Stanley Bros Trust (Piggery)

Monitoring Programme

Annual Report

2021-2022

Technical Report 2022-51

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Taranaki Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

The Stanley Bros Trust (the Company) operates a piggery located on the corner of 4833 South Road and 24 Arawhata Road, Opunake in the Arawhata catchment. The piggery is a breeder, grower, and finishing operation with the capacity of up to 5,381 pigs and piglets at any one time. The Company holds resource consents which allow the Company to discharge effluent to land via spray irrigation, and the discharging of effluent emissions to air from related practices.

During the monitoring period, Stanley Bros Trust demonstrated a level of environmental performance that required improvement and a high level of administrative performance.

This report for the period July 2021 to June 2022 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental and consent compliance 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 holds two resource consents, which include a total of 21 conditions setting out the requirements that the Company must satisfy. The Company holds one consent to discharge piggery effluent to land and one consent to discharge emissions into the air at this site.

The Council's monitoring programme for the year under review included one inspection, one effluent monitoring survey, and two rounds of surface water monitoring with samples from four sites collected for physicochemical analysis. Odour surveys were also undertaken during inspections. Data was supplied by the Company and reviewed by the Council.

The Company was unable to discharge effluent to the consented 100 ha of cut and carry pasture this monitoring period, with just 84.04 ha utilised for cut and carry operations. A variation of consent may be sought by the Company in the upcoming monitoring period.

The Company are currently carrying less pigs than their consented allowance and have no plans to increase stock numbers, citing instability within the pork industry.

Piezometer installation has been delayed. The Company has provided the Council with a proposal to negate their requirement for groundwater monitoring. This is an ongoing investigation by the Council.

The monitoring showed that a minor increase of nitrate-nitrogen was recorded down the length of the Arawhata Stream.

The operations have come under new management from within the Company structure. This represents a step-change with the Company operations, with greater control now being exercised in the field of irrigation management. This is in part due to the significant investment in new technologies for use across the Company site. The utilisation of these technological advances has the potential to achieve greater transparency in regard to effluent management and improve productivity for both current and future cut and carry operations on site.

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

In term of environmental performance and administrative performance by the consent holder, over the last several years there have been many non-compliant events, with abatements and infringements being issued on multiple occasions. The 2021-2022 monitoring period was an improvement on previous years with no abatement or infringements being issued and only two non-compliant consent conditions.

This report includes recommendations for the 2022-2023 year.

Table of contents

List of tables

List of figures

1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2021 to June 2022 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Stanley Bros Trust Piggery (the Company). The Company operates a piggery situated on the corner of 24 Arawhata Road, and 4833 South Road (State Highway 45), Opunake, in the Arawhata catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to discharge of water within the Arawhata catchment, and the air discharge permit 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 is the 3rd combined annual report by the Council 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 though annual programmes;
- the resource consents held by the Company in the Arawhata catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Company's site/catchment.

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

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

Section 4 presents recommendations to be implemented in the 2022-2023 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;

b. physical effects on the locality, including landscape, amenity and visual effects;

c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;

d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and

e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable 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 consent holders, this report also assigns a rating as to each Company's environmental and administrative performance during the period under review. The rating categories are high, good, improvement required and poor for both environmental and administrative performance. The interpretations for these ratings are found in Appendix II.

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

1.2 Process description

The Company own and operate a piggery located on the corner of 24 Arawhata Road and 4833 South Road (State Highway 45), Opunake. The piggery and surrounding land owned by the Company covers 133 ha. They are a breeder, grower and finishing operation capable of holding up to a maximum of 5,381 kg pig equivalents onsite at any one time. The discharge is made up of effluent and wash water from the piggery operation.

Up until early October 2018 the site operated as a piggery and dairy farm with 270 dairy cows. In October 2018 the dairy herd was sold and only a small amount of grazing stock remain on the farm.

The existing piggery is made up of seven purpose-built piggery sheds, which are ventilated with roof fans and side vents. The sheds are in good condition, with impervious wall cladding. The floor is impervious with concrete, wooden slats, and plastic flooring panels. The layout of the sheds is generally across the prevailing winds and there are side ventilation exhausts with automatic control. The configuration and locality of the sheds (along with the exhaust stacks) generally enhance dispersion of odours and dust from the sheds. The allowed stock density in sheds has been significantly reduced by revisions to animal welfare regulation changes, so extra planned sheds have not been built.

Pens are flushed daily with water and the effluent is pumped to a series of storage ponds before land application. Pond 1 has a storage capacity of 24,500 m^3 and pond 2 has a storage capacity of 19,320 m^3. The

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

ponds are stirred as effluent is applied to land through numerous methods which are described later in this report. Approximately 18 m^3 of effluent and wastewater is discharged onto land on a daily basis over approximately 105 ha. Since the closure of the dairy shed, effluent volume has reduced by 60%, increasing available storage to up to three months.

The Company undertook 'cut and carry' operations during this monitoring period, producing maize silage, grass silage, hay and haylage. The Company has also expressed interest in other 'cut and carry' operations for future years. Effluent will be applied after harvesting to maintain soil fertility for future crops.

Key determinants with effluent irrigation are potassium and nitrogen levels. The report produced by agKnowledge (in the consent application) estimated typical values for freshly voided manure characteristics based on 3.25 kg of manure per standard pig equivalent, and predicted nutrient loading rates based on these estimates with the inclusion of irrigation to 105 ha of land, and 30% of nitrogen gaseous loses. The report concluded that the nutrient input from the piggery and the 'cut and carry' operation is not excessive as harvested crops counter the high nutrient inputs from the piggery.

The existing piggery, ponds, and irrigation areas in relation to the property are shown in Figure 1 and Figure 2.

Figure 1 Location of Stanley Bros Trust Piggeries current buildings and effluent ponds

