

Silver Fern Farms Ltd Waitotara
Monitoring Programme
Annual Report
2014-2015
Technical Report 2015-93

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Executive summary

Silver Fern Farms Limited (the Company) operates a meat processing plant located on Wai-inu Beach Road, Waitotara in the Waitotara catchment. This report for the period 1 October 2014 to 30 September 2015, which coincides with killing season, describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental performance during the period under review, and the results and environmental effects of the Company's activities.

The Company holds a total of four resource consents, which include a total of 18 conditions setting out the requirements that the Company must satisfy. The Company holds resource consents to allow it to take and use water, to discharge wastes by spray irrigation to land, to discharge stormwater and cooling water to an unnamed tributary of the Waitotara River, and to discharge emissions into the air.

During the monitoring period, Silver Fern Farms Limited demonstrated an overall good level of environmental performance.

The Council's monitoring programme for the year under review included four inspections, and the collection of three effluent and 24 groundwater samples for physicochemical analysis. The Company supplied annual environmental monitoring reports, as well as records of the volume of water abstracted and the volume of effluent discharged.

The operation of the meat plant was affected by a flood in the Waitotara River on 20 June 2015, damage from which prevented access to the plant for processing for a period of several weeks.

New metering and telemetry to Council for monitoring of groundwater abstraction was installed in September 2014. The new system showed that the instantaneous volume limit was breached frequently by small amounts, although the daily limit was met, with one exception. The Company has applied for a higher instantaneous abstraction rate in the consent replacement process.

In September 2012, the Company commissioned a 20.7 ha extension of the irrigation area, and a further extension of 6.0 ha became operational in January 2013. Both areas were already covered by resource consent. This voluntary action, for which the Company was given an Environmental Award by Council in November 2014, increased the area irrigated for wastewater disposal by 36% to 110.5 ha to provide for increased production at the meat processing plant and to lower nitrogen loadings. Irrigation of the undeveloped areas will also increase pasture production. Monitoring of a site of significance to Ngaa Rauru Kiiitahi, a spring at the coast, was initiated in relation to the extension.

Stormwater and cooling water discharges were not found to have significant environmental effect.

No adverse effect of emissions to air was recorded.

During the period under review, the Company demonstrated a good level of environmental performance and administrative compliance with the resource consents.

For reference, in the 2014-2015 year, 75% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2015-2016 year.

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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is the Annual Report for the period October 2014-September 2015 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Silver Fern Farms Limited (the Company). The Company operates a meat processing plant situated on Wai-inu Beach Road at Waitotara, in the Waitotara catchment. The monitoring period coincides with the killing season.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to abstraction of water, discharge of wastes by spray irrigation to land, discharge of stormwater and cooling water in the Waitotara catchment, and the air discharge permit held by the Company to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the Company's use of water, land, and air, and represents the twenty-fourth combined annual report by the Council for this meat processing plant.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the RMA and the Council's obligations and general approach to monitoring sites through annual programmes, the resource consents held by SFF Waitotara, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted at the Company's site.

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

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

Section 4 presents recommendations to be implemented in the 2015-2016 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 a discharger, and may include cultural and socio-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 (eg, recreational, cultural, or aesthetic);
- (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 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 performance

Besides discussing the various details of the performance and extent of compliance by the Company during the period under review, this report also assigns a rating as to the Company's environmental and administrative performance.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year.

Administrative performance is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (i.e. a defence under 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.

1.2 Process description

The meat processing plant was constructed in 1987 within pastoral lands beside Wai-inu Beach Road, approximately 3.5 km south of Waitotara and 3 km north of Wai-inu Beach. The location of the plant site is shown in Figure 2, and the layout of the irrigation system in Figure 3. The nearest dwellings are farmhouses, situated about 900 metres to the north and 1200 metres to the south-east. The Waitotara River is located approximately 450 metres to the north of the plant.

The plant primarily slaughters and processes sheep and lambs, but is also capable of handling bobby calves and goats. The plant employs up to 335 people at any given time, and has an optimum annual capacity of one million sheep and bobby calves over a 50-week processing period. The majority of the processed output is exported. There are no fellmongery or rendering facilities, with all blood and renderable material taken off-site for processing.

Annual kills since the 1995-96 season are shown in Figure 1. A total of 590,485 animals were processed over the 2014-2015 monitoring period, compared with 562,161 in 2013-2014, an increase of 5.0%.

