



# pricemerrett

C O N S U L T I N G

## BRM Feed Lot Management Plan

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SURVEYING  
ENGINEERING  
IRRIGATION  
PROJECT  
MANAGEMENT

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### Project Details

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PMC Project Reference	F8285

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## 1.0 Introduction

Price Merrett Consulting Pty Ltd (PMC) was engaged by Ben & Rennae McInnes to provide planning and engineering input into the Management report for their application for Intensive Animal Production for their properties at Gunbower. This Report is provided in support of the Planning Permit Application to the Campaspe Shire

This Management report supports an intensive animal production facility consisting of one main feedlot area and a supporting grazing property located approximately 4km from Gunbower. As the total development is under 1000 head of cattle, formal land use approval is not required, only council approval to support that the requirements of the Victorian Grazing and Intensive Animal Production Guidelines are being met. Within this the Victorian Code for Cattle Feedlots 1995 is referred to as a best practice documents to assist in the presentation of the relevant aspects of the enterprise.

At 57 Gibbons Road up to 300 head of cattle occupy the feedlot. Additional cattle are also supplementary fed in the paddocks adjoining the feedlot under an intensive animal production situation and under strict observation and management.

At the 462 Richards Road site 600 head of cattle are fed at this site with grazing and supplementary feeding where the protein in their diet is gradually increased. These cattle are then fattened in the feedlot on a higher protein diet to reach the desired 400kg for 60 days before being sold to other feedlots as store cattle. This site is considered Grazing Animal production and is a Section 1 land use therefore a permit is not required.

The manager also has paddocks available for cattle grazing at Patho where cattle are rotated between the three sites depending on pasture availability and management requirements across the properties.

## 1.1 Background

In 2006 an application was submitted to the Department of Primary Industries under the Stock Containment Works project to seek financial incentives to establish a stock containment area to minimise soil impacts of 815Ha of farm land at the dairy site at 462 Richards Road. The pens were designed for 400 head of cattle at 57 Gibbon Road. Over the last 15 years, this area has continued its use as a cattle standoff area, gradually evolving from the original intention of a stock containment area to mitigate seasonal conditions to a cattle fattening/feedlot area in early 2012, complimentary to the dairy business. Later in 2017-18, after a complaint in regards to the manure waste being spilt on the road, Campaspe Shire has requested the need for approval be sought for compliance (EPIn100/2016).

Campaspe Shire has requested the application for compliance under the Grazing and Intensive Animal Production Guidelines and this amended application has been prepared due to the change in strategies that have been recently implemented in order to control odour and dust issues.

The properties are located at:

- 57 Gibbon Road Gunbower- Lots 42 –E\PP3378
- 462 Richards Road Gunbower- Lots 45, 46, 47, 48-E\PP3378

**BRM Farms is seeking approval for the use of Intensive Animal Production for the farm at 57 Gibbons Road. See Figures 2 & 3 for land use areas.**

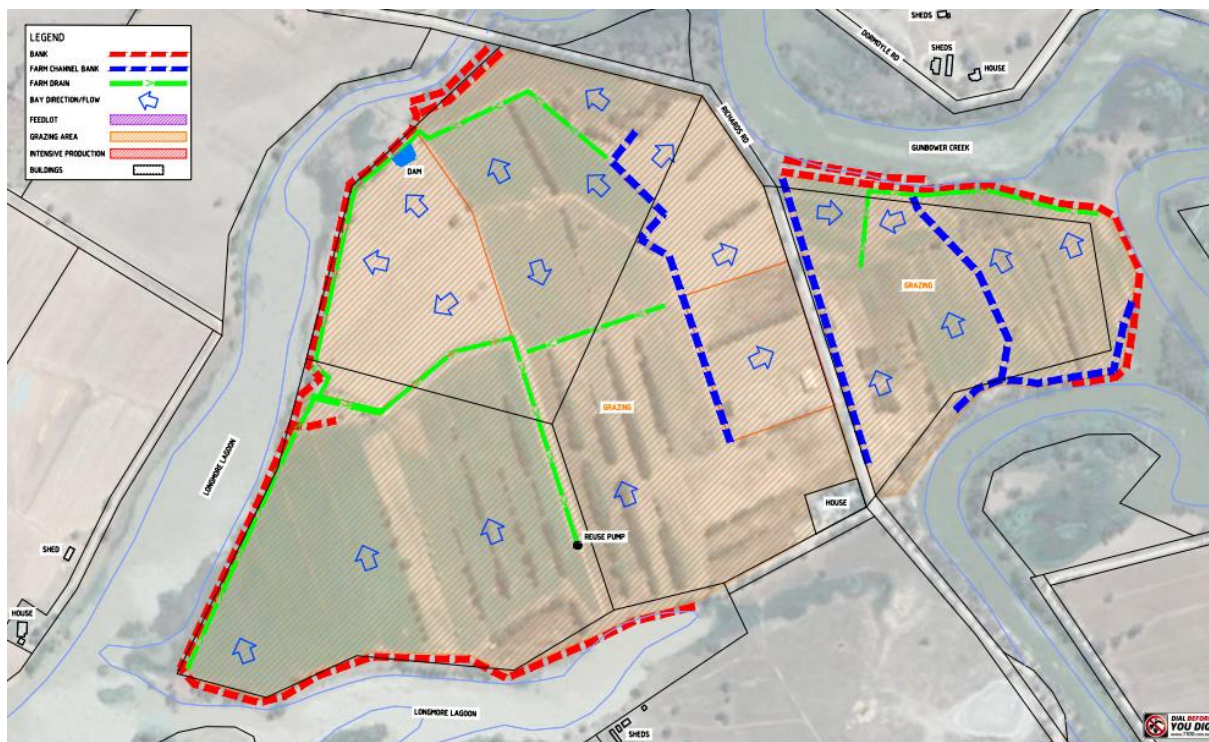
Under the Intensive Animal Production Guidelines:

*A planning permit is not required to use land for a cattle feedlot with up to 1000 cattle in the Farming Zone and Rural Activity Zone. However, the use must still comply with the requirements of the Victorian Code for Cattle Feedlots (1995) to the satisfaction of the responsible authority, and meet other conditions specified in the zones.*



**Figure 1: McInnes properties Study Area**

**Figure 2: Intensive Animal Production area – Gibbons Road**



## 1.2 Summary of Application

BRM Farms are seeking compliance under the Intensive Animal Production Guidelines.

Address	Land use		Cattle Numbers
57 Gibbon Road Gunbower	Intensive Animal Production	Feedlot	300
		Paddocks	variable
462 Richards Road Gunbower	Grazing Animal Production		600
Patho Properties	Grazing Animal Production		variable

The cattle numbers at Gibbons Road depend on feed availability. No more than 300 will be in the feedlot pens at any time and animal grazing will occupy the adjacent paddocks when feed is available. Supplementary feeding from moveable feeders will also be utilised to support animal diets. Rotational utilisation of space between the properties at Patho will also ensure pressure will be taken away from Gibbons Road site.

Overgrazing is to be avoided at Gibbons Road Farm to ensure dust and odour impacts are kept to a minimum. Cattle should be regularly directed to the Patho site to further minimise pressure on the environmental elements imposed at the Gibbons Road Farm.

## 2.0 Environmental Elements

### 2.1 Climate

Station number 80020

#### Summary statistics for all years

Move mouse over highest daily rainfall to view dates.

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	27.2	25.0	24.3	25.2	34.9	35.0	36.0	38.1	35.6	35.3	28.0	26.9
Median	21.4	11.7	15.5	19.8	31.4	30.0	33.4	35.0	30.2	24.5	22.0	16.6
Highest Daily	72.4	65.5	97.0	56.1	49.0	47.0	43.9	40.6	42.2	98.2	79.0	73.2

<b>Average annual rainfall:</b>	386mm
<b>Direction of prevailing winds:</b>	North-east summer South-west winter

