

ANZCO Eltham Limited
Monitoring Programme
Annual Report
2016-2017

Technical Report 2017-93

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Executive summary

ANZCO Foods Eltham Limited (the Company) operates a meat processing plant located at Eltham, in the Waingongoro catchment. Until May 2014, the site was known as Riverlands Eltham. The plant has an associated wastewater treatment ponds system from which effluent is disposed of either to land or to the river. This report for the killing season from October 2016-September 2017 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of the Company's activities.

The Company held 10 resource consents during the review period, which included a total of 117 conditions setting out the requirements that the Company must satisfy. The Company holds one consent to allow it to take and use water, two consents to discharge effluent and stormwater into the Waingongoro River, three consents to discharge effluent and solids to land, three consents for structures in watercourses, one of which was renewed during the review period, and one consent to discharge emissions into the air at the plant site.

Monitoring is carried out by both the Company and the Council. The Company monitors water abstraction rate, effluent flow rate and composition, receiving water quality, odour at the plant boundaries, effluent loadings and soil and herbage for irrigation areas. The Council undertakes inspections of the plant site and irrigation areas. Monitoring includes effluent quality checks and inter-laboratory comparisons, water quality, air quality and biological monitoring.

The Council's monitoring programmes for the period under review included four inspections, 56 samples collected for physicochemical analysis and two biomonitoring surveys of receiving waters.

The abstraction of water from the Waingongoro River was not found to have any adverse effect on the river and the physicochemical monitoring of the river showed compliance with consent conditions.

The biomonitoring surveys did not find any detrimental impact on the river caused by discharges from the meat plant to water.

During the 2016-2017 monitoring period most of the total plant effluent was sprayed onto grazed pasture. The irrigation period lasted 31 weeks from 31 October 2016 and 25 May 2017. The limit on nitrogen loading was exceeded on some paddocks and the irrigation of effluent from the Company has had an observable effect on the underlying groundwater quality, initiating a review of the Irrigation Management Plan.

With regard to emissions to air over the 2016-2017 period, no incidents were recorded.

During the period under review, the Company demonstrated a generally good to high level of environmental performance. Some improvement is required in regard to the discharge to land consent 5569-1 and in administrative compliance, in respect of the provision of monitoring reports and the frequency of data collection and supply.

During the monitoring period, the Company demonstrated an overall good level of environmental performance.

For reference, in the 2016-2017 year, consent holders were found to achieve a high level of environmental performance and compliance for 74 % of the consents monitored through the Taranaki tailored monitoring programmes, while for another 21 % of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the Company over the last few years, this report shows that the Company's performance remains at a good to high level with some room for improvement.

This report includes recommendations to be implemented during the 2017-2018 monitoring period.

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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 October 2016-September 2017 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by ANZCO Foods Eltham Limited (the Company). The Company operates a meat processing plant situated on London Street, Eltham, in the Waingongoro catchment. The period being reviewed in this report coincides with the killing season and the Company's financial year.

The Company holds 10 resource consents relating to the Company's surface water take and discharges to water, land, and air. The consents include a number of special conditions which set out specific requirements the Company must satisfy.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company.

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 is the 26th combined annual report and the 28th water-related report by the Council and its predecessors for the Company.

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 through annual programmes;
- the resource consents held by the Company;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted by the Company at the Eltham site.

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 2017-2018 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 the Company, 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 significant 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 in response to unauthorised incident reports, 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 in response to unauthorised incident reports.

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 in response to unauthorised incident reports. 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 2016-2017 year, consent holders were found to achieve a high level of environmental performance and compliance for 74 % of the consents monitored through the Taranaki tailored monitoring programmes, while for another 21 % of the consents, a good level of environmental performance and compliance was achieved.

1.2 Process description

The meat processing plant is situated mid-catchment, about 42 km by river from the sea (Figure 1). There has been a meat plant on the site since about 1894.

The meat processing plant has the capacity to process about 200,000 beef units and 120,000 calves per year. The beef season runs from early October to mid-July, peaking between January and May depending on livestock availability. Generally, peak kill occurs earlier and is higher in dry seasons owing to the reduced availability of stock feed. Calves are slaughtered between July and September. The majority of the processed output is exported. There are no fellmongery or rendering facilities. Blood and renderable material are taken off site for processing.

Water for plant operation is abstracted from the Waingongoro River and also taken from the Eltham town supply. The river abstraction point is situated at the upstream boundary of the site, immediately above the confluence with a small tributary that runs past the stockyards. The water taken from the river augments the supply of potable water from the municipal system.

Wastewater derives from four sources: killing, gutting (paunch material), processing, and the stockyards. Onsite wastewater treatment comprises of solids separation, followed by biological degradation.

Paunch contents are segregated by 'dry dumping' into hoppers, dewatered, and trucked off-site for use in vermiculture. Liquid effluent from paunch opening areas and the stockyards is passed through a 0.5 mm rotary screen. The screened solids are disposed of with the paunch material. All red meat streams are discharged to a sump through a coarse bar screen and pumped through a rotary screen. The separated solids are de-watered in a press and removed daily to an off-site rendering plant. The liquid effluent stream combines with the screened paunch/stockyard effluent and is discharged to the lagoon system.

There are eight lagoons in series with a total volume of about 40,000 m³. The first five (ponds 1, 2, 3, 3A and 4), about 20,000 m³ in volume, are anaerobic. The sixth (pond 5) is an aerated facultative lagoon, about 3 metres in depth, with aeration capacity of 44 kW. The seventh (pond 6), about 4.8 metres in depth, is for settling and allows some denitrification. The final lagoon (pond 7) is shallow, with a maximum depth of 1.5 m and an area of 0.76 ha.

Effluent from the final lagoon is discharged either to land by irrigation or to the Waingongoro River during times of high flow. The disposal system is managed so as to maximise discharge to land, thereby to minimise any adverse effects of the effluent on the river.

The irrigation area is a dairy farm immediately across the river from the plant that is accessed from Lower Stuart Road. The area irrigated increased progressively, from 60 ha when the reticulation system was commissioned in January 2001, to 265 ha in 2012-2013.

When effluent is discharged to the river, it is through a variable-rate pump via a pipe that projects over the river by about one third of its width. Flow is measured at a v-notch weir above the pipe inlet and is recorded electronically.



Figure 1 The Company's meat processing plant location

1.3 Resource consents

A summary of the consents held by the Company in relation to activities at the plant is given in Table 1 and are discussed in Sections 1.3.1 to 1.3.5. Two consents were recently reviewed 5437-3 and 2039-4 and conditions were updated in October 2017, following a recommendation in the 2015-2016 annual compliance report. Both versions of the consents have been summarised in the table below, for reference, but are not discussed in the following sections as they were updated outside the review period of this report. One consent 5739-1 was renewed during the reporting period.

Table 1 Summary of resource consents held by the Company

Consent number	Purpose of consent	Date issued	Next review	Date of expiry
1968-4	Discharge stormwater to Waingongoro River	9/07/2012	June 2023	1/06/2029
2039-4	Discharge treated wastewater to Waingongoro River	9/07/2012	June 2017	1/06/2029
2039-4.1	Discharge treated wastewater to Waingongoro River	13/10/2017	June 2023	1/06/2029
4644-3	Discharge emissions to air	5/05/2016	June 2023	1/06/2035
5437-3	Take from Waingongoro River	9/07/2012	June 2017	1/06/2029
5437-3.1	Take from Waingongoro River	13/10/2017	June 2023	1/06/2029
5569-1	Discharge treated wastewater to land (Stuart Road)	23/12/1999	June 2018	1/06/2026
5604-1	Structure for erosion control at water intake	9/03/2000	-	1/06/2017
5736-2	Discharge treated wastewater to land (Eltham Road)	9/07/2012	June 2023	1/06/2026
5739-1	Structure for pipeline crossing of Waingongoro River	14/12/2000	-	1/06/2017
5739-2	Structure for pipeline crossing of Waingongoro River	2/05/2017	June 2023	1/06/2035
6455-1	Structure for piping of unnamed tributary	20/09/2004	-	1/06/2023
7487-1	Discharge solids to land and emissions to air	17/09/2010	June 2023	Lapsed 2015

1.3.1 Water abstraction permit

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.

Water permit **5437-3** covers the take and use of water from the Waingongoro River for stock drinking, yard wash down and miscellaneous purposes. This permit was issued by the Taranaki Regional Council on 7 July 2012 under Section 87(d) of the RMA. It is due to expire on 1 June 2029. The review condition was exercised during the monitoring period, as recommended in the 2015-2016 compliance report. Conditions were updated, in October 2017, to require the provision of abstraction data to be transmitted directly to the Council computer system within 2 hours of being recorded.

There are 12 special conditions attached to this permit.

- Condition 1 limits maximum abstraction rate.
- Conditions 2 to 6 relate to metering and the keeping of records.
- Conditions 7 and 8 relate to use of the best practicable option to conserve water and to reporting.
- Conditions 9 and 10 address intake screen design for protection of fish.
- Condition 11 sets out a requirement for a donation to Council for riparian planting and management in the Waingongoro catchment.
- Condition 12 is a review provision.

1.3.2 Water discharge permit

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.

The Company holds two water discharge permits.

1.3.2.1 Discharge of wastewater

Water permit **2039-4** covers the discharge of treated meat processing wastewater from the meat processing plant into the Waingongoro River. This permit was issued by the Council on 7 July 2012 under Section 87(d) of the RMA. It is due to expire on 1 June 2029. The review condition was exercised during the monitoring period, as recommended in the 2015-2016 compliance report. Conditions were updated, in October 2017, to require the provision of discharge data to be transmitted directly to the Council computer system within 2 hours of being recorded.

There are 14 special conditions attached to this permit.

- Condition 1 limits maximum discharge rate.
- Condition 2 addresses receiving water effects after mixing.
- Condition 3 requires consultation with Council prior to significant changes on the site.
- Condition 4 addresses flow metering and provision of records.
- Conditions 5 to 8 relate to a Wastewater Management Plan.
- Condition 9 requires the appointment of a suitable wastewater operator on the site.
- Condition 10 requires adoption of the best practicable option to avoid adverse environmental effects.
- Condition 11 sets out a requirement for a donation to Council for riparian planting and management in the Waingongoro catchment.
- Conditions 12 and 13 deal with reduction of dissolved reactive phosphorus in the discharge, requiring a report and providing for subsequent review of consent.
- Condition 14 is a review provision.

1.3.2.2 Discharge of stormwater

Water permit **1968-4** covers the discharge of stormwater from various locations at the plant site into the Waingongoro River. This permit was issued by the Council on 7 July 2012 under Section 87(d) of the RMA. It is due to expire on 1 June 2029.

There are eight special conditions attached to this permit.

- Condition 1 requires adoption of the best practicable option to avoid adverse environmental effects.
- Condition 2 limits the catchment area.

- Condition 3 imposes limits on significant potential contaminants.
- Condition 4 addresses receiving water effects after mixing.
- Condition 5 requires a contingency plan in case of accidental spillage of contaminants.
- Condition 6 requires the maintenance of a stormwater management plan.
- Condition 7 requires consultation with Council prior to significant changes on the site.
- Condition 8 is a review provision.

1.3.3 Air discharge permit

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.

The Company holds discharge consent **4644-3** to cover the discharge of emissions into the air arising from meat processing and associated activities at the factory premises. This consent was issued by the Council on 5 May 2016 under Section 87(e) of the RMA. It is due to expire on 1 June 2035.

- Condition 1 defines the area of licensed activity.
- Condition 2 requires that the procedures and requirements set out in the consent application be followed, except when there is a conflict between such matters and the resource consent. (In the case of conflict, the consent prevails).
- Condition 3 and require the adoption of the best practicable option for controlling effects of discharges on the environment, and that processes be operated to minimise discharges.
- Condition 5 prohibits significant adverse effect on the environment.
- Conditions 6 and 7 address odour, including the provision of an air quality management plan.
- Condition 8 is a review provision.

1.3.4 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.

The Company holds three discharge consents that provide for disposal of wastewater and solids onto land in the Waingongoro catchment.

1.3.4.1 Wastewater discharge –Lower Stuart Road

Discharge consent **5569-1** covers the discharge of treated wastewater from meat processing and associated activities by irrigation onto and into land on Lower Stuart Road, Eltham and to discharge of emissions into the air, in the vicinity of various unnamed tributaries of the Waingongoro River and the Waingongoro River. This consent was issued by the Council on 23 December 1999 under Section 87(e) of the RMA. It is due to expire on 1 June 2026.

- Condition 1 sets a date for installation of the irrigation system.
- Conditions 2 to 5 relate to the implementation of a spray irrigation management plan.
- Conditions 6 to 8 address odour and spray effects.
- Conditions 9 to 13 place controls on the source, composition and application of wastewater.
- Condition 14 deals with any contamination of local groundwater or water supply.

- Conditions 15 and 16 address monitoring the exercise of consent.
- Conditions 17 to 19 are review provisions.

1.3.4.2 Wastewater discharge-Eltham Road

Discharge consent **5736-2** covers the discharge of treated wastewater from meat processing and associated activities by irrigation onto and into land known as Paulwell Farm, Eltham Road, Eltham and the discharge of emissions into the air.

This consent was issued by the Council on 7 July 2012 under Section 87(e) of the RMA. It is due to expire on 1 June 2026. To date, this consent has not been exercised.

There are 18 conditions attached to this consent.

- Condition 1 defines the sources of wastewater.
- Conditions 2 and 3 address odour and spray effects.
- Conditions 4 to 7 place controls on the composition and application of wastewater.
- Condition 8 deals with any contamination of local groundwater or water supply.
- Conditions 9 to 11 relate to the implementation of a wastewater irrigation management plan.
- Condition 12 requires the appointment of a suitable irrigation manager.
- Condition 13 requires adoption of the best practicable option to avoid adverse environmental effects.
- Conditions 14, 15 and 16 address monitoring of the discharge and receiving environment.
- Condition 17 requires a written annual report on exercise of the consent.
- Condition 18 is a review provision.

1.3.4.3 Waste solids discharge

Discharge consent **7487-1** covers the discharge of anaerobic pond solids and paunch solids onto and into land and contaminants to air in the Waingongoro catchment at locations on Lower Stuart, Eltham and Anderson Roads, Eltham. This consent was issued by the Council on 17 September 2010 under Section 87(e) of the RMA. It was due to expire on 1 June 2029 and has not been exercised. The consent lapsed on 30 September 2015.

- Condition 1 relates to location of the disposal sites
- Condition 2 addresses the keeping of records.
- Condition 3 requires adoption of the best practicable option for controlling effects of discharges on the environment, and that processes be operated to minimise discharges.
- Conditions 4 and 5 prohibit entry to surface water and define buffer zones.
- Condition 6 limits nitrogen application rate.
- Condition 7 addresses odour.
- Conditions 8 relates to implementation of a management plan for solids disposal.
- Condition 9 deals with complaints.
- Conditions 10 and 11 relate to lapse and review of consent.

1.3.5 Land use consents

Section 13(1)(a) of the RMA stipulates that no person may use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, or under, or over the bed of any lake or river, unless the activity is expressly allowed for by a resource consent, or a rule in a regional plan and in any relevant proposed regional plan.

The Company holds three land use consents in relation to structures in the Waingongoro River and its tributaries.

1.3.5.1 Water intake

Land use consent **5604-1** covers the construction, placement, use and maintenance of an intake structure and associated bank protection works on the true left bank of the Waingongoro River. This consent was issued by the Council on 9 March 2000 as a resource consent under Section 87(a) of the RMA. It is due to expire on 1 June 2017.

- Condition 1 relates to notification of construction and maintenance works.
- Conditions 2 to 7 relate to structure design and construction method.
- Condition 8 relates to removal of the structure.
- Condition 9 is a review condition.

1.3.5.2 Pipeline crossings

Land use consent **5739-1** covers the erection, placement and maintenance of a pipeline under the Waingongoro River. The pipeline carries treated effluent from the meat plant site to where it is irrigated onto land. This consent was issued by the Council on 14 December 2000 as a resource consent under Section 87(a) of the RMA. The consent expired on 1 June 2017.

- Condition 1 relates to notification of construction and maintenance works.
- Conditions 2 to 4 relate to structure design and construction method.
- Condition 5 relates to removal of the structure.
- Condition 6 is a review condition.

Land use consent **5739-2** covers the erection, placement and maintenance of a pipeline under the Waingongoro River. The pipeline carries treated effluent from the meat plant site to where it is irrigated onto land. This consent was issued by the Council on 2 May 2017 as a resource consent under Section 87(a) of the RMA and replaces consent 5739-1. It is due to expire on 1 June 2035.

- Condition 1 authorises the ongoing use of the pipeline.
- Condition 2 requires the maintenance of a contingency plan.
- Condition 3 relates to maintaining the structure in a safe a sound condition.
- Condition 4 is a review condition.

1.3.5.3 Culvert and stream alignment

Land use consent **6455-1** covers the placement and maintenance of a culvert in, and the realignment of, an unnamed tributary of the Waingongoro River immediately upstream of the water intake. This consent was issued by the Council on 20 September 2004 as a resource consent under Section 87(a) of the RMA. It is due to expire on 1 June 2023.

- Condition 1 requires that the best practicable option be used to prevent adverse effects on the environment.
- Condition 2 requires the consent to be exercised in accordance with documentation submitted.
- Conditions 3 and 4 relate to notification and timing of maintenance works.
- Condition 5 requires that the area of river bed disturbance be minimised.
- Conditions 6 and 7 relate to lapse and review of consent.

The summary of consent conditions above may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consents which are appended to this report as Appendix I.

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.

Monitoring in relation to the meat processing plant is undertaken by the Company and the Council and is outlined below.

1.4.2 Monitoring by the Company

Monitoring undertaken by the Company consists of four primary components. The results are reported to the Council when requested. Monitoring in relation to the meat processing plant is outlined below.

1.4.2.1 Water abstraction

The volume of water abstracted from the Waingongoro River is monitored continuously. A record is also kept of the volume of water taken from Eltham town supply.

1.4.2.2 Discharge to Waingongoro River

Wastewater discharge rate to the river is monitored continuously. The chemical composition of the discharge and the receiving water upstream and downstream is monitored as prescribed by the Council. The frequency of chemical monitoring is at least weekly.

The chemical composition of wastewater is also monitored at several points within the wastewater treatment system, as part of the management of that system. The company also makes a financial donation to Council for riparian planting and management in the Waingongoro catchment, which aids in the ongoing protection of the water course.

1.4.2.3 Discharge to land

Wastewater discharge rate to land is monitored continuously. The chemical composition of the discharge and the soil, herbage and adjacent surface waters of the irrigation areas are monitored as prescribed by the Council and an assessment of the results is provided in the Company's annual environmental monitoring report required under the Effluent Management Plan.

1.4.2.4 Odour surveys

Odour surveys are carried out at four points around the plant boundary at approximately weekly intervals. The frequency may be increased if significant odour is detected.

1.4.3 Monitoring by Taranaki Regional Council

The consent monitoring programme for the Company's site undertaken by the Council consists of six primary components as described below.

1.4.3.1 Programme liaison and management

There is generally a significant investment of time and resources by the Council in ongoing liaison with resource consent holders over consent conditions and their interpretation and application, in discussion over monitoring requirements, preparation for any reviews, renewals, or new consents, advice on the Council's environmental management strategies and the content of regional plans, and consultation on associated matters.

1.4.3.2 Review of the Company's monitoring data

The monitoring data gathered by the Company is provided to the Council and reviewed to determine compliance with resource consent conditions, and to assess trends in water usage, in wastewater discharge volume and composition and effects on the Waingongoro River, land irrigation areas, and in odour generation.

1.4.3.3 Site inspections

An officer of the Council visits the plant at quarterly intervals. The main points of interest are the water abstraction system, plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters, and sources of emission to air. The land used for irrigation is also inspected for any signs of ponding or adverse effects from the discharge and the neighbourhood surveyed for environmental effects, particularly odour.

1.4.3.4 Water quality monitoring

1.4.3.4.1 Surface water

Routine monitoring by the Council is undertaken on two occasions in relation to river discharge consent conditions and, on one occasion if discharge is occurring during low flow conditions. Additional monitoring may be carried out if any breach of consent conditions occurs.

Inter-laboratory comparison exercises are carried out concurrently on the sampling dates of the water quality monitoring rounds. Additional exercises may also be carried out if there is a significant difference between the two sets of monitoring results.

Surface water sampling is undertaken quarterly at three sites in relation to the wastewater irrigation consent. The location of surface water monitoring sites are displayed on Figure 2.

1.4.3.4.2 Groundwater

Groundwater in the vicinity of the wastewater irrigation area on Lower Stuart Road is monitored quarterly for any effects on the aquifer and any nearby shallow water resources. Details of each site are summarised below in Table 2 and locations are displayed on Figure 2.

Table 2 Groundwater monitoring site details

Site	Eastings	Northings	bore/well depth	type
GND1189	1709868	5634097	6.3	Supply well
GND1196	1709272	5634442	8.5	Monitoring bore
GND0849	1709130	5636145	14.9	Control site
GND1187	1710269	5633127	6.7	Supply well
GND1188	1709623	5633310	27.0	Supply well
GND1197	1709520	5633783	9.1	Monitoring bore
GND1198	1710088	5634327	8.6	Monitoring bore
GND1306	1709547	5634072	7.2	Old supply well
GND1344	1710054	5633834	8.8	TBC
GND1345	1709444	5632453	8.8	TBC

1.4.3.5 Biomonitoring surveys

Surveys of streambed macroinvertebrates and algae collected from several sampling sites in the Waingongoro River are carried out on a biannual basis, during spring and summer/autumn under low flow conditions. An additional survey may be carried out if a particularly low receiving water flow coincides with high kill rate at the plant.

Biological surveys determine whether or not the discharge of treated stormwater and uncontaminated site and process effluent from the site has had a detrimental effect upon the communities of the stream.

1.4.3.6 Water level monitoring station

The Council maintains a water level monitoring station on the Waingongoro River at Eltham Road, about 900 metres above the river discharge point. Data from the station includes river level, river flow and temperature. Data is telemetered to the Council offices at Stratford.

The information from flow is useful in the management of the Company's discharge to the river in terms of estimating available dilution.

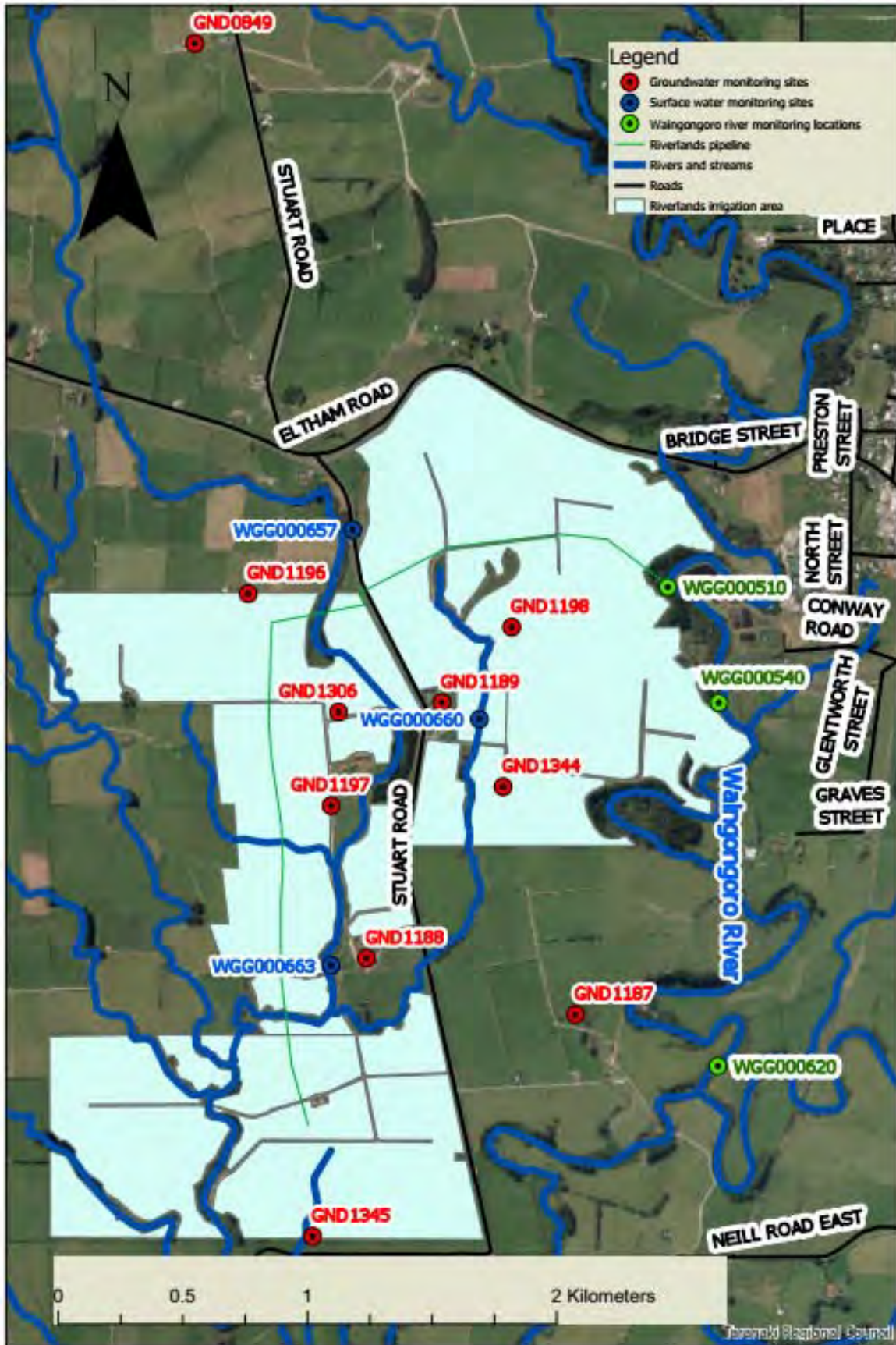


Figure 2 Groundwater and surface water monitoring locations

2 Results

2.1 Inspections

During the period under review, the Council carried out four inspections in relation to the Company's activities. Inspections were carried out on 12 January 2017, 10 April 2017, 9 June 2017 and 4 August 2017. The Council Officer undertook all four inspections in conjunction with a Company employee. No significant issues were identified during inspections and the facilities appeared to be tidy and well-managed.