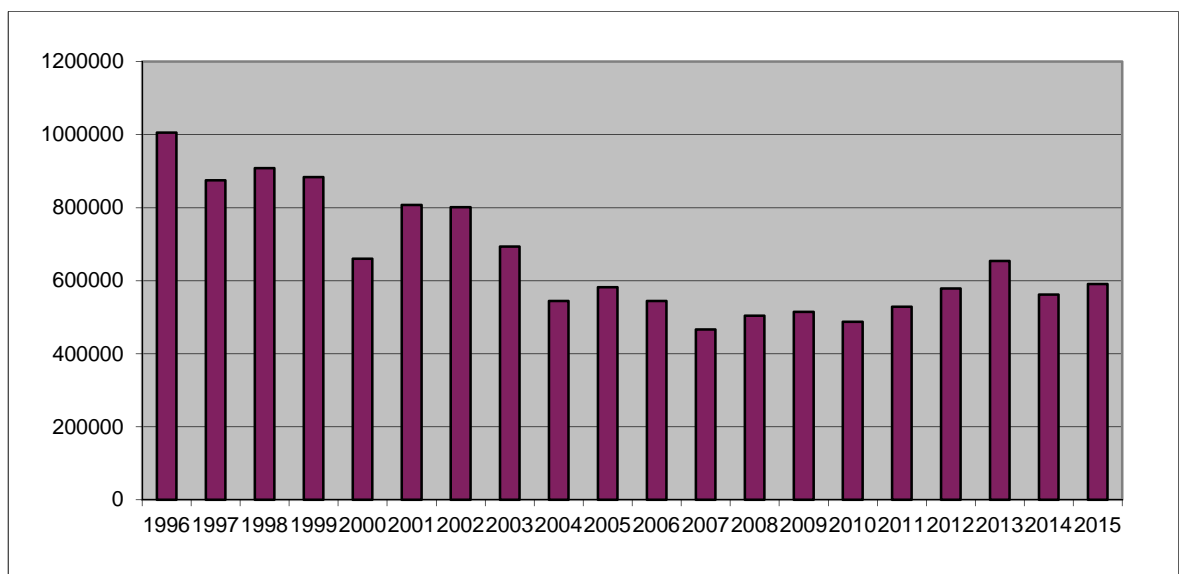


Figure 1 Annual kills since 1995-1996 season

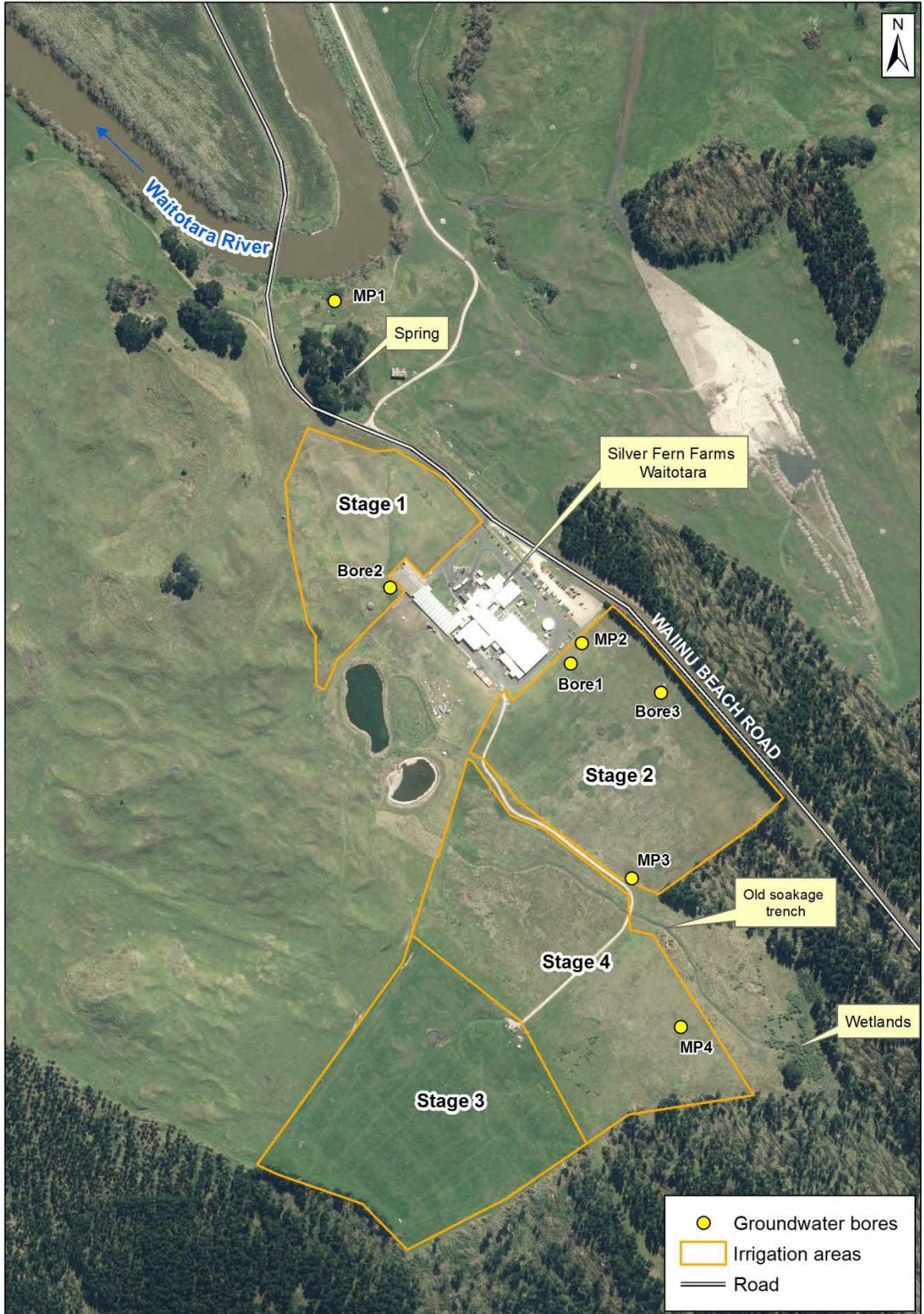


Figure 2 Location of SFF Waitotara meat processing plant showing irrigation areas and groundwater monitoring points

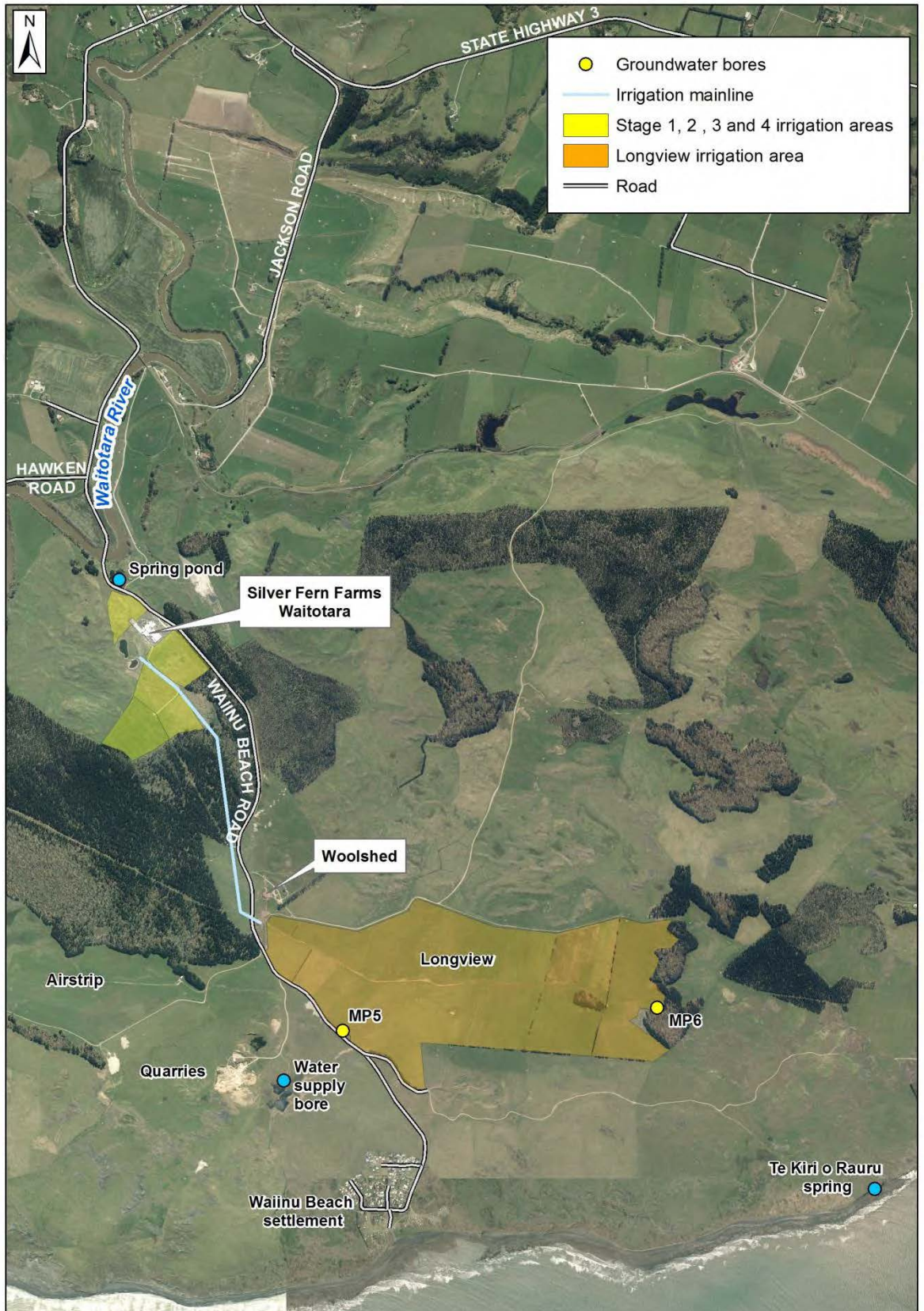


Figure 3 Location of SFF Waitotara meat processing plant showing irrigation areas and groundwater monitoring points

Ownership of the plant has changed twice. The original owner, Waitotara Meat Company, merged with Richmond Limited in October 1999, which in turn amalgamated with PPCS Limited in December 2004. PPCS Limited was rebranded Silver Fern Farms Limited in June 2008.

1.2.1 Water abstraction

The plant's water usage is proportional to the number of stock being processed through any particular period and the maximum daily water usage follows the same pattern as daily stock kill rate.

Water for operation of the plant is taken from two sources. Water of high quality is drawn from a deep aquifer via bores at the plant site. Water of lesser quality (high hardness) is piped from springs near the Waitotara River.

Three bores, each with the capacity to pump 770 cubic metres per day, pump from a depth of 122 to 140 metres. Two bores are pumped at any one time, with the other being a reserve supply. The aquifer is recharged by rainfall/riverbed infiltration in the hill country north of Waitotara. Aquifer analysis undertaken by the Company, and checked by the Council, shows that the maximum sustainable yield is 3000 cubic metres/day. Thus the aquifer capacity is substantially greater than the peak abstraction rate and is sufficient to supply the plant's needs without detriment to other users of the aquifer.

A secondary supply, for stock and yard washing purposes, is drawn at a rate of up to 200 cubic metres per day from springs which arise beside the Waitotara River, about 400 metres from the plant across Wai-inu Beach Road.

1.2.2 Discharges to land

Wastewater derives primarily from two sources, the plant and the stockyards. Plant effluent consists of wash-water from the washing of carcasses, pelts and offal, and from cleansing of process areas. Effluent is produced from the external yards as a result of washing incoming stock, stockyard washings and of discharge from the truck-wash facility.

After primary treatment by screening, the wastewater is stored in two holding ponds before discharge onto land by spray irrigation. Screenings are spread mechanically on the irrigation areas.

In September 2012, a total area of 80.7 ha (revised from 77.3 ha since 2010-2011) was irrigated, in two locations (Figure 3). An area of 13.3 ha adjacent to the plant that was owned by the Company was irrigated by 15 independently controlled fixed sprinkler networks. An area of 70.4 ha (revised from 64 ha) on the farm of Longview Limited, at a location about 2 km away towards the coast along Wai-inu Beach Road, was irrigated by one of three rotary boom travelling irrigators. Reticulation is by a ring main, around which a travelling irrigator is rotated manually according to weather conditions and effluent availability. Irrigator run lengths are about 400 m, with a wetted width of 45 m, giving an area of about 1.8 ha per application. An independent automated control system is in place for control of spray drift towards Wai-inu Beach.