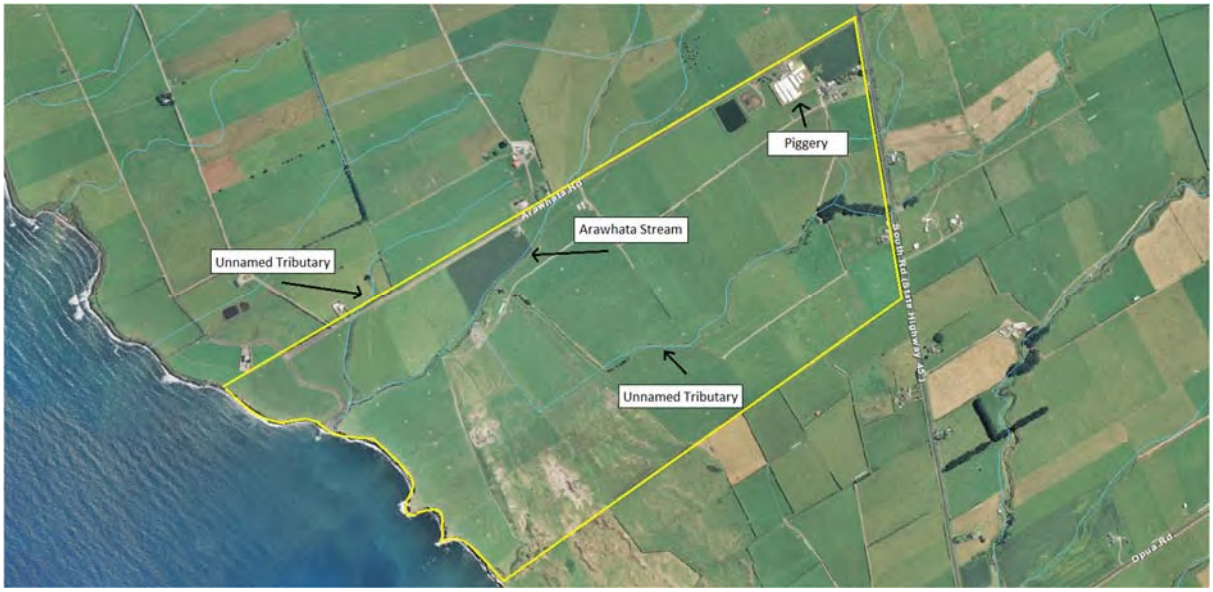

Figure 2 Stanley piggeries in relation to the Arawhata Stream and Unnamed Tributaries

1.3 Resource consents

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

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

Table 1 Summary of resource consents held by Stanley Bros piggery

Consent number	Purpose	Granted	Review	Expires
Air discharge permit				
5251-2.2	To discharge emissions into the air from pig farming operations and associated effluent treatment and waste management activities	2019	2024	2030
Discharges to land permit				
10671-1	To discharge piggery effluent onto land by spray irrigation	2019	2024	2030

1.4 Monitoring programme

1.4.1 Introduction

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

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

The monitoring programme for the Company site consisted of three primary components.

1.4.2 Programme liaison and management

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

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

1.4.3 Site inspections

The Company's site was visited on one occasion during the monitoring period. With regard to consents for the discharge of piggery effluent to land, the main points of interest were plant processes with potential or actual discharges to land, including contaminated stormwater and process wastewaters.

Sources of data being collected by the Company were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

As far as practical, inspections related to air emissions were integrated with inspections undertaken for other purposes for example inspection of the oxidation ponds. The air monitoring component focused on

processes with associated actual and potential emission sources and characteristics, including potential odour.

1.4.4 Chemical sampling

The Council undertook sampling of effluent collection and irrigation pond. In addition, surface water samples were collected from the Arawhata Stream and associated unnamed tributary on two occasions. The analytes tested for in the effluent pond and surface water samples include the following:

- Effluent pond (PGP001003) analytes
- Temperature, pH, electrical conductivity (EC), chloride, nitrate + nitrite nitrogen, total nitrogen, total kjeldahl nitrogen (TKN), total sodium, total phosphorus, total potassium, sodium absorption ratio (SAR), total calcium and total magnesium
- Arawhata Stream analytes
- Temperature, pH, electrical conductivity (EC), chloride, nitrate + nitrite nitrogen, chloride, total potassium, dissolved reactive phosphorus (DRP), free ammonia, total ammoniacal nitrogen and total biochemical oxygen demand (TBOD5).

The Council also undertook odour surveys to assess ambient air quality in the neighbourhood during inspections.

2 Results

2.1 Inspections

01 December 2021

Inspection undertaken by Compliance Officers and the Job Manager to assess compliance with the air and land discharge consents. No irrigation was being undertaken at the time of inspection and the ponds were at a low level. The new dribble bar was viewed that is to be used for effluent discharge. An odour survey was conducted, which found no objectionable odours beyond the boundary of the property. Compliance was given at the time of inspection.

2.2 Results of discharge monitoring

2.2.1 Effluent monitoring

Piggery effluent is pumped to the irrigation pond (Figure 1). The pond holds the effluent when conditions are not correct for irrigation to land to occur. A secondary pond is also available for additional storage if required.

The Council sampled the irrigation pond (PGP001003) on one occasion this monitoring period. The analysis of the one round is provided in the following Table 2. This year marks the inaugural year of monitoring at this industrial discharge.

Table 2 Irrigation pond effluent sample 2021-2022 results

PGP001003	Collected	14 June 2022
Parameter	Time	12:45
Temperature	°C	-
pH	pH Units	7.5
Electrical Conductivity (EC)	mS/m	452
Chloride	g/m^3	72
Nitrate-N + Nitrite-N	g/m^3	1.27
Total Nitrogen	g/m^3	580
Total Kjeldahl Nitrogen (TKN)	g/m^3	580
Total Sodium	g/m^3	89
Total Phosphorus	g/m^3	119
Total Potassium	g/m^3	270
Sodium Absorption Ratio (Total)		1.9
Total Calcium	g/m^3	102
Total Magnesium	g/m^3	40

2.2.2 Surface water monitoring

In lieu of groundwater monitoring, four surface water monitoring locations have been established on the Stream and associated unnamed tributary.

The four sites are provided in the following Figure 3:

- ARW000070 is located slightly offsite, to the northwest of the Company site. The stream is full of macrophyte vegetation with minimal to no shading. This is monitored to assess pre-irrigation area surface water quality (control site).
- ARW000954 is located on the eastern side of the Company site, up gradient of site irrigation areas. This stream is an unnamed tributary of the Arawhata Stream. It is assessed to provide pre-irrigation area surface water conditions (control site).
- ARW000984 is located in the central area of the site, within the irrigation areas, just prior to the confluence with the main stem of the Arawhata Stream. The aim of this site is to assess for any effect associated with the irrigation areas on the surface water body.

ARW000999 is located at the mouth of the Arawhata Stream, on the coast. This location seeks to assess the combined effect of the irrigation areas on the unnamed tributary and the main stem of the Arawhata Stream, prior to discharging into the Tasman Sea.