12 January 2017

Yards: runoff from the yard is entering the sump with no evidence of recent overflows. It was discussed that future loss of water take data or similar issues require the Council to be notified in writing.

By-products load out area: This area was found to be satisfactory. A small amount of blood was noted but is not entering stormwater.

Water treatment plant: The plant was operating correctly. The totaliser reading was 3,167,955 m³.

Wastewater system: The ponds looked relatively clear, with a good cover on ponds 1-3. Aerators were operating on pond 5, with one aerator out for repairs. ANZCO is investigating different options for replacement aerators. Pond 7 was discharging to irrigators with a volume of approximately 64 m³/hr being discharged.

Irrigation: Irrigation was occurring with three irrigators running.

Chemical and oil storage: These areas were found to be satisfactory.

Waste oil storage: The roofed bund had a small amount of water.

Odour: There was no objectionable odour on site. An odour survey was carried out with no odour detected at any of the four sites.

10 April 2017

Yards: runoff from the yard is entering the sump with no evidence of recent overflows.

Wastewater system: The ponds looked relatively clear, with a good cover on ponds 1-3. Aerators were operating on pond 5. Pond 7 was not discharging and had a relatively low level. All effluent is currently going to irrigation.

Chemical and oil storage: These areas were found to be generally satisfactory, although a small amount of water and debris was present in the oil bund. This will be cleaned out.

Odour: There was no objectionable odour on site. An odour survey was carried out with a very faint intermittent effluent odour detected at Conway Road. No odour was detected at any other sites.

6 June 2017

Yards: runoff from the yard is entering the sump with no evidence of recent overflows.

Wastewater system: The ponds looked relatively clear, with a good cover on ponds 1-3. Aerators were operating on pond 5. Pond 7 was discharging to the river and a sample was collected for inter-laboratory comparison. No irrigation was occurring. All treated effluent has been discharged to river since 4 June.

Chemical and oil storage: These areas were found to be satisfactory.

Discharge site: There was no visual environmental impact noted from the discharge at the monitoring sites.

Odour: there was no objectionable odour on site nor beyond the boundary at the designated monitoring locations.

4 August 2017

Yards: runoff from the yard is entering the sump with no evidence of recent overflows.

By-products load out, paunch area: This area was found to be tidy with equipment on standby at the time of inspection.

Wastewater system: Pond 7 was discharging to the river and a sample was collected for inter-laboratory comparison. Samples were also collected from the river. There were no visible environmental effects noted in the stream or downstream of the discharge.

Chemical and oil storage: These areas were found to be satisfactory.

Odour: there was no objectionable odour on site nor beyond the boundary at the designated monitoring locations.

2.1.1 Provision of consent holder data

The consent holder provides data on abstraction and discharge rates and volumes and effluent quality on a regular basis as laid out in the various management plans, or at the request of the Council. The data provided by the Company and the data collected by the Council is summarised below.

2.1.1.1 Abstraction data

Abstraction of water from the Waingongoro River is permitted under consent 5437-3 and is provided to the Council when requested. The Company has historically recorded abstraction from the river and provided it as daily volumes and due to the reduced recording frequency, it was not possible to determine if any breaches of the rate of abstraction per second occurred.

As recommended in the 2015-2016 report the consent was reviewed and revised and as of October 2017 the data will be provided directly to the Council at the required 15 minute intervals for assessment.

The Company also provide the volumes of water taken from the municipal supply. Monthly abstraction volumes from the river and the from the town supply are displayed in Figure 3.

During the October 2016 to September 2017 monitoring year 272,166 m³ of water use on site was sourced from the Waingongoro River under consent 5437-4 and 221,690 m³ was sourced from the Eltham town water supply.

The Company also provide a water use minimisation report under the requirements of Consent 5437-3 (Appendix II). The main conclusions in the report are listed below:

- Overall, the total water use for the Company has seen a decrease compared to the previous season;
- The total water use per animal processed was 2.73m³ a decrease from the 2.79m³ reported last year;
- The total potable water per animal was 2.18m³ a slight increase from the 2.16m³ reported last year; and
- The total non-potable water per animal was 0.55 m³ a decrease from the 0.63m³ reported last year.

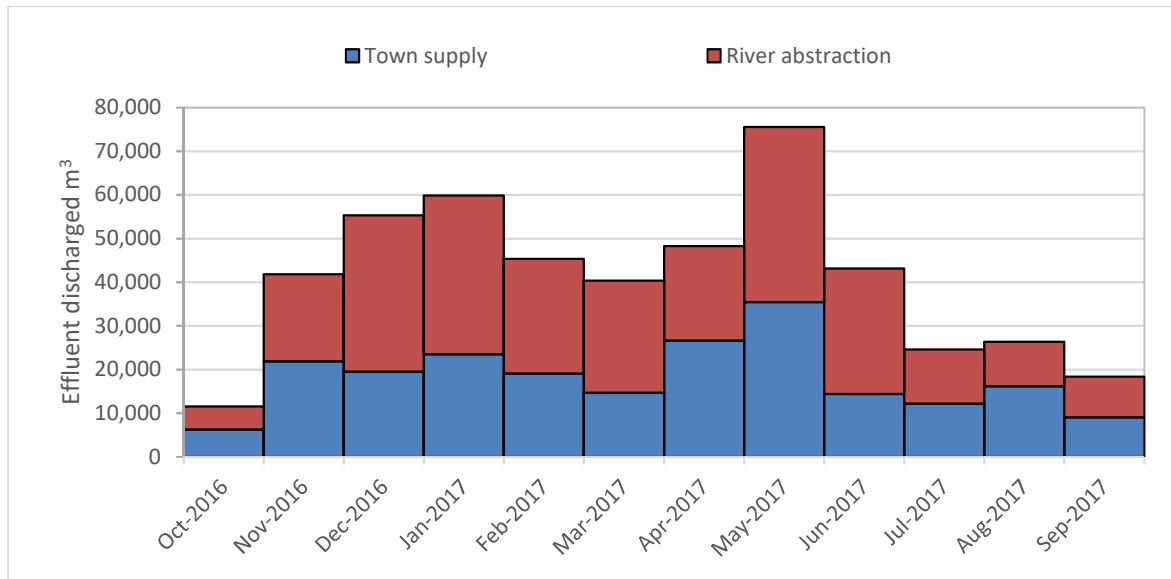


Figure 3 River abstraction and municipal water supply volumes

2.1.1.2 Discharge data

2.1.1.2.1 Discharge of treated wastewater to the river Consent 2039-4

Discharge data was provided by the Company when requested. The Company has historically recorded the discharge to the river and provided it as weekly volumes and not at the 15 minute intervals required by the consent. Due to the reduced recording frequency, it was not possible to determine if any breaches of the daily volume or rate of discharge occurred. The maximum daily discharge of 2,277 m³/day, calculated from the weekly data provided, occurred during the week commencing 22 May 2017. As recommended in the 2015-2016 report the consent was reviewed and revised and as of October 2017 the data will be provided directly to the Council at the required 15 minute intervals for assessment.

2.1.1.2.2 Discharge of stormwater to the river Consent 1968-4

Stormwater data is discharged directly to the river and there is no requirement to monitor the volumes of water discharged. Restrictions on the quality of the stormwater and any consequential impacts on the river are covered by conditions. During the monitoring period the stormwater discharged was not sampled to ensure it met the requirements of the consent.

2.1.1.2.3 Discharge of treated wastewater to land data Consent 5736-2 and 5569-1

No discharge occurred under consent 5736-2, all discharge to land occurred under 5569-1. Discharge data was provided by the Company when requested. However the data provided was for weekly volumes and not daily as required by the discharge consent therefore it was not possible to determine if any breaches on the daily volume of discharge occurred.

2.1.2 Discharge monitoring

Routine monitoring by the Council was undertaken on two occasions in relation to river discharge consent conditions with inter-laboratory comparison exercises carried out concurrently. No low flow sampling was undertaken during the period under review. From December 2016 to April 2017 the Company solely discharged to land and from June 2017 to October 2017 solely to the river. During the remaining months, discharge occurred to both the river and to land. Discharge to the river generally only occurs during periods of high flow in the river, to provide adequate dilution of the discharge and to land during periods of low flow in the river. During the monitoring period an unusual period of low flow conditions occurred during

June 2017 (Figure 4), when discharge was occurring to the river. The mean annual flows since 1974 are shown in Figure 4 for the Waingongoro River alongside the mean monthly flows over the reporting period for comparison. A total of 300,715 m³ or 62 % of total discharge was irrigated to land during the monitoring period and a total of 186,075 m³ or 38 % of total discharge (486,856 m³) was discharged to the river.

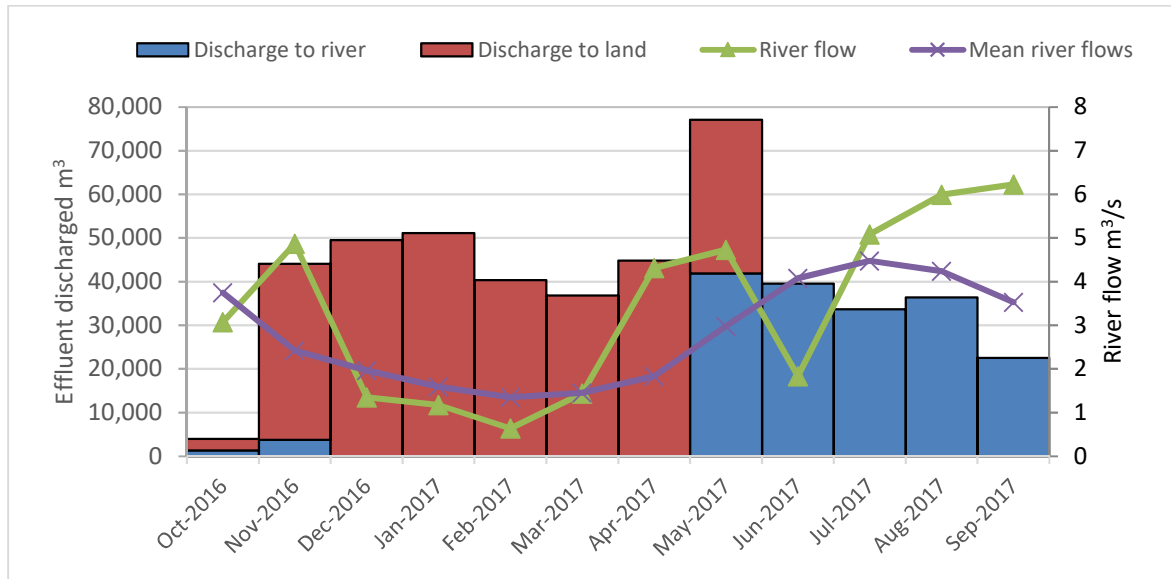


Figure 4 Effluent discharged to land and to the river October 2016 to September 2017

2.1.3 Results of receiving environment monitoring

To monitor for any significant impacts downstream of the river discharge site water quality parameters are monitored at three locations along the river. Groundwater and surface water monitoring are also undertaken at and around any site receiving discharge to land. Inspections are also undertaken at the site and any adjoining areas and discharge locations where impacts could occur.

2.1.3.1 Surface water monitoring undertaken by the Council

Surface water quality sampling in relation to the river discharge was undertaken on 6 July 2016, 16 September 2016, 9 June 2017 and 4 August 2017 at three sites. One site located 90 m upstream of the discharge (WGG000540), one site at the discharge location (IND00400) and one site located 400 m downstream of the discharge (WGG000540).

Results are included in Table 3 and Table 4. Water quality is also undertaken weekly by the Company during periods of discharge to the river and is discussed in Section 2.1.3.2. As a quality assurance measure surface water quality monitoring by the Council is undertaken in conjunction with the weekly surface water monitoring undertaken by the Company. A comparison of the data is discussed in Section 2.1.3.3 and data is displayed in Table 5.

Limits have been set on some water quality parameters after adequate mixing has occurred. A summary of these limits are as follows:

- Filtered carbonaceous biological oxygen demand must not exceed 2 g/m³ ;
- Dissolved oxygen must remain above 6 g/m³; and
- Maximum total ammonium concentration for a given pH must remain below the concentrations indicated in Table 1 of the discharge consent 2039-4.

The monitoring programme was carried out as per the requirements of the consent conditions and associated discharge management plans with the following exceptions:

- No black disc measurements were undertaken as required by consent 2039-4 condition 2(i); and
- The constituents of the stormwater discharge were not measured to ensure compliance with consent 1968-4 condition 3.

Results indicate that phosphorus, nitrogen and ammonium (Table 3 and Table 4) have all being significantly diluted by the time they reach the downstream monitoring location. All water quality limits were met during the period. Inspections undertaken by Council officers downstream of the discharge site indicated that there were no visible impacts on the river from the discharge.

Table 3 Surface water quality results 2016

Surface water results 2016-2017	Site id	Downstream limit	IND004001	WGG00540	WGG00510	IND004001	WGG00540	WGG00510
	Location		Discharge	Upstream	Downstream	Discharge	Upstream	Downstream
	Sample id		TRC162265	TRC162266	TRC162264	TRC163051	TRC163052	TRC163050
	Date		06 Jul 2016			16 Sep 2016		
Parameter	Time		11:25	11:45	11:15	09:32	09:42	09:25
Alkalinity	g/m ³ CaCO ₃		370	-	1.3	172	-	0.5
Biological oxygen demand	g/m ³	2.0	45	1.7	<0.5	13	<0.5	<0.5
Biological oxygen demand (CF)	g/m ³		9.2	0.5	-	2	<0.5	-
Calcium	g/m ³		16.8	-	-	18.7	-	-
Chloride	g/m ³		76.7	13	12.6	56.9	12.8	12.5
Chemical oxygen demand	g/m ³		160	-	-	130	-	-
Conductivity	mS/m		128	12.7	11.6	88.6	12.2	11.6
Dissolved reactive phosphorus	g/m ³ P		21.8	0.163	0.014	7.92	0.067	0.021
Enterococci	/100ml		220	20	37	150	110	88
Faecal coliforms	/100ml		4,200	140	180	800	200	230
Potassium	g/m ³		50.3	-	-	20	-	-
Magnesium	g/m ³		6	-	-	4.7	-	-
Sodium	g/m ³		134	-	-	61.1	-	-
Ammonia	g/m ³ N		78.6	0.522	0.026	58.2	0.428	0.023
Nitrate and nitrite as N (NNN)	g/m ³ N		33.7	2.2	1.93	39.2	1.96	1.66
Nitrite	g/m ³ N		-	0.275	0.004	45.9	0.290	0.007
PH	pH		7.7	7.7	7.7	7.8	7.8	7.7
Sulphate	g/m ³		15.6	-	-	<1.0	-	-
Suspended solids	g/m ³		29	4	12	20	3	3
Turbidity	NTU		20	3.1	3	11	1.5	1.7
Dissolved oxygen	g/m ³	6.0	5.84	11.43	11.52	8.3	10.58	10.64
Flow	m ³ /s		-	-	-	-	-	-
Dissolved oxygen	%		53.8	101.7	102.2	83	101.2	101.7

Surface water results 2016-2017	Site id	Downstream limit	IND004001	WGG00540	WGG00510	IND004001	WGG00540	WGG00510
	Location		Discharge	Upstream	Downstream	Discharge	Upstream	Downstream
	Sample id		TRC162265	TRC162266	TRC162264	TRC163051	TRC163052	TRC163050
	Date		06 Jul 2016			16 Sep 2016		
Parameter	Time		11:25	11:45	11:15	09:32	09:42	09:25
Temperature	° C		11.2	9.5	9.4	14.7	12.8	12.7
Ammonium	g/m ³		0.97065	0.00569	0.00028	1.16634	0.00746	0.00032
Nitrate	g/m ³ N		-	1.925	1.926	<0.001	1.67	1.653
SAR	None		7.14245	-	-	3.27172	-	-

Table 4 Surface water quality results 2017

Surface water results 2016-2017	Site id	Downstream limit	IND004001	WGG00540	WGG00510	IND004001	WGG00540	WGG00510
	Location		Discharge	Upstream	Downstream	Discharge	Upstream	Downstream
	Sample id		TRC171945	TRC171946	TRC171944	TRC172359	TRC172360	TRC172358
	Date		09 Jun 2017			04 Aug 2017		
Parameter	Time		09:45	10:05	09:55	09:30	10:00	09:40
Alkalinity	g/m ³ CaCO ₃		500	-	0.5	88	-	<0.5
Biological oxygen demand	g/m ³	2.0	64	0.7	<0.5	25	<0.5	<0.5
Biological oxygen demand (CF)	g/m ³		3.1	<0.5	-	3.9	<0.5	-
Calcium	g/m ³		20	-	-	19.5	-	-
Chloride	g/m ³		90.3	13.4	12.8	72.7	13.8	14.1
Chemical oxygen demand	g/m ³		170	-	-	140	-	-
Conductivity	mS/m		173	13.2	12.2	117	12.1	11.7
Dissolved reactive phosphorus	g/m ³ P		26.5	0.21	0.017	15.7	0.059	0.03
Enterococci	/100ml		110,000	350	52	330	19	28
Faecal coliforms	/100ml		56,000	550	100	2,000	240	240
Potassium	g/m ³		62.8	-	-	37.6	-	-
Magnesium	g/m ³		6	-	-	5.6	-	-
Sodium	g/m ³		180	-	-	98.9	-	-
Ammonia	g/m ³ N		98	0.785	0.024	74.7	0.297	0.044
NNN	g/m ³ N		56.8	2.32	1.92	70.5	2.33	2.17
Nitrite	g/m ³ N		52.5	0.44	0.004	72.1	0.175	0.008
PH	pH		7.7	7.6	7.6	7.7	7.5	7.6
Sulphate	g/m ³		17.2	-	-	18.8	-	-
Suspended solids	g/m ³		53	2	2	39	6	5
Turbidity	NTU		34	2.7	3.3	24	3.6	3.2

Surface water results 2016-2017	Site id	Downstream limit	IND004001	WGG00540	WGG00510	IND004001	WGG00540	WGG00510
	Location		Discharge	Upstream	Downstream	Discharge	Upstream	Downstream
	Sample id		TRC171945	TRC171946	TRC171944	TRC172359	TRC172360	TRC172358
	Date		09 Jun 2017			04 Aug 2017		
Parameter	Time		09:45	10:05	09:55	09:30	10:00	09:40
Dissolved oxygen	g/m ³	6.0	4.2	11.6	11.7	-	11.6	11.6
Flow	m ³ /s		0.002	1.577	1.577	10.56	-	-
Dissolved oxygen	%		37	100	101	-	100.6	100.5
Temperature	° C		9.9	8.6	8.7	6.7	7.5	7.8
Ammonium	g/m ³		1.09973	0.00637	0.0002	0.66202	0.00177	0.00034
Nitrate	g/m ³ N		4.3	1.88	1.916	<0.001	2.155	2.162
SAR	None		9.0663	-	-	5.08095	-	-

2.1.3.2 Surface water monitoring undertaken by the company

Monitoring of a reduced suite of analytes is undertaken by the Company weekly and analysed in their on-site laboratory. Downstream dissolved oxygen (DO) concentrations are displayed in Figure 5 and indicate that DO remained above the 6 g/m³ during periods of discharge. Downstream ammonium (NH₃) and pH are displayed in Figure 6. An increase in ammonium concentrations can be seen downstream during the river discharge period, with the greatest increases observed during June 2017. There was no observed corresponding increases in either the volume of discharge or ammonium content in the effluent discharged during this period therefore the observed increases may be linked to the lower than average mean flows and consequential reduced dilution recorded during that period. An inter-laboratory comparison is displayed in Table 5. The differences between results reported by the Company's onsite laboratory and the on-site Council laboratory are within the expected range of sampling and analytical variation.

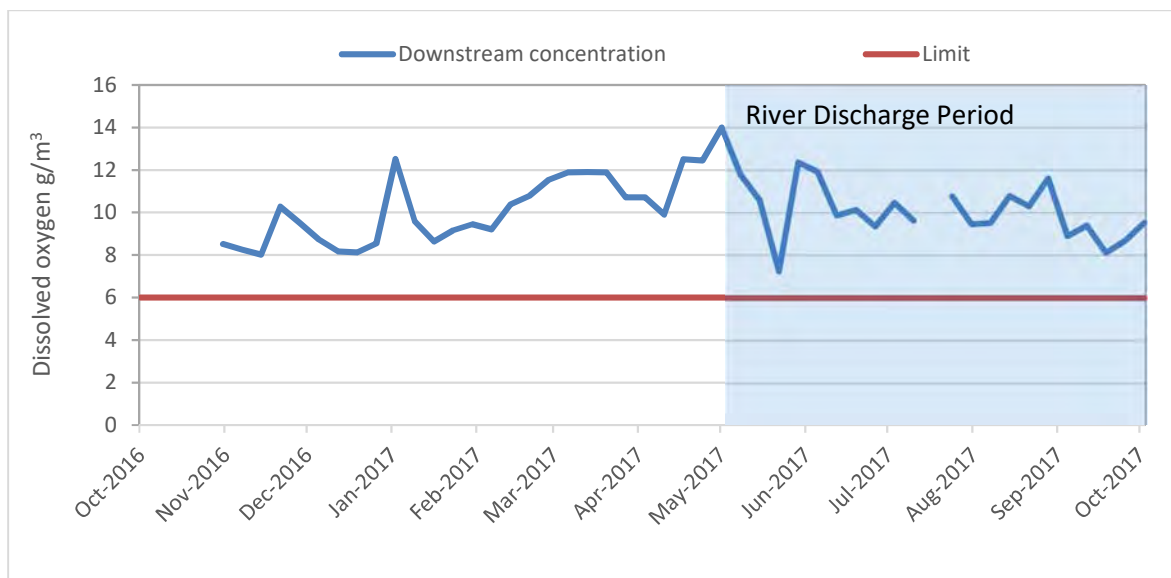


Figure 5 Dissolved oxygen concentrations downstream of discharge 2016-2017

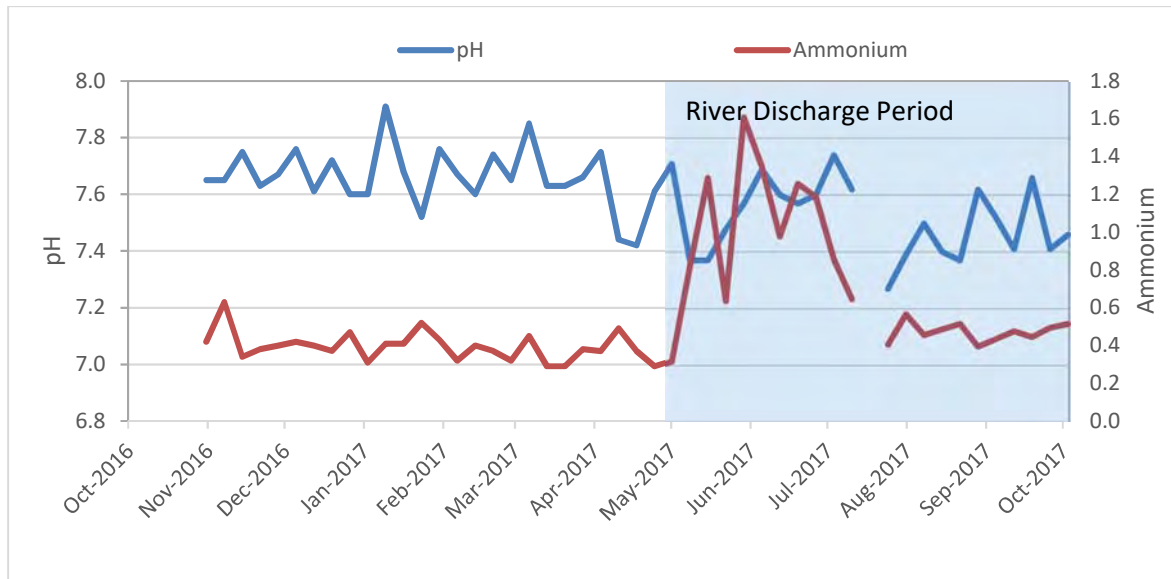


Figure 6 Ammonium and pH concentrations downstream of discharge 2016-2017

Table 5 Inter-laboratory comparison results 2016-2017

Surface water results 2016-2017	Site id	IND004001		WGG00540		WGG00510		IND004001		WGG00540		WGG00510	
	Location	Discharge		Upstream		Downstream		Discharge		Upstream		Downstream	
	Sample id	TRC162265	-	TRC162266	-	TRC162264	-	TRC163051	-	TRC163052	-	TRC163050	-
	Date	06 Jul 2016						16 Sep 2016					
		TRC	ANZCO	TRC	ANZCO	TRC	ANZCO	TRC	ANZCO	TRC	ANZCO	TRC	ANZCO
Temperature	° C	11.2	11.6	9.5	9.9	9.4	10	14.7	15.2	12.8	12.9	12.7	13
Dissolved oxygen	g/m ³	5.84	6.1	11.43	11.2	11.52	11.2	8.3	8.5	10.58	10.3	10.64	10.2
PH	pH	7.7	7.6	7.7	7.6	7.7	7.5	7.8	7.9	7.8	7.7	7.7	7.7
Ammonia	g/m ³ N	78.6	108	0.522	0.46	0.026	1.15	58.2	80	0.428	0.37	0.023	0.67
NNN	g/m ³ N	33.7	50	2.2	-	1.93	-	39.2	30	1.96	-	1.66	-
Chemical oxygen demand	g/m ³	160	185	-	-	-	-	130	112	-	-	-	-
Suspended solids	g/m ³	29	20	4	-	12	-	20	20	3	-	3	-
Surface water results 2016-2017	Site id	IND004001		WGG00540		WGG00510		IND004001		WGG00540		WGG00510	
	Location	Discharge		Upstream		Downstream		Discharge		Upstream		Downstream	
	Sample id	TRC171945	-	TRC171946	-	TRC171944	-	TRC172359	-	TRC172360	-	TRC172358	-
	Date	09 Jun 2017						04 Aug 2017					
		TRC	ANZCO	TRC	ANZCO	TRC	ANZCO	TRC	ANZCO	TRC	ANZCO	TRC	ANZCO
Temperature	° C	9.9	10.8	8.6	8.5	8.7	8.5	6.7	6.5	7.5	7.6	7.8	7.4
Dissolved oxygen	g/m ³	4.2		11.6		11.7			9.9	11.6	9.6	11.6	9.5
PH	pH	7.7	7.8	7.6	7.6	7.6	7.6	7.7	7.7	7.5	7.5	7.6	7.5
Ammonia	g/m ³ N	98	126	0.785	0.12	0.024	0.98	74.7	100.0	0.297	0.36	0.044	0.46
NNN	g/m ³ N	56.8	60.0	2.32	-	1.92	-	70.5	40	2.33	-	2.17	-
Chemical oxygen demand	g/m ³	170	220	-	-	-	-	130	219	-	-	-	-
Suspended solids	g/m ³	53	4	2	-	2	-	39	40	6	-	5	-

2.1.3.3 Discharge to land

Discharge to land by irrigation is permitted under consent **5569-1 and 5736-2**. Limits have been set on the daily rate of discharge to land and the effects of odour and spray on the land irrigated and surrounding the activity. The Company are also required under consent conditions to provide a management plan that details how the discharge and any effects will be monitored and where feasible minimised. A plan has been submitted by the Company and is currently under review. Consent 5736-2 was not exercised during the period. Water quality monitoring is undertaken by the Council at quarterly intervals at 10 groundwater monitoring sites and three shallow surface water monitoring sites, to assess any impacts on shallow water resources. Results from August 2016 to August 2017 for surface water monitoring sites are displayed in Table 6 to Table 9 and groundwater monitoring sites in Table 9 to Table 18. During the period under review irrigation to land occurred from 31 October 2016 to 25 May 2017 with the greatest volume of discharge occurring between November 2016 and April 2017.