The Longview Farm reticulation was extended by 20.7 ha to 91.2 ha in September 2012, and the fixed sprinkler irrigation area next to the plant was extended by 6.0 ha to 19.3 ha in January 2013, making a total irrigated area of 110.5 ha.

The land that is irrigated is largely undulating stabilised sand dunes, with an overlay of free draining yellow brown soils of very low natural fertility, that frequently have periods of soil moisture deficit. Properly managed, the irrigation system is expected to increase nutrient and moisture levels and moisture retention ability of the land while minimising the effect on groundwater quality.

The discharge of stormwater and effluent is primarily managed by SFF Waitotara via the Effluent Management Plan, which defines operational, monitoring and reporting procedures. The plan is essentially 'response driven' in that changes in operation of the treatment system are made in response to regular performance evaluations based on monitoring results.

1.2.3 Discharge to air

The sources of aerial emission from the plant are a boiler for hot water production, the stockyards, the effluent ponds, the effluent irrigation system, and miscellaneous plant processes.

1.3 Resource consents

1.3.1 Water abstraction permit

Section 14 of the Resource Management Act 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.

SFF Waitotara holds water abstraction permit **2261** to take up to 1300 cubic metres/day (17.6 litres/second) of water from three groundwater bores in the vicinity of the Waitotara River for meat processing purposes. This permit was issued by the Taranaki Regional Council on 23 January 1998 as a resource consent under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2016.

The consent has three special conditions. These special conditions cover the method and recording requirements for the water take.

Condition 1 sets out the need to operate a measuring device to record daily abstraction rates from each of the bores, as well as to keep records which shall be provided to the Council upon request.

Condition 2 requires that the bore head works shall be maintained to allow for water level measurements and water quality sampling.

Condition 3 is a review provision.

The permit is attached to this report in Appendix I.

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.

SFF Waitotara holds water discharge permit **5027** which allows for the discharge of stormwater, defrost water and evaporative cooling water into an unnamed tributary of the Waitotara River. This permit was issued by the Taranaki Regional Council on 8 November 2010 as a resource consent under section 87(e) of the RMA. The permit provides the option for review in June 2016 and in June 2022. The permit is due to expire in June 2028.

Consent **5027-2** has nine special conditions that relate to managing the quality of the stormwater discharge from the site.

Condition 1 requires the best practicable option for prevention of adverse effects on the environment to be used at all times.

Condition 2 limits the catchment area of the site.

Condition 3 relates to the containment of hazardous substances.

Condition 4 sets the concentration limits of pH, oil and grease, and suspended solids that should not be exceeded in the discharge.

Condition 5 deals with the discharge and its effects on the receiving waters.

Condition 6 requires the provision of a contingency plan which outlines procedures in the event of spillage or discharge of contaminants.

Condition 7 requires the preparation and maintenance of a stormwater management plan which outlines how the site is to be managed in order to minimise the contaminants that become entrained in stormwater.

Condition 8 relates to notification requirements.

Condition 9 provides for a review of the consent.

The permit is attached to this report in Appendix I.

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.

SFF Waitotara holds air discharge permit **4629** to cover the discharge of emissions into the air from various activities associated with meat processing operations. This permit was issued by the Taranaki Regional Council on 23 January 1998 under Section 87(e) of the RMA. It is due to expire on 1 June 2016.

Consent **4629** has five special conditions that relate to the management of discharges to air from the site.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires that odour generated from the site not be objectionable beyond the boundary of the site.

Condition 3 requires the Company to detail emission inventories from the site upon request.

Condition 4 requires that the discharge from the site be free of smoke.

Condition 5 provides for review of the consent.

The permit is attached to this report in Appendix I.

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.

SFF Waitotara holds water discharge permit **2260** which allows for the discharge of up to 1700 cubic metres/day of waste by spreading onto land and of wastewater by spray irrigation onto land from meat processing operations in the vicinity of the Waitotara River. This permit was issued by the Taranaki Regional Council on 2 July 1998 as a resource consent under Section 87(e) of the RMA. It is due to expire on 1 June 2016.

The consent has six special conditions. These special conditions relate to the quality of the discharge, and the effects on groundwater and the surrounding environment.

Condition 1 requires a management plan to be provided to the Council which addresses the method and rate of effluent application as well as measures that will be undertaken to minimise effects.

Conditions 2 and 3 require that the discharge does not result in offensive odour, or spray drift beyond the boundary of the property.

Condition 4 sets out the need to minimise impacts on groundwater.

Conditions 5 and 6 relate to the review of the management plan and review of the consent conditions.

The permit is attached to this report in Appendix I.

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets out an obligation for the Taranaki Regional Council to gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region.

The Taranaki Regional 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 at SFF Waitotara's meat processing plant is carried out by both the Company and the Council. The purposes of monitoring are:

- to determine compliance with conditions on resource consents;
- to determine the effects on surface waters and groundwater, and air quality from the exercise of the resource consents; and
- to provide information for management of the wastewater disposal system.

The monitoring programme has developed with experience in operation of the plant. A comprehensive effluent management plan has been prepared which specifically addresses monitoring of discharges to land.

1.4.2 Monitoring by SFF Waitotara

Monitoring undertaken by the Company covers two main areas as described below.

Water abstraction

The Company monitors the volume of water abstracted and reports the results to the Regional Council annually. Telemetry of abstraction rate and of bore water level was commissioned on 24 September 2014. Groundwater level monitoring was instituted as a requirement of consent 9608, held by DR Wilson for abstraction of groundwater at a location across the Waitotara River for irrigation of pasture land.

Irrigation system management

The irrigation system is managed through monitoring and control of volumes of wastewater applied to 23 sectors at the plant site and 65 runs across 19 paddocks at Longview Farm. Results of irrigation monitoring are reported to the Council annually.

In October 2009, the Company commenced monitoring the chemical composition of wastewater irrigated, on a monthly basis. This information is used mainly for more accurate measurement of nitrogen loadings on irrigation areas.

Soil of the irrigated areas is tested biennially to determine top-dressing requirements for pasture nutrients and maintenance of soil structure.

1.4.3 Monitoring by Taranaki Regional Council

The consent monitoring programme for the SFF Waitotara site undertaken by the Council consists of four primary components as described below.

Programme liaison and management

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

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

Review of SFF Waitotara monitoring data

Monitoring data gathered by the Company are reviewed to determine compliance with resource consent conditions and to assess trends in water usage, and in effluent volumes and land application.

Site inspections

An officer of the Council visits the Waitotara plant site at quarterly intervals. Inspections are made of the water abstraction system, stockyards, truck wash, processing facilities, boiler, blood and offal holding areas, and effluent treatment and waste disposal systems. An off-site odour assessment is conducted in the vicinity of the plant and irrigation areas. Monitoring results, irrigation records and activities which may influence plant effluent quality are discussed. The site neighbourhood is surveyed for environmental effects.

Chemical sampling

The composition of effluent irrigated and groundwater around irrigation areas is monitored quarterly. The effluent is analysed to determine its organic and mineral strength, particularly for calculation of nitrogen loading on irrigation areas. Groundwater at six locations, comprising five monitoring bores and a spring, is analysed to determine the effects of irrigation on water quality, particularly on nitrate concentration.

2. Results

2.1 Water

2.1.1 Inspections

An officer of the Taranaki Regional Council carried out four routine inspections of the SFF Waitotara site during the 2014-2015 monitoring period. These took place on 12 December 2014, and 23 March, 23 June and 21 September 2015. Each inspection by an officer of the Council is usually conducted in conjunction with a Company employee.

Particular attention is given to the following items:

- water supply (bores and spring)
- wastewater treatment system
- land irrigation system
- by-product load-out and truck-wash areas
- chemical and fuel/oil storage areas
- stormwater/road drains
- domestic sewage disposal

Site management was generally found to be good and no significant environmental issues were noted.

A large flood in Waitotara River on Saturday 20 June 2015 damaged the bridge on Wai-inu Beach Road, affecting access to the meat plant for about five weeks. The flood occurred during the annual maintenance shutdown, and caused four weeks of production to be lost at the start of the bobby calf season.

2.1.2 Results of water abstraction monitoring

Process water for the site is drawn from three groundwater bores and a spring via four separate pumps. Under consent **2261-2**, the daily volume limit is 1,300 m³ (15.0 L/s), at a maximum rate of 17.6 L/s.

Under the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010, SFF Waitotara was required by 10 November 2014 to take continuous measurements and keep daily record of volume taken, and thereafter supply by 31 July each year the record for the preceding 1 July to 30 June period.