### 2.2 Land Subject to Inundation Overlay

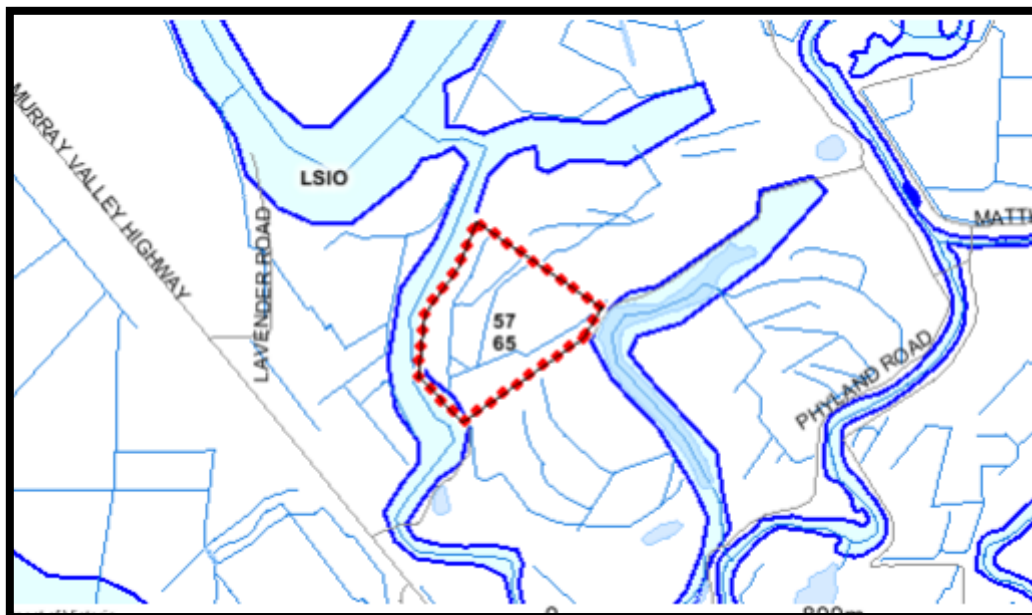


Figure 4: 57 Gibbon Road- LSIO

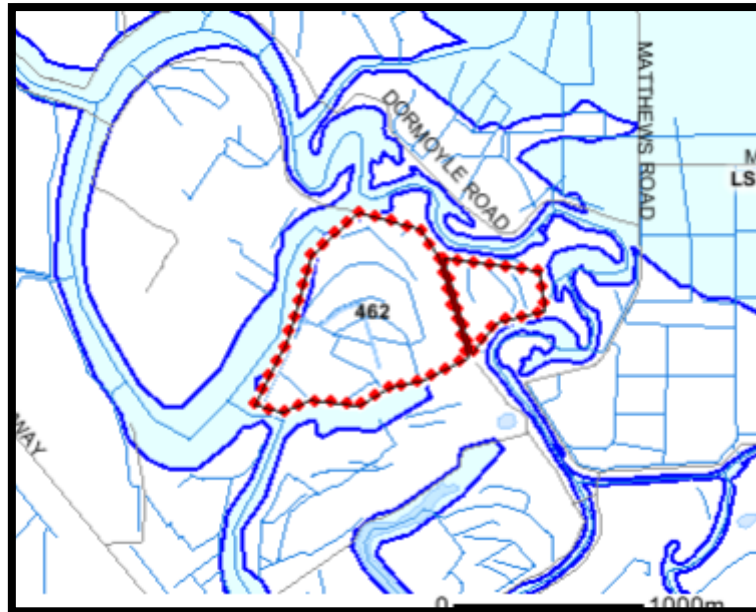


Figure 5: 462 Richards Road- LSIO

The LSIO is applied to ensure that development maintains or improves river and wetland health, waterway protection and flood plain health. The planning report shows that the LSIO follows the waterways and Lagoons adjacent to the property boundary. As such, the provision for no runoff to enter these waterways is required.

### 2.3 Topography

The land has been cleared and levelled for irrigation with the overall slope being from the west to the east. Site for both properties is considered flat overall.

### 2.4 Vegetation

Some areas on **both** properties may be sown to oats for grazing depending on seasonal conditions. Hay production during spring sees grass and cereal crop species planted and converted to hay during this season.

Trees are scattered across the property, with remnant trees and understory species forming roadside vegetation. For the calculation of the vegetation factor (S4), no tree cover was assumed for calculations for setbacks in regards to the feedlot at Gibbons road.

North Central Catchment Management Authority indicates the bioregion as Plains woodland.

### 2.5 Wind speed and direction

The predominant wind directions as shown in Figure 14 indicate potential direction of receptors for dust and odour. The southerly direction indicates that properties to the north of the feedlot would face increased exposure to dust and odour over other properties in the vicinity.

## Wind speed and direction rose

Product ID code: IDCJCM0021

Location: HAY (MILLER STREET)

Latitude: 34.52°S

Period: 9am Annual

Download: [PDF](#) | [Wind Frequency Data](#)

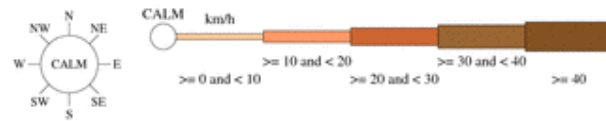
Longitude: 144.85°E

Start year: 1957

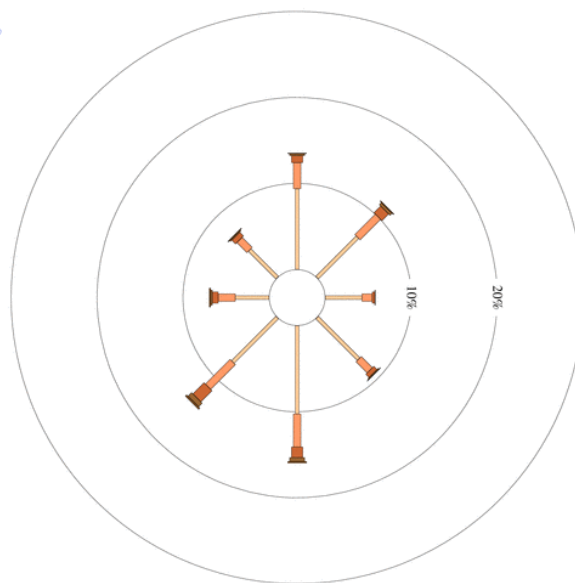
Site Number: 075031

Elevation: 93 metres (above sea level)

End year: 2015



9 am  
20691 Total Observations  
Calm 16%



**Figure 6: Wind directions- Bureau of Meteorology**

Wind directions are divided into eight compass directions. The circles around the image represent the various percentages of occurrences of the winds. For example, if the branch to the west just reaches the 10% ring it means a frequency of 10% blowing from that direction. The scale factor can be ignored when interpreting these wind roses. An observed wind speed which falls precisely on the boundary between two divisions will be included in the lower range (eg 10km/h is included in the 1-10 km/h range). Calm has no direction (Bureau of Meteorology).

## 2.6 Water

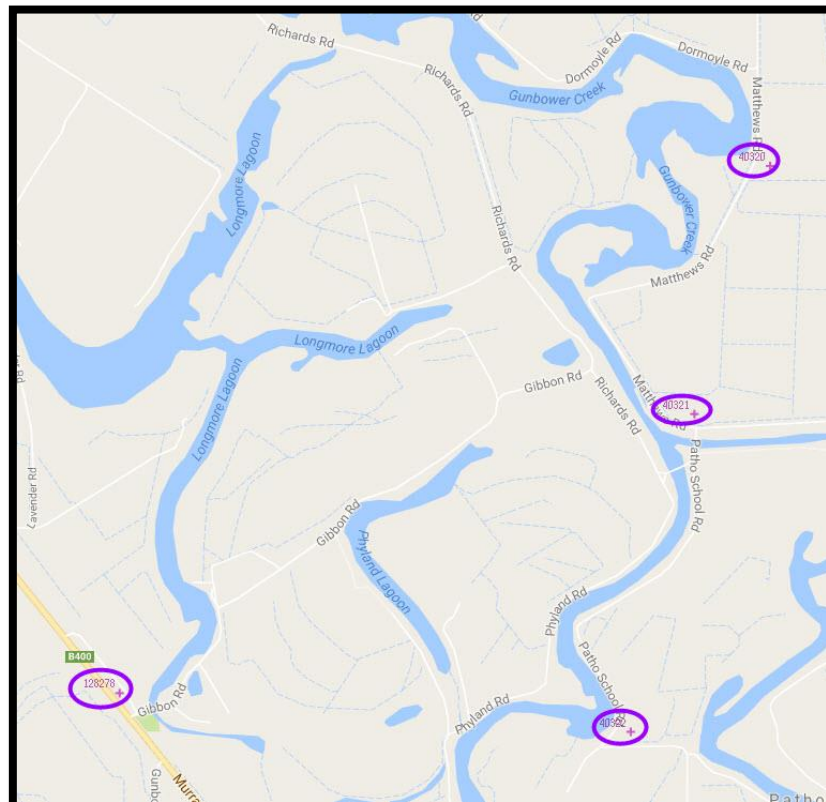
Lagoons are highly regulated as part of the Torrumbarry Irrigation District. Currently limited pasture paddocks are irrigated depending on seasonality. Water supply is adequate for cattle needs in peak times.

Sprinkler system for dust control is installed and used on a need only basis in exceptional dry weather circumstances, as over use can lead to poor cattle health.

## 2.7 Ground Water Information

The DELWP Water Measurement Information System indicates that the water-table in the area is between 2.5m and 5m below the natural surface. The closest monitored groundwater sites are along the Gunbower Creek and on the Murray Valley Highway.