2.1.3.3.1 Surface water quality monitoring

Surface water monitoring is undertaken at three sites WG000657, GW000660 and WG000663 in the vicinity of the discharge area. Results indicate there have been no significant changes in surface water quality during the review period.

Table 6 Surface water quality results WGG00065

Sample details	Units	WGG000657				
		TRC162711	TRC163848	TRC170694	TRC171622	TRC172636
Date	Collected	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	Time	12:30	11:15	11:00	12:00	13:00
Conductivity	mS/m@20C	20.2	20.3	19.9	20.4	20.1
Dissolved reactive phosphorus	g/m ³ P	0.007	0.007	0.038	0.012	0.006
Ammonia	g/m ³ N	0.025	0.019	0.004	0.008	0.018
NNN	g/m ³ N	4.44	4.07	7.07	4.23	4.45
PH	pH	7	7	7.3	7.3	7
Turbidity	NTU	16	9.9	8.2	12	10
Temperature	°C	12.7	13.3	14	13.6	12.7
Ammonium	g/m ³ (calculated)	0.00007	0.00006	0.00002	0.00005	0.00005

Table 7 Surface water quality results WGG000660

Sample details	Units	WGG000660				
		TRC162701	TRC163838	TRC170684	TRC171613	TRC172626
Date	Collected	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	Time	09:55	08:45	08:15	09:30	10:25
Conductivity	mS/m@20C	21	20.6	22.5	21.1	21.3
Dissolved reactive phosphorus	g/m ³ P	0.006	0.008	0.022	0.01	<0.003
Ammonia	g/m ³ N	0.063	0.054	0.039	0.263	0.034
NNN	g/m ³ N	3.18	2.77	1.51	2.03	3.73
PH	pH	6.9	7	7.3	7	7.1
Turbidity	NTU	3.8	5.4	4.1	5	5.5
Temperature	°C	10.2	13.2	14.1	12.7	10.9
Ammonium	g/m ³ (calculated)	0.00012	0.00016	0.00024	0.00073	0.0001

Table 8 Surface water quality results WGG000663

Sample details	Units	WGG000663				
		TRC162709	TRC163846	TRC170692	TRC171620	TRC172634
Date	Collected	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	Time	11:25	10:20	09:55	10:55	12:10
Conductivity	mS/m@20C	17.8	17.9	19.5	18.4	18.4
Dissolved reactive phosphorus	g/m ³ P	0.007	0.009	0.023	0.012	0.006
Ammonia	g/m ³ N	0.026	0.026	0.013	0.033	0.021
NNN	g/m ³ N	3.58	3.02	4.82	3.21	4.03
PH	pH	7.2	7.2	7.4	7.3	7.3
Turbidity	NTU	11	10	4.6	13	8.9
Temperature	°C	11.2	13.2	13.7	12.7	11.5
Ammonium	g/m ³ (calculated)	0.0001	0.00012	0.0001	0.00018	0.00011

2.1.3.3.2 Groundwater quality monitoring

Groundwater monitoring was undertaken at quarterly intervals at 10 sites. There are no significant differences observable between the concentrations of analytes reported during periods of irrigation to land (November –May) and periods of discharge to the river (August). Concentrations of all analytes appear to have remained relatively stable over the review period.

Table 9 Groundwater sampling undertaken by the Council at GND1196

Sample details	Units	GND1196				
		TRC162707	TRC163844	TRC170690	TRC171618	TRC172632
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	10:55	09:45	09:20	10:25	11:40
Calcium	g/m ³	9.3	9.5	9.9	11.2	10.2
Chloride	g/m ³	18.3	17.5	17.6	24	19.9
COD	g/m ³	<5	<5	6	6	13
Conductivity	mS/m@20C	17.3	17.1	17.2	19.6	17.5
Potassium	g/m ³	5.7	5.7	5.8	6.2	5.8
Magnesium	g/m ³	4.3	4.3	4.2	4.7	4.2
Sodium	g/m ³	18.6	17.9	18.5	19.6	18.1
Ammonia	g/m ³ N	0.009	<0.003	<0.003	<0.003	0.012
Nitrate and nitrite as N (NNN)	g/m ³ N	2.51	2.51	2.54	3.37	2.97
PH	pH	6.5	6.7	6.7	6.7	6.8
Depth to water	mbmp	3.37	4.39	5.69	3.59	2.81
Temperature	°C	13.6	13.4	13.5	13.4	13.5
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	<0.00001	0.00002

Table 10 Groundwater sampling undertaken by the Council at GND1197

Sample details	Units	GND1197				
		TRC162708	TRC163845	TRC170691	TRC171619	TRC172633
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	11:15	10:00	09:40	10:45	12:05
Calcium	g/m ³	21.7	23.6	22.8	20.8	20.4
Chloride	g/m ³	19.1	33.7	33.2	27.1	32.7
COD	g/m ³	5	<5	<5	6	<5
Conductivity	mS/m@20C	35.6	36.3	34.5	34.4	33.6
Potassium	g/m ³	10.4	10	7.7	10.8	10.1
Magnesium	g/m ³	10.8	11	10.5	9.2	8.8
Sodium	g/m ³	27.4	27	27.8	26.9	27.7
Ammonia	g/m ³ N	0.006	<0.003	<0.003	<0.003	<0.003
NNN	g/m ³ N	19.5	22.5	16.7	19.9	18.4
PH	pH	6	6.2	6.2	6.2	6.3
Depth to water	mbmp	2.89	2.8	3.49	2.75	2.54

Sample details	Units	GND1197				
		TRC162708	TRC163845	TRC170691	TRC171619	TRC172633
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	11:15	10:00	09:40	10:45	12:05
Temperature	°C	13.6	13.4	13.6	13.8	13.7
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Table 11 Groundwater sampling undertaken by the Council at GND1198

Sample details	Units	GND1198				
		TRC162703	TRC163840	TRC170686	TRC171615	TRC172628
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	10:15	09:15	08:55	10:05	11:05
Calcium	g/m ³	11.4	11.8	11.5	11.8	13.8
Chloride	g/m ³	22.1	21.9	23	22.7	24.5
COD	g/m ³	<5	7	<5	<5	7
Conductivity	mS/m@20C	20.6	20.6	19.7	21	23.1
Potassium	g/m ³	4.4	4.4	4	4.3	4.8
Magnesium	g/m ³	6.4	6.6	5.9	5.9	6.7
Sodium	g/m ³	19.8	19.2	19.6	20.1	21.5
Ammonia	g/m ³ N	0.004	0.006	<0.003	<0.003	0.012
NNN	g/m ³ N	7.36	7.14	6.06	7.44	10.2
PH	pH	6.2	6.5	6.2	6.7	6.5
Depth to water	mbmp	2.11	2.15	2.71	1.96	1.75
Temperature	°C	13.2	13.2	13.6	14.2	13.6
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Table 12 Groundwater sampling undertaken by the Council at GND1344

Sample details	Units	GND1344				
		TRC162700	TRC163837	TRC170683	TRC171612	TRC172625
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	09:40	08:30	08:00	09:00	10:35
Calcium	g/m ³	15.8	12.4	12.9	12.2	12.9
Chloride	g/m ³	21.9	21.5	22.4	21.7	22
COD	g/m ³	47	23	13	<5	25
Conductivity	mS/m@20C	25.3	22.3	22.7	24.8	22.2

Sample details	Units	GND1344				
		TRC162700	TRC163837	TRC170683	TRC171612	TRC172625
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	09:40	08:30	08:00	09:00	10:35
Potassium	g/m ³	8	8	8.1	7.2	8
Magnesium	g/m ³	7.3	7.3	7	6.6	6.5
Sodium	g/m ³	23.4	21.9	23	20.8	22.7
Ammonia	g/m ³ N	1.16	1.15	1.12	0.935	1.16
NNN	g/m ³ N	0.04	0.04	0.08	0.07	0.03
PH	pH	6.8	6.8	6.9	6.9	6.9
Depth to water	mbmp	1.98	2.06	2.32	1.97	1.85
Temperature	°C	13.3	13	14.2	14.2	13.4
Ammonium	g/m ³	0.00213	0.00206	0.00276	0.00231	0.0027

Table 13 Groundwater sampling undertaken by the Council at GND1345

Sample details	Units	GND1345				
		TRC162705	TRC163842	TRC170688	TRC171617	TRC172630
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	12:20	10:50	10:30	11:45	12:45
Calcium	g/m ³	15.1	17.8	19.7	16.8	18
Chloride	g/m ³	28.1	30.3	50.5	29.6	31.2
COD	g/m ³	<5	<5	5	<5	8
Conductivity	mS/m@20C	27.7	30.9	33	33.8	31.3
Potassium	g/m ³	5.2	5.5	6.2	5.6	5.6
Magnesium	g/m ³	10	8.8	12.6	9.6	10.7
Sodium	g/m ³	22.5	23.3	26.3	24	25.8
Ammonia	g/m ³ N	0.009	0.004	<0.003	0.007	<0.003
NNN	g/m ³ N	12	17.6	17.4	20.2	17.4
PH	pH	6	6.2	6.1	6.2	6.3
Depth to water	mbmp	3.17	3.23	3.38	2.03	2.83
Temperature	°C	14.1	13.7	14.7	14.3	14.3
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Table 14 Groundwater sampling undertaken by the Council at GND0849 (control site)

Sample details	Units	GND0849				
		TRC162712	TRC163849	TRC170695	TRC171623	TRC172637
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	12:50	11:45	11:30	12:30	13:20
Conductivity	mS/m@20C	16.1	15.3	14.9	15.8	18
Ammonia	g/m ³	0.01	<0.003	<0.003	<0.003	0.008
NNN	g/m ³ N	4.69	3.74	7.18	4.34	5.68
PH	pH	6.3	6.1	6.2	6.2	6.5
Temperature	°C	12.7	13.5	13.8	13.3	13.6
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Table 15 Groundwater sampling undertaken by the Council at GND1187

Sample details	Units	GND1187				
		TRC162704	TRC163841	TRC170687	TRC171616	TRC172629
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	12:00	10:40	10:15	11:20	12:30
Conductivity	mS/m@20C	22.9	23.7	25.1	24.4	22.5
Ammonia	g/m ³	0.003	<0.003	<0.003	<0.003	<0.003
NNN	g/m ³ N	4.49	4.67	6.2	5.53	4.65
PH	pH	6.4	6.9	6.6	6.6	6.6
Temperature	°C	13.7	14.6	14.6	13.9	13.7
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Table 16 Groundwater sampling undertaken by the Council at GND1188

Sample details	Units	GND1188				
		-	TRC163847	TRC170693	TRC171621	TRC172635
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	-	10:30	10:05	11:05	12:20
Conductivity	mS/m@20C	-	24.1	20.7	23.4	22
Ammonia	g/m ³	-	0.186	0.064	0.086	<0.003
NNN	g/m ³ N	-	4.46	5.21	6.52	7.83
PH	pH	-	6.7	7.4	6.6	6.4
Temperature	°C	-	13.2	15.8	14.5	14.2
Ammonium	g/m ³	-	0.00027	0.00056	0.00 011	<0.00001

Table 17 Groundwater sampling undertaken by the Council at GND1189

Sample details	Units	GND1189				
		TRC162702	TRC163839	TRC170685	TRC171614	TRC172627
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	10:05	09:00	08:40	09:50	10:50
Conductivity	mS/m@20C	38.9	38.4	32.7	26.7	38.7
Ammonia	g/m ³	0.015	0.011	<0.003	0.003	<0.003
NNN	g/m ³ N	18.2	17.7	14.5	11.8	18.5
PH	pH	6	6.1	6.2	6.6	6.2
Temperature	°C	14.2	14	14.3	13.6	13.6
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Table 18 Groundwater sampling undertaken by the Council at GND1306

Sample details	Units	GND1306				
		TRC162706	TRC163843	TRC170689	-	TRC172631
Date	-	31-Aug-16	14-Nov-16	16-Feb-17	09-May-17	25-Aug-17
Time	-	10:40	09:25	09:10	-	11:20
Conductivity	mS/m@20C	31.2	32.9	32.1	-	33.5
Ammonia	g/m ³	0.013	<0.003	<0.003	-	<0.003
NNN	g/m ³ N	15.4	16.3	15.4	-	16.6
PH	pH	6.1	6.2	6.5	-	6.3
Temperature	°C	11.7	13.5	14.6	-	14.9
Ammonium	g/m ³	<0.00001	<0.00001	<0.00001	-	<0.00001

2.1.3.3.3 Nitrogen in groundwater

An increase in the concentration of nitrate in groundwater can be seen in some bores overtime (Figure 7). The up-gradient control bore GND0849, which provides an indication of concentrations outside the area of effects, shows a slightly decreasing trend in nitrate concentrations. GND1187 which is located <500 m down-gradient of the irrigation area shows a slight increase in concentrations over time. GND1189, GND1197, GND1198 and GND1306 located near the centre of the irrigation area, and GND1345 located at the southernmost point of the irrigation area, all show significant increases in nitrate. The remaining bores GND1196 in the south and GND1344, GND1187 and GND1188 located to the south east fluctuate, but have remained relatively stable. Results indicate that improvements in the management of the irrigation system may be required and if not addressed concentrations are likely to continue to rise over time. Nitrate concentrations in GND1345, GND1197, GND1306 and GND1189 exceed the recommended limit of 11.3 mg/L as N for drinking water.

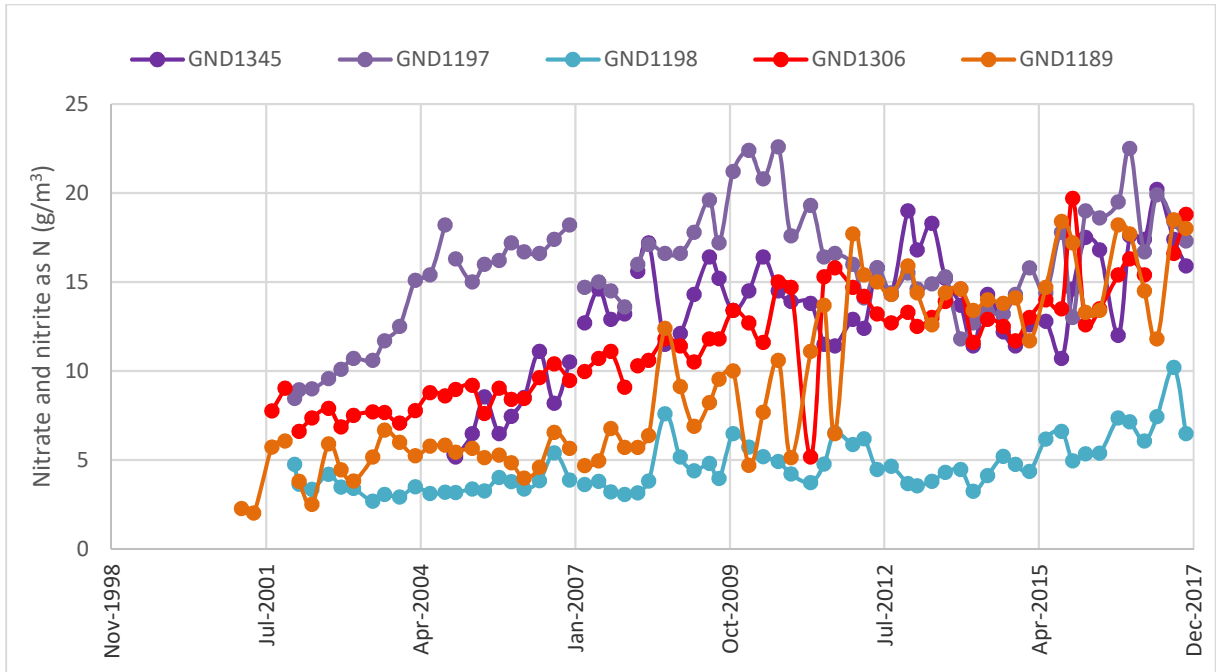


Figure 7 Increasing nitrate and nitrite as N concentrations in groundwater

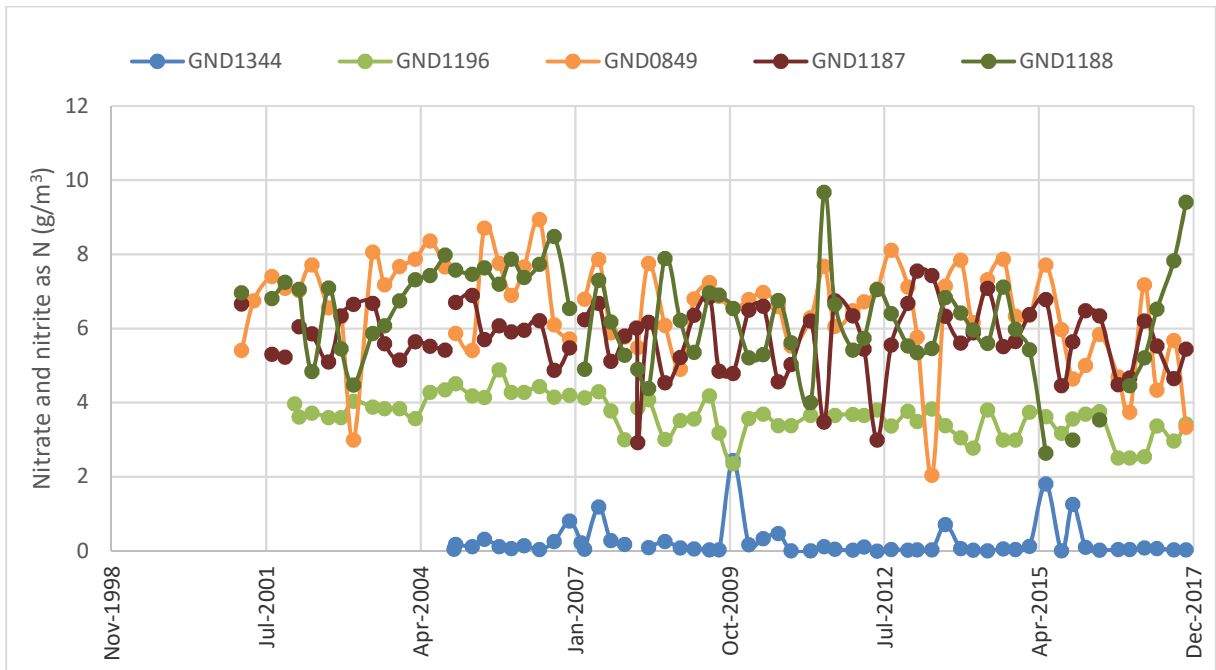


Figure 8 Stable or slightly decreasing nitrate and nitrite as N concentrations in groundwater

2.1.3.3.4 Hydraulic and nitrogen application rates

The Company monitors the volume of effluent pumped from the plant for discharge to land and uses this to calculate the volume of effluent irrigated to each paddock, using the area of the paddock and an assumed standard application depth of 45 mm. Nitrogen loadings are then calculated using the weekly total nitrogen value per hectare.

The consent requires that effluent application rates not exceed 300 kg per hectare per year. The calculated nitrogen rates per hectare indicate some exceedances have occurred during the review period (Table 19). As

the application rates and volumes are calculated, these figures could be over or under estimated, as they are reliant on both the accuracy of the data and the effective spreading of the irrigators.

Irrigation to land was undertaken from 31 October 2016 to 25 May 2017 over a period of 31 weeks. A total of 300,715 m³ of effluent was irrigated, which accounted for 62 % of the total effluent discharged over the review period. A total of 66,081 kg of nitrogen was applied during this time.

Table 19 Nitrogen loadings October 2016- October 2017

NITROGEN LOADINGS FROM IRRIGATION TO STUART ROAD BLOCK 2016-2017 SEASON											
Paddock	kg/Ha	Paddock	kg/Ha	Paddock	kg/Ha	Paddock	kg/Ha	Paddock	kg/Ha	Paddock	kg/Ha
B1	225.9	Y1	104.0	P1	276.3	O1	148.5	G1	227.7	G23	295.7
B2	300.2	Y2	199.4	P2	223.7	O2	265.1	G2	188.6	G24	287.1
B3	284.0	Y3	193.5	P3	242.6	O3	299.7	G3	298.4	G25	255.6
B4	216.9	Y4	226.4	P4	274.5	O4	178.2	G4	281.3	G26	299.3
B5	228.2	Y5	216.9	P5	303.8	O5	0.0	G5	317.7	G27	251.1
B6	187.7	Y6	126.0	P6	285.8	O6	150.8	G6	309.2	G28	200.7
B7	188.1	Y7	0.0	P7	313.7	O7	150.3	G7	318.6	G29	302.4
B8	228.6	Y8	96.3	P8	298.8	O8	151.2	G8	225.5		
B9	240.3	Y9	213.8	P9	306.9	O9	285.8	G9	308.3		
B10	215.6	Y10	159.3	P10	300.6	O10	278.6	G10	235.8		
B11	307.4	Y11	223.7			O11	260.1	G11	216.9		
B12	294.3	Y12	198.9			O12	247.1	G12	318.6		
B13	196.7	Y13	215.1			O13	327.6	G13	252.9		
B14	175.5	Y14	150.3			O14	221.9	G14	298.4		
B15	296.1	Y15	186.3			O15	232.7	G15	210.2		
B16	193.1	Y16	230.4					G16	201.2		
B17	234.0	Y17	275.4					G17	201.6		
B18	245.7	Y18	198.5					G18	289.4		
B19	320.9	Y19	195.8					G19	297.5		
		Y20	150.8					G20	228.2		
		Y21	96.3					G21	266.0		
		Y22	96.3					G22	216.9		

2.1.4 Biological surveys

The Council's standard 'kick-sampling' technique was used at five established sites to collect streambed macroinvertebrates from the Waingongoro River. Samples were processed to provide number of taxa (richness), MCI and SQMCI₅ scores, and EPT taxa for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI₅ takes into account taxa abundance as well as sensitivity to pollution,

and may reveal more subtle changes in communities. It may be the more appropriate index if non-organic impacts are occurring.

Significant differences in either the MCI or the SQMCI_s between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

The October 2016 (Spring) and February 2017 (Summer) macroinvertebrate surveys indicated that the discharge of treated wastewater and uncontaminated stormwater discharges from the Company's site had not had any detrimental effect on the macroinvertebrate communities of the Waingongoro River.

October 2016 (Spring Survey)

Macroinvertebrate richness's were slightly lower than historical medians but differences among sites were not particularly large. MCI scores indicated that the river communities were of 'good' generic health and generally conformed to predicted values though the 'primarily impacted' site had a significantly higher than normal MCI score and both 'impacted' sites had record high SQMCI_s scores which were significantly higher than normal indicating better than normal water quality preceding this survey. Overall, the results of this spring survey indicated that the discharge of waste from the Company's meat works into the Waingongoro River had not had any recent significant detrimental effects on the macroinvertebrate communities downstream of the discharge.

February 2017 (Summer Survey)

Macroinvertebrate richness's for all five sites were either slightly or significantly higher than historical medians and differences among the three most upstream sites were not significant indicating that there were no significant changes in macroinvertebrate health between the 'control' site and the two closest 'impacted' sites. MCI scores indicated that the macroinvertebrate communities' at all five sites were of 'good' generic health and generally conformed to predicted values. SQMCI_s scores were significantly higher than normal at the four most upstream sites and non-significantly higher at the bottom site indicating better than normal water quality preceding this survey. Overall, the results of this summer survey indicated that the discharge of waste from the Company's meat works into the Waingongoro River had not had any recent significant detrimental effects on the macroinvertebrate communities downstream of the discharge.

The full biomonitoring reports are included as Appendix III.

2.1.4.1.1 Soil and herbage monitoring

The Company undertake soil and herbage monitoring and provide this data to the Council in the annual report submitted under the Company's Effluent Management Plan.

2.2 Air

The discharge of emissions to air is permitted under consent 4644-3 for emissions relating to meat processing and associated activities at the premises and consent 5569-1 and for discharge to land via irrigation.