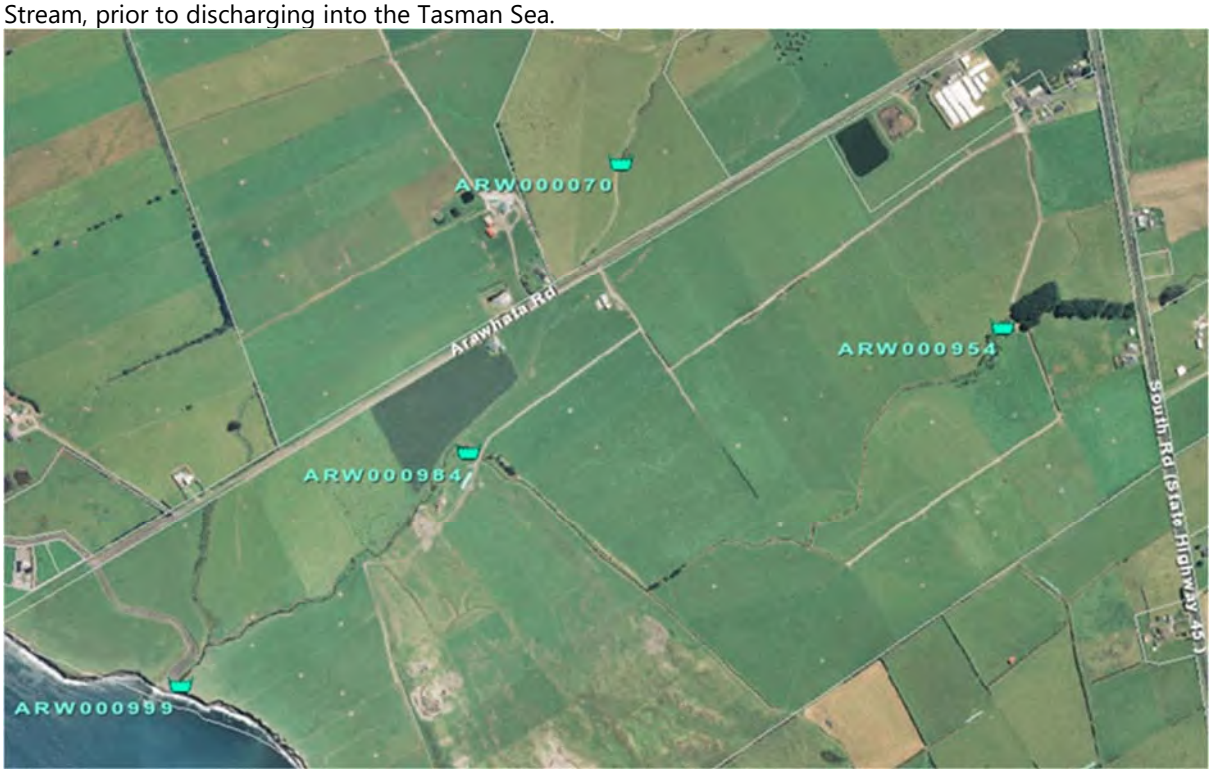

Figure 3 Surface water sampling locations

Two rounds of surface water monitoring was undertaken by the Council this monitoring period (Table 3 and Table 4).

Table 3 Surface water monitoring Arawhata Stream 2021-2022 results (22 December 2021)

	Site	ARW000070	ARW000954	ARW000984	ARW000999
	Collected	22 Dec 2021	22 Dec 2021	22 Dec 2021	22 Dec 2021
Parameter	Time	11:00	11:40	11:20	12:05
Sample Temperature	°C	18.8	18.6	18.2	19.2
Electrical Conductivity (EC)	mS/m	30.2	28.6	32.0	33.6
pH	pH Units	7.0	7.1	7.1	7.5
Chloride	g/m^3	39	36	40	39
Total Potassium	g/m^3	5.8	9.7	8.5	8.5
Dissolved Reactive Phosphorus	g/m^3	<0.004	0.018	0.015	0.016
Free Ammonia	g/m^3	<0.00005	<0.00007	0.00006	<0.00015
Nitrate-N	g/m^3	0.89	1.02	2.9	3.0
Nitrate-N + Nitrite-N	g/m^3	0.89	1.02	2.9	3.0
Nitrite-N	g/m^3	<0.02	0.002	0.006	0.006
Total Ammoniacal-N	g/m^3	<0.010	<0.010	0.011	<0.0010
Total Biochemical Oxygen Demand (TBOD$_5$)	g O_2/m^3	0.8	0.4	0.6	0.5

Table 4 Surface water monitoring Arawhata Stream 2021-2022 results (28 April 2022)

	Site	ARW000070	ARW000954	ARW000984	ARW000999
	Collected	28 April 2022	28 April 2022	28 April 2022	28 April 2022
Parameter	Time	13:15	13:30	13:45	12:55
Sample Temperature	°C	15.8	15.2	15.5	15.8
Electrical Conductivity (EC)	mS/m	29.3	29.3	33.6	35.3
pH	pH Units	7.4	7.5	7.6	8.0
Chloride	g/m^3	36	36	41	41
Total Potassium	g/m^3	5.5	9.7	8.4	8.5
Dissolved Reactive Phosphorus	g/m^3	0.011	0.068	0.016	0.019
Free Ammonia	g/m^3	<0.00008	0.00015	<0.00015	<0.0004
Nitrate-N	g/m^3	0.37	1.04	2.9	2.8
Nitrate-N + Nitrite-N	g/m^3	0.37	1.04	2.9	2.9
Nitrite-N	g/m^3	0.003	0.003	0.004	0.006
Total Ammoniacal-N	g/m^3	<0.010	0.013	<0.010	<0.010
Total Biochemical Oxygen Demand (TBOD$_5$)	g O_2/m^3	0.5	<0.4	<0.4	<0.4

The 2021-2022 monitoring rounds occurring in Summer and Autumn indicated the following:

- Surface water temperatures ranged 15.2-19.2°C.
- Surface water EC ranged 28.3-35.3 mS/m. Electrical conductivity increased down the length of the main stem, with the highest values occurring at the mouth of the stream (ARW000999).
- Surface water pH results ranged 7.0-8.0 pH.
- Total potassium ranged 5.5-9.7 g/m^3.
- Dissolved reactive phosphorus (DRP) ranged <0.004-0.068 g/m^3.
- Free ammonia was recorded at trace concentrations, ranging from <0.00005 - <0.0004 g/m^3.
- Nitrate nitrogen was recorded in all samples at low concentrations, ranging 0.37-3.0 g/m^3. This analyte increased in concentration down the length of the catchment. With the highest values occurring at the mouth of the stream (ARW000999)
- Nitrite nitrogen was recorded at low concentrations, ranging <0.002-0.006 g/m^3.
- Total ammoniacal nitrogen ranged from below the LOD through to 0.013 g/m^3.
- Total biochemical oxygen demand was recorded in all samples, however the results were all below 2 g/m^3.

The analysis of the two monitoring runs determines a slight increase in nitrate nitrogen down the length of the catchment. Electrical conductivity also increases slightly down the length of the catchment. These results are supported by the data from the surface water monitoring on 09 April 2021 during the 2020-2021 monitoring period. Further monitoring will take place in the 2022-2023 monitoring year, from which further inferences can be determined and long term trends can begin to be assessed.

2.3 Provision of consent holder data

Consent required information was provided to the Council by means of an annual report (appendix III). This was produced by the Company's third party consultant agKnowledge[2].

2.3.1 Pig inventory 2021-2022

Special condition 1 of consent 10671-1.1 states the effluent discharged shall be from a piggery of no more than 5,381, 50 kg pig equivalents. Table 5 indicates that the Company were well below the consented allowance, with 4,616 SPU equivalents. The total number of pigs in 2021-2022 has decreased from that of 2020-2021 by 18 pigs and 2,268 kg total.

Table 5 Stanley Bros piggery inventory 2021-2022

Type of pigs	No. of pigs	Average weight (kg)	Total weight (kg)	50 kg equivalent pigs (SPU)
Sows	351	162	56,862	1,137
Boars	4	162	648	13
Gilts	79	150	11,850	237
Light pork	1,354	70	94,780	1,896
Store pigs	832	44	36,608	732
Weaners	1,202	25	30,350	601
Total	**3,822**		**230,798**	**4,616**

[2] Report of 2021/22 effluent irrigation management plan for Stanley Bros Trust January 2022. agKnowledge

2.3.2 Record keeping

The consent holder is required to keep accurate records of effluent application to land, including as a minimum:

a. Volume of effluent applied;
b. Rate and time of application;
c. Area (ha) that the effluent was applied to
d. Method of irrigation; and
e. Type of crop that is grown on that land.