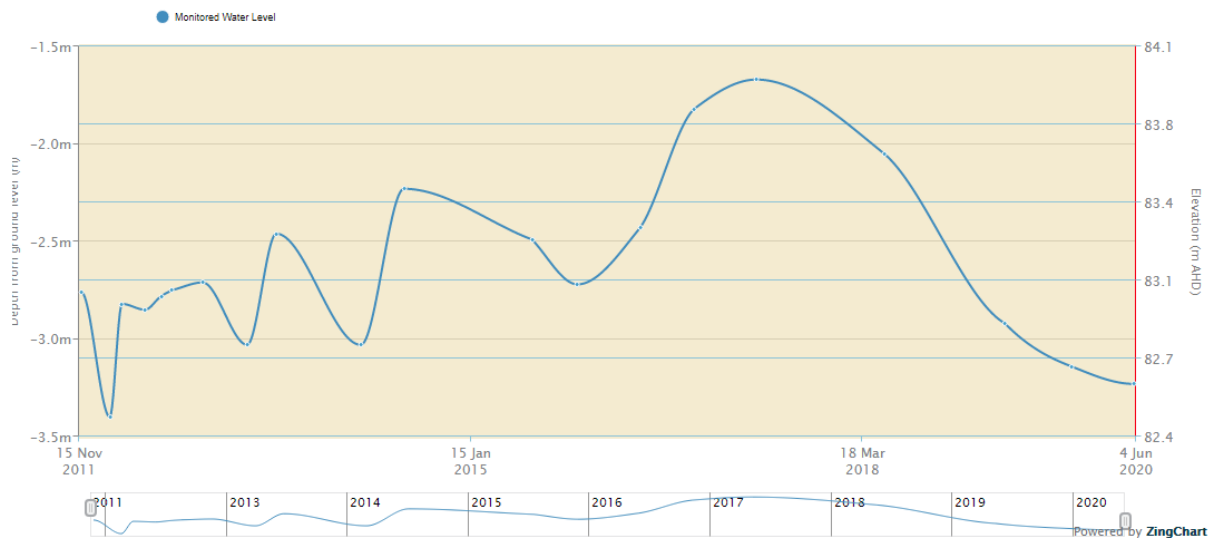
Bore data in the area of the Gibbons Road and Patho paddocks indicate that groundwater levels are in the region of >3m from the surface. (Bore ID:128278 Visualising Victoria's Groundwater website). There are a limited number of actively monitored bores in the immediate area.



**Figure 7: Ground water**

The feedlot is not in a declared catchment area, nor is it within 800m of a supply take-off for potable water, as determined by the Code of Practice for feedlots in Victoria.

Monitoring for bore: 128278



**Figure 8: Bore Data -128278 (2011-2020)**

Bore data indicates water table is currently at >3m.

## 2.8 Longmore Lagoon

Longmore Lagoon is a large, relatively shallow (average depth <2 metres) natural backwater of Gunbower Creek comprising two half-circular meanders connected by a narrow channel. The eastern meander is narrower with steeper banks whilst the western meander is wider and shallower. The lagoon is connected to Gunbower Creek through two regulating structures at each end of the western channel (North Central CMA, 2013b).

GMW also conducts regular water quality monitoring (i.e. parameters listed above) at key locations in the creek as well as Blue Green Algae (BGA) counts at Cockatoo, Gum, Turner, Splatts, Upper Gunbower, Longmore and Taylor's lagoons. Coliban Water also measures these parameters as well as alkalinity, arsenic, cyanide, iron, lead, manganese, mercury, nickel, sodium, tin, total organic carbon, zinc and colour of raw water prior to treatment at the Cohuna Water Treatment Plant (i.e. potable water supply).

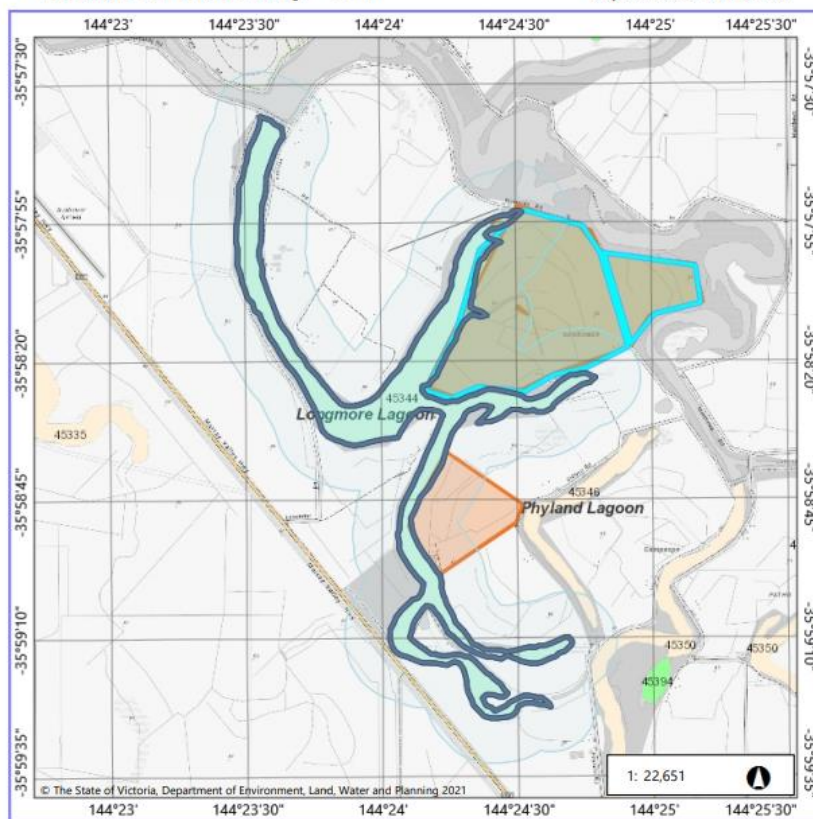
The Gibbons Road feedlot considered for Intensive animal production has fencing in place to prevent cattle from accessing the waterways. Further to this, the re-use system prevents runoff water from entering the waterways.

A 30-metre buffer is recommended from the identified wetlands where no works should occur.

Feeders and hay rings should be located 100m from the waterway and moved regularly.

# Wetland Base Map Map

Map Created on 10-Mar-2021



Wetland Name : Longmore Lagoon

Wetland Number : 45344

Figure 9: Wetland Base Map

## 2.9 Flooding Potential

According to NCCMA potential flood levels in a 1% AEP are restricted to the creek and lagoon alignments and no overland flow is expected. The presence of constructed banks around the perimeter of the property would prevent flooding. See supplied Site Plans.



**Figure 10: Photo showing bank and fencing**

A re-use system is incorporated into the irrigation development and contains all runoff from the farm across both properties.

As flood levels for the 1% AEP probability (100 year ARI) have not been determined for this area under the Water Act 1989 according to North Central Catchment Management Authorities.

Internal drainage for the site is designed to hold runoff from the site from storm events up to and including the 10% AEP storm event. See Waste Management Plan

There are constructed banks erected to prevent the inflow of runoff from the farm entering the waterways. In a 1% AEP and above if the NCCMA consider the site to flood, extensive flooding on a regional level will potentially be experienced. Internal drainage for the site is designed to hold runoff from the site from storm events up to and including the 10% AEP storm event.

The constructed banks along the edge of the lagoons at both farms are designed to keep all runoff within the property boundary and an internal drainage network directs the water to reuse storage dams. Survey shows that bank levels are approximately 0.2m higher than the surrounding farmland and will potentially keep floodwaters out. The 1% AEP flood level for this area is yet to be determined therefore the effectiveness of these banks is difficult to ascertain, as well as the potential from overland inundation. The Land manager confirmed that the property did not experience overland flooding or overbank flooding from the Lagoons or the Gunbower Creek during the 2016 flood event.

Consultation with the NCCMA (June 2020) has advised the following:

*North Central CMA would not object in principle to the construction of a feed lot at the location described above, however before it could give its formal consent plans of the proposed feed lot must be submitted for approval. The plans must outline how the following minimum conditions are to be achieved:*

- 1. All buildings and works must be set back a minimum of 100 metres from the top of bank of the waterway.*
- 2. No runoff from the site may be permitted to enter any designated waterway. Prior to the commencement of works, detailed engineering plans and computations must be supplied to the North Central CMA that demonstrates the following:*
  - i. The internal drains and dam(s) must be designed to hold runoff from the site from storm events up to and including the 10% AEP storm event.*

### 3.0 Location and Size

The feedlot area at 57 Gibbon Road will contain 300 head of cattle which are grown out to approximately 400kg, being held in 10 pens where their entire diet is provided from outside the pen. Additional cattle will have access to the paddocks adjoining the feedlot when required and can be fed intensively.