2.2.1 Inspections

The company undertakes daily or weekly walkovers of the site and the Council undertakes additional air surveys during quarterly site inspections and in response to any public complaints.

During the period over review there were no incidents reported by the public and no significant odours detected by the Company or the Council during inspections.

Surveys undertaken by the Company reported the following:

- Slight occasional wafts were reported during some of the weekly odour surveys across all months;

- No odours above a level 1 (slight occasional wafts) were reported; and
- Odours were noted to be emanating from either the ponds or yards.

Surveys undertaken by the Council during the quarterly site inspections and reported the following

- During the April 2017 inspection a very faint intermittent effluent odour detected at Conway Road; and
- No objectionable odours were reported during the September 2016, January 2017, June 2017 or August 2017 inspections.

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 the Company. 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 the Company concerned 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).

In the 2016-2017 period, the Council was required to record one incident, in association with the Company's conditions in resource consents or provisions in Regional Plans. The incident was reported by the Company.

The incident #34592, which occurred on 1 May 2017, involved a blockage in a pipe leading to the wastewater ponds resulting in an unplanned discharge to the Waingongoro River. The inspection, found a portable pump being used to direct wastewater from a sump to the second pond. Evidence of wastewater overflowing from the sump across land and into the Waingongoro River could be seen. The river was in high flow and very turbid, so no significant effect would be expected from the unplanned discharge. The incident was caused by a small plastic bucket, which had been blown in to the pond. The pipe was unblocked and all waste water was being directed to pond system by the end of the inspection. A letter was sent out requesting explanation of incident and the Company installed grating on top of the open wastewater drain to prevent any further wind-blown objects from entering the drain and causing a blockage.

3 Discussion

3.1 Discussion of site performance

Overall, during the 2016-2017 period, the Company demonstrated a generally good to high level of environmental performance and compliance with the resource consents.

Surface water abstraction

For the take from the Waingongoro River, compliance was generally achieved, with the following exception;

- Abstraction data being provided by the Company as daily volumes and not at 15 minute intervals as required by the consent.

As of October 2017 the issues with data supply should be rectified and data will be provided electronically directly to the Council at the required 15 minute intervals to avoid any future non-compliance.

Discharge to water

For the discharge to the river, compliance with consent conditions was achieved, with the following exceptions.

- Discharge data being provided by the Company as weekly volumes and not at 15 minute intervals as required by the consent;
- Specific stormwater quality sampling was not undertaken, prior to discharge to the river; and
- Black disc measurements were not undertaken during river water quality sampling as required by the consent conditions.

As of October 2017 the issues with data supply should be rectified and data will be provided electronically directly to the Council at the required 15 minute intervals to avoid any future non-compliance.

Historically, stormwater sampling and black disc measurements have not been undertaken as part of the monitoring programme. Therefore, a recommendation to update the monitoring programme to include these, to avoid any further non-compliance, will be added to this report.

Discharge to air

For the discharge to air, compliance with consent conditions was achieved.

Discharge to land

For the discharge to land, the disposal of treated wastewater was generally well managed. Sampling undertaken reported no observable significant changes in groundwater or surface water quality during the period under review. Compliance with consent conditions was achieved with the following exception:

- Some exceedances in nitrogen loading per hectare were noted; and
- Historical data indicate there may be some long term effects on groundwater quality over time.

Currently nitrate concentrations in some bores exceed the New Zealand guidelines for drinking water.

Provision of data

In regard to administrative performance, improvement is still required in respect of the timely provision of monitoring reports as summarised below:

- A report is still required by the consent holder investigating dissolved reactive phosphorus levels under condition 12 of consent 2039-4; and
- The water use minimisation report required for submittal by 31 May 2017 was submitted late.

3.2 Environmental effects of exercise of consents

Surface water abstraction

During the October 2016-September 2017 monitoring year 272,166 m³ of water use on site was sourced from the Waingongoro River under consent 5437-4 and 221,690 m³ was sourced from the Eltham town water supply. There were no observable impacts to the river as a result of the abstraction.

Discharge to water

The results of both the spring and summer biomonitoring surveys indicated that the discharge of waste from the Company's meat works into the Waingongoro River had not had any recent significant detrimental effects on the macroinvertebrate communities downstream of the discharge. The surface water quality monitoring exhibited no significant changes over the review period indicating that adequate dilution is occurring downstream of the discharge site. No observable impacts were noted during inspection and all prescribed water quality limits were met.

Discharge to air

Some slight occasional wafts of odour were reported during weekly inspections by the Company and during one of the quarterly inspections by the Council. No complaints were received by the Council from the public regarding any odours or emissions to air.

Discharge to land

There were some minor exceedances in the nitrogen loading rate at the irrigation site. However due to the method of calculations these exceedances are likely not significant.

Groundwater results during the period under review remained relatively stable in all bores. However, a review of the historical data since 2001 does indicate that nitrate concentrations have increased significantly in some bores over time. As these concentrations are anticipated to continue increasing a recommendation to review consent conditions and/or the irrigation management plan and identify feasible mitigation methods will be included in this report.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 20 to Table 30. A summary of the consent holder's compliance record from 2014 to date is set out in Table 31 for comparison.

Table 20 Summary of performance for consent 1968-4

Purpose: To discharge stormwater from various locations at a meat processing plant site into the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option	Site inspection – checking that standard operating procedures to achieve compliance with conditions are followed	Yes
2. Limit on catchment area	Site inspection	Yes
3. Concentration limits upon potential contaminants in discharge	Stormwater sampling-	No-stormwater sampling not undertaken
4. Controls on effect of discharge in receiving water	Inspection, river sampling and bio-monitoring	Yes
5. Maintenance of contingency plan	Receipt and certification of Plan. Plan received, approved 11 September 2008. Updated Plan received 12 February 2015	Yes
6. Maintenance of stormwater management plan	Receipt and certification of Plan. Plan received, approved 11 September 2008. Updated Plan received 12 February 2015.	Yes
7. Consultation over significant proposed changes	Liaison during visits. No significant changes undertaken during year	N/A
8. Optional review provision re environmental effects	Option not available. Next review date June 2023	N/A
Overall assessment of environmental performance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		High

Table 21 Summary of performance for consent 2039-4

Purpose: To discharge treated wastewater into the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limits of discharge rates and volumes	Inspections of data and discharge point inspections	Yes
2. Concentration limits upon potential contaminants in discharge	Chemical sampling and biomonitoring	Yes

Purpose: To discharge treated wastewater into the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Notification of significant proposed changes	Inspections and receipt of notification. No significant changes undertaken during year	Yes
4. Installation of meter and datalogger	Inspection and receipt of data-	No-data not recording at required intervals
5. Activities to be exercised in accordance with a management plan	Inspections and liaison and receipt of Company reports	Yes
6. Review and update of management plan	Plan received by Council and approved in 1997. Most recent update Sept 2003 approved by Council	Yes
7. Option for review of wastewater plan	No review sought by either Council or Company. Not requested	N/A
8. Plan to be implemented	Inspections and liaison and receipt of Company reports	Yes
9. Designated staff member	Officer introduced to Council	Yes
10. Adopt the best practical option (bpo)	Review of management plan and inspections	Yes
11. Donation to Taranaki Tree Trust	Confirmation with Council finance department that donation received	Yes
12. Provide a report investigating dissolved reactive phosphorus DRP	Receipt of report –	No-report not received
13. Optional review following receipt of DRP report	Review of report	N/A
14. Optional review provision re environmental effects	Review undertaken during 2017. Next consideration June 2023	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		High Improvement required
Overall assessment of administrative performance in respect of this consent		

Table 22 Summary of performance for consent 4644-3

Purpose: To discharge emissions into the air arising from meat processing and associate activities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge to take place from authorised area	Inspection by Council	Yes
2. Discharge to take place as described in application	Inspection by Council	Yes
3. Consultation over significant proposed changes	On-going liaison. No significant changes undertaken during year	N/A

Purpose: To discharge emissions into the air arising from meat processing and associate activities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Adopt best practicable option (bpo) to prevent or minimise adverse effects	Liaison with Company and inspection by Council	Yes
5. Minimise emissions and effects by most appropriate equipment and operational controls	Inspection by Council	Yes
6. No offensive or objectionable odour beyond boundary	Odour surveys by both Company and Council, and keeping of complaints record	Yes
7. Provision of air quality management plan	Plan received by Council and approved in 1997. Most recent update received 11 February 2015	Yes
8. Optional review provision re environmental effects	Option not available. Next review date 1 June 2023.	N/A
Overall assessment of environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 23 Summary of performance for consent 5437-3

Purpose: To take and use water from the Waingongoro river for use in a meat processing plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on maximum abstraction rate	Continuous flow metering by consent holder	Yes
2. Installation of flow meter and provision of records	Inspection, review of data	No-data not recorded at required intervals
3. Certification of flow meter	Receipt of certification. (Provided 18 November 2014).	Yes
4. Reporting of monitoring equipment faults	Inspection, receipt of reports	N/A
5. Access to metering system	Inspection	Yes
6. Formatting of records	Inspection, and review of data received	No-data not provided at required interval
7. Adopt best practicable option for conservation of water	Site inspection – checking that standard operating procedures to achieve compliance with conditions are followed	Yes
8. Annual report on water use and recycling	Receipt of report. Report is required by 31 May but was not received until December.	Yes
9. Intake screened and designed to protect fish	Inspection	Yes

Purpose: To take and use water from the Waingongoro river for use in a meat processing plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
10. Intake modifications not to affect juvenile fish	Inspection	N/A
11. Donation to Council for riparian protection	Confirmation with Council finance dept. that donation received	Yes
12. Optional review provision re environmental effects	Reviewed during monitoring period. Next review date June 2023	Yes
Overall assessment of environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		High Improvement required

Table 24 Summary of performance for consent 5569-1

Purpose: To discharge up to 3500 cubic/metres/day of treated wastewater from meat processing and associated activities by irrigation onto and into land, and to discharge emissions into the air in the vicinity of various unnamed tributaries of the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Operational within 12 months of issue	Irrigation commenced January 2001	N/A
2. Provision of spray irrigation management plan	Plan received by Council and approved in 2001. Most recent update received 11 February 2015	Yes
3. Plan to be followed	Liaison, inspections and provision of monitoring reports	Yes
4. Optional review of management plan	Plan received by Council	N/A
5. Designated staff member	Part of Company Technical Manager's job description	Yes
6. Prohibition of untreated blood	Inspections	Yes
7. No offensive or objectionable odour beyond boundary	Inspections and complaint register	Yes
8. No spray drift beyond boundary	Inspections, and complaint register	Yes
9. Biosolids/sludge from aerobic ponds only	Inspections. No bio-solids/sludge discharged on Stuart Road property	N/A
10. Limit on sodium adsorption ratio	Chemical monitoring	Yes
11. Prohibition of ponding and run-off	Inspections	Yes
12. Spray buffer zones	Inspections	Yes

Purpose: To discharge up to 3500 cubic/metres/day of treated wastewater from meat processing and associated activities by irrigation onto and into land, and to discharge emissions into the air in the vicinity of various unnamed tributaries of the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
13. Limit on nitrogen application rate to 300 kg/ha/year	Monitoring by Company and data review by Council.	No-some exceedances
14. Provisions for contamination of groundwater or water supply	Monitoring by Council	No-nitrate increasing over time
15. Maintenance of monitoring bores	Inspection and sampling	Yes
16. Baseline and operational monitoring	Soil, herbage and water quality sampling by Company	Yes
17. Optional review provision for operational requirements	Not sought by Company	N/A
18. Optional review provision to assess design of treatment/disposal system	Option no longer available	N/A
19. Optional review provision re environmental effects	Option not available. Next review date June 2018	N/A
Overall assessment of environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		Improvement required High

Table 25 Summary of performance for consent 5604-1

Purpose: To construct, place, user and maintain an intake structure and associated bank protection works on the true left bank of the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to and after works	Receipt of notifications	N/A
2. Construction and maintenance in accordance with documentation	Inspection by Council, previously	Yes
3. Minimum batter slope		N/A
4. Riverbed material not to be removed		N/A
5. Adoption of best practicable option to avoid or minimise adverse effects	Liaison with Company and inspection of structure	Yes
6. No machinery refuelling on riverbed		N/A

Purpose: To construct, place, user and maintain an intake structure and associated bank protection works on the true left bank of the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. Riverbed disturbance and reinstatement		N/A
8. Removal of structure when no longer required		N/A
9. Optional review provision re environmental effects	Option not available. Consent expires June 2017	N/A
Overall assessment of environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 26 Summary of performance for consent 5736-2

Purpose: To discharge treated wastewater from meat processing and associated activities by irrigation onto and into land, and to discharge the associated emissions into the air at or about (NZTM) 1708468E-5634921N		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge only from pond 6 or 7	Inspection by Council	N/A
2. No offensive or objectionable odour beyond boundary	Inspections and complaint register	N/A
3. No spray drift beyond boundary	Inspections, and complaint register	N/A
4. Limit on sodium adsorption ratio	Chemical monitoring	N/A
5. Prohibition of ponding and run-off	Inspection and complaint register	N/A
6. Spray buffer zones	Inspection by Council	N/A
7. Limit on Nitrogen application rate	Monitoring by Company and data review by Council	N/A
8. Provisions for contamination of groundwater or water supply	No local groundwater use downslope, no contamination of roof water	N/A
9. Provision of wastewater irrigation management plan	Plan for disposal of bio-solids produced August 2005	N/A
10. Review of plan following a request from the Council	Receipt and review of plan	N/A
11. Plan to be provided to third parties for review		N/A
12. Designated staff member	Part of Company Technical Manager's job description	Yes

Purpose: To discharge treated wastewater from meat processing and associated activities by irrigation onto and into land, and to discharge the associated emissions into the air at or about (NZTM) 1708468E-5634921N		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
13. Adopt best practicable option (bpo) to prevent or minimise adverse effects	Liaison with Company and inspections	N/A
14. Maintenance of monitoring bores	Bores not installed as consent not exercised, other than bio-solids disposal in Sept/Oct 2005	N/A
15. Monitoring of surface waters to be undertaken downstream	Chemical and microbiological monitoring by Council	N/A
16. Baseline and operational monitoring of herbage, soil and water	Water monitoring by Council and soil/herbage monitoring by Company	N/A
17. Annual report on consent compliance		N/A
18. Optional review provision re environmental effects	Option not available. Next review due 2023	N/A
Overall assessment of environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		Not exercised

Table 27 Summary of performance for consent 5739-1

Purpose: To erect, place and maintain a pipeline under the bed of the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to and after works	Receipt of notifications	N/A
2. Construction and maintenance in accordance with documentation	Inspection by Council	Yes
3. Adoption of best practicable option to avoid or minimise adverse effects	Liaison with Company and inspection of structure	Yes
4. Riverbed disturbance and reinstatement		N/A
5. Removal of structure when no longer required		N/A
6. Optional review provision re environmental effects	Option not available. Consent expired June 2017.	N/A

Purpose: To erect, place and maintain a pipeline under the bed of the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 28 Summary of performance for consent 5739-2

Purpose: To erect, place and maintain a pipeline under the bed of the Waingongoro River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to and after works	Receipt of notifications	N/A
2. Construction and maintenance in accordance with documentation	Inspection by Council	Yes
3. Adoption of best practicable option to avoid or minimise adverse effects	Liaison with Company and inspection of structure	Yes
4. Riverbed disturbance and reinstatement		N/A
5. Removal of structure when no longer required		N/A
6. Optional review provision re environmental effects	Option not available. Consent expires June 2017.	N/A
Overall assessment of environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 29 Summary of performance for consent 6455-1

Purpose: To erect, place and maintain a culvert in, and to realign, an unnamed tributary of the Waingongoro River for site access purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option (bpo) to avoid or minimise adverse effects	Liaison with Company and inspection of structure	Yes
2. Construction and maintenance in accordance with documentation	Inspection by Council	Yes
3. Notification prior to and after works	Notifications given 17 and 30 April 2007	Yes

Purpose: To erect, place and maintain a culvert in, and to realign, an unnamed tributary of the Waingongoro River for site access purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Timing of maintenance works	Liaison with Company and inspection	Yes
5. Riverbed disturbance and reinstatement	Inspection by Council	Yes
6. Lapse of consent if not exercised	Consent exercised	N/A
7. Optional review provision re environmental effects	Option not available. Consent expires June 2017	N/A
Overall assessment of environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 30 Summary of performance for consent 7487-1

Purpose: To discharge anaerobic pond solids and paunch solids onto and into land and contaminants to air in the Waingongoro catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Disposal within defined areas	Inspection by Council	N/A
2. Keeping of disposal records	Recording by Company and review by Council	N/A
3. Adopt best practicable option (bpo) to avoid or minimise adverse effects	Liaison with Company and inspection by Council	N/A
4. No discharge to surface water	Inspection by Council	N/A
5. Buffer zones	Inspection by Council	N/A
6. Limit on Nitrogen application rates	Monitoring by Company and data review by Council	N/A
7. No offensive or objectionable odour beyond boundary	Inspections and complaint register	N/A
8. Provision and maintenance of solids disposal management plan	Review by Council, plan yet to be provided, consent not exercised.	N/A
9. Notification and recording of complaints	Reporting by Company and inspection by Council	N/A
10. Lapse of consent if not exercised	Whether exercised by 30 September 2015.	Lapsed
11. Optional review provision re environmental effects	Option not available. Next review date June 2017	N/A

Purpose: <i>To discharge anaerobic pond solids and paunch solids onto and into land and contaminants to air in the Waingongoro catchment</i>		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of environmental performance in respect of this consent		Not exercised
Overall assessment of administrative performance in respect of this consent		

Table 31 Evaluation of environmental performance since 2014

Year	Consent no	High	Good	Improvement required	Poor
2014-2015	1968-4	1			
	2039-4	1			
	4644-3	1			
	5437-3	1			
	5569-1		1		
	5604-1	1			
	5736-2	Not exercised			
	5739-1	1			
	6455-1	1			
	7487-1	Not exercised			
2015-2016	1968-4	1			
	2039-4	1			
	4644-2	1			
	4644-3	1			
	5437-3		1		
	5569-1			1	
	5604-1		1		
	5736-2	Not exercised			
	5739-1	1			
	6455-1	1			
	7487-1	Lapsed 30 September 2015			
2016-2017	1968-4		1		
	2039-4	1			
	4644-3	1			
	5437-3	1			
	5569-1			1	
	5604-1	1			

Year	Consent no	High	Good	Improvement required	Poor
	5736-2	Not exercised			
	5739-1	1			
	5739-2	1			
	6455-1	1			
	7487-1	Lapsed 30 September 2015			
Totals		20	4	2	0

During the year, the Company demonstrated a generally high level of environmental and administrative performance with the resource consents as defined in Section 1.1.4. There are some minor issues in the supply of data and one consent (5569-1) requires some improvement in environmental performance. Since 2014 the Company has generally maintained either a good or high level of environmental and administrative performance with resource consents.

3.4 Recommendations from the 2015-2016 Annual Report

In the 2015-2016 Annual Report, it was recommended:

1. THAT monitoring of water abstraction and discharges in relation to the meat processing plant of ANZCO Foods Eltham Limited in the 2016-2017 year continue at the same level as in 2015-2016.
2. THAT monitoring of air emissions from the activities of ANZCO Foods Eltham Limited in the 2016-2017 year continue at the same level as in 2015-2016.
3. THAT the option for a review of resource consent 1968-4 (discharge stormwater) in June 2017, as set out in condition 8 on consent 1968-4 not be exercised, on the ground that the current conditions are adequate to deal with any potential adverse effects.
4. THAT the option for a review of resource consent 2039-4 (discharge wastewater) in June 2017, as set out in condition 14 on consent 2039-4 be exercised, on the ground that the current method of providing data to Council is not adequate to comply with the consent conditions.
5. THAT the option for a review of resource consent 5437-3 (take) in June 2017, as set out in condition 12 on consent 5437-3 be exercised, on the ground that the current method of providing data to Council is not adequate to comply with the consent conditions.
6. THAT the option for a review of resource consent 6455-1 (pipeline structure) in June 2017, as set out in condition 7 on consent 6455-1 not be exercised, on the ground that the current conditions are adequate to deal with any potential adverse effects.
7. THAT the option for a review of resource consent 7487-1 (discharge solids) in June 2017, as set out in condition 11 on consent 7487-1 not be exercised, on the ground that the current conditions are adequate to deal with any potential adverse effects.

These recommendations were fully implemented during the 2016-2017 monitoring period.

3.5 Alterations to monitoring programmes for 2017-2018

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 2017-2018

1. THAT monitoring of water abstraction and discharges in relation to the meat processing plant of ANZCO Foods Eltham Limited in the 2016-2017 year continue at the same level as in 2015-2016 with the following additions:
 - a) Stormwater sampling be undertaken by the Company during periods of heavy rainfall and results reported to the Council;
 - b) Black disc monitoring be added to the quarterly surface water sampling programme undertaken by the Council on behalf of the Company.

Recommendations to this effect are attached to this report.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) 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 2017-2018.

3.6 Exercise of optional review of consent

Resource consent 5569-1 provides for an optional review of the consent in June 2018. Condition 19 allows the Council to review the consent, for the purpose of ensuring the consent conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Based on the results of monitoring in the year under review, and in previous years as set out in earlier annual compliance monitoring reports, which indicate ongoing nitrogen loading exceedances and increasing nitrate concentrations trends in groundwater it is considered that there are grounds that require a review of the consent to be pursued.

4 Recommendations

1. THAT the option to review consent 5569-1 (discharge to land) in June 2018, as set out in condition 19 of consent 5569-1 be exercised, on the grounds that the current conditions are not adequate to deal with the effects of the activity on groundwater. Or as an alternative, the Management Plan be updated and include improvements in nitrogen loading management strategies designed to combat the increasing nitrate concentrations in groundwater.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the wastewater management plan be reviewed and updated to assess and then implement new measures designed to mitigate the increasing nitrate trends in groundwater and avoid any further nitrogen loading exceedances.
4. THAT the DRP report required by consent 2039-4 be submitted to the Council for review.
5. THAT monitoring of water abstraction and discharges in relation to the meat processing plant of ANZCO Foods Eltham Limited in the 2016-2017 year continue at the same level as in 2015-2016 with the following additions:
 - a) Stormwater sampling be undertaken by the Company during periods of heavy rainfall and results reported to the Council;
 - b) Black disc monitoring be added to the quarterly surface water sampling programme undertaken by the Council on behalf of the Company.

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.
BODF	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 20°C and expressed in mS/m.
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.
F	Fluoride.
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 ³	Cubic 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.
mS/m	Millisiemens per metre.
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).
NNN	Nitrate and nitrite combined, expressed in terms of the mass of nitrogen (N).
NO ₃	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
UI	Unauthorised Incident.

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Appendix I

Resource consents held by ANZCO Foods Eltham Limited

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

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

Name of
Consent Holder: Riverlands Eltham Limited
P O Box 124
ELTHAM 4353

Decision Date: 9 July 2012

Commencement
Date: 9 July 2012

Conditions of Consent

Consent Granted: To discharge stormwater from various locations at a meat processing plant site into the Waingongoro River at or about (NZTM) 1710920E-5634567N

Expiry Date: 1 June 2029

Review Date(s): June 2017, June 2023, and/or within 3 months of receiving notification under special condition 7

Site Location: London Street, Eltham

Legal Description: Lot 1 DP 11593 [Discharge source & site]

Catchment: Waingongoro

*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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The stormwater discharged shall be from a catchment area not exceeding 1.8 hectares
3. Constituents of the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 10
suspended solids	Concentration not greater than 100 gm ⁻³
oil and grease	Concentration not greater than 15 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.

4. After allowing for reasonable mixing, within a mixing zone extending 20 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
 - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b) any conspicuous change in the colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life.
5. The consent holder shall 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.
6. The consent holder shall 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:

Consent 1968-4

- a) the loading and unloading of materials;
- b) maintenance of conveyance systems;
- c) general housekeeping; and
- d) management of the interceptor system.