SFF Waitotara installed new meters for each of water abstraction pumps, with telemetry to Council from 24 September 2014. Previously, weekly records had been kept. The meters were calibrated by a suitably qualified independent person.

Total daily abstraction volumes for the monitoring period are shown in **Figure 4**.

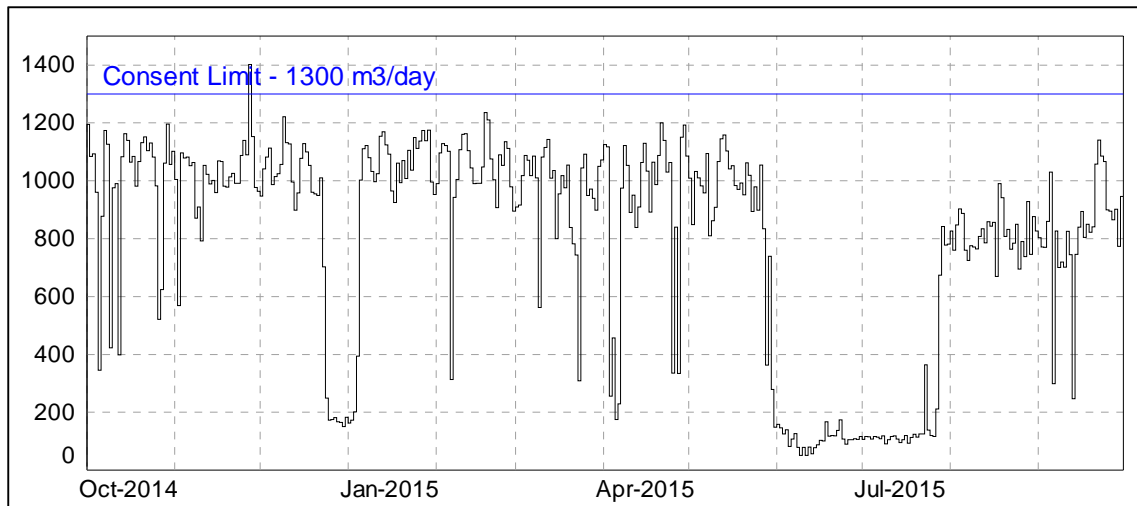


Figure 4 Average daily abstraction rate, October 2014 – September 2015

The total volume abstracted over the 12-month period ending 30 September 2015 was approximately 288,869 m³, of which 254,061 m³ was taken from the deep aquifers and 34,808 m³ from the spring beside the Waitotara River. This equates to 0.489 m³ per animal slaughtered, which is equivalent to a decrease of 0.004 m³, or 0.8%, per animal compared to the 2013-2014 monitoring period.

The daily abstraction rate was within the limit of 1,300 cubic metres/day set on consent **2261-2**, with one exception, on 27 November 2014, when a volume of 1,402 m³ was taken, a factor of 7.8% over the limit. Refer to section 2.3.

The instantaneous abstraction rate limit of 17.6 litres/second was found to be breached frequently, mostly by small amounts for short periods, when the new metering and telemetry system was installed in September 2014. The Company took action by reconfiguring the pumping system to reduce maximum abstraction rate and, on advice of Council, applying for a change of the maximum instantaneous limit without change in the daily volume limit. Refer to section 2.3.

2.1.3 Results of discharge monitoring

2.1.3.1 Effluent monitoring

Irrigation volumes

Records of the volume of effluent irrigated at the SFF Waitotara site have been supplied by the Company in accordance with the Effluent Management Plan. The reported total volume irrigated for the 12-month period ending 30 September 2015 was approximately 237,841 m³, an increase of 5.7% over 2013-2014. This value represents 82% of the reported water abstraction volume. Some of the reasons put forward by the Company for the difference in the volumes abstracted and discharged are;

- Not all waste streams are directed to effluent for disposal, for example cooling water and domestic sewage;
- Loss of boiler-generated steam to atmosphere;
- Evaporation from the cooling towers;
- Evaporation from effluent ponds;
- Release of off-specification stored chlorinated water (infrequent)

Effluent composition

The results from chemical monitoring of effluent irrigated are given in Table 1. Samples were taken from a tap that was installed on the irrigation line in the pump shed beside Pond 2 on 17 December 2012 (site code IND003001, NZTM Grid Reference 1748026-5588757). Previously, samples were taken just beneath the surface of Pond 2 adjacent to the inlet to the irrigation pump. The new sampling point enables better representation of the wastewater irrigated. The results of monitoring of Pond 2 are used below, as this is the regular effluent holding pond, with Pond 1 only used in the event of an emergency (ie, a problem with the irrigators or plant which results in the need to hold effluent for a period of time). No effluent sample was taken on 23 June 2015, as the works had been closed more than three weeks for maintenance.

Table 1 Chemical monitoring results for irrigation pond 2014-2015

Sample		Summary of Past Results 1991-2014				15 Dec 2014	23 Mar 2015	23 Jun 2015	21 Sep 2015
		N	Max	Min	Med				
Time	NZST					0900	0750		1100
Temperature	°C	78	30.8	11.6	21.2	27.6	25.6		20.3
Conductivity, 20°C	mS/m	84	246	81.1	142	140	122		101
pH	pH	83	7.7	6.8	7.1	7.0	6.9		7.2
Suspended solids	g/m ³	81	2500	28	190	770	250		280
COD	g/m ³	83	4700	100	480	1260	460		730
Total nitrogen	g/m ³ N	55	174	47	108	138	82		76
Ammonia nitrogen	g/m ³ N	84	190	12.9	95	99	78		63
Nitrate + Nitrite	g/m ³ N					0.05	0.02		0.03
Total phosphorus	g/m ³ P	71	20	6.8	17	19	14		9.2
Sodium	g/m ³	83	241	75	107	106	117		97
Potassium	g/m ³	82	347	22	104	88	73		48
Calcium	g/m ³	81	76	11	28	15	9.8		20
Magnesium	g/m ³	81	11	2.5	6.0	5.7	4.9		4.0
SAR						5.9	7.6		5.2
KAR						2.9	2.8		1.5

SAR = Sodium adsorption ratio; KAR = Potassium adsorption ratio.
N = Number.

A summary of past results is included for comparison. The relocation of the sampling point, from the effluent pond surface to the irrigation line, is likely to have reduced variation in test result values.

In general, the strength of the irrigated wastewater, in terms of mineral and nitrogen content (conductivity and total nitrogen), was similar to that of the previous several killing seasons. The organic strength, represented by chemical oxygen demand (COD), showed some variation, which may be related to the amount of blood present at the time of sampling.

Nitrogen loading

Nitrogen loading on the irrigation areas is expressed as kilograms of nitrogen per hectare per year (kgN/ha/y). On the basis of the reported irrigation volumes and effluent total nitrogen concentrations, as provided by the Company, the average nitrogen loading over the entire 110.8 ha (enlarged) area irrigated for the 2014-2015 review period was 248 kg/ha/y, being 263 kg/ha/y on Longview Farm and 175 kg/ha/y adjacent to the plant. (A total of 27,214 kg of nitrogen was applied to the entire area, including the extension, at an average concentration of 114 g/m³). The highest loading for a single sector was 390 kg/ha/y, on Longview Farm.

In comparison, for the 2013-2014 review period, a total of 24,714 kg of nitrogen was applied to the entire area, at an average concentration of 110 g/m³. The average nitrogen loading was 223 kg/ha/y, being 251 kg/ha/y on Longview Farm and 93 kg/ha/y adjacent to the plant. The highest loading for a single sector was 396 kg/ha/y, on Longview Farm.

2.1.3.2 Groundwater monitoring

The locations of the six groundwater monitoring points (MPs) are depicted in Figure 2 and Figure 3 and described in Table 2. The four points near the plant are positioned approximately in a straight line running upslope (southward) from the Waitotara River towards the wetland which used to receive overflow from the effluent holding ponds (pre 1999). The fifth and sixth points are downslope of the Longview Farm irrigation area.

MP1 is the spring from which water is drawn for stock and yard washing. The spring is located approximately 120 metres from the Stage I irrigation area at the nearest point. The other five monitoring points are piezometer bores which are located at the periphery of irrigation areas. MP2 is underneath (section 5 of) Stage II irrigation area. MP3 is about 35 metres downslope of the old effluent overflow trench and of the new Stage IV area. MP4 is in the lower part of the Stage IV area, about 200 metres downslope of the Stage III area and about 35 metres upslope of the effluent overflow trench. The effluent overflow trench runs between MP3 and MP4 to the wetland.