At 462 Richards Road cattle have access to grazing with the majority of their high protein diet being supplemented. Up to 600 cattle are fed here depending on seasonality and management requirements. As this is considered grazing a permit is not required as a Section 1 use in the Campaspe shire Planning Schemes. However it has been referenced in the Management Plan as cattle will inhabit both the intensive feedlot and the grazing environments in their time they are kept at BRM Farms, and the sites close association to the local environment and conditions. See Appendix 3 for Plans of the existing drainage and land use.

Grazing properties are also accessible for cattle at the site, to the east at Patho. As cattle are grazed at this site they are not included in this Intensive animal production application.

Cattle numbers fluctuate regularly as cattle are monitored and located to the section of the farm with the feeding regime which is best suited to their stage of growth and what best suit their needs, and available markets.

#### 3.1 Separation Distances & Number of Standard Cattle Units

The management of cattle at 57 Gibbon Road potentially imposes on the community issues with odour and dust. As a means to control the impact of these on nearby residents, separation distances can be applied using the formula set out below from the Performance Standard provided in the Victorian Code for Cattle Feedlots.

In addition to the Code, the Guidelines for Victorian Feed-pads and Free-stalls recommends separation distances from sensitive receptors and has determined minimum distances to the proximity of the receptor to the odour producing source. See table below. These distances relate to the proximity of the effluent pond and the features at the existing site.

Gunbower Township is approximately 3.2 km away from site and is not considered to be impacted by odour issues from the intensive animal production area.

Setbacks according to the Guidelines for Victorian Dairy Feedpads and Free stalls and the VCCF											
Guideline	57 Gibbon Road										
<b>Effluent ponds:</b> <ul style="list-style-type: none"> <li>• 300 metres from a neighbouring house</li> <li>• 50 metres from the property boundary</li> <li>• 60 metres from irrigation channels and drains (required by Goulburn Murray Water)</li> <li>• 1 metre above the highest seasonal water table .</li> </ul>	<ul style="list-style-type: none"> <li>• Highest seasonal water table reading is 1.7m below surface.</li> <li>• 60m from boundary</li> <li>• Effluent Pond to sensitive receptors: Neighbouring Houses <ul style="list-style-type: none"> <li>○ 18 Lavender Road – 360m</li> <li>○ 106 Gibbon Road - 350m</li> <li>○ 133 Gibbon Road – 540m</li> </ul> </li> </ul>										
<b>Distance from land application of liquid wastes to:</b> <table> <tr> <td>Site boundary</td><td>20m</td></tr> <tr> <td>Public area</td><td>100m</td></tr> <tr> <td>Watercourse bore or spring</td><td>100m</td></tr> <tr> <td>Off-site residence</td><td>200m</td></tr> <tr> <td>Flood prone land</td><td>200m</td></tr> </table>	Site boundary	20m	Public area	100m	Watercourse bore or spring	100m	Off-site residence	200m	Flood prone land	200m	20m  100m >312m
Site boundary	20m										
Public area	100m										
Watercourse bore or spring	100m										
Off-site residence	200m										
Flood prone land	200m										
<b>Distance from solid waste spreading areas to:</b> <table> <tr> <td>Site boundary</td><td>20m</td></tr> <tr> <td>Public area</td><td>100m</td></tr> <tr> <td>Watercourse, bore spring</td><td>200m</td></tr> <tr> <td>Off-site residence</td><td>200m</td></tr> <tr> <td>Flood prone land</td><td>200m</td></tr> </table>	Site boundary	20m	Public area	100m	Watercourse, bore spring	200m	Off-site residence	200m	Flood prone land	200m	NA – no solid waste spread onsite
Site boundary	20m										
Public area	100m										
Watercourse, bore spring	200m										
Off-site residence	200m										
Flood prone land	200m										
<b>Distance from feedlot works areas to:</b> <table> <tr> <td>Calculated setbacks</td><td>312m</td></tr> <tr> <td>Waterway</td><td>200m</td></tr> <tr> <td>Boundary</td><td>50m</td></tr> </table>	Calculated setbacks	312m	Waterway	200m	Boundary	50m	<ul style="list-style-type: none"> <li>• 18 Lavender Road – 450m</li> <li>• 106 Gibbon Road - 332m</li> <li>• 133 Gibbon Road – 560m</li> </ul> 120m 25m				
Calculated setbacks	312m										
Waterway	200m										
Boundary	50m										
<b>Distance of feeders and hay rings to waterway:</b> <table> <tr> <td></td><td>100m</td></tr> </table>		100m	>100m Achievable								
	100m										

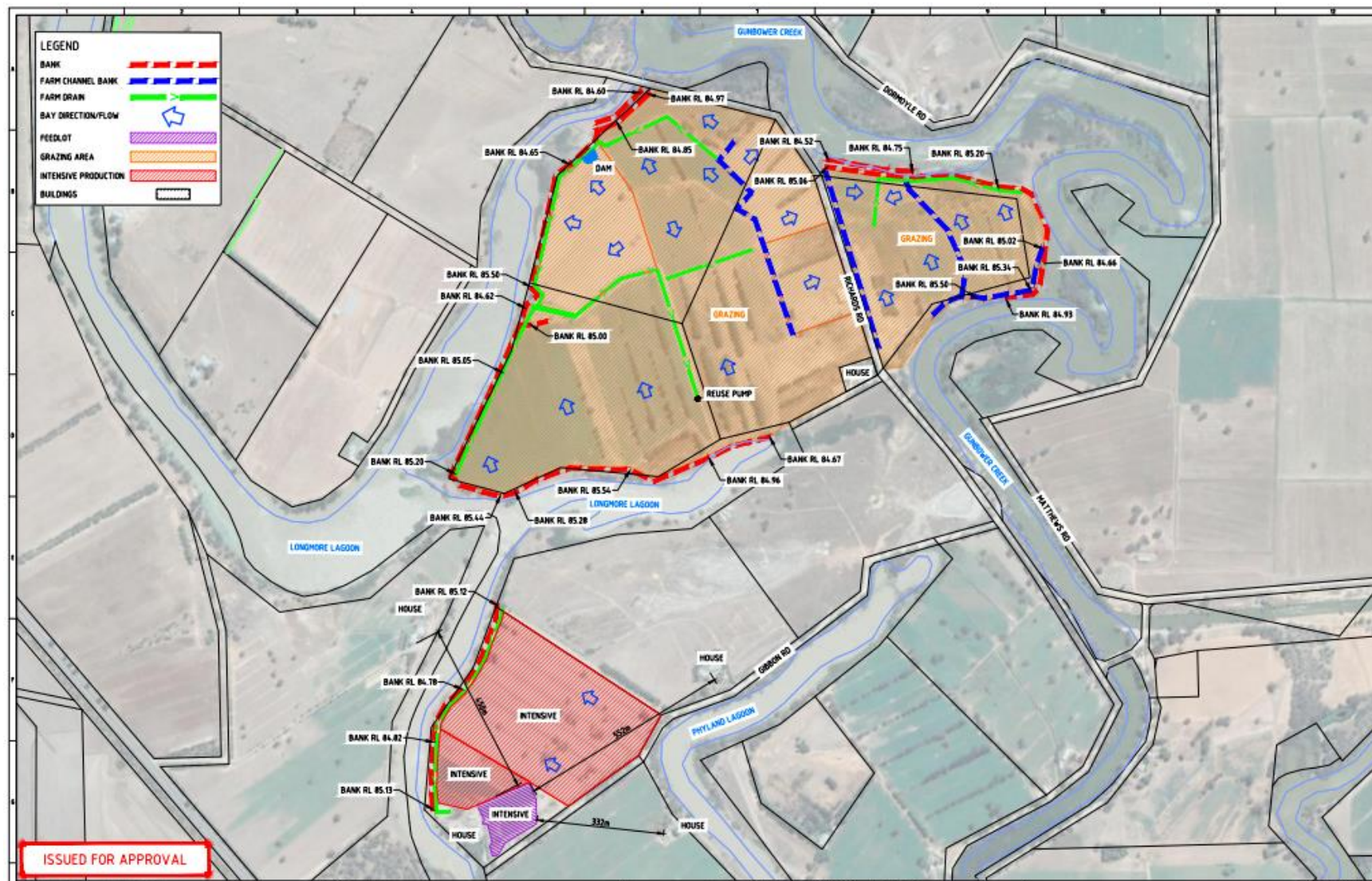


Figure 11: Site Plan

### 3.1.1 Effluent pond separation distances

Figure 4 (below) shows the distances from the effluent pond to the sensitive receptors:

- 18 Lavender Road
- 106 Gibbon Road
- 133 Gibbon Road

These are private dwellings and can all potentially be impacted by the Feedlot area through odour and dust. Setback distances are the most effective way to control the negative impacts of such developments. The guideline recommends 300m as suitable from the effluent pond, according to the Guidelines for Victorian Dairy Feedpads and Free stalls. The effluent pond only contains stormwater runoff as no pen wash down is carried out, and operates basically as an evaporation pond.