2.3.2.1 Rate and time of effluent application

Table 6 below provides the rate and time of the applications to land in the 2021-2022 monitoring period.

Table 6 Irrigations per month and effluent volumes applied 2021-2022

Month	Irrigation per month (days)	Effluent volumes applied (mm)
July 2021	18	59.0
August	37	105.5
September	17	40.0
October	14	53.2
November	12	68.7
December	0	0
January 2022	25	78.1
February	11	24.7
March	35	73.9
April	14	32.1
May	10	50.7
June	33	40.3

2.3.2.2 Area (ha) that effluent is applied and total volume applied

The farm is divided into six blocks, these total 105.1 ha. The annual effluent volumes applied to these blocks is provided in the following Table 7. The total volume of effluent applied in the 2021-2022 monitoring year was 24,083 m^3.

Table 7 Annual effluent volumes by irrigation block in mm and m^3 loading of N per ha 2021-2022

Block	Effective area (ha)	Effluent volume applied (mm)	m^3 of effluent
Main Road	7.7	18.3	1409.1
Arawhata	20.8	17.4	3619.2
Centre	25.3	32.8	8298.4
Ron's	17.6	23.1	4065.6
Sand dunes	23.8	20.5	4879
Cliff tops	9.9	18.3	1811.7

Block	Effective area (ha)	Effluent volume applied (mm)	m^3 of effluent
Total	105.1	-	24,083

2.3.2.3 Method of irrigation

The effluent from the piggery is pumped to storage pond prior to land application. The Company communicated that three different delivery systems were used during the 2021-2022 monitoring year:

1. Dribble bar – main method of effluent application, depths applied (~3 mm)
2. 'Weta' travelling rain gun – used to apply effluent to the Sand Dune block at 8mm depths during 8 months of the year.
3. Slurry tank – used for applying effluent (~8 mm) at strategic times of the year to minimise odour to the areas beside the South Road and close to houses, as well as at the back of the farm along Arawhata Road, that is close to a neighbour's house. The total area was 11.5 ha.

2.3.2.4 Type of crops grown

Two crops were grown under the cut and carry system in 2021-2022. Maize Silage paddocks (37.2 ha) which were cultivated in October and harvested in March, yielding around 22.6 tonnes DM/ha.

An annual Ryegrass was planted as a crop cover over the cooler and wetter months. This is harvested in September/early October, yielding 4.3 tonnes DM/ha.

A 12 ha Centre Block was not planted in annual grass as these paddocks had the first season of maize harvested from it.

Over the rest of the farm excluding the Sand Dune Block, the pasture was mown to produce 691 bales as haylage and 768 bales as hay.

Table 8 Dry matter yields of cut and carry operations 2021-2022. Sourced agKnowledge report 21/22

Harvested Feed	Feed Amount	Average DM Yield	DM removed (tonnes)
Maize silage	37.2 ha	22,640 kg/ha	841
Grass silage	25 ha	4,310 kg/ha	108
Hay (15's)	768 bales	300 kg/bale [1]	270
Haylage (15's)	691 bales	300 kg/bale [2]	204

2.3.3 Cut and carry operation

Crops/cut and carry operations were undertaken in the 2021-2022 monitoring period. These included maize baleage and hay. These accounted for a total of 84.04 ha of land actioned under cut and carry operations.

Special condition 9 of consent 10671-1.1 states:

The consent holder shall ensure that the effluent is discharged to at least 100 hectares of land that is not grazed and that is planted in crops that are removed from the property i.e. a 'cut and carry' operation. It may also be applied and additional areas that are grazed.

Given that the Company only discharged to 84.04 ha during the monitoring year, this is a minor non-compliance of special condition 9 of consent 10671-1.1.

The irrigation to areas of cut and carry has increased slightly from that of the 2020-2021 monitoring year. With 84.01 ha being irrigated to in 2021-2022, a slight increase from 81.5 ha in the 2020-2021 monitoring period.

Consideration must be given to the Company which is not carrying its maximum piggery capacity (5,381 SPU equivalents consent 10671-1.1) with a reduction of 765 SPU equivalents below the maximum, at 4,616 SPU.

The Company plan to operate in the proximity of these reduced pig numbers (4,616 SPU) in the future. As such, a variation on consent 10671-1.1 will be sought by the Company in the upcoming monitoring period. To have the requirement for 100 ha of cut and carry land reduced to reflect the reduced SPU equivalents.

2.3.4 Total nitrogen and potassium in the effluent

During the 2021-2022 monitoring period the consent holder collected four effluent samples for chemical analysis. These results have been combined with the samples collected during the 2020-2021 monitoring period to determine mean nitrogen and potassium concentrations. The highest concentrations were recorded in April 2021 in the previous monitoring period when the pond level was at its lowest. Results displayed in Table 9 were provided in agKnowledge effluent management report 21/22.

Table 9 Mean nutrient composition of piggery effluent (n=9) plus 95% confidence interval

Nutrients in piggery effluent	Mean (g/m^3)	95% CI (g/m^3)
Nitrogen	733	104
Phosphorus	176	71
Potassium	281	15
Calcium	683	1,053
Magnesium	88	61
Sodium	85	11

2.3.5 Nutrient management

Consent 10671-1.1, special conditions 10 and 11 require the following:

10. The Total Nitrogen applied to any hectare of land shall not exceed:
    a. 400 kg in any 12-month period for 'cut and carry areas'; or
    b. 200 kg in any 12-month period for any other land (including grazed pasture).

11. The total Potassium applied to any hectare of land shall not exceed:
    a. 300 kg in any 12-month period for 'cut and carry areas'; or
    b. 100 kg in any 12-month period for any other land (including grazed pasture).

Utilising the data provided in the following Table 10, which was calculated by the mean concentration for nitrogen provided by the Company (733 g/m^3). It is possible to extrapolate the loading of N per hectare.

2.3.6 Nitrogen loading

Estimated nitrogen loading across all areas is provided in Table 10. All cut and carry areas were estimated to be well below consent 10671-1.1, condition 10, loading allowance for nitrogen, which allows up to 400 kg N /ha. For the non cut and carry areas the N loading was estimated to be below consent condition 10671-1.1, condition 10, loading allowance for nitrogen, which allows up to 200 kg N/ha. The consent holder is compliant with the nitrogen nutrient application to land requirements.

Table 10 Estimated nitrogen (N) loading by irrigation block 2021-2022

Block	Effective area (ha)	m^3 of effluent	Loading of N kg per ha
Main Road	7.7	1409.1	134.1
Arawhata	20.8	3619.2	127.5
Centre	25.3	8298.4	240.4
Ron's	17.6	4065.6	169.3
Sand dunes	23.8	4879	150.3
Cliff tops	9.9	1811.7	134.1
Total	105.1	24,083	-
Underlined blocks indicate cut and carry areas. Please note 2.74 ha of the sand dunes is actioned under cut and carry.			