MP5 is beside Wai-inu Beach Road. It lies between Longview Farm irrigation area and the old quarry where the water supply bore for Wai-inu Beach is situated. MP6 is near the boundary of Longview Farm closest to the sea and to the coastal spring Te Kiri o Rauru.

Table 2 Groundwater monitoring sites

Name	Site Code	Location	Grid reference, NZTM	
MP1	GND1124	Spring N (downslope) of Stage 1 irrigation area, adjacent to Waitotara River	1747905	5589252
MP2	GND000097	Piezometer, N (downslope) corner of Stage 2 irrigation area	1748176	5588876
MP3	GND000098	Piezometer, S (upslope) corner of Stage 2 irrigation area	1748231	5588618
MP4	GND000099	Piezometer, NE (downslope) of Stage 3/4 irrigation area, adjacent to wetland	1748351	5588498
MP5	GND0686	Piezometer, W (downslope) of Longview irrigation area	1749098	5586785
MP6	GND2510	Piezometer, SE (downslope) of Longview irrigation area	1750792	5586905

The summary of chemical analysis results for the quarterly samples taken from the six groundwater monitoring points is given in Table 3. Range and median (in brackets) values are given.

Table 3 Water quality results for monitoring bores, October 2014 – September 2015

Parameter	Unit	MP1 Spring by river	MP2 Below stage 2	MP3 Above stage 2	MP4 Below stages 3 and 4	MP5 Longview West	MP6 Longview East
Water level	m	-	2.355 – 3.545 (2.81)	2.235 – 3.56 (2.90)	4.885 – 6.26 (5.625)	4.12 – 5.24 (4.80)	5.445 – 6.64 (5.97)
Temperature	°C	13.4 – 16.1 (14.6)	14.1 – 16.5 (15.6)	13.8 – 15.6 (15.4)	14.7 – 15.5 (15.2)	14.3 – 15.4 (15.1)	14.6 – 14.9 (14.7)
Conductivity, 20°C	mS/m	49.1 – 51.3 (50.0)	58.0 – 68.6 (63.2)	44.1 – 65.4 (47.6)	38.2 – 62.5 (45.2)	57.3 – 60.4 (58.3)	63.0 – 78.8 (72.8)
pH	pH	7.3 – 7.4 (7.4)	7.3 – 7.5 (7.4)	7.4 – 7.6 (7.4)	7.4 – 7.6 (7.5)	7.3 – 7.6 (7.5)	7.2 – 7.6 (7.4)
COD	g/m ³	7 – 30 (9)	12 – 16 (13)	10 – 16 (11)	7 – 9 (9)	<5 (<5)	<5 (<5)
Ammonia, total	g/m ³ N	1.78 – 2.2 (2.0)	<0.003–0.022 (0.016)	0.014 – 0.58 (0.020)	<0.003–0.028 (0.014)	<0.003–0.023 (0.005)	<0.003–0.018 (<0.003)
Nitrate + nitrite	g/m ³ N	4.1 – 5.5 (4.8)	12.8 – 20 (18.3)	3.5 – 10.0 (5.4)	6.8 – 24 (10.3)	10.5 – 12.9 (11.5)	4.6 – 5.9 (5.6)
Chloride	g/m ³	41 – 47 (43)	23 – 35 (29)	28 – 70 (34)	20 – 47 (24)	33 – 40 (40)	67 – 96 (73)
Calcium	g/m ³	60 – 66 (62)	88 – 100 (93)	64 – 98 (73)	64 – 101 (75)	92 – 97 (95)	92 – 129 (124)
Magnesium	g/m ³	7.4 – 8.1 (7.6)	6.6 – 8.2 (7.6)	3.3 – 6.0 (4.0)	3.8 – 5.9 (4.5)	9.9 – 11 (11)	10 – 12 (11)
Potassium	g/m ³	18.5 – 20 (19.2)	34 – 47 (39)	21 – 32 (25)	6.7 – 15.3 (10.7)	1.8 – 2.0 (1.9)	2.7 – 3.4 (2.9)
Sodium	g/m ³	27 – 31 (28)	17.8 – 19.2 (18.8)	18.5 – 28 (21)	13.8 – 23 (16.4)	23 – 27 (25)	27 – 39 (33)

The parameters of most interest with regard to the operation of the wastewater disposal system and the monitoring of its effects on the surrounding environment are the nitrogen species (nitrate and ammonia), the organic strength (COD), and the mineral strength (conductivity). Figure 5 shows how the levels of conductivity, ammonia and nitrate, respectively, have varied through time for groundwater at the six monitoring points.

The spring water at MP1 is likely to be subject to the effects of activities at the surface, such as local farming, and particularly the irrigation of wastewater by SFF Waitotara. Since monitoring began in 1992, conductivity has risen and fallen twice over a range of up to two-fold, with peaks in the winters of 2001 and 2007. In 2014-2015, the nitrate concentration varied seasonally, with a peak in winter and trough in summer, between 4.1 and 5.5 g/m³N.

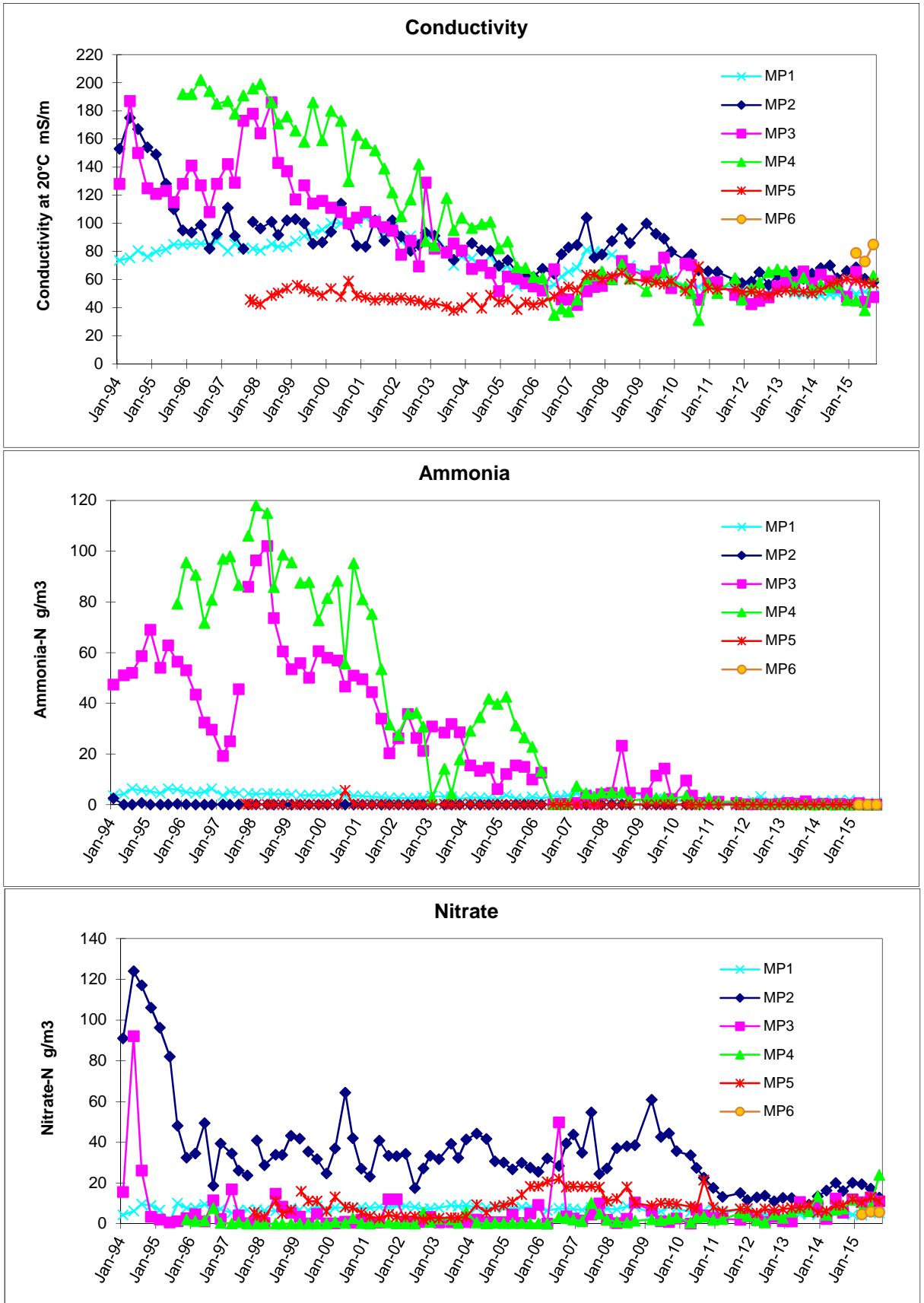


Figure 5 Conductivity, ammonia and nitrate at groundwater monitoring points, 1994-2015

The composition of groundwater at MP2 appears to respond relatively quickly to changes in wastewater loading on the Stage 2 irrigation area. This is consistent with rapid wastewater infiltration through approximately 2 metres of sandy soil to the underlying water table. The levels of ammonia present are very low, indicating almost complete nitrification in aerobic soil. The most significant feature at MP2 is the nitrate concentration, which, after reaching a high of 124 g/m³N in June 1994, fluctuated between about 20 and 50 g/m³N. In the 2010-2011 monitoring period nitrate concentration fell in response to reduced irrigation volumes, and since has ranged between about 10 and 20 g/m³N, lifting when volumes increased in 2014-2015.