Figure 12: Distance to sensitive receptor from effluent pond

### 3.1.2 Feedlot Separation Distances

As the Victorian Code for Cattle Feedlots 1995 offers best practice guidelines for this application, the Code adopts the use of Standard Cattle Units (SCU) so as to compare feedlots and incorporate different size cattle and turnout weights.

The pens are graded, compacted and well managed. The Standard Cattle Units (SCU) allows feedlots to be compared on a similar basis. A conversion factor allows adjustments in the cattle numbers of head a feedlot can carry where stock produced are heavier or lighter than the reference weight of 600kg ie. 1

SCU = 1 x 600kg beast. A conversion factor of 0.74 is adapted to the 400kg beast which is generally turned off this farm.

Therefore the revised operation of 300 head of cattle in the feedlot with an approximate turnout weight of 400kg is  $(0.74 \times 300) = 222$  SCU's assuming the pens are full every day of the year.

Separation distances are calculated from the Code and incorporate conditions relating to the site and the calculated SCU.

Site factors are:

S1 = 21 from Table 4.1

S2 = 1 from Table 4.2

S3 = 1.0 from Table 4.3

S4 = 1.0 from Table 4.4

Composite S =  $S1 \times S2 \times S3 \times S4$   
= 21

Distance D =  $\sqrt{VN}$   
=  $21\sqrt{222}$

Factors	Gibbons road
Number of head	300
Standard Cattle Units (SCU) 400kg turnoff live weight – 0.74	222
Stocking Intensity Factor (S1)	21
Receptor Factor (S2) – isolated house	1
Terrain Factor (S3) - Flat	1
Vegetation (S4) – No tree cover	1
For a Class C Feedlot	<b>312m</b>

Receptor type	Direction	Separation Distance	Topography	Vegetation
18 Lavender Road	NW	450m	Flat	Scattered trees and lagoon. Grass
106 Gibbon Road	SE	330m	Flat	Remnant roadside vegetation, road
133 Gibbon Road	E	560m	Flat	Scattered paddock trees, grass
Property Boundary (road)	S	30m	Flat	Remnant roadside vegetation
Water course	W	124m	Flat	Grassed
Public Road	S	30m	Flat	Remnant roadside vegetation
Gunbower	NW	3200m	Flat	Treed, grass



Figure 13: Existing Setback Distances at 57 Gibbon Road from feedlot works area to dwellings.

Regular shifting of the feeders and hay rings to prevent manure and urine concentration should be implemented.

The measurement is taken from the external boundary of the works area to the dwelling, at 106 Gibbons Road and 18 Lavender Road; the setback distance of 312m is met. See Figure 14.

### 3.1.3 Proximity to Waterways

As the separation distance of 200m is not met from the stock pens to Longmore Lagoon the requirement for this is to ensure that no drainage or runoff water can enter the waterway. All drainage water is directed to the central effluent pond which collects runoff and a levee bank is constructed along the length of the bank which will restrict flows to within the property boundary. See Sheet 2 of PMC drawings for cross section.

## 3.2 Recent Strategies to reduce dust and odour

### 3.2.1 Strategies

- ❖ *Increasing the frequency of pen cleanout should address any concerns and issues with odour and 4 times per year should be achieved. (Dependant on favourable weather conditions).*
- ❖ *300 head of cattle maximum in the feedlot pens site. The manure harvested through pen cleaning is to be removed by contractor and composted off site.*
- ❖ *Cleaning of feed sites should take place at least every pen cleaning to remove food residues to control odour.*

- ❖ *The extended feedlot pens are to be returned to cropping/grazing. By offering grazing at this site and reducing the stocking density for intensive farming, odour issues will be minimised. The environmental conditions in the paddocks should be carefully monitored for odour causing situations.*
- ❖ *The calculated setback distance of 312m is met in regards to 18 Lavender Road and 106 Gibbon Road and the feedlot works area.*
- ❖ *Sprinklers will be re-installed in the feedlot to prevent dust in dry conditions.*

### **3.2.2 Recent Management Improvements**

- ❖ *Property owner has purchased trees to be planted along the bank of the lagoon to provide a visual buffer.*
- ❖ *Installation of an internal fence along the extent of the frontage on Gibbon Road to contain cattle movements between properties. Further fencing upgrades at the stock containment pen site have been completed so that roadway users and 106 Gibbon Road are no longer exposed to stray cattle.*
- ❖ *Fencing off of all the lagoon banks so cattle cannot access water and cause erosion and impaction to the bank profile, or excrete raw effluent into the waterway when cattle enter the water.*
- ❖ *By restricting cattle access to the lagoon banks and waterway, water quality and turtle nesting habitat should be protected.*
- ❖ *Neighbours will be informed via email when odour causing operations such as pen cleaning will be conducted.*
- ❖ *A diary will be updated regularly to assist in recording incidents and complaints in order to identify the source of any issues. Management strategies can then be implemented to rectify the problems that arise. Operational procedures will also be recorded.*
- ❖ *A temporary straw bale screen was placed along Gibbon Road frontage to block view of feedlot from road.*

### **3.3 Cattle Management**

Tactical grazing across the Gibbons Road, Richards Road and Patho properties is a flexible approach that allows the producer to use set stocking and rotational grazing, throughout a single year or a series of years, to meet different animal and pasture objectives.

Where set stocking can be utilised in area which offer low stocking densities such as at Patho, supplementary feeding can be used to correct seasonal imbalances in feed supply to demand.

Rotational grazing at the Gibbons Road and Richards Road sites generally allows for higher overall stocking rates. The presence of infrastructure such as quality fencing and yarding, along with the element of labour, means that cattle grazing will support the growth of pasture as rest time to palatable species growth is encouraged.

Continual rotation between all three sites and regular moving of grain feeders and hay rings should minimise soil impact and reduce concentration and build-up of cattle waste which produce odour.

## 4.0 Odour

Utilising the VCCF to assess best practice the issue of odour impacts and mitigation measures can be assessed.

### 4.1.1 Objective

The Approved measure for odour control will be met within the design objectives and acceptable standards.

### 4.1.2 Accepted Standard

The formula used to determine feedlot separation distances and feedlot size in approved measures in the Code, of location and size is utilised as the performance measure for odour control.

Whilst every considerable strategy is taken to minimise odours in the running of the feedlot, it is still a factor in the running of any livestock practice. Odours are generally emitted from the ponds, laneways and pen surfaces, and the distribution of effluent onto paddocks.

### 4.1.3 Approved Measure

Activities taken to manage odour should be planned with consideration of weather events and days of the week. There is no actual component of odour which can be measured, only the intensity and tolerance of individuals. Traditionally the imposition of buffer distances is the adopted means for dealing with odour mitigation and calculation for this takes into account composite site factors and Standard Cattle Units at the farm.

Management at the feedlot ensures that pens are cleaned of solid waste a minimum of four times a year which has the effect of reducing material which produce odour.

Fly control is also established with good pen cleaning practice, which minimises effluent build up and reducing moisture content of the ground surface during the warmer months when flies tend to breed the most.

Management practices:

- Regular pen cleaning program
- Pen and drainage maintenance
- Dead stock management & immediate disposal
- Removal of spoilt feed
- Stockpiling of manure to ensure stockpiles shed water
- Incorporation of manure as soon as possible post application

- Continual recording of all above activities

Wind observation data from the Bureau of Meteorology indicates that the prevailing wind direction is from the west. Consideration to the neighbours to the east of the feedlot should be considered, along with recording of wind events when conducting pen cleaning processes.

See Section 3.1 Setback Distances

## 5.0 Noise

Utilising the VCCF to assess best practice the issue of noise impacts and mitigation measures can be assessed.

### 5.1.1 Objective

Noise levels generated by the feedlot do not cause any material detriment to nearby residents or persons affected by transport of cattle and feed associated with the operation of the feedlot.

### 5.1.2 Accepted Standards

- Location of all equipment minimises likelihood of mechanical noise
- Loading and Unloading of stock and livestock handling located within feedlot boundary work area away from road and other dwellings
- Truck movements regulated

### 5.1.3 Approved Measures:

- All machinery operations involved with any of the management practices are operated in accordance with the manufacturer's specifications and any noise suppression equipment installed is maintained.
- Noise levels generated on the feedlot do not exceed measures established by EPA
- Noise on adjacent properties from machine operations does not exceed ambient levels before 6am and after 10pm.
- All vehicles operating on-site and off-site have efficient exhaust mufflers.
- Property access points and roads on the premises are located a minimum of 250m from neighbouring dwellings

<ul style="list-style-type: none"> <li>• Day: 46</li> <li>• Evening: 41</li> <li>• Night: 36 (dB(A))</li> </ul>	<ul style="list-style-type: none"> <li>• Day 0700—1800 Monday—Friday</li> <li>• 0700—1300 Saturdays</li> <li>• Evening 1800—2200 all days</li> <li>• 1300—1800 Saturdays</li> <li>• 0700—1800 Sundays and public holidays</li> <li>• Night 2200—0700</li> </ul>
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## 6.0 Waste Storage, Treatment & Use

### 6.1 Waste Stockpile and Use

The manure waste generated from pen cleaning has previously been stockpiled onsite in the vicinity of the feedlot pens. Recently a local Contractor has been engaged to remove all solid waste from the site as a means to reduce odour at the site. This manure waste is then composted offsite by the contractor as part of his business, to be later used as fertiliser.