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

7. The consent holder shall notify the Chief Executive, Taranaki Regional Council, prior to making any changes to the processes or operations undertaken at the site, or the chemicals used or stored on site, that could alter the nature of the discharge. Any such change shall then only occur following receipt of any necessary approval under the Resource Management Act 1991. Notification shall include the consent number, a brief description of the activity consented and an assessment of the environmental effects of any changes, and be emailed to consents@trc.govt.nz.
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:
 - a) during the month of June 2017 and/or June 2023 and/or
 - b) within 3 months of receiving a notification under special condition 7 above;

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 9 July 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Riverlands Eltham Limited
P O Box 124
ELTHAM 4353

Decision Date: 9 July 2012

Commencement
Date: 9 July 2012

Conditions of Consent

Consent Granted: To discharge treated wastewater into the Waingongoro
River at or about (NZTM) 1710612E-5634427N

Expiry Date: 1 June 2029

Review Date(s): June 2017, June 2023, June 2026, and/or within 60 days
months of receiving notification under special condition 13

Site Location: London Street, Eltham

Legal Description: Lot 2 DP 12254 Lot 3 DP 1622 Lots 5-7,14 DP 1623 Lot 1
DP 11593 & Sec 101 Eltham Vill Sett [Discharge source &
site]

Catchment: Waingongoro

*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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The discharge shall not exceed 3500 cubic metres per day and the rate of discharge shall not exceed 81 litres per second.
2. After allowing for reasonable mixing, within a mixing zone extending 100 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving water:
 - (a) a reduction in the dissolved oxygen concentration below 6 gm⁻³;
 - (b) the concentration of total (un-ionised and ionised) ammonia nitrogen as gm⁻³ nitrogen exceeding the values given in Table 1 below for the corresponding pH;
 - (c) the concentration of filtered carbonaceous Biochemical Oxygen Demand (20 °C, 5-day test) exceeding 2 gm⁻³;
 - (d) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - (e) any conspicuous change in the colour or visual clarity;
 - (f) any emission of objectionable odour;
 - (g) the rendering of fresh water unsuitable for consumption by farm animals;
 - (h) any significant adverse effects on aquatic life, habitats, or ecology; and
 - (i) a decrease in water clarity of greater than 33% as determined using the standard black disc measurement.
3. The consent holder shall advise the Taranaki Regional Council prior to making any change in the processes undertaken at the site which could significantly alter the nature of the discharge. The advice shall be given by emailing consents@trc.govt.nz.
4. Before exercising this consent the consent holder shall install, and thereafter maintain a meter and a datalogger at the site of discharge. The meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of the discharge to an accuracy of ± 5%, at intervals not exceeding 15 minutes. Records of the date, the time and the rate and volume the discharge, shall be made available to the Chief Executive, Taranaki Regional Council on request.
5. Subject to the other conditions this consent, this consent shall be exercised in accordance with a 'Wastewater Disposal Management Plan' (the 'Management Plan') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The Management Plan shall detail the management of the discharge in combination with the land disposal authorised by consents 5569-1 and 5736-2 (Joblin Farm and Paulwell Farm), and the methods and procedures undertaken by the consent holder to ensure that the conditions of this consent are met and can be shown to be met. It shall address but not necessarily be limited to the following matters:

Consent 2039-4

- (a) monitoring the water quality and rate of the discharge;
 - (b) monitoring the water quality and flow in the receiving water;
 - (c) management of the wastewater treatment system;
 - (d) minimisation of phosphorous and nitrogen in the wastewater discharge and how this is being achieved;
 - (e) treatment and disposal of screenings and oxidation pond sludges;
 - (f) criteria for the use of spray irrigation or discharge to surface water;
 - (g) reporting on the exercise of the consent; and
 - (h) methods and procedures utilised to minimise the discharge to the Waingongoro River, and the effects of that discharge, and to maximise the discharge to land.
6. Within three months of the granting of this consent, the consent holder shall update and review the management plan required by condition 5 and resubmit the plan for certification by the Chief Executive, Taranaki Regional Council.
7. Within one months notice given by the Taranaki Regional Council, the consent holder shall review the management plan required by condition 5 and resubmit the plan for certification by the Chief Executive, Taranaki Regional Council.
8. A copy of any reviewed Plan, as per conditions 6 and 7, shall be provided to the Department of Conservation and Fish and Game New Zealand (Taranaki Region), for the Taranaki Regional Council to take into account any comments received (within a two week timeframe from when the Plan was provided).
9. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the wastewater system. The officer shall be regularly trained on the content and implementation of the wastewater disposal management plan, and shall be advised immediately of any revision or additions to the management plan.
10. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
11. The consent holder shall mitigate the effects of the discharge by making annual payments of \$9000 (GST exclusive) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and management in the Waingongoro River catchment excluding that area being irrigated under consent 5569. The amount to be paid shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation, and be made no later than 1 September each year.
12. Before 31 December 2013 the consent holder shall engage a suitably qualified independent person to prepare a report investigating Dissolved Reactive Phosphorus (DRP) in the discharge and options for reducing it. The report shall include, but not necessary be limited to:
 - (a) Details the DRP levels in the discharge and its potential environmental effect on the Waingongoro River;
 - (b) Benchmarking of DRP levels with other discharges of a similar nature;
 - (c) Options for further reducing DRP levels; and
 - (d) The feasibility of implementing DRP reduction options.

13. The Council may, pursuant to section 128 of the Resource Management Act 1991, review any or all of the conditions of this consent by giving notice of review within 60 days of receiving a report required by condition 12 for the purpose of requiring specific conditions to reduce the levels of Dissolved Reactive Phosphorus (DRP) in the discharge.
14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2026 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; and/or
 - (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Table 1: Maximum total ammonia concentration in the Waingongoro River for a given pH

pH of receiving water	Total Ammonia (gm ⁻³)	pH of receiving water	Total Ammonia (gm ⁻³)	pH of receiving water	Total Ammonia (gm ⁻³)
		7.1	2.96	8.1	1.09
		7.2	2.81	8.2	0.935
		7.3	2.65	8.3	0.795
		7.4	2.47	8.4	0.673
6.5	3.48	7.5	2.28	8.5	0.568
6.6	3.42	7.6	2.07	8.6	0.480
6.7	3.36	7.7	1.87	8.7	0.406
6.8	3.28	7.8	1.66	8.8	0.345
6.9	3.19	7.9	1.46	8.9	0.295
7.0	3.08	8.0	1.27	9.0	0.254

Signed at Stratford on 9 July 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Riverlands Eltham Limited
PO Box 124
Eltham 4353

Decision Date
(Review): 13 October 2017

Commencement Date
(Review): 13 October 2017 (Granted Date: 9 July 2012)

Conditions of Consent

Consent Granted: To discharge treated wastewater into the Waingongoro River

Expiry Date: 1 June 2029

Review Date(s): June 2023, June 2026

Site Location: London Street, Eltham

Grid Reference (NZTM) 1710612E-5634427N

Catchment: Waingongoro

*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 discharge shall not exceed 3500 cubic metres per day and the rate of discharge shall not exceed 81 litres per second.
2. After allowing for reasonable mixing, within a mixing zone extending 100 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving water:
 - (a) a reduction in the dissolved oxygen concentration below 6 gm⁻³;
 - (b) the concentration of total (un-ionised and ionised) ammonia nitrogen as gm⁻³ nitrogen exceeding the values given in Table 1 below for the corresponding pH;
 - (c) the concentration of filtered carbonaceous Biochemical Oxygen Demand (20 °C, 5-day test) exceeding 2 gm⁻³;
 - (d) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - (e) any conspicuous change in the colour or visual clarity;
 - (f) any emission of objectionable odour;
 - (g) the rendering of fresh water unsuitable for consumption by farm animals;
 - (h) any significant adverse effects on aquatic life, habitats, or ecology; and
 - (i) a decrease in water clarity of greater than 33% as determined using the standard black disc measurement.
3. The consent holder shall advise the Taranaki Regional Council prior to making any change in the processes undertaken at the site which could significantly alter the nature of the discharge. The advice shall be given by emailing consents@trc.govt.nz.
4. Before exercising this consent the consent holder shall install, and thereafter maintain a meter and a datalogger at the site of discharge. The meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of the discharge to an accuracy of ± 5%, at intervals not exceeding 15 minutes. Records of the date, the time and the rate and volume the discharge, shall be made available to the Chief Executive, Taranaki Regional Council on request.
5. The records of water discharged 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 discharged as 'zero' when no water is discharged; and
 - c) be transmitted to the Taranaki Regional Council's computer system within two hours of being recorded.

Consent 2039-4.1

6. Subject to the other conditions this consent, this consent shall be exercised in accordance with a 'Wastewater Disposal Management Plan' (the 'Management Plan') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The Management Plan shall detail the management of the discharge in combination with the land disposal authorised by consents 5569-1 and 5736-2 (Joblin Farm and Paulwell Farm), and the methods and procedures undertaken by the consent holder to ensure that the conditions of this consent are met and can be shown to be met. It shall address but not necessarily be limited to the following matters:
 - (a) monitoring the water quality and rate of the discharge;
 - (b) monitoring the water quality and flow in the receiving water;
 - (c) management of the wastewater treatment system;
 - (d) minimisation of phosphorous and nitrogen in the wastewater discharge and how this is being achieved;
 - (e) treatment and disposal of screenings and oxidation pond sludges;
 - (f) criteria for the use of spray irrigation or discharge to surface water;
 - (g) reporting on the exercise of the consent; and
 - (h) methods and procedures utilised to minimise the discharge to the Waingongoro River, and the effects of that discharge, and to maximise the discharge to land.
7. Within three months of the granting of this consent, the consent holder shall update and review the management plan required by condition 6 and resubmit the plan for certification by the Chief Executive, Taranaki Regional Council.
8. Within one months notice given by the Taranaki Regional Council, the consent holder shall review the management plan required by condition 6 and resubmit the plan for certification by the Chief Executive, Taranaki Regional Council.
9. A copy of any reviewed Plan, as per conditions 7 and 8, shall be provided to the Department of Conservation and Fish and Game New Zealand (Taranaki Region), for the Taranaki Regional Council to take into account any comments received (within a two week timeframe from when the Plan was provided).
10. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the wastewater system. The officer shall be regularly trained on the content and implementation of the wastewater disposal management plan, and shall be advised immediately of any revision or additions to the management plan.
11. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
12. The consent holder shall mitigate the effects of the discharge by making annual payments of \$9000 (GST exclusive) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and management in the Waingongoro River catchment excluding that area being irrigated under consent 5569. The amount to be paid shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation, and be made no later than 1 September each year.

Consent 2039-4.1

13. Before 31 December 2013 the consent holder shall engage a suitably qualified independent person to prepare a report investigating Dissolved Reactive Phosphorus (DRP) in the discharge and options for reducing it. The report shall include, but not necessary be limited to:
 - (a) Details the DRP levels in the discharge and its potential environmental effect on the Waingongoro River;
 - (b) Benchmarking of DRP levels with other discharges of a similar nature;
 - (c) Options for further reducing DRP levels; and
 - (d) The feasibility of implementing DRP reduction options.
14. The Council may, pursuant to section 128 of the Resource Management Act 1991, review any or all of the conditions of this consent by giving notice of review within 60 days of receiving a report required by condition 13 for the purpose of requiring specific conditions to reduce the levels of Dissolved Reactive Phosphorus (DRP) in the discharge.
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 2017 and/or June 2023 and/or June 2026 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; and/or
 - (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 13 October 2017

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Table 1: Maximum total ammonia concentration in the Waingongoro River for a given pH

pH of receiving water	Total Ammonia (gm ⁻³)	pH of receiving water	Total Ammonia (gm ⁻³)	pH of receiving water	Total Ammonia (gm ⁻³)
		7.1	2.96	8.1	1.09
		7.2	2.81	8.2	0.935
		7.3	2.65	8.3	0.795
		7.4	2.47	8.4	0.673
6.5	3.48	7.5	2.28	8.5	0.568
6.6	3.42	7.6	2.07	8.6	0.480
6.7	3.36	7.7	1.87	8.7	0.406
6.8	3.28	7.8	1.66	8.8	0.345
6.9	3.19	7.9	1.46	8.9	0.295
7.0	3.08	8.0	1.27	9.0	0.254

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

Name of
Consent Holder: ANZCO Foods Limited
PO Box 124
Eltham 4353

Decision Date: 5 May 2016

Commencement Date: 5 May 2016

Conditions of Consent

Consent Granted: To discharge emissions into the air arising from meat processing and associated activities at the factory premises

Expiry Date: 1 June 2035

Review Date(s): June 2023, June 2029

Site Location: 75 London Street, Eltham

Grid Reference (NZTM) 1710980E-5634465N

Catchment: Waingongoro

*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. This consent authorises emissions only from the area shown on the attached map.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of the original application for this consent and any subsequent applications to change conditions. In the case of any contradiction between the documentation submitted in support of previous applications and the conditions of this consent, the conditions of this consent shall prevail.
3. Prior to undertaking any alterations to the plant, processes or operations 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.
4. 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.
5. The consent holder shall minimise the emissions and impacts of contaminants discharged into air from the site by:
 - a) the selection of the most appropriate process equipment;
 - b) process control equipment and emission control equipment;
 - c) the methods of control;
 - d) supervision and operation; and
 - e) the proper and effective operation, supervision, maintenance and control of all equipment and processes at all times.
6. The discharges authorised by this consent shall not give rise to any odour at or beyond the boundary of the site that is offensive or objectionable.
7. The site shall be operated in accordance with an 'Odour Management Plan' prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The plan shall detail how the site will be managed to achieve compliance with the conditions of this consent and shall address, as a minimum:
 - a. possible sources of objectionable air discharge;
 - b. air emissions control; and
 - c. air monitoring.

Consent 4644-3.0

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 2023 and/or June 2029, 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 5 May 2016

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management



Area in which emissions are authorised by this consent.

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

Name of
Consent Holder: Riverlands Eltham Limited
P O Box 124
ELTHAM 4353

Decision Date: 9 July 2012

Commencement
Date: 9 July 2012

Conditions of Consent

Consent Granted: To take and use water from the Waingongoro River for use
in a meat processing plant at or about (NZTM) 1710920E-
5634567N

Expiry Date: 1 June 2029

Review Date(s): June 2017, June 2023

Site Location: Lower London Street, Eltham

Legal Description: Lot 1 DP 11593 [Site of take & use]

Catchment: Waingongoro

*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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The volume of water taken shall not exceed 1972 cubic metres per day (22.8 litres per second).
2. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm 5\%$. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

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

3. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):
 - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
 - (b) has been tested and shown to be operating to an accuracy of $\pm 5\%$.

The documentation shall be provided:

- (i) within 30 days of the installation of a water meter or datalogger;
 - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
 - (iii) no less frequently than once every five years.
4. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
 5. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.
 6. The records of water taken shall:
 - (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and
 - (b) specifically record the water taken as 'zero' when no water is taken.

Consent 5437-3

7. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the taking of water, including, but not limited to, the efficient and conservative use of water.
8. The consent holder shall annually investigate and report on compliance with condition 7 including water conservation measures, plant water recycling and reuse. The report to be received by the Chief Executive, Taranaki Regional Council, by 31 May each year.
9. The consent holder shall ensure that the intake is screened and designed to avoid fish entering the intake or being trapped against the screen.
10. The consent holder shall ensure that no modification is made to the intake that in any way could increase the likelihood of juvenile fish entering the intake or being trapped against the screen.
11. The consent holder shall mitigate the effects of the discharge by making annual payments of \$5000 (GST exclusive) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and management in the Waingongoro River catchment excluding that area being irrigated under consent 5569. The amount to be paid shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation, and be made no later than 1 September each year.
12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 for the 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; and/or
 - (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 9 July 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Riverlands Eltham Limited
PO Box 124
Eltham 4353

Decision Date
(Review): 13 October 2017

Commencement Date
(Review): 13 October 2017 (Granted Date: 9 July 2012)

Conditions of Consent

Consent Granted: To take and use water from the Waingongoro River for
use in a meat processing plant

Expiry Date: 1 June 2029

Review Date(s): June 2023

Site Location: London Street, Eltham

Grid Reference (NZTM) 1710920E-5634567N

Catchment: Waingongoro

*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 volume of water taken shall not exceed 1972 cubic metres per day (22.8 litres per second).
2. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm 5\%$. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

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

3. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):
 - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
 - (b) has been tested and shown to be operating to an accuracy of $\pm 5\%$.

The documentation shall be provided:

- (i) within 30 days of the installation of a water meter or datalogger;
 - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
 - (iii) no less frequently than once every five years.
4. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
5. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.
6. The records of water 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; and
 - c) be transmitted to the Taranaki Regional Council's computer system within two hours of being recorded.

Consent 5437-3.1

7. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the taking of water, including, but not limited to, the efficient and conservative use of water.
8. The consent holder shall annually investigate and report on compliance with condition 6 including water conservation measures, plant water recycling and reuse. The report to be received by the Chief Executive, Taranaki Regional Council, by 31 May each year.
9. The consent holder shall ensure that the intake is screened and designed to avoid fish entering the intake or being trapped against the screen.
10. The consent holder shall ensure that no modification is made to the intake that in any way could increase the likelihood of juvenile fish entering the intake or being trapped against the screen.
11. The consent holder shall mitigate the effects of the discharge by making annual payments of \$5000 (GST exclusive) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and management in the Waingongoro River catchment excluding that area being irrigated under consent 5569. The amount to be paid shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation, and be made no later than 1 September each year.
12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 for the 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; and/or
 - (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 13 October 2017

For and on behalf of
Taranaki Regional Council

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: Riverlands Eltham Limited
P O Box 124
ELTHAM

Consent Granted
Date: 23 December 1999

Conditions of Consent

Consent Granted: To discharge up to 3500 cubic metres/day of treated wastewater from meat processing and associated activities by irrigation onto and into land, and to discharge emissions into the air, in the vicinity of various unnamed tributaries of the Waingongoro River and the Waingongoro River [area bounded by following GRs]:
Q20:186-932, Q20:189-962, Q20:198-962, Q20:195-966,
Q20:200-969, Q20:210-962, Q20:209-954, Q20:203-954,
Q20:202-940, Q20:191-931

Expiry Date: 1 June 2026

Review Date(s): June 2002, June 2004, June 2006, June 2008, June 2013,
June 2018

Site Location: Lower Stuart Road, Eltham

Legal Description: Lot 1 DP 11593 & Lot 2 DP 12254 Ngaere SD [plant site]
Pt Sec 51 Blk XIII Ngaere SD
Lot 1 DP 3895 & Pt Sec 51 Blk XIII Ngaere SD
Pt Sec 38 Blk IX Ngaere SD
Sec 47 Blk IX Ngaere SD
Lot 1 DP 7965 & Pt Sec 38 Blk IX Ngaere SD
Lot 1 DP 3463 & Lot 2 DP 16398 & Pt Sec DP 3535 Blk IX Ngaere SD
Lot 1 DP 16398 Blk IX Ngaere SD
Lot 2 DP 17749 Blk IX Ngaere SD
Pt Sec 39 Blk IX Ngaere SD
Lot 1 DP 5241 Blk IX Ngaere SD
Pt Sec 40 Blk IX Ngaere SD

Catchment: Waingongoro

Tributary: Various unnamed

Consent 5569-1

General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

Irrigation system

1. The irrigation system shall be installed and operational within 12 months of the granting of this consent.

Management Plan

2. Prior to the exercise of this consent, the consent holder shall provide a spray irrigation management plan, to the approval of the General Manager, Taranaki Regional Council, outlining the management of the system, which shall demonstrate ability to comply with consent conditions and shall address the following matters:
 - (a) designated application areas;
 - (b) selection of appropriate irrigation methods for different types of terrain;
 - (c) application rate and duration;
 - (d) application frequency;
 - (e) farm management and operator training;
 - (f) soil and herbage management;
 - (g) prevention of runoff and ponding;
 - (h) minimisation and control of odour effects offsite;
 - (i) operational control and maintenance of the spray irrigation system;
 - (j) monitoring of the effluent [physicochemical];
 - (k) monitoring of soils and herbage [physicochemical];
 - (l) monitoring of groundwater beneath and beyond the irrigated area [physicochemical];
 - (m) remediation measures;
 - (n) mitigation measures including screening of any storage facilities and riparian planting;
 - (o) reporting monitoring data;
 - (p) monitoring of the Waingongoro River and relevant tributaries;
 - (q) procedures for responding to complaints; and
 - (r) notification to the council of non-compliance with the conditions of this consent.

The objective of the plan shall be to minimise discharges to the Waingongoro River under consent 2039 and maximise discharges to land.

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

Consent 5569-1

4. The spray irrigation management plan described in special condition 2 of this consent shall be subject to review upon two months notice by either the consent holder or the Taranaki Regional Council.
5. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the spray irrigation system. The officer shall be regularly trained on the content and implementation of the spray irrigation management plan, and shall be advised immediately of any revision or additions to the spray irrigation management plan.

Odour and spray effects

6. No raw or untreated animal blood shall be discharged.
7. There shall be no offensive or objectionable odour at or beyond the boundary of the property or properties on which spray irrigation is occurring.
8. There shall be no spray drift as a result of the irrigation of treated wastewater at or beyond the boundary of the property or properties on which spray irrigation is occurring.

Land effects

9. The discharge of biosolids or sludge from the wastewater treatment system as a result of the exercise of this consent shall only take place from aerated or aerobic ponds or the oxidation pond.
10. The sodium absorption ration [SAR] of the wastewater shall not exceed 10.
11. There shall be no ponding of wastewater, and/or any direct discharge to a watercourse due to the exercise of this consent.
12. The edge of the spray zone shall be at least:
 - a) 20 metres from the banks of any watercourse;
 - b) 50 metres from any bore, well or spring actively used for water supply purposes;
 - c) 20 metres from any public road;
 - d) 20 metres from any property boundary that is not part of the irrigation area, unless the written approval of the landowner has been obtained to allow the discharge at a lesser distance;
 - e) 150 metres from any dwellinghouse [except that listed in condition 12(f)] unless the written approval of the occupier has been obtained to allow discharge at a closer distance; and
 - f) 300 metres from the boundary of the property described as Lot 1 DP 17749 Blk IX Ngaere SD, unless the written approval of the occupier has been obtained to allow the discharge at a closer distance.
13. The effluent application rate shall not exceed 300 kg nitrogen/ha/year. This condition shall be reviewed in accordance with condition 18 to assess the possible reduction of the loading rate.
14. That should monitoring of the discharge under conditions 13, 15 and 16 indicate contamination of local groundwater or a water supply from the roof of a dwellinghouse as a result of the exercise of this consent the consent holder shall:
 - a) undertake appropriate remedial action as soon as practicable as described in the spray irrigation management plan prepared under condition 2, or other such action reasonably required by the General Manager, Taranaki Regional Council;
 - b) shall review the spray irrigation management plan and incorporate such reasonable modifications as are considered necessary by the General Manager, Taranaki Regional Council; and
 - c) where water supplies are significantly affected, immediately provide alternative supplies as reasonably required by the General Manager, Taranaki Regional Council.

Monitoring

15. The consent holder shall site, install and maintain to the satisfaction of the General Manager, Taranaki Regional Council, monitoring bores for the purpose of determining groundwater quality in the vicinity of the discharge.
16. The consent holder shall undertake such baseline and operational monitoring of the activities licensed by this consent as deemed reasonably necessary by the General Manager, Taranaki Regional Council.

Review

17. The consent holder may apply to the Taranaki Regional Council for a change or cancellation of the conditions of this consent, in accordance with section 127(1)(a) of the Resource Management Act 1991, to take account of operational requirements, the results of monitoring, or irrigation scheme expansion.
18. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2002 and June 2004, for the purpose of assessing the need to increase the land area of the scheme, reduce nitrogen loading to land and/or increase treatment at the wastewater treatment system to reduce the nitrogen concentration of the effluent.
19. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2002, June 2004, June 2006, June 2008, June 2013 and/or June 2018, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 23 December 1999

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Land Use Consent
Structure - Erosion Control
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Riverlands Eltham Limited
P O Box 124
ELTHAM

Consent Granted
Date: 9 March 2000

Conditions of Consent

Consent Granted: To construct, place, use and maintain an intake structure and associated bank protection works on the true left bank of the Waingongoro River at or about GR: Q20:209-963

Expiry Date: 1 June 2017

Review Date(s): June 2005, June 2011

Site Location: 75 Lower London Street, Eltham

Legal Description: Lot 1 DP11593 Blk IX Ngaere SD

Catchment: Waingongoro

General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

- 1. THAT the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the commencement and upon completion of the initial construction and again prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water.
- 2. THAT the structures authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
- 3. THAT the consent holder shall install a rock batter with a minimum batter slope of 1:1.5 in front of the bank protection works, to avoid adverse effects on the river bank as a result of the construction of the bank protection works.
- 4. THAT no material shall be removed from the riverbed for the construction of the rock batter specified in condition 3.
- 5. THAT the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
- 6. THAT no refuelling of equipment or machinery shall take place on any area of the riverbed.
- 7. THAT the consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
- 8. THAT the structures authorised by this consent shall be removed and the area reinstated, if and when the structures are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the structure[s] removal and reinstatement.

Consent 5604-1

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

Signed at Stratford on 9 March 2000

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Riverlands Eltham Limited
P O Box 124
ELTHAM 4353

Decision Date: 9 July 2012

Commencement
Date: 9 July 2012

Conditions of Consent

Consent Granted: To discharge treated wastewater from meat processing and associated activities by irrigation onto and into land, and to discharge the associated emissions into the air at or about (NZTM) 1708468E-5634921N

Expiry Date: 1 June 2026

Review Date(s): June 2017, June 2023

Site Location: Paulwell Farm, Eltham Road, Eltham

Legal Description: Lot 2 DP 13131 Blk IX Ngaere SD [Discharge site]

Catchment: Waingongoro

*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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The discharge of wastewater as a result of the exercise of this consent shall only take place from either pond 6 or 7.
2. The discharge authorised by this consent shall not give rise to an odour at or beyond the boundary of the property boundary that is offensive or objectionable.
3. There shall be no spray drift, as a result of the irrigation of treated wastewater, at or beyond the property boundary.
4. The sodium adsorption ratio (SAR) of the wastewater shall not exceed 15.
5. There shall be no ponding of wastewater for more than three hours, and/or any overland flow of wastewater to a watercourse due to the exercise of this consent.
6. The edge of the spray zone shall be at least:
 - (a) 20 metres from the water's edge in any watercourse, and outside of the riparian buffer zone as specified in the riparian management plan supplied by the applicant;
 - (b) 50 metres from any bore, well or spring actively used for water supply purposes;
 - (c) 20 metres from any public road;
 - (d) 20 metres from any property boundary that is not part of the irrigation area, unless the written approval of the landowner has been obtained to allow the discharge at a lesser distance;
 - (e) 150 metres from any dwelling house unless the written approval of the occupier has been obtained to allow discharge at a closer distance;
 - (f) 45 metres from any milking shed.
7. The Total Nitrogen applied to any hectare of land shall not exceed:
 - (a) 600 kilograms in any 12-month period for 'cut and carry areas'; or
 - (b) 300 kilograms in any 12-month period for any other land (including grazed pasture).

For the purposes of this consent 'cut and carry areas' is land that is not grazed and any vegetation is routinely cut and removed.

8. Should monitoring of the discharge under conditions 15 and 16 indicate, in the opinion of the Chief Executive, Taranaki Regional Council, contamination of local groundwater or a water supply from the roof of a dwelling house as a result of the exercise of this consent the consent holder shall:

Consent 5736-2

- (a) undertake appropriate remedial action as soon as practicable as described in the wastewater irrigation management plan prepared under condition 9, or other such action reasonably required by the Chief Executive, Taranaki Regional Council;
 - (b) shall review the wastewater irrigation management plan and incorporate such reasonable modifications as are considered necessary by the Chief Executive, Taranaki Regional Council; and
 - (c) where water supplies are significantly affected, immediately provide alternative supplies as reasonably required by the Chief Executive, Taranaki Regional Council.