At MP3, upgradient of stage 2 area, the effects of wastewater disposal via the old soakage trench and wetland have been apparent. Both mineral (conductivity) and organic (COD) component concentrations were elevated, but have fallen since peaking in the 1997-1998 year. The amount of ammonia present has continued to reduce significantly since 1998, which is attributed to no longer using the soakage trench and wetland for discharge. The reduction is also consistent with the movement of wastewater through saturated soil, such as would occur below a soakage trench or wetland. Nitrate concentrations have been relatively low, generally less than 4 g/m³N, from the period immediately after installation of the piezometer, as the lack of oxygen in the saturated soil has prevented nitrification. Since 2005, there have been occasional spikes in the nitrate level of up to about 12 g/m³N, with one value of 50 g/m³N recorded in July 2007. After development of stage IV irrigation area in January 2013, nitrate concentration has lifted, with seasonal variation from 2 to 12 g/m³N, peaking in winter.

In the past, the effects of wastewater disposal have been recorded as being the greatest at MP4, the site closest to the wetland. The concentrations of several groundwater parameters (sodium, potassium, alkalinity and chloride) were similar to those in the wastewater itself, until after disposal of effluent to the area ceased in 1999. Subsequently, nitrate concentrations were generally low, with occasional spikes, until winter 2006, since when levels have increased, to about 5 g/m³N in 2012, and further to about 8 g/m³ after the development of stage 4 irrigation area in January 2013, with spikes, of up to 24 g/m³N in September 2015, coincident with increases in groundwater level.

Groundwater quality at MP5, downslope of the western side of Longview Farm irrigation area, was monitored for two years before irrigation commenced there in January 1999, and showed considerable variation in nitrate concentration (4 to 16 g/m³N) during that period. Post-irrigation, nitrate concentration increased from 2 g/m³N in 2002 to 22 g/m³N in 2006 then fell again from 2008, remaining in the range 5 to 13 g/m³ at the end of the 2014-2015 monitoring period.

MP6 was established on 1 February 2015 in the new irrigation area on the south-eastern side of Longview Farm, where irrigation commenced in September 2012. The piezometer was sampled on three occasions during the 2014-2015 review period. Conductivity was higher than at the other groundwater monitoring sites, reflecting closer proximity to the sea. Nitrate concentration was moderately low and steady at 4.6 to 5.9 g/m³N.

Grass growth in the irrigation areas has been good, and is especially apparent when dry spells limit growth in adjoining non-irrigated areas. Monitoring in 2014-2015 showed grazing was well managed and it was noticeably greener than surrounds during dry periods.

2.1.3.3 Te Kiri o Rauru spring

When consent was sought from STDC to provide for extension to the irrigation area on Longview Farm, consultation with tangata whenua, Ngaa Rauru Kiitahi, raised a concern about potential effect of the irrigation on a sacred spring, Te Kiri o Rauru, that is situated at the coast approximately 1,350 metres from the nearest part of the wastewater application area.

In response, the Company undertook to monitor the quality of water from the spring. Three-monthly sampling, for turbidity, total coliforms and total nitrogen analysis, was initiated at the site identified by Te Kaahui o Rauru representative Dallas McLeod. The spring constitutes seeps at the base of an 8-10 metre-high shellrock face over a distance of about 100 metres at the shore.

To provide comprehensive background information, a sample of the spring taken by the Company on 24 September 2012 was analysed by the Council for a wide range of physico-chemical parameters. Another sample, taken on 16 December 2012 about 30 metres west of the first sampling site, which had been covered by sand, was analysed by Council for microbiological quality. A further sample was taken near the first site on 22 September 2015. The results are presented in Table 4.

Table 4 Chemical composition of Te Kiri o Rauru spring

Parameter	Units	24.09 12	16.12. 12	22.09.15
Temperature	°C			14.6
Conductivity	mS/m, 20°C	60.1	87.2	63.0
Turbidity	NTU	0.11	0.24	
Chemical oxygen demand	g/m ³	5		<5
pH	pH	7.9	8.2	7.6
Alkalinity, total	g/m ³ CaCO ₃	230		205
Calcium	g/m ³	92		92
Magnesium	g/m ³	10		10
Sodium	g/m ³	36		39
Potassium	g/m ³	2.7		2.7
Bicarbonate	g/m ³ HCO ₃	280		250
Chloride	g/m ³	58		67
Sulphate	g/m ³	51		54
Nitrate+Nitrite	g/m ³ N	1.44		1.60
Ammonia, total	g/m ³ N	<0.003		<0.003
Nitrogen, total	g/m ³ N	1.48		
Phosphorus, dissolved reactive	g/m ³ P	0.043		
Phosphorus, total	g/m ³ P	0.043		
Iron, total	g/m ³	<0.03		
Manganese, total	g/m ³	<0.01		
Faecal coliforms	cfu/100ml		<1	<1

The levels of potential contaminants from wastewater irrigation, coliforms and nitrate, were low. Samples taken by the Company three-monthly have all had low total coliform (<1 cfu/100ml) and total nitrogen (<5 g/m³) values, except for the sample taken on 14 September 2014, which had a total nitrogen of 7.4 g/m³.

2.2 Air

2.2.1 Inspections

The sources of aerial emission from the plant are a boiler for hot water production, the stockyards, the effluent ponds, the effluent irrigation system, and miscellaneous plant processes. Routine inspections of the site were conducted on four occasions, as described in section 2.1.1: 12 December 2014 and 23 March, 23 June and 21 September 2015.

No offensive odour as a result of plant operation was found at the plant or irrigation area boundaries during the review period.

2.3 Investigations, interventions, and incidents

The monitoring programme for each year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the consent holder. During the year matters may arise which require additional activity by the Council e.g. 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 Taranaki Regional 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 Unauthorised Incident Register (UIR) 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 2014-2015 period, Council was required to undertake significant additional investigations and interventions, or record incidents, in association with SFF Waitotara's conditions in resource consents or provisions in Regional Plans on two occasions, following self-notification in relation to the abstraction of groundwater.

Instantaneous water abstraction limit

Upon installation of new metering on the groundwater abstraction system, with telemetry to Council in September 2014, it was found that the instantaneous abstraction rate limit of 17.6 L/s on consent **2261-2** was being breached frequently, mostly for short periods by amounts of less than 15%. The limit on maximum daily abstraction rate was not exceeded.

The Company took action by reconfiguring the pumping system to reduce maximum abstraction rate. However, the breaches continued. Given that the daily volume limit was not being exceeded, and there was no long-term effect on groundwater level, the Company was advised by Council to apply for an increase in maximum instantaneous abstraction rate, with no change in daily rate, for when the consent expires in June 2016. No further action was taken by Council.

Daily water abstraction limit

On 27 November 2014, the telemetered daily volume of groundwater abstracted was 1,402 m³, exceeding the limit on consent **2261-2** by a factor of 7.8%. In written explanation the next day, the Company stated that major leaks to the ground surface had occurred from two of the three bores, which were kept running to provide some water to the plant, while the other bore had malfunctioned. The leaks had been fixed. Given the short duration of the breach, and lack of environmental effect, no further action was taken by Council.

2.4 Annual report by SFF Waitotara

SFF Waitotara produces an annual report on the monitoring programme associated with its resource consents.

The report for the period October 2014 to September 2015 was received on 23 December 2015.

In summary, the report states:

Silver Fern Farms is committed to the maintenance of high environmental standards. As per our company environmental policy the Waitotara Plant goals are to minimise any adverse effects on the environment and identify opportunities for improvement.

This report provides an overview of the environmental performance of discharges to land, air and water from activities undertaken at Silver Fern farms Waitotara for 1st October 2014 to 30th September 2015.