As solid waste is no longer used by BRM Farms as fertiliser a nutrient balance statement is not required to assess the available area for application.

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**Figure 14: Manure Stockpile**

## 6.2 Runoff

Generally after rainfall events the pond is partially filled and the water is allowed to evaporate throughout the year. Monitoring of pond capacity during and after rainfall events should be undertaken to ensure sufficient volume during wetter than average periods. Excess water is then pumped onto paddocks adjacent to paddocks. Historically this has only occurred once in 15 years.

With respect to the cattle stock containment pens, the key emphasis will be contaminated runoff from rainfall from the pens to the centralized sedimentation pond.

A settling Manure Volume can be calculated from the centralised sedimentation pond which collects all rainfall runoff from the cattle pens and animal handling area. Calculations are derived from the VCCF 1995. The below volumes have been previously calculated by Agriculture Victoria in their 2016 report on the McInnes property at Gibbon Road, and were found to accurately represent the volume of the pond, in line with data obtained by Price Merrett Consulting.

$$V = (D \times M \times A_p \times F_s) / 1000$$

V= storage volume

D = nominal pack depth (mm) – 200

M = proportion of manure loss during rain periods (3% pen slop) – 30

Ap = area of pens m<sup>2</sup> @ 8,055 m<sup>2</sup>

Fs = safety factor (1.25) to allow in variation in cleaning intervals.

Therefore  $200 \times 30 \times 8055 \times 1.25 / 1000 = 60,400$  litres or **0.06 ML**.

$V = 200 \times 30 \times 14,500 \times 1.25 / 1000 = 108,750$  litres or 0.11 ML

The existing capacity of the sedimentation pond = **0.15 ML** which is more than adequate.

The drainage system which services the extended feedlot pens at present collects any irrigation water or rainfall runoff and directs it to the reuse sump located north west of the feedlot. The overall capacity of the sump is estimated at **0.75ML**. This infrastructure prevents any runoff from entering the nearby lagoon. **See Figure 10 for location.**

### 6.3 Runoff Storage- Feedlot pens

The runoff storage capacity provided in the retention pond is calculated as follows:

$$Q = [(A_p + A_b) \times (R_f \times R_o)] \times F_s + [A_s \times R_f] / 100$$

Where:

Q = Volume (cubic metres)

Ap = Area of pens (m<sup>3</sup>)

Ab = Balance catchment area (m<sup>3</sup>)

Rf = 1 in 10 year annual catchment yield data, or 80% of the 1 in 20 year 24 hr rainfall event, whichever is greater.

Ro = Runoff coefficient (0.3 – 400mm to 500mm rainfall)

Fs = Safety factor (1.25)

As = Area of storage dam

$$[(8055 + 1000) \times (50 \times 0.3)] \times 1.25 + [900 \times 50] / 1000$$

$$[9055 \times 15] \times 1.25 + 450$$

$$= 620\text{m}^3$$

Based upon these calculations and the expected storage of the effluent pond we can estimate that in a one in ten year storm event the existing capacity of the pond may not be sufficient enough to hold runoff volumes. Excavation of the pond is recommended.

### 6.4 Runoff Dispersal Area

The net area required for the direct dispersal of pen runoff, as an alternative to irrigation, is determined as follows-

$$A_d = A_c \times 5 \times (R_f / 400)$$

Where:

Ad = Dispersal Area (Ha)

Ac = Area of catchment (Ha) (ie the controlled drainage area)

Rf = 1 in 10 year annual rainfall occurrence (mm)

$$A_d = A_c \times 5 \times (R_f / 400)$$

$$= 1 \times 5 \times (50 / 400)$$

**Ad = 0.6Ha**

**Available area for dispersal is 15Ha**

No cattle shall be grazed at this site for a minimum of three weeks post effluent application.

## 6.5 Rainfall Intensity

According to the Bureau of Meteorology Website – Design Rainfall Data System (2016), Figure 10, the expected rainfall intensity for a 1 hour, 1 in 20 year storm event is 22.6mm.

From this we can calculate Settling Basin Volume (S)

$$S = P \times T \times A_c / 1000$$

P = rainfall intensity for a 1 hour, 1 in 20 wet year storm (mm/hr) – 32

T = detention time (0.5 hr)

A<sub>c</sub> = area served by the pond (m<sup>2</sup>)

$$\begin{aligned} S &= 32 \times 0.5 \times 8055 / 1000 \\ &= 91 \text{ m}^3 \end{aligned}$$

$$S + V = 91 + 60 = 151 \text{ m}^3 = 0.15\text{ML}$$

Runoff Storage

From the above calculation the measured volume of the effluent pond is adequate (0.15ML) for the 1 in 20 year storm event for 24 hour holding capacity.

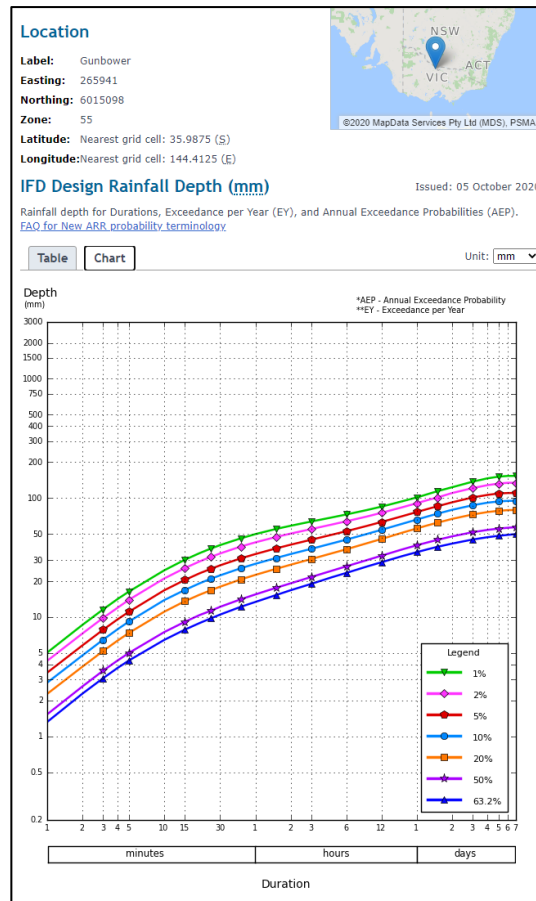


Figure 15: Rainfall data BOM (Bureau of Meteorology) website.

## 6.6 Avoidance of Groundwater Contamination

The soils of 57 Gibbon Road are heavy clays. The feedlot pens are compacted and built up to provide a graded surface for runoff which is directed to the sedimentation/effluent pond located between the two rows of pens. As the soils in the area have been assessed as being heavy clays and by nature have low permeability, seepage into groundwater is not anticipated and the risk for contamination is considered low.

Feeders and hay rings should be moved regularly to prevent concentration of animal waste which produces odours. Heavy clays at the site should prevent infiltration but intensive areas can be prone to pugging in wet conditions.





## 6.7 Salt Budget




As solid waste is no longer spread at the Plains Blocks the requirement for a salt budget is not considered necessary.

## 6.8 Disposal of Animal Carcasses

Dead animals are removed daily by knackery service when required

## 7.0 Property Layout

<p><b>Site 1: Gibbons Road</b></p>			
<p>1.</p>	<p>Looking north along Lagoon bank Presence of bank to prevent runoff from farm and restrict flood water entry</p>		
<p>2.</p>	<p>Looking South</p>		
<p>3.</p>	<p>Looking south</p>		

<p><b>Site 2: Richards Road</b></p>		
<p>4.</p>	<p>Bank along alignment of lagoon. Looking South</p>	
<p>5.</p>	<p>Shows pipeline under track with backflow prevention. Into internal channel. Looking South</p>	

## 7.1 Patho Properties

Paddock	Lot number	Operation
1	3-C\PP3378	Grazing
2	1\PS328870	Grazing/Cropping
3	66,52,11A-C\PP3378	Grazing
4	11-C\PP3378	Grazing

5	55,55B-C\PP3378	Grazing
6	55A-C\PP3378	Grazing

## 8.0 Design & Construction


### 8.1 Feedlot Drainage





Gibbon road feedlot is adequately serviced by an extensive drainage and reuse network (Refer Layout Plan- green line represents drains). The drainage system collects any irrigation or rainfall runoff and directs it to the reuse sump located northwest of the feedlot. The overall capacity of the sump is estimated at 0.75ML. As the farm is only minimally irrigated at present, the capacity of the system is excessive to requirements, and infrastructure prevents any runoff from entering the nearby lagoon.