2.3.7 Potassium loading

Estimated potassium loading has been calculated and provided in the following Table 11. The results demonstrated that the Company were compliant with the potassium loading condition (11) of consent 10671-1.1, across all irrigation blocks, in the 2021-2022 monitoring period. This condition allows up to 300 kg/ K ha for cut and carry areas, while for the non-cut and carry areas, a maximum of 100 kg/ K ha is allowed. All potassium loading was below 100 kg/ K ha for all areas.

Table 11 Estimated potassium (K) loading by irrigation block 2021-2022

Block	Effective area (ha)	m^3 of effluent	Loading of potassium ha/kg
Main Road	7.7	1409.1	51.4
Arawhata	20.8	3619.2	48.8
Centre	25.3	8298.4	92.2
Ron's	17.6	4065.6	64.9
Sand dunes	23.8	4879	57.6
Cliff tops	9.9	1811.7	51.4
Total	105.1	24,083	-
Underlined blocks indicate cut and carry areas. Please note 2.74 ha of the sand dunes is actioned under cut and carry.			

2.3.8 Cut and carry operation

The Company provided the Council with analysis of composite feed samples[3] of each crop, so that the nutrient uptake and removal off-farm could be calculated.

[3] Report of 2021/22 effluent irrigation management plan for Stanley Bros Trust January 2022. agKnowledge

Table 12 Nitrogen and potassium concentrations and total N and K removed in the cut and carry system

Harvested Feed	N (% in DM)	K (% in DM)	N uptake (kg)	K uptake (kg)
Maize silage	1.23	1.03	10,344	8,662
Grass silage	1.70	2.80	1,836	3,024
Hay (15's)	1.60	1.60	4,320	4,320
Haylage (15's)	1.80	2.50	3,672	5,100
Total			20,172	21,106

In total the Company removed 20,172 kg nitrogen (N) and 21,106 kg potassium (K) from cut and carry areas this monitoring period.

2.4 Incidents, investigations, and interventions

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.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

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 individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

Table 13 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to the Company activities during the 2021-2022 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

Table 13 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
18 March 2020	During the 2019-2020 monitoring period it was found the Company had not installed groundwater monitoring bores as per special condition 14 of consent 10671-1.1	N	Y	Two abatement notices were issued in the 2020-2021 monitoring period, requiring the Company to install the bores by 31 August 2020. Discussion with the Council extended this abatement notice until 31 August 2021. Since this date, further discussion has been held with the Council in concern to removing the bores from the consent. A proposal has been provided to the Council which offers rationale through additional monitoring means, to negate the bores requirement. The Council is considering the proposal at present.

3 Discussion

3.1 Discussion of site performance

2021-2022 marked the end of the third monitoring period for the Company. After the first and second monitoring period the Company had a few outstanding issues to address.

The Company was required to provide the Council with an Effluent Irrigation Management Plan (EIMP), as well as the concentrations of nitrogen and potassium within the irrigation effluent. The plan, in addition to the effluent monitoring was delivered in this monitoring period, as stated by the Company. The Company commissioned agKnowledge to undertake the works and their assistance has been retained throughout the monitoring period.

The plan fulfilled the consent requirements by providing information on the following:

- Management of the cut and carry operation;
- Evapotranspiration and available water holding capacity of the soil over the irrigated area;
- How irrigation will be scheduled to maximise the benefits of the evapotranspiration and minimise subsurface drainage;
- How effluent is to be applied as uniformly as practicable over the irrigated area, and the uniformity of application demonstrated;
- The designated application area and buffer zones for streams and the property boundary; and
- The determination of the total nitrogen and potassium in the effluent.

From an administrative performance perspective, performance has been satisfactory during the period under review. However, there has been a singular ongoing non-compliance throughout the monitoring period as outlined in section 2.4.

Consent 10671-1.1 condition 14 requiring the installation of a minimum of three piezometers by the 31st January 2020 is non-compliant. The consent holder wishes to remove this consent condition, however, until this is removed by the company or enforced by the Council, the condition will be marked as non-compliant. The rationale behind the removal of this consent must be presented to the council.

In addition, a minor non-compliance was recorded during the review of the Company records. The Company were unable to irrigate to 100 ha of cut and carry pasture in the monitoring period as required by consent 10671-1.1. Irrigation occurred to only 84.04 ha of cut and carry land. However, it is noted that reduced pig numbers (765 SPU below maximum consented limit) generates less effluent for irrigation to land.

The Company has been informed that if they wish to vary their consent to reduce the consented maximum irrigation area for cut and carry operations, then a variation of the current consented limit may be possible if the supporting rationale provides confidence that the variation effect will be no more than minor.

It should be noted that post December 2020 the operations have come under new management from within the Company structure. The early sign is a step-change in the Company operations, with greater control now being exercised in irrigation management. This is in part due to the significant investment in new technologies for use across the Company site (section 2.2.4). The utilisation of these technological advances on site has the potential to achieve greater transparency in regard to effluent management and improve productivity for both current and future cut and carry operations on site.

3.2 Environmental effects of exercise of consents

No known environmental effects have occurred at Stanley Bros Trust piggery during the 2021-2022 monitoring period. Inspections, surface water monitoring and effluent monitoring all displayed the company is compliant in terms of adverse environmental effects. This is a vast improvement from the 2020-2021 monitoring period, in which several abatement notices and infringements were issued for poor environmental performance.

The soil sensors which are currently being trialled by the Company are telemetered to the GPS within the tractor, as well as to a hand held phone. The aim is to provide the Company with up-to-date soil water balance, and available capacity of the soil in real-time. This information can then be used to inform decisions around when and where irrigation application can occur, reducing the risk of excess discharge through ponding, leaching or runoff. It is noted that the Company have engaged expert advice to utilise these technologies. Groundwater monitoring bores are still required to monitor the actual effect of the irrigation activity on groundwater.

Riparian planting and fencing has been completed across the site. It is understood from discussions that the Company is undertaking maintenance only (replacing perished plants) at the present time.

The Company records estimated that 20,172 kg nitrogen (N) and 21,106 kg potassium (K) were removed from cut and carry areas during the monitoring period.

The two Arawhata Stream monitoring rounds recorded minor increases on nitrate-nitrogen down the length of the site. Further monitoring will assess the practicality of these new technologies over time.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 14-16.