The Company holds a total of four resource consents, which include a total of 18 conditions setting out the requirements that the Company must satisfy. The Company hold resource consents which allow it to take and use water, to discharge wastewater by spray irrigation and spread stockyard solids onto land, to discharge Stormwater and cooling water to an unnamed tributary of the Waitotara River, and to discharge emissions into the air.

Average daily water take for the 2014-15 year was 782m³ per day. The highest daily abstraction was 1402m³ on 27th November 2014 over the limit of 1300m³ per day. This was the only incidence of water take being above the limit in the year and circumstances triggering this were dealt with immediately, this was reported to the Taranaki Regional Council on the 28th November 2014. Total water take for the season was 288,863m³ this was up by 4% compared to the previous year of 276,755m³. This difference is in line with kill figures which were also up by 5% on the previous season with 590,485 stock units killed. Water use represented as litres used for each carcass processed for the 2014-15 season was 466 litres per carcass, compared to the 2013-14 season of 534 litres per carcass. Although total water use was up, water use per carcass was down which is due to more efficient use of water during the 2014-15 season.

Wastewater quality and volumes were up compared to the 2013-14 season with total average nitrogen levels at Longview recorded at 263 kgN/Ha/Yr compared to the previous season of 251 kgN/Ha/Yr. The Waitotara Plant nitrogen loading levels for the season were recorded as 175 kgN/Ha/Yr. this is a direct result of using as much of the available consented land as possible including the 2012 wastewater irrigation extensions at Waitotara more efficiently to spread nitrogen loadings. There have been no fundamental changes to processing or the wastewater system during 2014-15, the increased wastewater output and the associated nitrogen loading will vary with the amount of stock units killed. During the 2014-15 season a total of 590,485 stock units was killed compared to 562,161 for the previous 2013-14 season. The difference of 28,324 killed stock units is in line with the difference of wastewater/nitrogen loading.

In addition to Taranaki Regional Council monitoring of groundwater Silver Fern Farms Waitotara samples quarterly from a groundwater spring of significance to Ngaa Rauru Kiiitahi, this is located on the Beach adjacent to the irrigation. Results indicate that the Te Kiri o Rauru water quality is well within the National Drinking water standard for nitrates of 11.3 mg/L (equivalent to g/m³).

Stormwater from the Waitotara site catchment which also includes cooling water and defrost water from the Plant is monitored and managed to mitigate effects on the receiving environment, all monitoring and sampling of Stormwater throughout the 2014-15 season was acceptable with no consent conditions breached.

No emissions to air from any of the activities undertaken at the site have been observed beyond the boundary of the property and no complaints have been received.

Overall it can be concluded that control of discharges from Silver Fern Farms Waitotara activities are adequate and the monitoring programme is suitable and effective.

3. Discussion

3.1 Discussion of plant performance

Inspections of the SFF Waitotara site during the 2014 -2015 review period found that the site was generally well managed and staff well trained. On no occasion were there items requiring action. The Company has a history of responding to and resolving any issues in a timely manner.

In September 2014, telemetry to Council was installed on measurement of water abstraction rates for individual bores and the spring. This enabled compliance with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010, which applied to the Company from November 2014. The new abstraction telemetry system showed that there were minor breaches of the consent to abstract groundwater, for which appropriate measures were taken.

With regard to the discharge of stormwater and effluent, in general, the disposal systems were found to be operated and maintained in a satisfactory manner over the 2014-2015 period. The discharge of emissions to air was also well managed throughout the monitoring period.

In September 2012, the Company commissioned a 20.7 ha extension of the area where travelling irrigators apply wastewater to land. A further extension, of the fixed sprinkler irrigation area by 6.0 ha, became operational in January 2013. Both areas were already covered by resource consent. This voluntary action, for which the Company was given an Environmental Award by Council in November 2014, increased the area irrigated for wastewater disposal by 36% to 110.5 ha to provide for increased production at the meat processing plant and to lower Nitrogen loadings. Irrigation of the undeveloped areas will also increase pasture production. Average nitrogen loadings reduced from 349 kgN/ha/y in 2011-2012 to 223 kgN/ha/y in 2013-2014, a factor of 36%, though there was also a 4% reduction in kill. Nitrogen loadings increased to 248 kg/ha/y in 2014-2015, following a 5% increase in kill, with more even spreading over the irrigation areas.

Monitoring of Te Kiri o Rauru spring, situated over a kilometre downgradient of the irrigation extension, to satisfy concerns of tangata whenua continued in 2014-2015.

3.2 Environmental effects of exercise of consents

No adverse effects on the surrounding environment, including effects on groundwater from the abstraction of water and discharge of stormwater and effluent at the SFF Waitotara site have been recorded during the 2014-2015 review period. This is consistent with the monitoring carried out in previous years, including sampling of the five groundwater monitoring points which confirmed that the effluent disposal system at the SFF Waitotara site is effectively managing the discharge of wastewater and stormwater from the site without adverse environmental effect, and that the volume of water being abstracted is within the limits of the resource consent.

In terms of environmental effects from the discharge of emissions to air, no offensive or objectionable odours were detected beyond the boundary of the site during inspections.

3.3 Evaluation of performance

A tabular summary of the Company's compliance record for the year under review is set out in Table 5 to Table 8.

Table 5 Summary of performance for Consent 2261-2

Purpose: To take up to 1300 cubic meters [17.6 litres/second] of water from three groundwater bores in the vicinity of the Waitotara River for meat processing purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Operate a measuring device to record daily rates of abstraction	Provision of groundwater abstraction data to the TRC.	No, volume limit exceeded
2. Provision for water level and water quality sampling to be made at the bores	Chemical sampling	Yes
3. Optional review provision re environmental effects	Not scheduled for consideration during year under review. Consent expires June 2016.	N/A
Overall assessment of environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent t		Improvement required High

N/A = not applicable

Table 6 Summary of performance for Consent 2260-2

Purpose: To discharge up to 1700 cubic metres/day of a) Waste by spreading onto land; and b) Wastewater by spray irrigation onto land; from meat processing operations in the vicinity of the Waitotara River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge to occur in accordance with Management Plan	Site inspections and data provided. Plan updated 15 November 2015	Yes
2. No offensive or objectionable odour beyond the boundary of the property	Site inspections and complaints register	Yes
3. Discharge not to result in spray drift beyond the boundary of the property	Site inspections and complaints register	Yes
4. No effects upon ground water	Site inspections and chemical sampling. Minor effects	No
5. Review of management plan	Not exercised	N/A
6. Review of consent conditions	Not scheduled for consideration during year under review. Consent expires June 2016.	N/A
Overall assessment of environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		Good High

Table 7 Summary of performance for Consent 5027-2

Purpose: To discharge stormwater, defrost water and evaporative cooling water from a meat processing plant site into an unnamed tributary of the Waitotara River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option	Site inspections and chemical sampling	Yes
2. Limits on catchment area of site	Site inspections	Yes
3. Containment of hazards	Site inspections	Yes
4. Limits on pH, oil and grease and suspended solids	Site inspections and chemical sampling	Yes
5. Discharge shall not give rise to effects on stream beyond mixing zone	Site inspections and chemical sampling	Yes
6. Provide and maintain a contingency plan	Council records and site inspections. Plan updated 23 March 2011.	Yes
7. Provide and maintain a stormwater management plan	Council records and site inspections. Plan updated 23 March 2011.	Yes
8. Notification on changes on site	No required during monitoring period	N/A
9. Review of consent conditions	Not scheduled for consideration during year under review. Next consideration June 2016.	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 8 Summary of performance for Consent 4629-2 t

Purpose: To discharge emissions into the air from various activities associated with meat processing operations		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option	Site inspections	Yes
2. No odour beyond boundary of the site	Site inspections and complaints register	Yes
3. Detail emissions from the site	Information not requested by TRC	N/A
4. Discharge to be smoke free	Site inspections	Yes
5. Review of consent conditions	Not scheduled for consideration during year under review. Consent expires June 2016.	N/A
Overall assessment of environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

During the 2014-2015 monitoring period, the Company demonstrated a good level of environmental and high level of administrative performance and compliance with its resource consents as defined in Section 1.1.4.

3.4 Recommendations from the 2012-2014 Biennial Report

In the 2012-2014 Annual Report, it was recommended:

1. THAT monitoring of air emissions from the meat processing operations of Silver Fern Farms Limited (Waitotara) in the 2014-2015 year continues at the same level as in 2012-2013.
2. THAT monitoring of discharges of stormwater and effluent from the meat processing operations of Silver Fern Farms Limited (Waitotara) in the 2014-2015 year continues at the same level as in 2012-2013.
3. THAT monitoring of water abstraction for the meat processing operations of Silver Fern Farms Limited (Waitotara) in the 2014-2015 year continues at the same level as in 2012-2013.