### 8.2 Feedlot Construction

All operations are to be considered under the Intensive Animal Production Guidelines and the Victorian Code for Cattle Feedlots 1995 where applicable as the guiding principles.

#### 8.2.1 Feedlot at Site 1: Gibbons Road

<b>Pen Floor Preparation</b>	Surface compacted and raised to provide drainage	
<b>External Surface Runoff</b>	No run off can enter nearby creeks or lagoons	All runoff graded and diverted towards central effluent pond
<b>Laneways</b>	All weather surface maintained	
<b>Cattle Handling Yards</b>	Safe, solid, steel construction on all forcing yards, crushes, races and Feedlot pens	
<b>Water Supply</b>	Gunbower creek irrigation supply	
<b>Internal Pen Drainage Control</b>	Pens slope back to central drain between the two rows	In event that internal catchment drain becomes full it is decanted via pump to adjoining channel to be diluted with irrigation water for application to paddocks. Historically frequency only once in ten years.

<b>Feed Troughs</b>	Concrete	
<b>Feed Trough Aprons</b>	Not installed	
<b>Water Troughs</b>	Concrete	
<b>Water Trough Aprons</b>	Not installed	
<b>Fencing</b>	Solid steel construction in pens Adjoining paddocks wire fencing	
<b>Drains</b>	Central to feedlot pens. Decanted via pump for application to irrigation water. Soils of local area are clays and would have reduced permeability therefore infiltration of waste water into groundwater is minimal.	

## 8.2.2 Approved Measures

Both the Victorian Code for Cattle Feedlots 1995 and the Management of Dairy Effluent Guidelines 2008 outline the fundamental objectives of an effluent system, which encourages:

- All effluent from the feedlot, paddocks and tracks must be contained and reused (collected by contractor at pen cleaning to be composted for fertiliser).
- Effluent must not enter surface waters (including billabongs, lagoons, creeks or rivers).
- Effluent must not enter ground water (either directly or through infiltration from seepage)
- Effluent must not contaminate land (nutrient overload)
- Offensive odours must not impact beyond property boundaries.

## 8.2.3 Yard Plans and Site layout



Figure 16: Yard Plan

## 8.2.4 Soil type

Soils at the feedlot sites are of a grassy red gum landscape unit which is mostly cleared of this predominant vegetation for farming practices. Soil testing indicates that soils are heavy clays. The Gunbower association, as it is referred to, is composed of three grey soil types depending on their level in the landscape. These range from fine sandy clay to a sandy clay loam to a loam over clays at depth.

## 9.0 Operation & Management

### 9.1 Objectives

- Frequency of cleanout is sufficient to ensure feedlot meets the requirement of Class C feedlot at four times per year
- Standard of operation and maintenance of the waste system used does not lead to soil degradation or pollution off-site or cause detriment due to odour or other causes.

#### 9.1.1 Record keeping

Procedure to respond to complaints		Ben McInness notified and procedures investigated and responded to.
Management of Incidents and review procedure		Any complaints regarding operational procedures from local community and/or authorities are recorded
Method and procedure for reporting to relevant authority		Feedlot owner and manager required to report 12 monthly
Record Keeping	Complaints	All complaints regarding feedlot are recorder. The details of the complaints are kept as per feedlot licence conditions.
	Incident recording	Records of all incidents are maintained on site at the feedlot.
	Operational recording	The details of the feedlot operation are kept on site at feedlot.
Plan for regular review		6 monthly

National Livestock Identification Scheme (NLIS)	Stipulates that cattle movement between properties must be recorded where two different Property Identification Codes (PIC) exist. The code however enables a single "home" PIC to be established to allow the owner of the two properties to transfer cattle between farms without the need for transferring cattle details.
Victorian Code of Practice for the Welfare of Cattle	Is adhered to as required and cattle health is closely monitored and recorded
Dead stock	Removed by knackery service. Details of dead animal recorded
Veterinary practice	Any cattle requiring veterinary care to be treated by Border Vet Clinic, Gunbower
Employment	BRM Farms employs 4 people to feed stock, care for animals and manage property.

### 9.2 Contingency Plan

**Environmental issues are managed according to the following:**

Loss of water	A backup water supply via use of additional pump.
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	Generator available.
Flooding and fire	Storm event Flooding managed through internal drainage system. No external flooding an issue due to banks surrounding the property. Fire not seen as high risk due to lack of tree cover. Grass fire possibly potential for isolated occurrence. Emergency services available. Manure stockpiles are managed to ensure any spontaneous fires are extinguished as soon as possible.
Disease outbreak and mass mortality	The stock inspector and vets would be contacted to determine cause of death. Dead animals would be buried in mass burial site.
Chemical or effluent spills	Chemicals stored, maintained and used in accordance with the relevant regulations.

### 9.3 Feedlot Management

At Gibbons Road the feedlot development is to be managed similarly to a Class C feedlot for 300 head. This classification is allocated to provide suitable separation distances from sensitive receptors encompasses factors like Standard Cattle Units (SCU) the grading timetable of pens, compacted and well managed surfaces, trees and climate. Pens are well fenced with compacted clay base and concrete aprons to direct runoff. Any liquid runoff is directed to a containment drain central between the two sections of pens. This is pumped directly in channels to paddocks nearby for dispersal when required, depending on climatic conditions and volume available in pit- historically only once a year.

The Gibbons Road feedlot is divided into 10 pens of approximately 0.09Ha with additional handling and hospital yards. Paddocks adjacent to the feedlot pens are utilised for the grazing of cattle, which helps to reduce stocking densities and allow for cleanout and maintenance of pens.

The Richards Road farm- Site 2, is operated as a grazing animal production farm with animals being fed in a low intensity manner over the whole property and suitable cattle then walked to the feedlot at Gibbons Road- Site 1, to be grown out and fattened before sale.

#### 9.3.1 Feeding

The feedlot ration is comprised of the following ingredients:

Ingredient Name	R1	R2	R3
Wheat - Disc milled	470.00	580.00	690.00
Barley Hay	330.00	240.00	100.00
Barley Straw	100.00	100.00	110.00
Canola Meal	70.00	40.00	30.00
McInnes Supp 4%	20.00	30.00	40.00
Vegetable Oil			15.00
Limestone	10.00	10.00	15.00
<b>Total</b>	<b>1,000.00</b>	<b>1,000.00</b>	<b>1,000.00</b>

Feed test results in Appendix 2.

Cattle can be grazed in the paddocks adjacent to the feedlot when grass is available and supplementary feed can still be offered so as to maintain the animal's diet. This is beneficial during periods of wet weather so as to reduce pressure in the feedlot and improve animal health and reduce odour. Care not to over graze and bare the soil surface should be taken. Regular shifting of the feeders and hay rings to prevent manure and urine concentration should be implemented.

### 9.3.2 Required Management Practice

#### Approved Measures:

#### *Cleaning and Maintenance- Class C Feedlot*

OPERATIONAL SPECIFICATIONS	Activity	Frequency	Method
Routine Cleaning and Maintenance	Spilt feed cleaned	Each Pen cleaning	Front end loader
	Wet patches eliminated	Each pen cleaning	Back-fill with gravel and compacted with loader tyres
	Potholes repaired	Six monthly	Back-fill with gravel and compacted with loader tyres
	Cleaning under fences	Quarterly or each pen cleaning	Front end loader
	Drainage channel maintenance	Annually	Front end loader
	Pen cleaning	4 x per year minimum	Front end loader by removal
	Retention pond or dispersion area	Annually- prior to winter	Desludging and application as per management guidelines
	Pen cleaning via mounding	Technique not used	Cleaning by removal with excavator.
	Pad Renovation	On pen cleaning	As best practice
	Disposal of runoff		Collection of runoff drainage in effluent pond has ample volume but potential for a once yearly application with irrigation water to adjacent paddocks is feasible or as required.
	Manure disposal	Removed by contractor	Excavator/front end loader
	Vermin and weeds	As required	Methods to comply with manufacturer's

			instructions
Feeding out and Watering	Equipment	Operated to minimise spillage	
	Feed residues in trough	Weekly	Removed with pen cleaning
	Water troughs and float valves	Maintained	Checked daily and immediately fixed if needed
	Drainage water from trough cleaning	Disposed of without wetting pen surface	Only during dry conditions
	Water troughs located adjacent to drains	Monthly	Water directed to internal drain
Water Troughs	Cleaned by hose with no wetting to pen floor	Drainage direct to feedlot drainage system without crossing pen floor	Reinforced concrete on aprons, sloped away from pen, minimum 2.5m width
Feed troughs	Fully enclosed bases	Concrete troughs. To specifications in code.	Aprons 2.5m into pen