9. Subject to the other conditions this consent, this consent shall be exercised in accordance with a 'Wastewater Irrigation Management Plan' (the 'Management Plan') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The Management Plan shall detail methods and procedures undertaken by the consent holder to ensure that the conditions of this consent are met and can be shown to be met, and shall address but not necessarily be limited to the following matters:
 - (a) designated application areas and buffer zones for streams and the property boundary;
 - (b) selection of appropriate irrigation methods for different types of terrain;
 - (c) application rate and duration;
 - (d) application frequency and nitrogen loading rate;
 - (e) farm management and operator training;
 - (f) soil and herbage management;
 - (g) prevention of runoff and ponding;
 - (h) minimisation and control of offsite odour and spray drift effects;
 - (i) operational control and maintenance of the spray irrigation system;
 - (j) monitoring of the effluent (physicochemical);
 - (k) monitoring of soils and herbage (physicochemical);
 - (l) monitoring of groundwater beneath and beyond the irrigated area (physicochemical);
 - (m) monitoring of local water supplies and remediation;
 - (n) mitigation measures including riparian planting to be undertaken according to the riparian management plan supplied by the applicant;
 - (o) reporting monitoring data;
 - (p) monitoring of the tributaries draining the property;
 - (q) procedures for responding to complaints; and
 - (r) notification to the council of non-compliance with the conditions of this consent;
 - (s) procedures for recording maintenance and repairs; and
 - (t) procedures for draining and flushing the irrigation mainlines and laterals to prevent anaerobic conditions.

An objective of the plan shall be to minimise discharges to the Waingongoro River under consent 2039 and maximise discharges to land.

10. The consent holder shall review the Management Plan, required by condition 9, and submit it for certification within 3 months of receiving such a request from the Chief Executive, Taranaki Regional Council.

Consent 5736-2

11. A copy of the reviewed Management Plan shall be provided to the Department of Conservation and Fish and Game New Zealand (Taranaki Region), for the Taranaki Regional Council to take into account any comments received (within a two week timeframe from when the Plan was provided).
12. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the wastewater irrigation system. The officer shall be regularly trained on the content and implementation of the wastewater irrigation management plan, and shall be advised immediately of any revision or additions to the wastewater irrigation management plan.
13. 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.
14. Prior to the exercise of this consent, the consent holder shall after consultation with the Chief Executive, Taranaki Regional Council, install a minimum of three groundwater monitoring bores. The bores shall be at locations and to depths, that enable monitoring to determine any change in groundwater quality resulting from the exercise of this consent. The bores shall be installed in accordance with NZS 4411:2001 and all associated costs shall be met by the consent holder.
15. The consent holder shall undertake surface water monitoring that is certified by the Chief Executive, Taranaki Regional Council as being adequate to determine any change in surface water quality resulting from the exercise of this consent
16. The consent holder shall undertake such baseline and operational monitoring of the activities licensed by this consent that may be fixed in accordance with section 36 of the Resource Management Act 1991. Baseline monitoring shall include, but not be limited to, sampling herbage, soil, surface water and groundwater. Operational monitoring shall include, but not be limited to spray drift characterisation.
17. The consent holder shall, after the consent is exercised, annually by 1 July, provide to the Chief Executive, Taranaki Regional Council a written report on the implementation of the Wastewater Irrigation Management Plan required in condition 9, and compliance with this consent.
18. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2017 and/or June 2023, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 9 July 2012

For and on behalf of
Taranaki Regional Council

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: Riverlands Eltham Limited
P O Box 124
ELTHAM

Consent Granted
Date: 14 December 2000

Conditions of Consent

Consent Granted: To erect, place and maintain a pipeline under the bed of
the Waingongoro River at or about GR: Q20:208-963

Expiry Date: 1 June 2017

Review Date(s): June 2005, June 2011

Site Location: Lower London Street, Eltham

Legal Description: Lot 1 DP 11593 & Sec 101 Eltham Vill Sett Blk IX Ngaere
SD [Riverlands property]
Pt Sec 39 Blk IX Ngaere SD [Reardon property]

Catchment: Waingongoro

Consent 5739-1

General conditions

- a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. The consent holder shall notify the Taranaki Regional Council in writing at least 48 hours prior to the commencement and upon completion of the initial construction and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water.
2. The structure[s] authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
3. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
5. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.
6. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 14 December 2000

For and on behalf of
Taranaki Regional Council

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: Riverlands Eltham Limited
PO Box 124
Eltham 4353

Decision Date: 2 May 2017

Commencement Date: 2 May 2017

Conditions of Consent

Consent Granted: To use a pipeline under the bed of the Waingongoro River

Expiry Date: 1 June 2035

Review Date(s): June 2023, June 2029

Site Location: 75 London Street, Eltham

Grid Reference (NZTM) 1710634E-5634514N

Catchment: Waingongoro

*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. This consent authorises the ongoing use of the pipeline structure existing at the time the application for this consent was lodged, and as described in the application. Any change to the nature or scale of the structure may therefore need to be authorised by a formal process in accordance with the Resource Management Act, 1991.
2. The consent holder shall maintain and regularly review a 'Contingency Plan' that details measures and procedures that will be undertaken in the event of pipeline failure or any escape of contaminants from the pipeline. The plan shall be approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity as being adequate to avoid, remedy or mitigate the environmental effects of such an event.
3. The consent holder shall maintain the structure in a safe and sound condition such that it continues to function effectively.
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 June 2023 and/or June 2029, 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 2 May 2017

For and on behalf of
Taranaki Regional Council

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: Riverlands Eltham Limited
P O Box 124
ELTHAM

Consent Granted
Date: 20 September 2004

Conditions of Consent

Consent Granted: To erect, place and maintain a culvert in, and to realign, an unnamed tributary of the Waingongoro River for site access purposes at or about GR: Q20:209-962

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Lower London Street, Eltham

Legal Description: Lot 3 DP 1622 Lots 5-7 14 DP 1623 Lot 1 DP 11593 Sec 101 Eltham Vill Sett Blk X Ngaere SD

Catchment: Waingongoro

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 consent shall be undertaken generally in accordance with the documentation submitted in support of application 3311. In the case of any contradiction between the documentation submitted in support of application 3311 and the conditions of this consent, the conditions of this consent shall prevail.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water.
4. Once initial work is complete, any further instream works shall take place only between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as practicable, be minimised and any areas which are disturbed shall, so far as practicable, be reinstated.
6. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with

Consent 6455-1

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 20 September 2004

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Riverlands Eltham Limited
P O Box 124
ELTHAM 4353

Decision Date: 17 September 2010

Commencement
Date: 17 September 2010

Conditions of Consent

Consent Granted: To discharge anaerobic pond solids and paunch solids onto and into land and contaminants to air in the Waingongoro catchment at or about (NZTM) 1708439E-5635064N, 1710226E-5634406N and 1712433E-5635858N

Expiry Date: 1 June 2029

Review Date(s): June 2017, June 2023

Site Location: Lower Stuart Road, Eltham Road & Anderson Road,
Eltham

Legal Description: Lot 1 DP 11593 Lot 3 DP 1622 [Discharge Source]

Part of Lots 1 & 3 DP 399595, Lot 1 DP 13131 Pt Sec 21 Blk IX Ngaere SD, Pt Lot 2 DP 13131 Pt Sec 21,22 Block IX Ngaere SD, Pt Sec 38 Blk IX SD, Lot 1 DP 7965 and Part of Sec 38 Blk IX SD, Lot 1 DP 3463 Blk IX Ngaere SD, Lot 2 DP 16398 Blk IX Ngaere SD and Part Sec of DP 3535 Blk IX Ngaere SD, Lot 2 DP 17749 Blk IX Ngaere SD, Pt Sec 39 IX Ngaere SD, Lot 1 DP 5241 Blk IX Ngaere SD, Pt Sec 40 Blk IX Ngaere SD [Discharge Sites]

Catchment: Waingongoro

*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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

Exercise of Consent

1. The discharge of anaerobic pond solids and paunch solids to land shall only occur within the boundaries of the disposal sites authorised by this consent i.e. within the areas shaded on the plan attached.
2. The consent holder shall keep a record of:
 - The volume of anaerobic pond solids and/or paunch solids discharged to land;
 - The date of disposal;
 - The area of disposal;
 - Nitrogen loading calculations [which demonstrate compliance with special condition 6].

These records shall be made available to the Chief Executive of Taranaki Regional Council upon request.

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.
4. No anaerobic pond solids, paunch solids, or water which has been in contact with the deposited solids, shall enter surface water.
5. The disposal of anaerobic pond solids and paunch solids to land shall not occur within:
 - 25 metres of a watercourse [whether flowing continuously or intermittently];
 - 20 metres of any property boundary;
 - 50 metres of a water supply well or spring actively used for potable supply;
 - 150 metres of any residential dwelling [unless written approval has been obtained from the owner/occupier to dispose closer].
6. Over any 12 month period the total nitrogen application rate shall not exceed:
 - 300 kg of plant available nitrogen per hectare [of land used for disposal] for grazing areas; and
 - 600 kg plant available nitrogen per hectare [of land used for disposal] for cut-and-carry areas.

Consent 7487-1

7. The discharges authorised by this consent shall not give rise to any odour at or beyond the boundary of the disposal sites that is offensive or objectionable.
8. The consent holder shall prepare and thereafter maintain a management plan that, to the satisfaction of the Chief Executive of the Taranaki Regional Council, details how the disposal of anaerobic pond solids and paunch solids to land will be managed to ensure that the conditions of this consent will be met. The plan shall include but not necessarily be limited to:
 - a) A description of disposal areas and buffer zones;
 - b) The application rate and method;
 - c) The depth and frequency of coverage;
 - d) Details of composting management;
 - e) Methods for preventing run-off to surface water;
 - f) Methods for determining compliance with nitrogen loading conditions;
 - g) How leaching to groundwater will be minimised;
 - h) Methods for minimisation and control of odour effects offsite;
 - i) Contingency procedures; and
 - j) Monitoring and reporting methods [undertaken by the consent holder].
9. The consent holder shall maintain a permanent record of any complaints received alleging adverse effects from or related to the exercise of this consent. This record shall include the following, where practicable:
 - a) the name and address of the complainant, if supplied;
 - b) date, time and details of the alleged event;
 - c) weather conditions at the time of the alleged event [as far as practicable];
 - d) investigations undertaken by the consent holder in regards to the complaint and any measures adopted to remedy the effects of the incident/complaint; and
 - e) measures put in place to prevent occurrence of a similar incident.

The consent holder shall make the complaints record available to officers of Taranaki Regional Council, on request.

The consent holder shall notify the Chief Executive, Taranaki Regional Council, or his delegate, of any complaints received, which relate to the exercise of this permit, within 24 hours of being received.

At the grant date of this consent, the Council's phone number is 0800 736 222 [24 hr service].

Lapse and review dates

10. This consent shall lapse on 30 September 2015, 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.

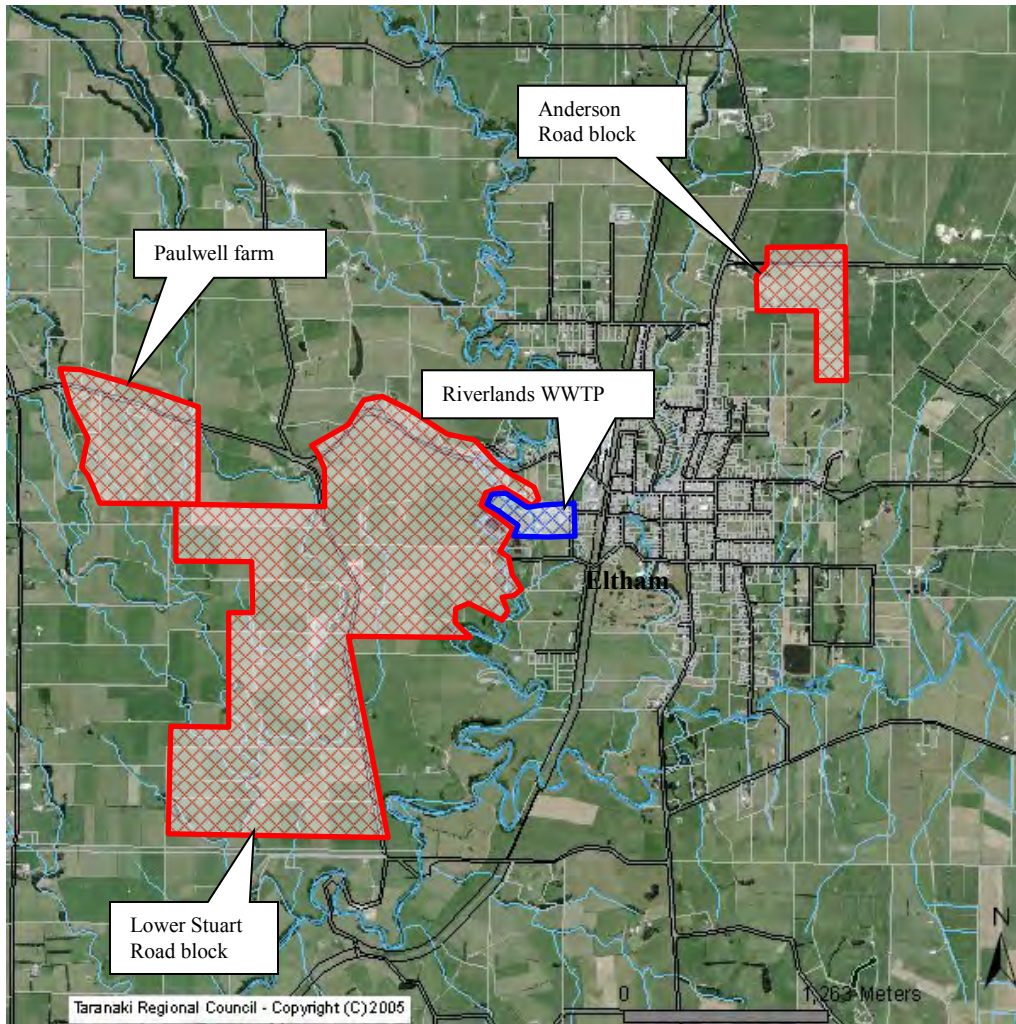
Consent 7487-1

11. 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 2023 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 17 September 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management



Plan attached: Aerial photo illustrating the site areas for land disposal relative to the Wastewater Treatment Plant.

Appendix II

ANZCO Water Use Minimisation Report 2016-2017

To: General Manager – Taranaki Regional Council

From: Rawiri Mako – Anzco Foods Limited

Date: 6 September 2017

Subject: Water Use Report 2016/17 Season

This report is written to satisfy special condition 3 of Resource Consent 5437 - to take and use water from the Waingongoro River.

Table 1 below compares the 2016/17 beef season for the period from 26 October 2016 to 5 July 2017 with the five previous seasons. A complete record of water use for the 2016/17 season is attached in Appendix 1.

Table 1. Water Use Comparison (Beef Season only)						
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Total Kill	163,932	172,038	157,957	171,466	170,004	159,248
Town Supply Potable (m³)	170,530	219,270	194,495	165,862	166,590	186,498
River Water Abstracted (m³)	297,682	290,272	232,170	320,994	307,453	248,607
- River Potable made (m ³)	194,148	172,818	149,034	206,377	200,990	161,288
- River Non-potable (m ³)	103,534	117,454	83,136	114,617	106,463	87,319
Total Potable Water (m³)	364,678	392,088	343,529	372,239	367,580	347,786
Total Water Use (m³)	468,212	509,542	426,665	486,856	474,043	435,105
Potable per body (m³)	2.22	2.28	2.17	2.17	2.16	2.18
Non Potable per body (m³)	0.63	0.68	0.53	0.67	0.63	0.55
Total Water Use per body (m³)	2.85	2.96	2.70	2.84	2.79	2.73

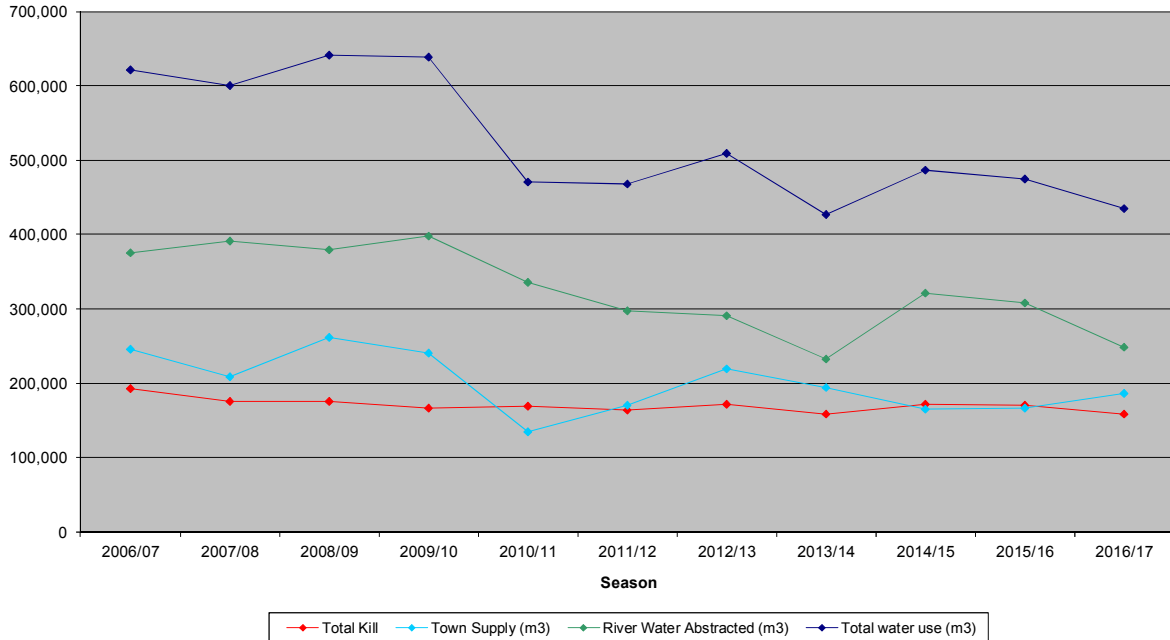
Analysis of Water Use figures for 2016/2017

Table 1 above and Graphs 1 & 2 below show the comparative water use figures and trends for the last 6 seasons. A comparison of the water use figures in 2016/17 is detailed below.

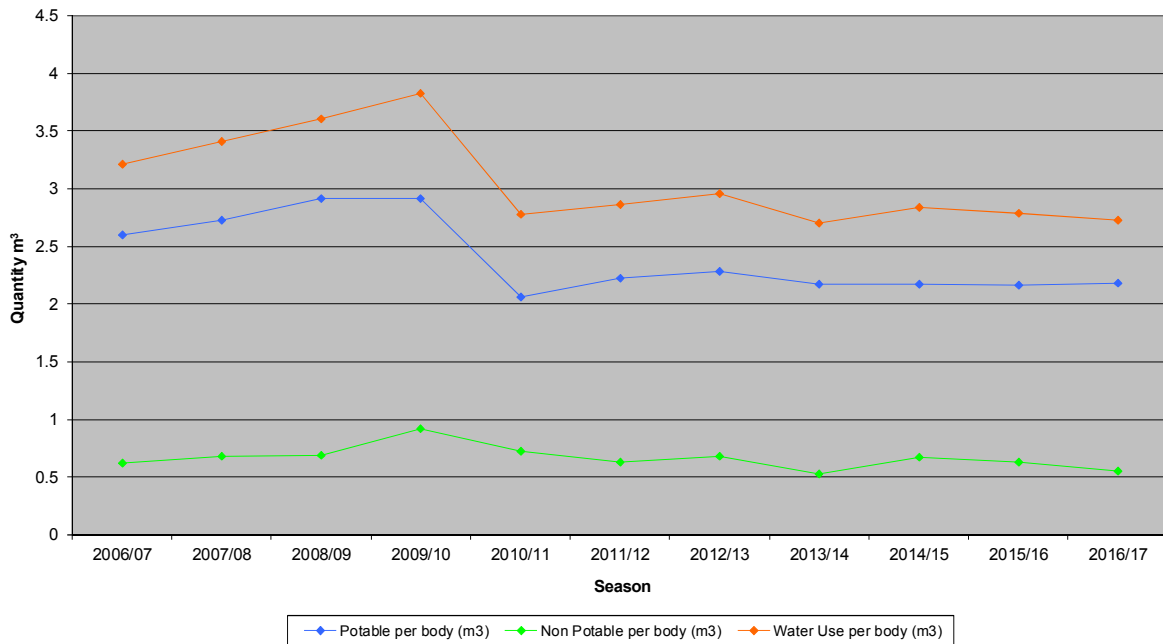
- The total beef kill for 2016/17 was 159,248. This was a decrease of 10,756 cattle on the previous season.
- Due to the unusual weather experienced over the first six months of 2017 the water treatment plant was unable to operate at full capacity.

- Overall, total water use for Anzco Foods Limited has seen a decrease compared with the previous season.
- The total water use per body figure of 2.73m³ has decreased from 2.79m³ last year.
- The total potable water per body figure of 2.18m³ has increased from 2.16m³ last year.
- The non-potable water per body figure of 0.55 m³ has decreased from 0.63m³ last year.

Graph 1. Water Use Trends



Graph 2. Water Use Trends Per Body



Potable Water

- A slight increase in potable water use has been recorded for the 2016/17 season.
- Potable water use this season was 347,786m³ compared to 367,580m³ used last season. This is a potable water use decrease of 19,794m³ compared with last seasons' potable water use. The reduced potable water use was due to less cattle being processed.
- Town potable use was up by 19,908m³ and potable made was down by 39,702m³.
- Compliance requirements continue to be ongoing with regards to processing, hygiene and cleanups in and around the plant. With this in mind, there will always be challenges involving the saving of water as opposed to compromising compliance regulations.

Non Potable Water

- The non-potable water use this season was 87,319m³ compared to 106,463m³ used last season. This is a decrease this season of 19,144m³ compared to last season. 12,739m³ of the reduced non-potable water use was due to water savings and as with the potable water use, the rest was down to less cattle being processed compared to the previous season.
- Non-potable water is used in the yards for washing down the cattle; washing down stock trucks; cleaning up around the by-products and effluent pre-treatment areas; and in the outside rumblers and gut washer.
- An increased amount of customer and compliance requirements are reviewed constantly and the cleaning of stock prior to slaughter is one of these requirements. This is also a challenge in regard to the saving of water as opposed to meeting customer demand and compliance regulations.

Improvements made / Future Initiatives

- The total water use for the 2016/17 beef season was 435,105m³ compared to the previous seasons' total water use 474,043m³.
- This was a decrease of total water of 38,938m³. The beef kill for the season was 159,248, a decrease of 10,756 from the previous season.
- The total water use/body has seen a decrease by 60lts/body to 2.73m³/body compared to 2.79m³/body for the previous season.
- For the 2017/18 season, we are still investigating installing magic eyes on all of the wash basins which should further reduce our water use significantly. Securing the finance to complete this work has been the main reason this was not started last season.

Trends in Water Supply and Use

Table 2 below shows comparative percentages on water supply and water use over the past six seasons. Trends in this data are discussed below.

Table 2. Water Supply and Use						
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
% of total water from River	64%	57%	55%	65%	65%	57%
% of total water from Town supply	36%	43%	45%	35%	35%	43%
% of Potable water use	78%	77%	80%	76%	78%	80%
% of Non-Potable water use	22%	23%	20%	24%	22%	20%
% of Potable water from River	53%	44%	43%	55%	55%	46%
% of Potable water from Town Supply	47%	56%	57%	45%	45%	54%

- The proportion of water sourced from the river compared to town supply has shown a decrease in the river take compared to last season. This was largely due to the weather with a higher than usual rainfall causing high turbidity in the river.
- In terms of percentage between potable and non-potable water use. There has been a 2% increase in potable water use countered by a 2% decrease in non-potable water use.
- Under our consent, abstraction from the Waingongoro River is limited to 1972 m³/day. Our water abstraction rates for 2016/17 have all been within this limit when considering the +/- 5% allowance on the overall daily take.

Appendix III

Biomonitoring Reports

To Job Manager, Jane Harvey
From Scientific Officer, Darin Sutherland
Document 18045766
Report DS072
Date 6 April 2017

Biomonitoring of the Waingongoro River in relation to ANZCO Eltham Ltd wastes discharges, February 2017

Introduction

Two biological surveys (spring and summer) are scheduled annually for the assessment of effects of treated meatworks wastes discharges on the biological communities of the Waingongoro River. An assessment of TRC biomonitoring data [1995 to 2010] undertaken as a component of the consent renewal process (Stark, 2010) concluded that overall, monitoring data collected by Taranaki Regional Council (the Council) over the previous 15 years indicated some improvement in river health downstream of the discharge, since discharge to the river was reduced by adoption of land disposal 2001. Macroinvertebrate communities indicated that the river downstream of the discharge has improved from 'fair' to 'good' condition over the 15 years and that the impact of the discharge had been no more than minor given the ability of the river to assimilate the wastewater and periodic floods scouring periphyton from the riverbed. Almost all MCI values recorded from sites downstream of the ANZCO (previously Riverlands) discharge exceeded 80 units and had been within the 95% confidence limits of the predictive relationships between MCI and site altitude or distance from source that Stark & Fowles (2009) developed based on data from 'control' sites (i.e., upstream of consented discharges) in the Waingongoro catchment.

This current survey, the second of the scheduled surveys for the 2016–2017 monitoring period, was performed in summer under a period of moderate flow conditions.

Method

The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates from two long-established sampling sites (1 and 3) and a site (3a) established at the time of the spring 1999 survey; one site (4) immediately upstream of the confluence of the Mangawhero Stream, and a site (8) downstream of this confluence in the Waingongoro River (illustrated in Figures 1 and 2) on 1 March 2016. Site 4 was sampled as a component of the Eltham WWTP/landfill survey and was included to provide comparative information associated with the survey performed in conjunction with the South Taranaki District Council Eltham WWTP system where the treated wastewater discharge had been diverted out of the catchment (to Hawera WWTP) since late winter, 2010. Site 8 was sampled as a component of the Council's State of the Environment programme.