Table 14 Summary of performance for consent 5251-2.2

Purpose: ***To discharge emissions into the air from pig farming operation and associated practices including effluent treatment and other waste management activities***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Maximum allowable number of pig equivalents	Liaison with Company and review of Company records indicated that the piggery is carrying less than consented (5,381 SPU equivalents) Actual 4,616 SPU equivalents	Yes
2. Adoption of best practical option to avoid or minimise adverse effects	Liaison with Company and inspections	Yes
3. Consultation and approval prior to alterations to plant and process	Liaison with Company	N/A
4. Minimisation of impact and emissions through use of equipment and suitable methods	Monitoring Inspections	Yes
5. Operation of piggery in accordance with original application	Monitoring inspections	Yes

Purpose: *To discharge emissions into the air from pig farming operation and associated practices including effluent treatment and other waste management activities*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
6. Objectionable odour at site boundary not permitted	Monitoring inspections	Yes
7. Optional review provision	Consent expires June 2030- next review June 2024	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

Table 15 Summary of performance for consent 10671-1.1

Purpose: *To discharge piggery effluent onto land by spray irrigation*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Effluent discharge no more than allowable number of pig equivalents	Liaison with Company and review of Company records indicated that the piggery is carry less than consented (5,381 SPU equivalents) Actual 4,661 SPU equivalents	Yes
2. Minimisation of nutrient leaching to groundwater	Liaison with Company and review of records indicated more N and K was removed than discharge to land	Yes
3. No overflow of effluent from disposal system	Liaison with Company and inspection	Yes
4. Sufficient storage available in effluent storage ponds	Liaison with Company and Inspection	Yes
5. No effluent surface ponding exceeding 30 minutes	Monitoring Inspection	Yes
6. Sodium adsorption ratio of wastewater shall not exceed 15	Sampling and review of chemical parameters	Yes
7. Effluent applied in consented areas and away from dwellings/rivers	Monitoring Inspection	Yes
8. No spray drift beyond property boundary	Monitoring Inspection	Yes
9. The consent holder shall ensure that the effluent is discharged to at least 100 ha of land that is not grazed and that is planted in crops that are removed from the property	Liaison with Company and Inspection	No, discharged to only 84.04 ha of cut and carry land.
10. Total nitrogen applied on land will not exceed 400 kg in 12 month cut and carry areas, or 200 kg in 12 month pasture areas	Liaison with Company and review of records with estimate of loading from duplicate sample from effluent pond	Yes for both cut and carry and non-cut and carry areas.

Purpose: *To discharge piggery effluent onto land by spray irrigation*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
11. Total potassium applied on land will not exceed 300 kg in 12 month cut and carry areas, or 100 kg in 12 month pasture areas	Liaison with Company and review of records with estimate of loading from duplicate sample of effluent pond	Yes for both cut and carry and non-cut and carry areas.
12. Accurate records of applied effluent volume, rate, area, method, and type of crop grown	Liaison with Company	Yes
13. Consent exercised in accordance with Effluent Irrigation Management Plan	Liaison with Company and Inspection	Yes
14. Installation of three piezometers by 31 January 2020 for groundwater quality monitoring	Liaison with Company and Inspection	No, a proposal is currently being reviewed by Council
Overall assessment of consent compliance and environmental performance in respect of this consent		**Improvement required**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 16 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2019-2020	5251	1	-	-	-
	10671	-	-	1	-
2020-2021	5251	-	-	1	-
	10671	-	-	1	-
2021-2022	5251	1	-	-	-
	10671	-	-	1	-
Totals	-	2	-	4	-

During the year, the Company demonstrated a level of environmental performance that required improvement as consent 10671-1.1 received a rating of improvement required due to condition 14 remaining non-compliant. The Company demonstrated a high level of administrative performance. Appendix II defines categories used to evaluate environmental and administrative performance.

3.4 Recommendations from the 2020-2021 Annual Report

In the 2020-2021 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the Company site will remain unchanged from that undertaken in the 2020-2021 monitoring period. Three rounds of surface water monitoring will be completed.
2. THAT the Council review a proposal submitted by the Company. The result of the review will determine whether or not the original consent requirement; to install piezometers in three locations, be upheld.
3. The Company shall submit for a variation of consent 10671-1.1. To reduce the number of pigs allowed by the consent, to what is currently held on site. In doing so the Company will also submit, with supporting rationale, for a reduction in the cut and carry irrigation area requirement
4. THAT should there be issues with environmental or administrative performance in 2021-2022, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendation 1 was undertaken, however, not all surface water monitoring rounds were completed.

Recommendation 2 is ongoing and discussion will continue in the 2022-2023 monitoring period.

Recommendation 3 has not been submitted to council. Company operating significantly below SPU equivalents maximum value.

Recommendation 4 was achieved with the exception of the requirement for the installation of piezometers and effluent discharge to cut and carry land of over 100 ha. Monitoring will remain the same for the 2022-2023 period.

3.5 Alterations to monitoring programmes for 2022-2023

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

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

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

Planned changes for 2022-2023 monitoring programme include a review of the proposal submitted by the Company to assess whether it provides confidence to the Council that the removal of the piezometers from the consent will not cause adverse effects to groundwater. This assumes that the technology used by the Company will negate the piezometer requirement.

The Company shall submit for a variation of consent 10671-1.1 to reduce the number of pigs allowed by the consent to what is currently held on site. In doing so the Company will also submit, with supporting rationale, for a reduction in the cut and carry irrigation area requirement.

The monitoring programme will remain unchanged from that undertaken in the 2021-2022 monitoring period. Four rounds of surface water monitoring will be completed, along with three inspections and four effluent monitoring surveys.

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 2022-2023.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at the Company site will remain unchanged from that undertaken in the 2021-2022 monitoring period. Four rounds of surface water monitoring will be completed, along with, three inspections and four effluent monitoring surveys.
2. THAT the Council review a proposal submitted by the Company. The result of the review will determine whether or not the original consent requirement; to install piezometers in three locations, be upheld.
3. The Company shall submit for a variation of consent 10671-1.1 to reduce the number of pigs allowed by the consent, to what is currently held on site. In doing so the Company will also submit, with supporting rationale, for a reduction in the cut and carry irrigation area requirement.
4. THAT should there be issues with environmental or administrative performance in 2022-2023, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

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

Al*	Aluminium.
As*	Arsenic.
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 25°C and expressed in µS/cm.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DM	Dry matter.
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.
FNU	Formazin nephelometric units, a measure of the turbidity of water
Fresh	Elevated flow in a stream, such as after heavy rainfall.
$g/m^2/day$	grams/$metre^2$/day.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.

Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident register	The incident register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square Metres.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
MPN	Most Probable Number. A method used to estimate the concentration of viable microorganisms in a sample.
µS/cm	Microsiemens per centimetre.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM_{10}, $PM_{2.5}$, $PM_{1.0}$	Relatively fine airborne particles (less than 10 or 2.5 or 1.0 micrometre diameter, respectively).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act 1991* and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU or FNU.
Zn*	Zinc.

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

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

Bibliography and references

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agKnowledge. 2022. Report on 2021-22 Effluent Irrigation Management Plan for Stanley Bros Trust

Ministry for the Environment. 2018. Best Practice Guidelines for Compliance, Monitoring and Enforcement under the Resource Management Act 1991. Wellington: Ministry for the Environment.

Taranaki Regional Council (2021): *Stanley Bros Trust (Piggery) Monitoring Programme Annual Report 2020-2021*. Technical Report 2021-89.

Appendix I

Resource consents held by Stanley Bros Trust Piggery

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

Water abstraction permits

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

Water discharge permits

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

Air discharge permits

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

Discharges of wastes to land

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

Land use permits

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

Coastal permits

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

Taranaki Regional Council

Discharge Permit

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

Name of Consent Holder:	Stanley Bros Trust (Trustees: Ronald Thomas Stanley & Noel Henry Stanley) 4789A South Road RD 31 Opunake 4681
Decision Date	6 August 2019
Commencement Date	6 August 2019

Conditions of Consent

Consent Granted:	To discharge piggery effluent onto land by spray irrigation
Expiry Date:	1 June 2030
Review Date(s):	June 2021, June 2024, June 2027
Site Location:	24 Arawhata Road, Opunake
Grid Reference (NZTM)	1670475E-5637131N
Catchment:	Arawhata

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

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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 effluent discharged shall be from a piggery of no more than 5,381, 50 kg pig equivalents.