These recommendations were implemented during the period under review.

3.5 Alterations to monitoring programmes for 2015-2016

In designing and implementing the monitoring programmes for air/water discharges in the region, the Taranaki Regional Council has taken into account the extent of information made available by previous authorities, its relevance under the Resource Management Act, the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting to the regional community, 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 emitting to the atmosphere/discharging to the environment.

In the case of SFF Waitotara, the programme for 2014-2015 was unchanged from that for 2013-2014. It is similarly proposed that for 2015-2016, the monitoring programme remain the same as the previous monitoring period. A recommendation to this effect is attached to this report.

3.6 Exercise of optional review of consents

None of the consents allow for an optional review in June 2016.

4. Recommendations

1. THAT monitoring of air emissions from the meat processing operations of Silver Fern Farms Limited (Waitotara) in the 2015-2016 year continues at the same level as in 2014-2015.
2. THAT monitoring of discharges of stormwater and effluent from the meat processing operations of Silver Fern Farms Limited (Waitotara) in the 2015-2016 year continues at the same level as in 2014-2015.
3. THAT monitoring of water abstraction for the meat processing operations of Silver Fern Farms Limited (Waitotara) in the 2015-2016 year continues at the same level as in 2014-2015.

Glossary of common terms and abbreviations

The following abbreviations and terms are used within this report:

BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction
Condy	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
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
IR	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
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
KAR	Potassium adsorption ratio. A measure of the suitability of water use in agricultural irrigation, as determined by the concentrations of solids dissolved in the water.
l/s	Litres per second
mS/m	Millisiemens per metre
NH ₄	Ammonium, normally expressed in terms of the mass of nitrogen (N)
NO ₃	Nitrate, normally expressed in terms of the mass of nitrogen (N)
NNN	Nitrate plus nitrite, expressed in terms on the mass of nitrogen (N)
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment
resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15)
RMA	Resource Management Act 1991 and subsequent amendments
SAR	Sodium adsorption ratio. A measure of the suitability of water use in agricultural irrigation, as determined by the concentrations of solids dissolved in the water.

SS	Suspended solids
Temp	Temperature, measured in °C (degrees Celsius)
UI	Unauthorised Incident

For further information on analytical methods, contact the Council's laboratory.

Bibliography and references

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- Taranaki Regional Council 2008, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2007-2008, Technical Report 2008-69
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Taranaki Regional Council 2011, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2010-2011, Technical Report 2011-95

Taranaki Regional Council 2012, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2011-2012, Technical Report 2012-82

Taranaki Regional Council 2014, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Biennial Report 2012-2014, Technical Report 2014-87.

Appendix I

**Resource consents held by
Silver Fern Farms Limited (Waitotara)**
(For a copy of the resource consent
please contact the TRC consent 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: Silver Fern Farms Limited
P O Box 941
DUNEDIN

Consent Granted
Date: 2 July 1998

Conditions of Consent

Consent Granted: To discharge up to 1700 cubic metres/day of
a) waste by spreading onto land; and
b) wastewater by spray irrigation onto land; from meat
processing operations in the vicinity of the Waitotara River at
or about (NZTM) 1748161E-5588686N

Expiry Date: 1 June 2016

Review Date(s): June 2004, June 2010

Site Location: Waiinu Beach Road Waitotara

Legal Description: Consent Holder: Lot 1 DP 63598 Lot 1 DP 75951 Blk XIV
Wairoa SD
A V Pearce: Pt Sec 49, 49A Waitotara Dist Blk XIV
Wairoa SD
DV & JV Pearce: Pt Sec 92, 149, 153 Waitotara Dist Pt Sec 3,
10 Sec 1, 5, 6 Blk XIV Wairoa SD

Catchment: Waitotara

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. That the discharge shall occur in accordance with the provisions of the Management Plan for the Treatment of Meat Processing Plant Effluent [May 1998] supplied with the application or a plan modified by agreement between the consent holder and the Chief Executive, Taranaki Regional Council, which addresses the following matters:
 - a) effluent application rate and method;
 - b) pasture and soil husbandry;
 - c) prevention of run-off and spray drift;
 - d) effluent, soil and groundwater monitoring;
 - e) contingency events;
 - f) reporting.
2. That the discharge shall not result in offensive or objectionable odour levels beyond the boundary of the property.
3. That the discharge shall not result in spray drift beyond the boundary of the property.
4. That the consent holder shall manage the discharge in such a manner as to minimise impacts on groundwater quality.
5. That the Taranaki Regional Council or the consent holder may review the management plan, referred to in condition 1, at any time by giving at least three months written notice, for the purpose of establishing the adequacy of the plan in dealing with any adverse effects on the environment.

Consent 2260-2

6. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the discharge on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 3 June 2008

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: Silver Fern Farms Limited
P O Box 941
DUNEDIN

Consent Granted
Date: 23 January 1998

Conditions of Consent

Consent Granted: To take up to 1300 cubic metres/day [17.6 litres/second] of water from three groundwater bores in the vicinity of the Waitotara River for meat processing purposes at or about (NZTM) 1748161E-5588686N

Expiry Date: 1 June 2016

Review Date(s): June 2004, June 2010

Site Location: Waiinu Beach Road Waitotara

Legal Description: Lot 1 DP 63598 Pt Sec 49 SO Plan 34844 Blk XIV Wairoa SD

Catchment: Waitotara

General conditions

- a) That 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) 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 operate a measuring device capable of recording daily rates of abstraction from each bore and shall make such records available to the Taranaki Regional Council upon request.
2. That provision at the headworks of the bores for water-level measurements and water quality sampling shall be made and be maintained.
3. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the abstraction on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 3 June 2008

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: Silver Fern Farms Limited
P O Box 941
DUNEDIN

Consent Granted
Date: 23 January 1998

Conditions of Consent

Consent Granted: To discharge emissions into the air from various activities associated with meat processing operations at or about (NZTM) 1748161E-5588686N

Expiry Date: 1 June 2016

Review Date(s): June 2004, June 2010

Site Location: Waiinu Beach Road Waitotara

Legal Description: Lot 1 DP 75951 Lot 1 DP 63598 Pt Secs 153, 7, 92 & SO Plan 34844 Pt Sec 14, 9, 49 Waitotara Dist Blk XIV Wairoa SD

General conditions

- a) That 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) 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 adopt the best practicable option or options to prevent or minimise the adverse effects of the discharges on the environment.
- 2. That at no time shall the consent holder cause or allow an odour at or past the legal boundary of the consent holder's site that in the opinion of at least one enforcement officer of the Taranaki Regional Council is noxious or offensive or objectionable.
- 3. That the consent holder shall detail emission inventories from the site upon the request of the Taranaki Regional Council.
- 4. That any discharge from the factory site shall be free of smoke.
- 5. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the abstraction on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 3 June 2008

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: Silver Fern Farms Limited
P O Box 941
DUNEDIN 9054

Decision Date: 8 November 2010

Commencement
Date: 8 November 2010

Conditions of Consent

Consent Granted: To discharge stormwater, defrost water and evaporative cooling water from a meat processing plant site into an unnamed tributary of the Waitotara River at or about (NZTM) 1748084E-5589290N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Waiinu Beach Road, Waitotara

Legal Description: Lot 1 DP 63598 [Discharge source & site]
Sec 81 Blk XIII XIV Wairoa SD [Discharge site]

Catchment: Waitotara

*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 discharge shall be from a catchment area on the site not exceeding 2.3 hectares.
3. Any significant volumes of hazardous substances [e.g. diesel fuel, hydrochloric acid and sulphuric acid] on site shall be:
 - a) contained in a double skinned tank, or
 - b) stored in a dedicated bunded area with drainage to sumps, or to other appropriate recovery systems, and not directly to the site stormwater system.
4. Constituents of the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 9.0
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.

5. After allowing for reasonable mixing, within a mixing zone extending 30 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.
6. The consent holder shall maintain a contingency plan. The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

Consent 5027-2

7. The consent holder shall maintain a stormwater management plan. This plan shall be adhered to at all times and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council document how the site is to be managed in order to minimise the contaminants that become entrained in the stormwater. The plan shall include but not necessarily be limited to:
- 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.

8. 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. 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 worknotification@trc.govt.nz.
9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review:
- a) during the month of June 2016 and/or June 2022; and/or
 - b) within 3 months of receiving a notification under special condition 8 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 8 November 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management