Site 3a replaced site 2a about seventeen years earlier, due to changes in the river channel following flood events and the subsequent unsuitability of the previously surveyed site (2a) which had been located at the periphery of the 50 m mixing zone. The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates from three established sampling sites 1, 3 and 3a. Current biomonitoring sites are presented in Table 1.

Table 1 Biomonitoring sites in the Waingongoro River Stream surveyed in association with the ANZCO meatworks

Site No	Site code	Grid reference	Location
1	WGG000500	E1710576 N5634824	Eltham road bridge (upstream of discharge)
3	WGG000540	E1710727 N5634084	Approximately 200 m downstream of rail bridge approximately 400m downstream of discharge
3a	WGG000550	E1710830 N5633975	Approximately 600m downstream of discharge
4	WGG000620	E1710708 N5632961	Approximately 100m upstream of Mangawhero Stream confluence
8	WGG000665	E1709784 N5632049	Approximately 2 km downstream of Mangawhero Stream confluence (off Stuart Road)

This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001). Samples were preserved with Kahle's Fluid for later stereomicroscopic sorting and identification according to documented Taranaki Regional Council methodology and macroinvertebrate taxa abundances scored based on the categories in Table 2.

Table 2 Macroinvertebrate abundance categories

Abundance category	Number of individuals
R (rare)	1-4
C (common)	5-19
A (abundant)	20-99
VA (very abundant)	100-499
XA (extremely abundant)	500+

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa collected from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways. A difference of 11 units or more in MCI values is considered significantly different (Stark 1998).

A semi-quantitative MCI value, SQMCI₅ (Stark, 1999) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these scores, and dividing by the sum of the loading factors. The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA).

Sub-samples of algal and detrital material taken from the macroinvertebrate samples were scanned under 40-400x magnification where necessary to determine the presence or absence of any mats, plumes or dense growths of bacteria, fungi or protozoa ('undesirable biological growths') at a microscopic level. The presence of these organisms is an indicator of organic enrichment within a stream.

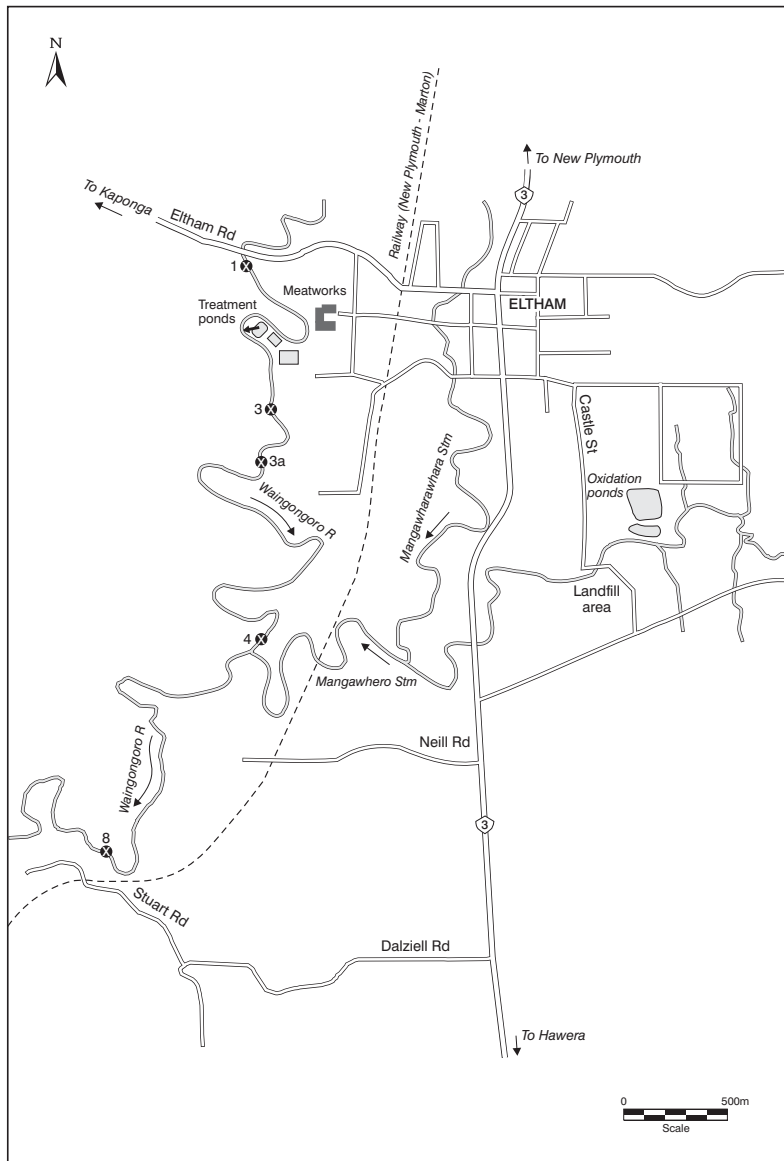


Figure 1 Biomonitoring sampling site locations in the Waingongoro River in relation to ANZCO meatworks discharges

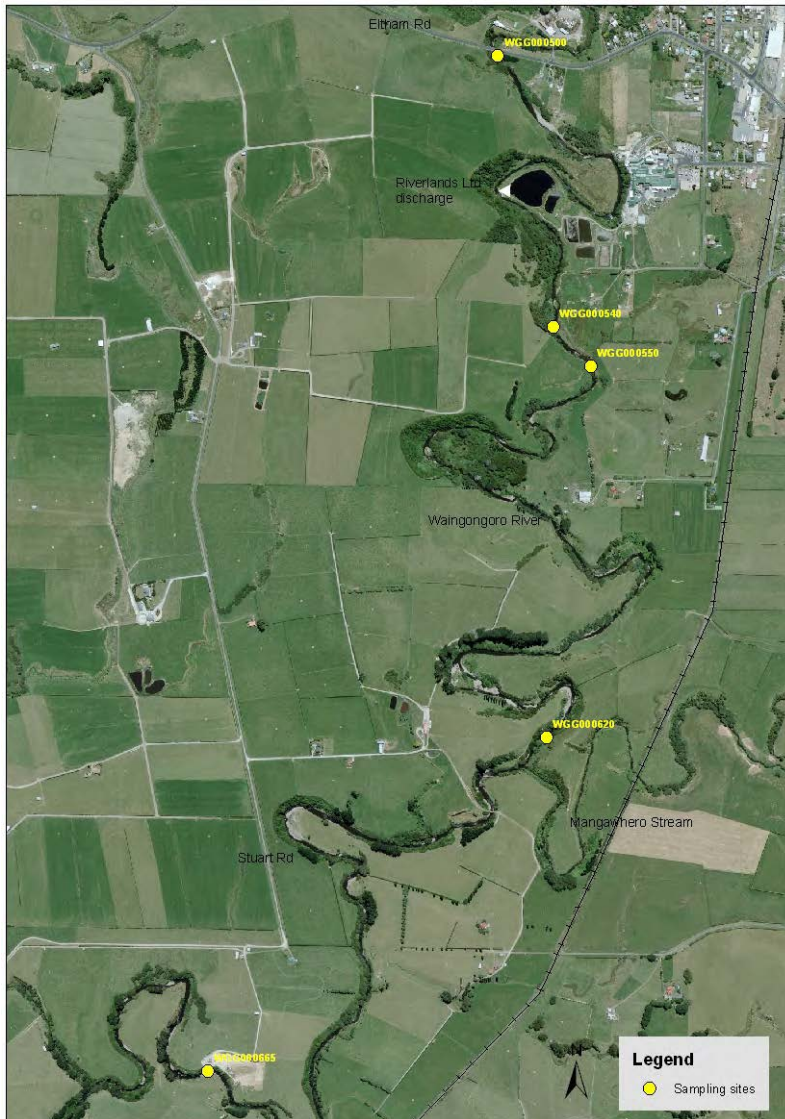


Figure 2 Location of biomonitoring sites in relation to the Eltham WWTP and landfill

Results

Site habitat characteristics and hydrology

This summer survey was performed under moderate flow conditions (approximately median flow), nine days after a fresh in excess of both 3 times median flow and 16 days after 7 times median flow in the Waingongoro River.

The water temperatures during the survey were in the range 16.5-18.5 °C. Water levels were moderate and water speed was swift. The water was uncoloured and clear for site 1 and uncoloured and cloudy for sites 3, 3a, 4 and 8. The substrate at all three sites was comprised predominately of cobble with lesser amounts of silt, sand, fine and coarse gravel, site 3a also had a reasonable amount of boulder.

Sites 1, 3, and 3a had slippery algal mats and no filamentous algae. There were patchy leaves on the streambed. Sites 4 had patchy algal mats and filamentous algal while site 8 had widespread mats and patchy filamentous algal. Site 4 had patchy moss and leaves on the streambed and site 8 had patchy moss only on the streambed.

No discharges from the outfall were occurring at the time of this survey. No treated wastes had been discharged to the river for a period of xxxxx days prior to this survey.

Macroinvertebrate communities

A summary of data obtained from previous surveys of the various river sites is presented in Table 3.

Table 3 Summary of macroinvertebrate taxa numbers and MCI values for previous surveys performed between August 1981 and October 2016

Site No.	N	No of taxa			MCI value			SQMCIs value		
		Median	Range	Current survey	Median	Range	Current survey	Median	Range	Current survey
1	64	23	15-32	22	101	78-124	104	6.1	3.3-7.5	7.2
3	64	23	14-32	18	99	71-119	100	5.9	1.9-7.8	7.1
3a	43	22	16-30	18	100	79-124	109	5.7	2.8-7.7	7.2
4	31	27	16-35	16	95	77-116	111	5.6	3.7-6.5	6.8
8	45	20	14-30	20	94	77-111	101	4.3	2.4-7.6	4.8

The macroinvertebrate fauna results for the present survey are listed in Table 2 and illustrated in Figure 2 (for sites 1, 3 and 3a) and Figure 3 (for sites 4 and 8).

Table 4 Macroinvertebrate fauna of the Waingongoro River in relation to ANZCO Ltd's discharges sampled on 14 February 2017

Taxa List	Site Number	MCI score	1	3	3a	4	8
	Site Code		WGG000500	WGG000540	WGG000550	WGG000620	WGG000665
	Sample Number		FWB17052	FWB17053	FWB17054	FWB17055	FWB17057
PLATYHELMINTHES (FLATWORMS)	<i>Cura</i>	3	-	R	-	-	-
NEMERTEA	Nemertea	3	R	-	-	-	-
ANNELIDA (WORMS)	Oligochaeta	1	R	C	-	-	R
	Lumbricidae	5	-	-	R	-	-
MOLLUSCA	<i>Physa</i>	3	-	-	-	R	-
	<i>Potamopyrgus</i>	4	C	VA	C	VA	C
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	R	-	R	R	R
	<i>Coloburiscus</i>	7	A	R	C	C	R
	<i>Deleatidium</i>	8	XA	XA	XA	XA	VA
	<i>Nesameletus</i>	9	C	C	C	C	R
PLECOPTERA (STONEFLIES)	<i>Zelandobius</i>	5	R	-	-	-	-
	<i>Zelandoperla</i>	8	R	-	-	-	-
COLEOPTERA (BEETLES)	Elmidae	6	A	A	C	C	R
	Hydraenidae	8	C	R	R	R	R
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	C	R	C	C	C
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	VA	A	VA	VA	VA
	<i>Costachorema</i>	7	R	-	R	C	C
	<i>Hydrobiosis</i>	5	C	C	C	A	C
	<i>Pycnocentroides</i>	5	R	C	R	C	R
DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	R	R	R	-	A
	<i>Maoridiamesa</i>	3	-	-	-	R	VA
	Orthoclaadiinae	2	C	-	R	-	A
	<i>Polypedilum</i>	3	-	-	R	-	-
	Tanypodinae	5	-	R	-	-	-
	Tanytarsini	3	R	R	R	R	A
	Empididae	3	R	-	-	R	C
	Muscidae	3	-	-	-	-	R
	<i>Austrosimulium</i>	3	R	R	R	-	-
Tabanidae	3	-	R	-	-	-	
Tanyderidae	4	R	R	-	-	R	
No of taxa			22	18	18	16	20
MCI			104	100	109	111	101
SQMCIs			7.2	7.1	7.2	6.8	4.8
EPT (taxa)			10	6	8	8	8
%EPT (taxa)			45	33	44	50	40
'Tolerant' taxa		'Moderately sensitive' taxa		'Highly sensitive' taxa			

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

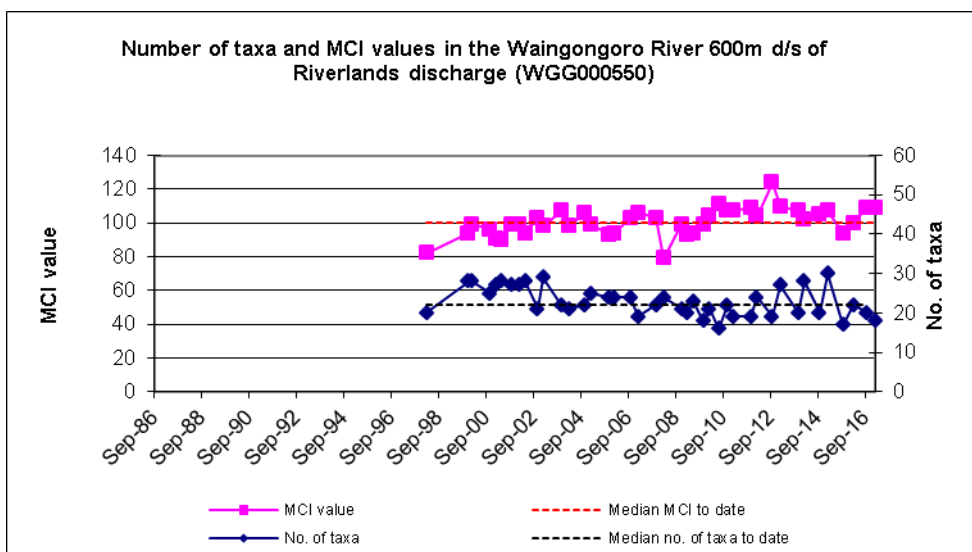
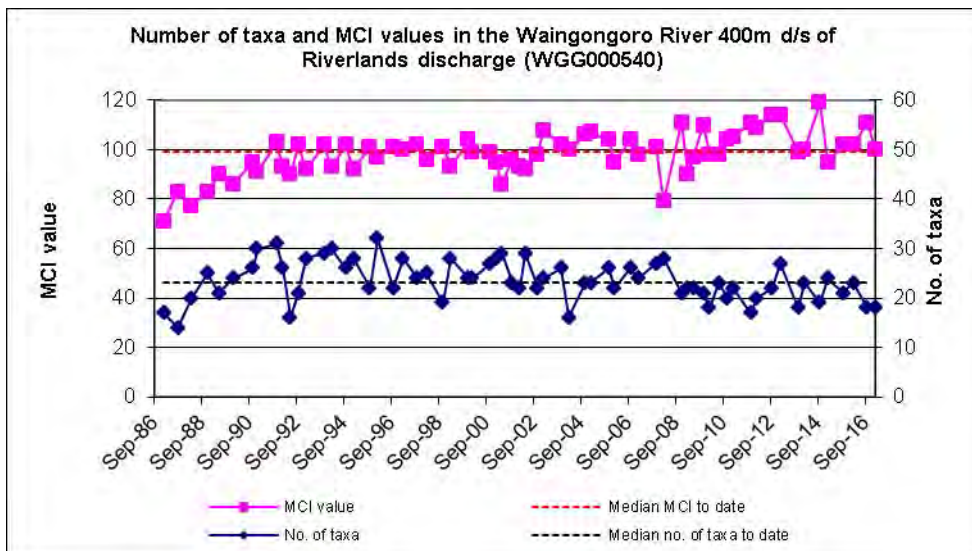
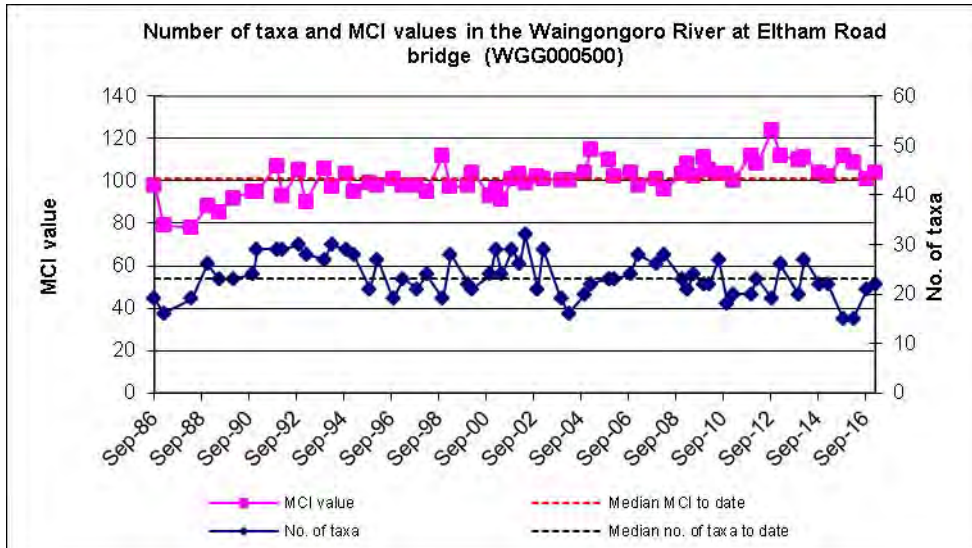


Figure 2 Taxa richness and MCI values for the three sites in the vicinity of ANZCO Eltham Ltd to date

Sites in the immediate vicinity of the meatworks (sites 1, 3 and 3a)

Site 1 (Eltham Rd)

A moderately high macroinvertebrate community richness of 22 taxa was found at site 1 ('control' site) at the time of the summer survey. This was a typical number for the site being one taxon less than the historic median (Table 4).

The MCI score of 104 units indicated a community of 'good' biological health which was a non-significant three higher than the historical median MCI score of 101 units. The SQMCI_s score of 7.2 units was significantly higher than the median SQMCI_s score of 6.1 units (Table 3).

The community was characterised by one 'tolerant' taxon [caddisfly (*Hydropsyche/Aoteapsyche*)], one 'moderately sensitive' taxon [elmid beetles], and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 4).

Site 3 (400m d/s of discharge)

A moderate macroinvertebrate community richness of 18 taxa was found at site 3 ('primary impacted' site (Table 4) which was five taxa lower than the historic median score of 23 taxa.

The MCI score of 100 units indicated a community of 'good' biological health which was not significantly higher (Stark, 1998) than the historic median MCI score of 99 units. The MCI score was also not significantly different to the 'control' site score (by 4 units) though the MCI score was significantly lower than the preceding spring survey on October 2016 (111 units). The SQMCI_s score of 7.1 units was significantly higher than the historical median score of 5.9 units (Table 3).

The community was characterised by two 'tolerant' taxa [snail (*Potamopyrgus*) and caddisfly (*Hydropsyche/Aoteapsyche*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 4).

Site 3a (600m d/s of discharge)

A moderate macroinvertebrate community richness of 18 taxa was found at site 3a ('secondary impacted' site) at the time of the summer survey. This was two taxa less than the historic median of 20 taxa (Table 4).

The MCI score of 109 units indicated a community of 'good' biological health which was not significantly different (Stark, 1998) to the median MCI score of 100 units. The MCI score was not significantly different to the 'control' site score of 104 units. The MCI score was also the same as the proceeding survey on October 2016 (109 units). The SQMCI_s score of 7.2 units was significantly higher than the median SQMCI_s score of 5.7 units (Table 3).

The community was characterised by one 'tolerant' taxon [caddisfly (*Hydropsyche/Aoteapsyche*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 4).

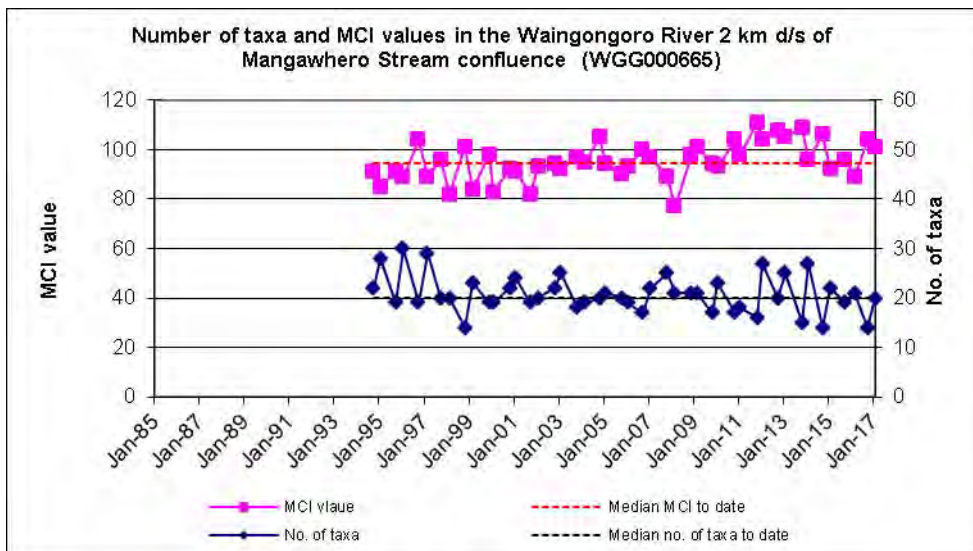
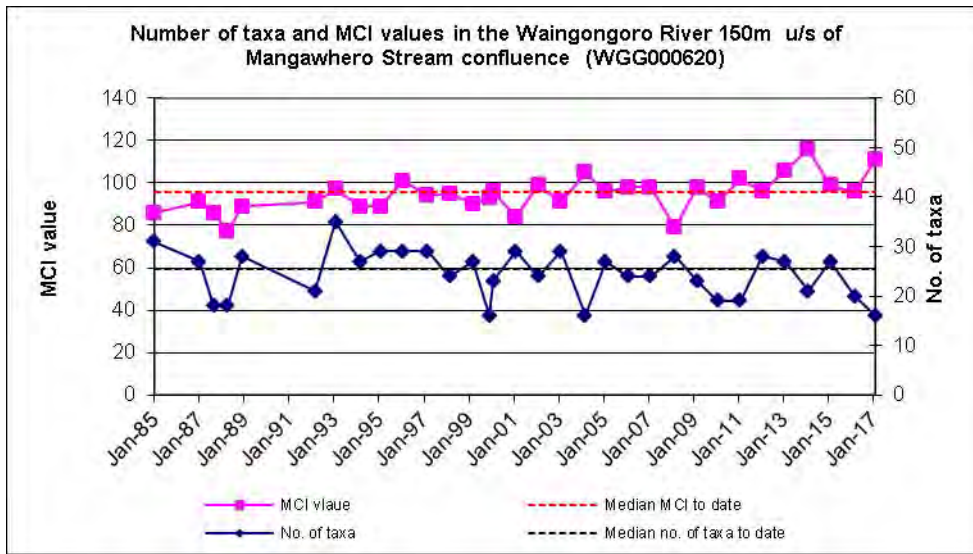


Figure 3 Taxa richness and MCI values for sites upstream and downstream of the Mangawhero Stream (sites 4 & 8)

Sites upstream and downstream of the Mangawhero Stream (sites 4 & 8)

Site 4 (U/s of Mangawhero River confluence)

A moderate macroinvertebrate community richness of 16 taxa was found at site 4 at the time of the survey (Table 4) which was substantially lower than the median taxa richness of 27 taxa.

The MCI score of 111 units indicated a community of 'good' biological health which was significantly higher (Stark, 1998) than the median MCI score of 95 units. The SQMCIS score of 6.8 units was also significantly higher than the median SQMCIS score of 5.6 units (Table 4).

The community was dominated by two 'tolerant' taxa [snail (*Potamopygus*) and caddisfly (*Hydropsyche/Aoteapsyche*)] and 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

Site 8 (Stuart Road)

A moderate macroinvertebrate community richness of 20 taxa was found at site 8 at the time of the survey (Table 4).

The MCI score of 101 units indicated a community of 'good' biological health which was not significantly different (Stark, 1998) to the median MCI score of 94 units. The SQMCIS score of 4.8 units was also not significantly different (Stark, 1998) to the median SQMCIS score of 4.3 units (Table 4).

The community was dominated by four 'tolerant' taxa [caddisfly (*Hydropsyche/Aoteapsyche*) and midges (*Maoridiamesa*, Orthocladiinae and Tanytarsini)], one 'moderately sensitive' taxon [cranefly (*Aphrophila*)] and one 'highly sensitive' taxon mayfly (*Deleatidium*) (Table 5).

Microscopic streambed heterotrophic assessment

The microscopic heterotrophic assessments at the three sites above and below the ANZCO discharges showed no significant growths of heterotrophic organisms in the Waingongoro River.

Discussion

Macroinvertebrate richnesses were equal to or slightly lower than historical medians at four of the surveyed sites with only site 4 recording a significant decrease in taxa richness (by 11 taxa). Differences among all sites were small however, being within 0-4 taxa of each other.

MCI scores at the two 'impacted' sites directly downstream of the discharge were not significantly different to the 'control' site MCI score (within 4-5 MCI units). This result coupled with the two 'impacted' sites having higher MCI scores than their historic medians indicates that both 'impacted' sites were not being affected by nutrient enrichment from the ANZCO plant at the time of the summer survey. Using the equation $MCI = 79.12 + 0.116A$ where A is altitude (recorded as 200 m asl for sites 1 and 3 and 195 m asl for site 3a) for streams arising inside Egmont National Park (Stark and Fowles, 2009) the expected MCI score was 102 units for all three sites. Therefore, all three observed MCI scores did not significantly differ (Stark, 1998) from the predicted value.