2. Notwithstanding the conditions of this consent, it shall be exercised in a manner that minimises the leaching of nutrients to groundwater.

3. There shall be no overflow of effluent from any part of the effluent disposal system.

4. The consent holder shall ensure that at all times, while complying with the other requirements of this consent, there is sufficient storage available in the effluent storage ponds for any reasonably likely inflow, so that there is no unauthorised discharge to land or water.

5. Discharges to land shall not result in effluent ponding on the surface that remains for more than 30 minutes.

6. The sodium adsorption ratio of the wastewater shall not exceed 15.

7. No effluent shall be applied to land less than:
   a. 25 metres from the water's edge in any watercourse
   b. 50 metres from any bore, well or spring actively used for water supply purposes; or
   c. 150 metres from any dwelling house unless the written approval of the occupier has been obtained to allow discharge at a closer distance.

8. There shall be no spray drift, as a result of the irrigation of treated wastewater, at or beyond the property boundary.

9. The consent holder shall ensure that the effluent is discharged to at least 100 hectares of land that is not grazed and that is planted in crops that are removed from the property i.e. a 'cut and carry' operation. It may also be applied and additional areas that are grazed.

10. The Total Nitrogen applied to any hectare of land shall not exceed:
    (a) 400 kilograms in any 12-month period for 'cut and carry areas'; or
    (b) 200 kilograms in any 12-month period for any other land (including grazed pasture).

11. The total Potassium applied to any hectare of land shall not exceed:

    (a) 300 kilograms in any 12-month period for 'cut and carry areas'; or
    (b) 100 kilograms in any 12-month period for any other land (including grazed pasture).

12. The consent holder shall keep accurate records of effluent application to land, including as a minimum, the:

    a. volume of effluent applied;
    b. rate and time of application;
    c. area (ha) that the effluent was applied to;
    d. method of irrigation; and
    e. type of crop that is grown on that land.

    This information shall be provided to the Taranaki Regional Council annually during the month of July and at other times when requested.

13. From 1 November 2019, this consent shall be exercised in accordance with an Effluent Irrigation Management Plan ('EIMP') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The EIMP shall detail how effluent irrigation is managed to minimise nutrient leaching to groundwater. The EIMP shall include as a minimum, details of:

    (a) management of the cut and carry operation
    (b) evapotranspiration and available water holding capacity of the soil(s) over the irrigated area;
    (c) how irrigation will be scheduled to maximise the benefits of evapotranspiration and minimise subsurface drainage;
    (d) how effluent is to be applied as uniformly as practicable over the irrigated area, and the uniformity of application demonstrated;
    (e) the designated application areas and buffer zones for streams and the property boundary; and
    (f) the determination of total Nitrogen and Potassium in effluent.

14. Before 31 January 2020 the consent holder shall after consultation with the Chief Executive, Taranaki Regional Council, install a minimum of three piezometers. The piezometers 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 piezometers shall be installed in accordance with NZS 4411:2001 and all associated costs shall be met by the consent holder.

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 2021 and at 3-yearly intervals thereafter, for the purpose 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
    (b) addressing any significant increases in the concentration of nutrients in the groundwater.

Signed at Stratford on 6 August 2019

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Taranaki Regional Council

Discharge Permit

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

Name of Consent Holder:	Stanley Bros Trust (Trustees: Ronald Thomas Stanley & Noel Henry Stanley) 4789A South Road RD 31 Opunake 4681	
Decision Date (Change):	6 August 2019	
Commencement Date (Change):	6 August 2019	(Granted Date: 12 September 2012)

Conditions of Consent

Consent Granted:	To discharge emissions into the air from a pig farming operation and associated practices including effluent treatment and other waste management activities
Expiry Date:	1 June 2030
Review Date(s):	June 2024
Site Location:	24 Arawhata Road, Opunake
Grid Reference (NZTM)	1670475E-5637131N

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

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www.facebook.com/TaranakiRegionalCouncil twitter.com/TaranakiRC

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 maximum number of pigs on the property, at any one time, shall not exceed 5,000 pigs (or 5,381, 50 kg pig equivalents).

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

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

4. The consent holder shall minimise the emissions and impacts of air 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) the proper and effective operation, supervision, maintenance and control of all equipment and processes; and
   e) the proper care of all pigs on the site.

5. The consent holder shall, at all times, operate the piggery and associated activities in accordance with the information provided in support of the original application and any subsequent application to change the conditions to this consent, except as otherwise required or directed by the conditions set out in this resource consent.

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

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 2018 and/or June 2024 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 6 August 2019

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

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

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

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

Appendix III

Company provided annual report

agKnowledge
"The Independent Fertiliser Experts"

Annual Effluent Irrigation Management Plan 2021-22

For

Stanley Bros Trust

July 2022

agKnowledge
"The Independent Fertiliser Experts"

agKnowledge
"The Independent Fertiliser Experts"

Brief

Stanley Bros Trust have asked agKnowledge Ltd to update their Effluent Irrigation Management Plan (EIMP) for the Taranaki Regional Council (TRC). This EIMP is required to meet the discharge consent conditions (Consent 10671-1.1) for the July 1, 2021 to June 30, 2022 period.

Discharge Consent Conditions

The specific discharge consent conditions required by the TRC relating to effluent applications to land on this property are as follows:

Clause 12. The consent holder shall keep accurate records of effluent application to land, including as a minimum, the:

a. volume of effluent applied;
b. rate and time of application;
c. area (ha) that the effluent was applied to;
d. method of irrigation; and
e. type of crop that is grown on that land.

In addition, information was also requested on:

f. the determination of total Nitrogen and Potassium in effluent,
g. to provide effluent monitoring data to determine the loading of nitrogen and potassium across the irrigation areas?
h. pig numbers for the year.

Each of these points will be addressed but not in the order presented above.

Pig numbers for the year

TRC Special Condition 1 (Consent 5251-2.2) states that the number of pigs on the property, at any one time, shall not exceed 5,000 pigs (or 5,381, 50 kg pig equivalents).

The total number of pigs, by class and average liveweight (LWT) is shown below (Table 1). The 50 kg LWT Standard Pig Unit (SPU) has been derived from the total LWT carried.

Table 1: Pig inventory for 2021/22.

Pig Class	Pig Numbers	Average LWT (kg)	Total LWT (kg)	SPU equivalents
Sows	351	162	56,862	1,137
Gilts	79	150	11,850	237
Boars	4	162	648	13
Light Pork	1,354	70	94,780	1,896
Store Pigs	832	44	36,608	732
Weaners	1,202	25	30,050	601
Total			**230,798**	**4,616**

The number of SPUs carried by the Stanley Bros Piggery is 14% below the consented number.

Effluent Applications

a) Volume of effluent applied

The total volume of effluent applied from the Piggery during 2021/22 was 626mm. Details of application depths, timing of applications and receiving blocks are set out below.

b) Rate and time of application

Table 2: Irrigations per month and effluent volumes applied.

