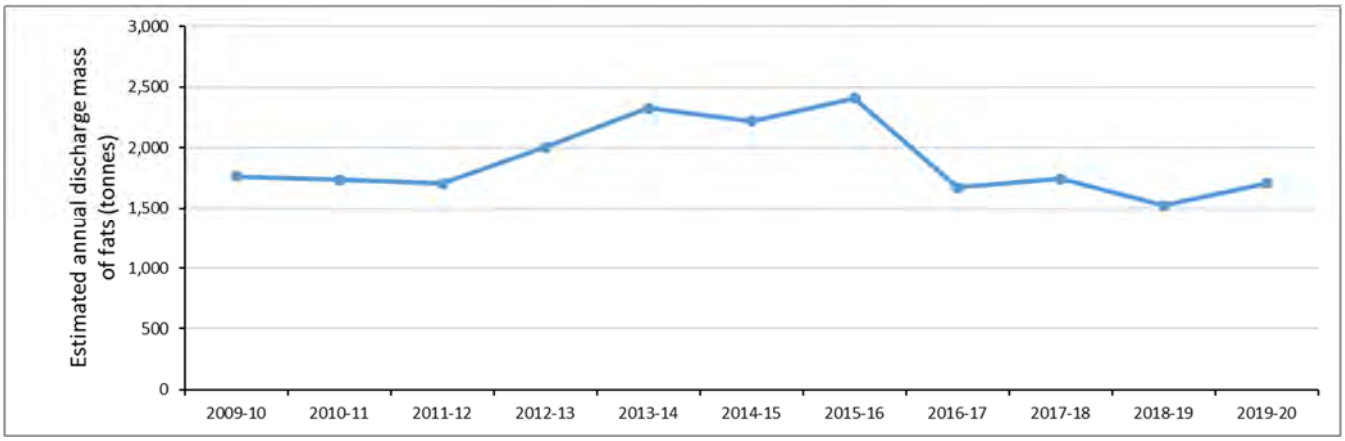

Tawhiti Stream flow (black line, m3/s) and abstraction rate (blue line, L/s) from 1 July 2019 to 30 June 2020.
Flow (m³/sec)
Abstraction Rate (l/s)
7 x median - 3.955 m³/sec
3 x median - 1.693 m³/sec
Fonterra Consent Reduce Limit - 800 L/s
median - 0.565 m³/sec
Fonterra Consent Lower Limit - 240 L/s
Fonterra Consent Emergency Limit - 50 L/s
Jul-2019
Sep-2019
Nov-2019
Jan-2020
Mar-2020
May-2020
Tawhiti at Duffys from 01-Jul-2019 to 30-Jun-2020
0047 at Tawhiti Stream from 1-Jul-2019 00:00:00 to 1-Jul-2020 00:00:00

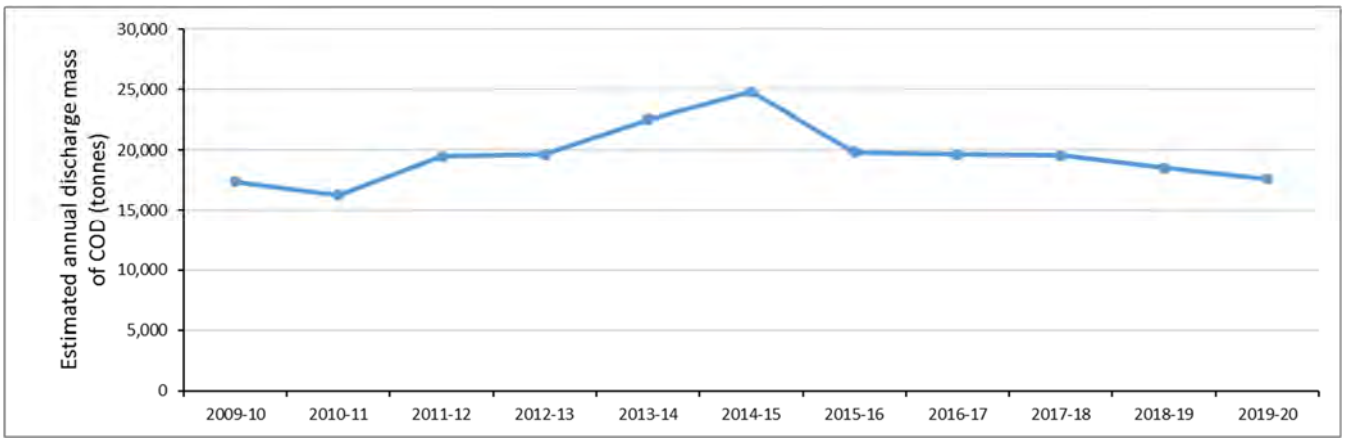
Appendix III

Fonterra Whareroa wastewater constituent mass loads (Annual estimates 2010-2020)


Annual wastewater discharge volume (m3)
9,000,000
8,500,000
8,000,000
7,500,000
7,000,000
6,500,000
6,000,000
5,500,000
5,000,000
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20


Estimated annual discharge mass of suspended solids (tonnes)
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20


Estimated annual discharge mass of fats (tonnes)
3,000
2,500
2,000
1,500
1,000
500
0
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20


Estimated annual discharge mass of COD (tonnes)
30,000
25,000
20,000
15,000
10,000
5,000
0
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20