Sites 4 and 8 are situated a considerable distance downstream from the discharge and are highly unlikely to show any significant impacts from the ANZCO discharge if no adverse effects from the discharge are detected at sites 3 and 3a. Unlike most previous surveys there was no trend of decreasing MCI score the further downstream the sample was taken which is typically found in Taranaki streams (Stark and Fowles, 2009) and is usually attributed to diffuse and point source pollution from agricultural sources.

Comparisons with the previous survey conducted in October 2016 indicated that the 'control' site had a non-significant increase in MCI score (three units) compared with site 3 which has a significant decrease (11 MCI units) and site 3a had the same score of 109. The significant decrease at site 3 was largely due to a relatively high number of 'rare' tolerant taxa (five of the eight 'tolerant' taxa recorded were 'rare') and thus probably

did not represent a significant effect. In contrast, MCI scores at sites 4 and 8 were higher than historical medians by a significant 16 units for site 4 and a non-significant eight units at site 8 indicating either improved or no change in downstream water quality.

Examination of the SQMCI scores which takes into account abundances as well as tolerance values indicates that sites 1, 3 and 3a all had 'excellent' health, were significantly higher than historical medians, and were within 0.1 SQMCI units of each other indicating no significant difference in SQMCI scores among the three upstream sites. The high SQMCI scores which were largely due to the 'highly sensitive' and 'extremely abundant' mayfly (*Deleatidium*) recorded at all three sites. This abundance has been found in many previous surveys for this reach and indicates that there is relatively good water quality and habitat for macroinvertebrates. Sites 4 and 8 also had SQMCI scores higher than historical medians with site 4 being significantly higher and not significantly different to the three upstream sites but the site 8 score was only non-significantly (by 0.5 SQMCI units) higher than its historical median and significantly lower than the four upstream sites, largely as a result of higher numbers of 'tolerant' midges (*Maoridiamesa*) which corresponded with higher periphyton levels (widespread mats and patchy filaments) at the site.

No heterotrophic growths were recorded indicating that discharges from ANZCO were not causing high levels of dissolved organic compounds in the Waingongoro River downstream of the discharge which was consistent with the macroinvertebrate indices.

Overall, the results of this February 2017 macroinvertebrate survey indicated that the discharge of waste from the ANZCO meatworks had not had any recent significant detrimental effects on the macroinvertebrate communities of the Waingongoro River.

Summary and conclusions

The Council's standard 'kick-sampling' technique was used at five established sites to collect streambed macroinvertebrates from the Waingongoro River. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI_s scores for each site.

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

Macroinvertebrate richnesses for all five sites were either slightly or significantly higher than historical medians and differences among the three most upstream sites were not significant indicating that there were no significant changes in macroinvertebrate health between the 'control' site and the two closest 'impacted' sites. MCI scores indicated that the macroinvertebrate communities at all five sites were of 'good' generic health and generally conformed to predicted values. SQMCI_s scores were significantly higher than normal at the four most upstream sites and non-significantly higher at the bottom site indicating better than normal water quality preceding this survey. Overall, the results of this summer survey indicated that the discharge of waste from the ANZCO meatworks into the Waingongoro River had not had any recent significant detrimental effects on the macroinvertebrate communities downstream of the discharge.

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To Job Manager, Jane Harvey
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Report DS057
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Biomonitoring of the Waingongoro River in relation to ANZCO Eltham Ltd wastes discharges, October 2016

Introduction

Two biological surveys (spring and summer) are scheduled annually for the assessment of effects of treated meatworks wastes discharges on the biological communities of the Waingongoro River. An assessment of TRC biomonitoring data [1995 to 2010] undertaken as a component of the consent renewal process (Stark, 2010) concluded that overall, monitoring data collected by Taranaki Regional Council (the Council) over the previous 15 years indicated some improvement in river health downstream of the discharge, since discharge to the river was reduced by adoption of land disposal 2001. Macroinvertebrate communities indicated that the river downstream of the discharge has improved from 'fair' to 'good' condition over the 15 years and that the impact of the discharge had been no more than minor given the ability of the river to assimilate the wastewater and periodic floods scouring periphyton from the riverbed. Almost all MCI values recorded from sites downstream of the ANZCO (previously Riverlands) discharge exceeded 80 units and had been within the 95% confidence limits of the predictive relationships between MCI and site altitude or distance from source that Stark & Fowles (2009) developed based on data from 'control' sites (i.e., upstream of consented discharges) in the Waingongoro catchment.

This current survey, the first of the scheduled surveys for the 2016–2017 monitoring period, was performed in spring under a period of moderate flow conditions.

Method

The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates from three established sampling sites 1, 3 and 3a.

Site 3a replaced site 2a for the spring 1999 survey due to changes in the river channel following flood events and the subsequent unsuitability of the previously surveyed site (2a) which had been located at the periphery of the 50 m mixing zone. Current biomonitoring sites are presented in Table 1.

Table 1 Biomonitoring sites in the Waingongoro River Stream surveyed in association with the ANZCO meatworks

Site No	Site code	Grid reference	Location
1	WGG000500	E1710576 N5634824	Eltham road bridge (upstream of discharge)
3	WGG000540	E1710727 N5634084	Approximately 200 m downstream of rail bridge approximately 400m downstream of discharge
3a	WGG000550	E1710830 N5633975	Approximately 600m downstream of discharge

This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001). Samples were preserved with Kahle's Fluid for later stereomicroscopic sorting and identification according to documented Taranaki Regional Council methodology and macroinvertebrate taxa abundances scored based on the categories in Table 2.

Table 2 Macroinvertebrate abundance categories

Abundance category	Number of individuals
R (rare)	1-4
C (common)	5-19
A (abundant)	20-99
VA (very abundant)	100-499
XA (extremely abundant)	500+

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa collected from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways. A difference of 11 units or more in MCI values is considered significantly different (Stark 1998).

A semi-quantitative MCI value, SQMCI_s (Stark, 1999) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these scores, and dividing by the sum of the loading factors. The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA).

Sub-samples of algal and detrital material taken from the macroinvertebrate samples were scanned under 40-400x magnification where necessary to determine the presence or absence of any mats, plumes or dense growths of bacteria, fungi or protozoa ('undesirable biological growths') at a microscopic level. The presence of these organisms is an indicator of organic enrichment within a stream.

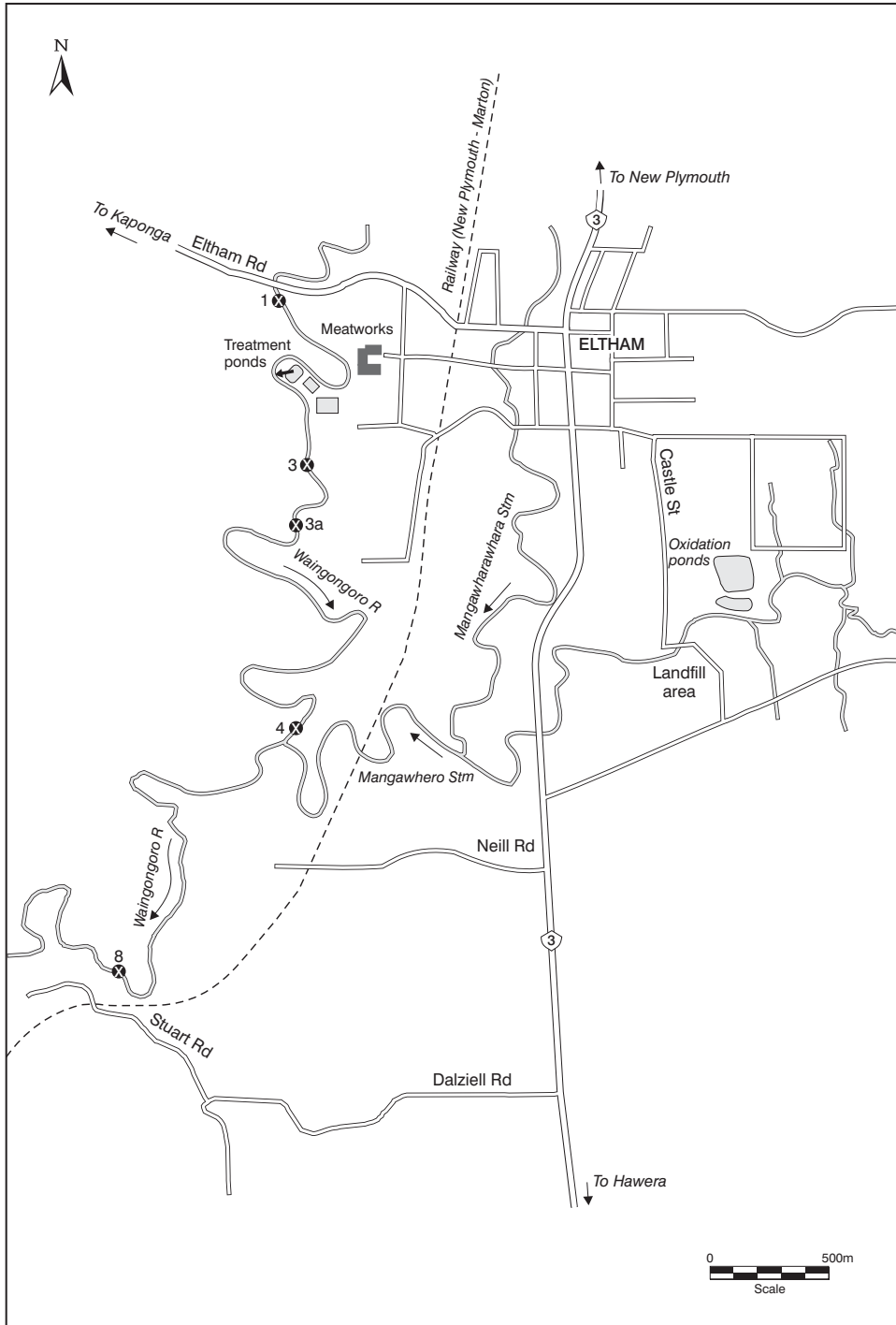


Figure 1 Biomonitoring sampling site locations in the Waingongoro River in relation to ANZCO meatworks discharges

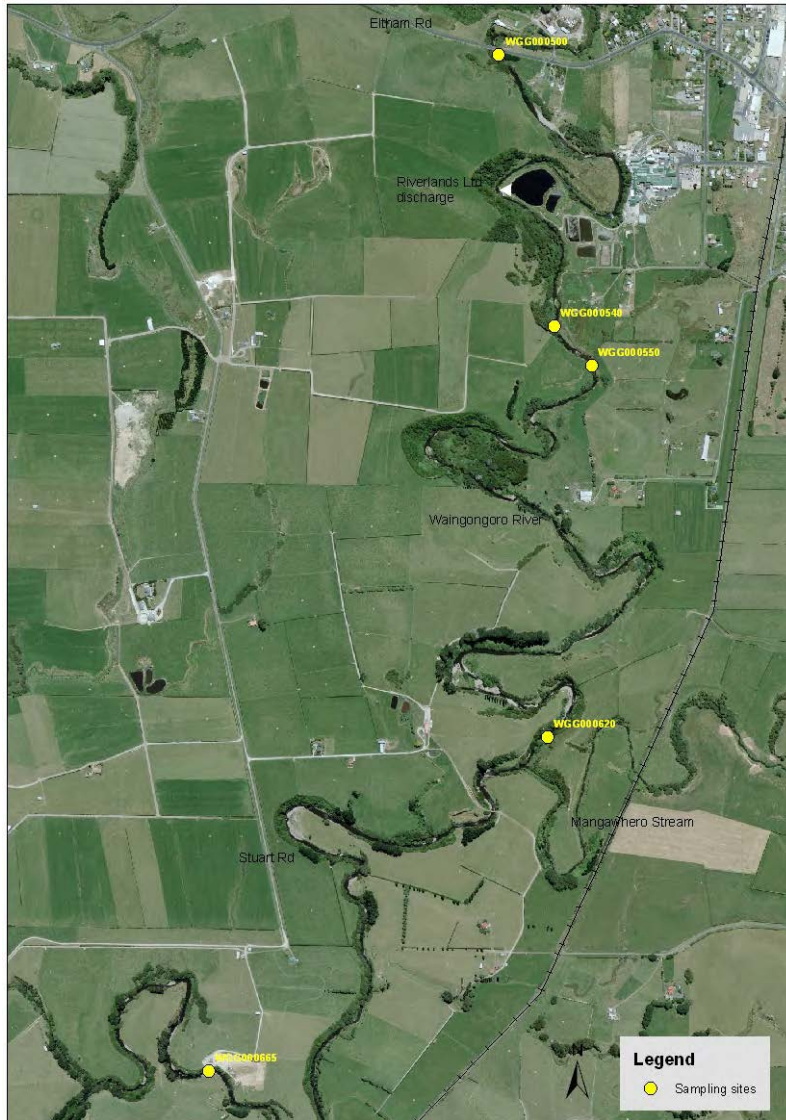


Figure 2 Location of biomonitoring sites in relation to the Eltham WWTP and landfill

Results

Site habitat characteristics and hydrology

This spring survey was performed under moderate flow conditions (approximately median flow), nine days after a fresh in excess of both 3 times median flow and 16 days after 7 times median flow in the Waingongoro River.

The water temperatures during the survey were in the range 12.3-13.1 °C. Water levels were moderate and water speed was swift. The water was uncoloured and clear. The substrate at all three sites was comprised predominately of cobble with lesser amounts of silt, sand, fine and coarse gravel, site 3a also had a reasonable amount of boulder.

Site 1 had slippery algal mats and no filamentous algae. Site 3 had slippery algal mats and no filamentous algae. There were patchy leaves on the streambed. Site 3a had slippery periphyton mats and patchy filamentous algae. There was patchy moss and patchy leaves on the streambed.

No discharges from the outfall were occurring at the time of this survey. No treated wastes had been discharged to the river for a period of eight days prior to this survey.

Macroinvertebrate communities

A summary of data obtained from previous surveys of the various river sites is presented in Table 3.

Table 3 Summary of macroinvertebrate taxa numbers and MCI values for previous surveys performed between August 1981 and March 2016

Site No.	N	No of taxa			MCI value			SQMCI _s value		
		Median	Range	Oct 2016	Median	Range	Oct 2016	Median	Range	Oct 2016
1	63	23	15-32	21	101	78-124	101	6.1	3.3-7.5	6.6
3	63	23	14-32	18	99	71-119	111	5.9	1.9-7.7	7.8
3a	40	23	16-30	20	100	79-124	109	5.6	2.8-7.7	7.7

The macroinvertebrate fauna results for the present survey are listed in Table 2 and illustrated in Figure 2 (for sites 1, 3 and 3a).

Table 4 Macroinvertebrate fauna of the Waingongoro River in relation to ANZCO Ltd's discharges sampled on 18 October 2016

Taxa List	Site Number	MCI score	1	3	3a
	Site Code		WGG000500	WGG000540	WGG000550
	Sample Number		FWB16232	FWB16233	FWB16234
NEMATODA	Nematoda	3	R	R	-
ANNELIDA (WORMS)	Oligochaeta	1	R	-	R
MOLLUSCA	<i>Potamopyrgus</i>	4	R	-	R
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	R	-	-
	<i>Coloburiscus</i>	7	A	A	A
	<i>Deleatidium</i>	8	VA	XA	XA
	<i>Nesameletus</i>	9	R	R	C
	<i>Zephlebia group</i>	7	R	-	R
PLECOPTERA (STONEFLIES)	<i>Acroperla</i>	5	-	R	R
	<i>Zelandobius</i>	5	C	C	C
COLEOPTERA (BEETLES)	Elmidae	6	A	R	R
	Hydraenidae	8	-	R	R
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	C	C	C
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	C	C	C
	<i>Costachorema</i>	7	-	R	R
	<i>Hydrobiosis</i>	5	C	C	C
	<i>Beraeoptera</i>	8	R	R	R
	<i>Pycnocentroides</i>	5	A	R	C
	DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	-	R
Eriopterini		5	R	-	-
<i>Maoridiamesa</i>		3	-	R	R
Orthocladiinae		2	C	R	C
Tanytarsini		3	C	R	R
Empididae		3	R	-	-
<i>Austrosimulium</i>		3	C	-	-
Tanyderidae		4	R	-	-
No of taxa			21	18	20
MCI			101	111	109
SQMCIs			6.6	7.8	7.7
EPT (taxa)			10	10	11
%EPT (taxa)			48	56	55
'Tolerant' taxa		'Moderately sensitive' taxa		'Highly sensitive' taxa	
R = Rare	C = Common	A = Abundant	VA = Very Abundant	XA = Extremely Abundant	

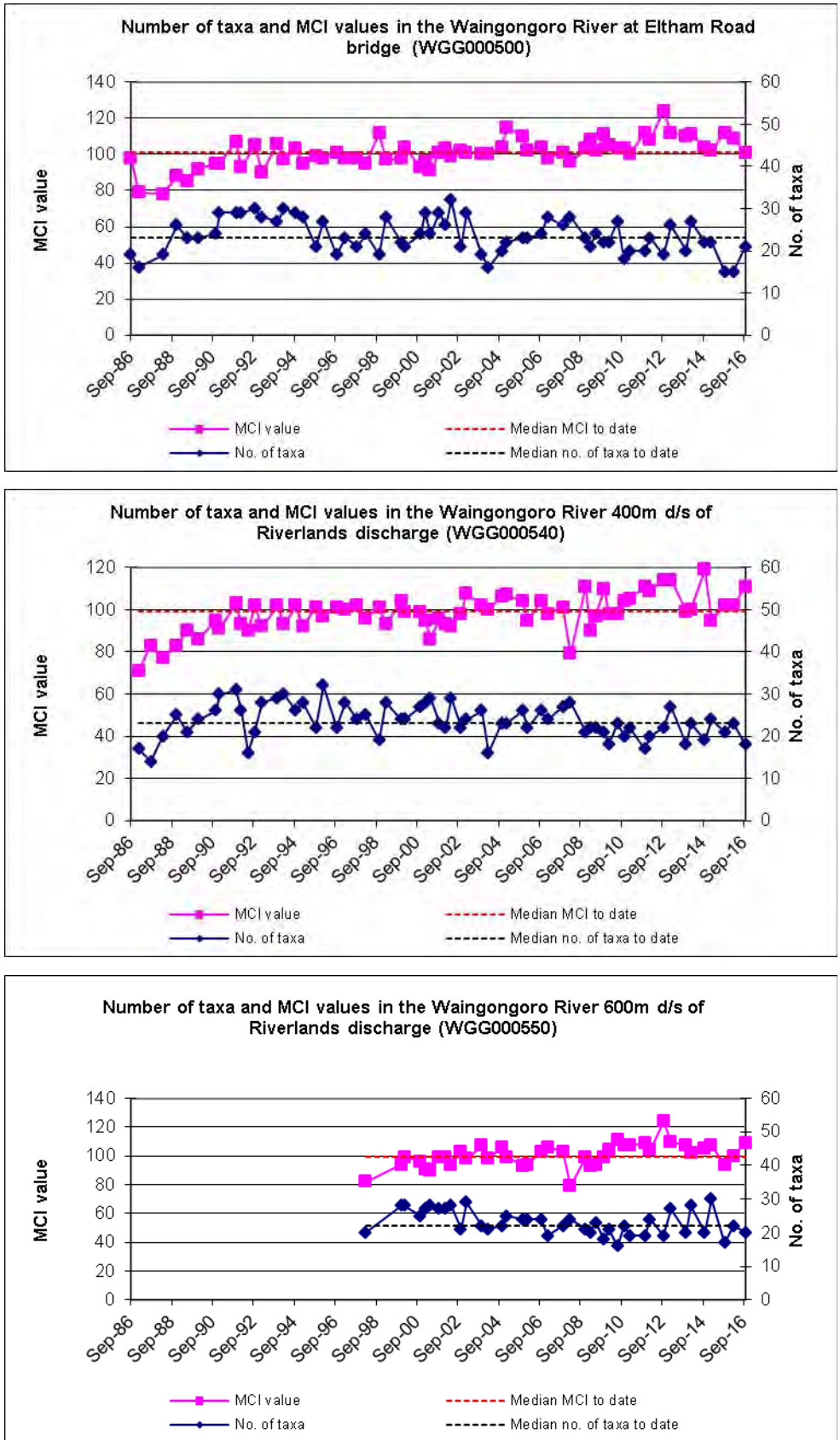


Figure 2 Taxa richness and MCI values for the three sites in the vicinity of ANZCO Eltham Ltd to date

Site 1 (Eltham Rd)

A moderate macroinvertebrate community richness of 21 taxa was found at site 1 ('control' site) at the time of the spring survey. This was a typical number for the site being two taxa less than the historic median (Table 4).

The MCI score of 101 units indicated a community of 'good' biological health which was the same as the historical median MCI score of 101 units. The SQMCI₅ score of 6.6 units was not significantly higher than the median SQMCI₅ score of 6.1 units (Table 3).

The community was characterised by two 'moderately sensitive' taxa [elmid beetles and caddisfly *Pycnocentroides*] one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 4).

Site 3 (400m d/s of discharge)

A moderate macroinvertebrate community richness of 18 taxa was found at site 3 ('primary impacted' site) at the time of the spring survey (Table 4) which was five taxa lower than the historic median score of 23 taxa.

The MCI score of 111 units indicated a community of 'good' biological health which was significantly higher (Stark, 1998) than the historic median MCI score of 99 units. The MCI score was also close to being significantly higher than the 'control' site score (10 units). The MCI score was not significantly different to the preceding survey on March 2016 (102 units). The SQMCI₅ score of 7.8 units was the highest recorded SQMCI₅ score for the site and significantly higher than the historical median score of 5.9 units (Table 3).

The community was characterised by one 'moderately sensitive' taxon [mayfly (*Coloburiscus*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 4).

Site 3a (600m d/s of discharge)

A moderate macroinvertebrate community richness of 20 taxa was found at site 3a ('secondary impacted' site) at the time of the spring survey. This was three taxa less than the historic median of 23 taxa (Table 4).

The MCI score of 109 units indicated a community of 'good' biological health which was not significantly different (Stark, 1998) to the median MCI score of 100 units. The MCI score was not significantly different to the 'control' site score of 101 units. The MCI score was also not significantly higher than the proceeding survey on March 2016 (100 units). The SQMCI₅ score of 7.7 units was the equal highest ever recorded for the site and significantly higher than the median SQMCI₅ score of 5.5 units (Table 3).

The community was characterised by one 'moderately sensitive' taxon [mayfly (*Coloburiscus*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 4).

Microscopic streambed heterotrophic assessment

The microscopic heterotrophic assessments at the three sites above and below the ANZCO discharges showed no significant growths of heterotrophic organisms in the Waingongoro River.

Discussion

Macroinvertebrate richnesses were slightly lower than historical medians at all three sites but differences among sites were small, being within 1-3 taxa of each other. Generally taxa richness was fairly typical for spring conditions that generally have slightly lower taxa richness than the combined spring and summer median.

MCI scores at the two 'impacted' sites downstream of the discharge were higher than the 'control' site MCI score. This result coupled with the two 'impacted' sites having higher MCI scores than their historic medians while the 'control' site had a typical result strongly indicates that both 'impacted' sites were not being affected by nutrient enrichment from the ANZCO plant at the time of the spring survey.

Using the equation $MCI = 79.12 + 0.116A$ where A is altitude (recorded as 200 m asl for sites 1 and 3 and 195 m asl for site 3a) for streams arising inside Egmont National Park (Stark and Fowles, 2009) the expected MCI score was 102 units for all three sites. Therefore, all three observed MCI scores did not significantly differ (Stark, 1998) from the predicted value.

Comparisons with the previous survey conducted in March 2016 indicated that the 'control' site had a non-significant decrease in MCI score (eight units) compared with both 'impacted' sites which had non-significant improvements in MCI score (both nine units). In Taranaki spring surveys often have slightly higher MCI scores than summer surveys. This is largely due to rivers and streams during summer having higher periphyton biomasses and higher water temperatures compared with spring.

Both 'impacted' sites recorded record high SQMCI scores indicating better than normal water quality. The high SQMCI scores which were largely due to the 'highly sensitive' and 'extremely abundant' mayfly (*Deleatidium*) recorded at both sites. This abundance has been found in many previous surveys for this reach and indicates that there is relatively good water quality and habitat for macroinvertebrates.

Periphyton, another indicator of nutrient enrichment, was relatively similar at all three sites and reasonably low (slippery mats and no filaments at site 1 and 3 and patchy at site 3a). Site 3a had some boulder substrate which was absent from the two upstream sites. Boulder is less likely to be mobilised during floods and freshes and therefore it may maintain higher levels of periphyton than smaller substrates. The presence of leaf packs at sites 3 and 3a but not 1 would also be an important as leaf packs provide habitat and a food source for macroinvertebrates which may also explain the 'control' site having a lower MCI score than the two 'impacted' sites.

No heterotrophic growths were recorded indicating that discharges from ANZCO were not causing high levels of dissolved organic compounds in the Waingongoro River downstream of the discharge which was consistent with the macroinvertebrate indices.

Overall, the results of this October 2016 macroinvertebrate survey strongly indicated that the discharge of waste from the ANZCO meatworks had not had any recent significant detrimental effects on the macroinvertebrate communities of the Waingongoro River. Small differences among sites were likely due to habitat differences such as substrate composition, periphyton biomass and presence/absence of leaf packs.

Summary and conclusions

The Council's standard 'kick-sampling' technique was used at three established sites to collect streambed macroinvertebrates from the Waingongoro River. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI_s scores for each site.

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

Macroinvertebrate richnesses were slightly lower than historical medians but differences among sites were not particularly large. MCI scores indicated that the river communities were of 'good' generic health and generally conformed to predicted values though the 'primarily impacted' site had a significantly higher than normal MCI score and both 'impacted' sites had record high SQMCI_s scores which were significantly higher than normal indicating better than normal water quality preceding this survey. Overall, the results of this spring survey indicated that the discharge of waste from the ANZCO meatworks into the Waingongoro

River had not had any recent significant detrimental effects on the macroinvertebrate communities downstream of the discharge.

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