Month	Irrigations per month (days)	Effluent volumes applied (mm)
July 2021	18	59.0
August	37 [1]	105.5
September	17	40.0
October	14	53.2
November	12	68.7
December	0	0
January 2022	25	78.1
February	11	24.7
March	35 [1]	73.9
April	14	32.1
May	10	50.7
June	33 [1]	40.3

[1] Multiple irrigation delivery systems operating.

c) Area (ha) that effluent is applied to

For effluent application purposes, the farm is divided into six blocks, totalling ~105 ha. The average annual effluent volumes applied to these blocks is shown in Table 3. The average annual application depth for 2021/22 was 21.7mm.

Table 3: Block areas and annual effluent volumes applied.

Farm Block	Effective Area (ha)	Effluent volume applied (mm)
Main Road	7.7	18.3
Arawhata	20.8	17.4
Centre	25.3	32.8
Ron's	17.6	23.1
Sand Dunes	23.8	20.5
Cliff Tops	9.9	18.3

d) Method of irrigation

The effluent flushed from the Piggery is pumped to a storage pond prior to land application. Three different delivery systems were used during 2021/22:

1) Dribble bar - main method of effluent application, depths applied (~3mm).
2) 'Weta' travelling rain gun – used to apply effluent to the Sand Dunes Block at 8mm depths during 8 months of the year.
3) Slurry tanker – used for applying effluent (~8mm) at strategic times of the year to minimise odour to the areas beside the South Road and close to houses, as well as at the back of the farm along Arawhata Road, that is also close to a neighbours' house. The total area applied was ~11.5ha.

e) Total Nitrogen and Potassium in effluent

Four effluent samples were collected during the 2021/22 period for chemical analysis. These results have been combined with the previous samples collected during 2020/21 to determine the mean nitrogen and potassium concentrations in the piggery effluent (Table 4). The highest nutrient concentrations were in the April when the pond level was at its lowest.

Table 4: Mean nutrient composition of piggery effluent (n=9) plus 95% Confidence Interval (C.I.).

Nutrients in Piggery Effluent	Mean (g/m3)	95% C.I. (g/m3)
Nitrogen	733	104
Phosphorus	176	71[1]
Potassium	281	15
Calcium	683	1053[1]
Magnesium	88	61[1]
Sodium	85	11

[1] One sampling (April 2021) had outlier values for P, Ca & Mg; e.g., Ca values normally ranged between 89-124, but were 4,000 at the April sampling.

f) Type of crops grown

Two crops, maize silage and permanent pasture, were grown under the Cut and Carry system in 2021/22.

The maize silage paddocks (37.2 ha) were cultivated and planted in October, then harvested in March, yielding around 22.6 tonnes DM/ha. An annual ryegrass was then planted as a cover crop, over the cooler/wetter months, and harvested as grass silage in late September/early October yielding ~4.3 tonnes DM/ha. A 12 ha part of the Centre Block was not planted in the annual grass as this paddock had just had a first season maize crop harvested from it.

On the rest of the farm, except for the Sand Dunes Block, pasture was mown, with the earlier crops removed as haylage (691 bales) and the later crops removed as hay (768 bales).

g) Management of cut and carry operation

The feed grown on-farm and then sold off-farm, for 2021/22, was as follows (Table 5).

Table 5: Dry matter yields of Cut and Carry crops.

Harvested Feed	Feed Amount	Average DM Yield	DM removed (tonnes)
Maize silage	37.2 ha	22,640 kg/ha	841
Grass silage	25 ha	4,310 kg/ha	108
Hay (15's)	768 bales	300 kg/bale [1]	270
Haylage (15's)	691 bales	300 kg/bale [2]	204

[1 & 2] Feed Supplement data from Beef+LambNZ Factsheet (2017)

Composite maize silage feed samples of each block were collected and analysed by Hill Laboratories so that nutrient uptake and removal off-farm could be calculated (Table 6).

Table 6: Nitrogen & potassium concentrations and total N and K removed in the Cut and Carry system.

Harvested Feed	N (% in DM)[1]	K (% in DM)[1]	N uptake (kg)	K uptake (kg)
Maize silage	1.23	1.03	10,344	8,662
Grass silage	1.70	2.80	1,836	3,024
Hay (15's)	1.60	1.60	4,320	4,320
Haylage (15's)	1.80	2.50	3,672	5,100

In total, 20,172 and 21,106 kg's of N and K respectively were removed off-farm in the harvested feed.

Nutrient Management

The resource consent also includes special conditions for nutrient management viz:

Special condition 10. The Total Nitrogen applied to any hectare of land shall not exceed: (a) 400 kilograms in any 12-month period for 'cut and carry areas'; or (b) 200 kilograms in any 12-month period for any other land (including grazed pasture).

Special Condition 11. The total Potassium applied to any hectare of land shall not exceed: (a) 300 kilograms in any 12-month period for 'cut and carry areas'; or (b) 100 kilograms in any 12-month period for any other land (including grazed pasture).

Maize Silage and Grass Silage

Piggery effluent was applied to the maize silage areas at an average application depth of 29mm supplying 215 kg N/ha and 82 kg K/ha; fertiliser N (100 kg N/ha) was also applied at the sowing of the maize and for the annual ryegrass (Table 8). No potassium fertiliser was applied.

Permanent Pasture

The total nutrients for the Hay and Haylage Cut and Carry crops were applied solely as piggery effluent and calculated to be 51 kg N/ha and 20 kg K/ha (Table 7).

Nutrient balance

Table 7 summarises the nutrient inputs and outputs for the Cut and Carry operations.

Table 7: Summary of nutrient inputs and outputs (kg/ha).

Cut & Carry Crops	Area (ha)	Inputs		Outputs	
		N	K	N	K
Maize silage & annual grass	37.2	315	82	278	233
Hay & haylage	74.5	51	20	107	126

The N and K inputs applied were below the consented maximum limits for the Cut and Carry operation.

Soil tests

Soil samples have been collected (0-15cm depth) and analysed for available mineral N and Quick Test K. Results from 2018 to 2022 are presented in Table 8 and show there has been no accumulation of N and K in these soils, given normal variability.

Table 8: Average nitrogen & potassium concentrations in soils since 2018.

Soil analysis (0-15 cm)	**2018** (n=4)	**2020** (n=5)	**2021** (n=5)	**2022** (n=4)
Available nitrogen (kg/ha)	206	192	194	192
Potassium (MAF QT units)	8	7	8	12

Livestock

A number of dry stock animals are carried on the farm to control pastures both inside and outside the Cut and Carry areas. Note that the Sand Dunes block receives effluent but is solely grazed by livestock. Table 9 summarises the number of animals and their duration on the property during 2021/22.

Table 9: Livestock carried on-farm during 2021-22.

Stock Class	**Number carried**	**Average LWT (kg)**	**Total LWT (kg)**	**Time on Farm (months)**
R1 heifers	156	185	28,860	11
Winter grazers	176	425	74,800	1
Total			**103,660**	

Bob Longhurst & Dr Doug Edmeades
14 July, 2022