### 9.3.3 Odour

Wet Conditions	In wet conditions where prolonged periods of rain are expected it may be feasible to reduce cattle numbers in feedlot pens to minimise the build-up manure and reduce the main source of odour.
Odour is minimised by:	<ul style="list-style-type: none"> <li>• Regular pen cleaning</li> <li>• Maintaining suitable pen stocking rate</li> <li>• Managing cattle numbers in wet conditions</li> <li>• Monitoring weather conditions and only conducting pen cleaning when wind speed and direction is favourable</li> </ul>

### 9.3.4 Dust

Sprinklers:	The installation of sprinklers within the pens has been implemented in order to minimise the spread of dust during summer and dry periods.
Dust is minimised by:	<ul style="list-style-type: none"> <li>• Gravel roadways</li> <li>• Maintaining suitable pen stocking rate</li> <li>• Watering of roadways if required</li> <li>• Utilising sprinkler system to moisten feed pens</li> </ul>
Sprinklers and Heat:	The sprays should also reduce summer temperatures and encourage cattle to eat more and put on more weight. Overuse of sprinklers in the past has led to pneumonia in cattle so animals and conditions are closely monitored.

### 9.3.5 Other Measures

Stormwater	Network of banks and drainage channels direct all runoff to reuse system
Waste chemicals and Chemical containers	Agricultural and veterinary chemicals and used containers are disposed of in accordance to manufacturer's instructions and local authority requirements. Details recorded of method, date, product, quantity and location. Sharps container for needles disposed of by vet.
Fly and Vermin control	Fly populations are controlled through regular pen maintenance: <ul style="list-style-type: none"> <li>• Pen cleaning</li> <li>• Removal of manure from fence lines</li> </ul> Vermin populations are minimised by ensuring grain storage are kept clean. Where required chemical treatment may be utilised, ensuring no contamination of feed products. Details of vermin chemical treatment are recorded. Any complaints regarding fly and vermin populations are recorded.
Weeds and weed seed management	Weed and weed seed populations are managed by regular mowing of grass areas, the feedlot complex and surrounds. Weed populations along driveways and effluent holding pond is controlled through herbicide treatment. Details of chemical treatment are recorded: <ul style="list-style-type: none"> <li>• Date</li> <li>• Product name</li> <li>• Location used</li> <li>• Quantity used</li> <li>• Batch number</li> <li>• Expiry Date</li> <li>• Withholding period</li> </ul> Any noxious weeds are reported to relevant authorities.

## 10.0 Traffic/Parking

### 10.1 Existing conditions

Access	Site 1: Gibbon Road: Truck access to loading races is off road with adequate turn around on farm to allow easy manoeuvrability without inhibiting traffic movement along Gibbon road. Parking offers plenty of space for staff and machinery all within property boundaries.
Truck operation	Daytime hours
Driveways and access roads	Width acceptable for trucks and vehicles >10m. Tractors and feed-out wagons have ample room to access silos and deliver feed along external tracks adjacent to feed troughs.
Loading ramp location	Attached to cattle management facility, off road, and within feedlot area, with excessive area for truck to manoeuvre.

Surface treatment	Crushed rock for all weather access around feedlot and essential access tracks
Parking	Parking spaces adjacent to staff room/shed for vehicles
Maintenance	Surface maintained as required and potholes filled
Truck movements	Cattle transported from Plains blocks to feedlot in a truck have a journey of approximately 6km in total, 200m on Murray Valley Highway. 2.2km between the feedlot properties.

Trucks have the ability to enter the property, turn and back into the cattle loading facility without the need to block access onto Gibbons Road or Richards Road.

### 10.1.1 Cattle Movements

Cattle movements between Feedlots (Site 1 & 2)	<p>Moved between the two feedlots at Site 1 and 2 are herded along the local roadways</p> <ul style="list-style-type: none"> <li>• All livestock must be effectively under control at all times when they're being moved across and along the road.</li> <li>• Cattle are moved regularly via truck</li> <li>• Signs which meet to VicRoads' guidelines must be in place while livestock are being moved and removed immediately after.</li> <li>• All private farm gates can be closed as cattle walk along the road</li> <li>• The construction of a new laneway along the Gibbons Road boundary prevents cattle from entering the road and travelling in front of 106 Gibbon Road.</li> <li>• You can only move livestock across or along a public road during daylight.</li> <li>• Any livestock deposits on any road or pavement which could cause a hazard to other road users must be removed as soon as possible.</li> <li>• Grazing of Livestock and Driving of Livestock permits are available for 6-12 months from the Campaspe Shire Council at no charge. Conditions apply.</li> </ul>
Plains Blocks	<ul style="list-style-type: none"> <li>• Cattle are moved via Truck from Plains Blocks to Feedlot. Approx 6km</li> </ul>



**Figure 17: Cattle Movements (2.2kms along Gibbons Road and Richards Road)**

### 10.1.2 Approved Measures

A traffic management plan could be produced to cover below elements however traffic volumes are considered low at this stage of the development:

- truck and farm machinery movements
- access
- driveways and access roads
- Loading ramp location
- Surface treatment
- Parking
- Maintenance

## 11.0 Landscaping

The feedlot has been an established enterprise for well over 15 years. The residence is located adjacent to managers residences and gardens are maintained with large trees and shrubs used for screening.

Remnant native vegetation is situated along Gibbons road and Richards road and biodiversity and condition is indicative of the farming and rural environment in the area.

A straw bale barrier is erected in front of the southern side of the feedlot along Gibbon Road to act as a visual screen.

### 11.1 Vegetation Buffer

The allowance for vegetation to be factored into calculations requires light tree cover with dense upper and lower story not less than 250m in width, or if little lower story vegetation, must be greater than 500m width. Vegetation is not significant enough at this farm to be considered.

Trees have and understory species have begun to be planted along the lagoon edge as a means to provide a visual screen between the feedlot and the residents at 18 Lavender Road. It will take time for the vegetation to reach maturity and ultimately increase the biodiversity of the area.

## 12.0 Appendix 1- Soil Test



### Client Details

Client: SWAN HILL CHEMICALS	Date received: 19/01/2021
Grower: BEN McINNES	Current Paddock: PICKINNEY WEST (Sampled: 19/01/2021)
Order No.: 321581	Date reported: 22/01/21
Sample ID: 21001730	Profile sampled (cm): 15
Lab code: ES25	Client agronomist: MAX BALDISSERA
Crop: SOIL	Soil Type: Medium Soil (CEC 8-12meq)

### N-Check Results

NO3-N: 1.40ppm	Nitrate: 5.9 kg/ha	Total available NO3 + NH4: 7.1 kg/ha
NH4-N: 0.28ppm	Ammonium: 1.2 kg/ha	Total req. NO3 + NH4 (kg/ha):
		Total available NITROGEN = 2.3 kg/ha
Bulk Density: 1.02g/cm	Rootzone Moisture 15 mm	% Moisture: 9.97% W/W

### expressSoil Results

Analyte	Units	Result	Optimal Range	Status
pH (H <sub>2</sub> O)*	(pH)	6.92	6 - 7	Slightly Acidic
pH (CaCl <sub>2</sub> )*	(pH)	5.98	5.3 - 6.5	Slightly Acidic
EC*	dS/m	0.211	0 - 0.15	Very High
Lime requirement	t/ha			
ESI	units	0.014	value >0.05	Low
Total Carbon*	%	0.699		
Total Nitrogen*	%	0.082		
Carbon:Nitrogen Ratio	(ratio)	8.55		
Organic Matter	%	1.1	3.25 - 5.2	Very Low
M3 PSR	(ratio)	0.01	0.06 - 0.23	Very Low
Mehlich Phosphorus*	ppm	4.4	40 - 90	Very Low
Potassium*	ppm	352.5	245 - 400	Satisfactory
Sulphur*	ppm	12.8	12 - 45	Satisfactory
Calcium*	ppm	1480	1620 - 2700	Low
Magnesium*	ppm	758.4	200 - 400	Very High
Sodium*	ppm	595.4	20 - 85	Very High
Chloride*	ppm	215.5	0 - 200	High
Zinc*	ppm	0.39	2.2 - 11	Very Low
Copper*	ppm	2.72	2.5 - 10	Satisfactory
Boron*	ppm	2.64	2.2 - 6	Satisfactory
Manganese*	ppm	143.8	18 - 70	Very High
Iron*	ppm	121.1	35 - 230	Satisfactory
CEC	meq/100g	18		
Calcium	meq/100g	7.4 (41.1%CEC)	8.1 - 13.5	Low
Potassium	meq/100g	0.9 (5.0%CEC)	0.6 - 1.0	Satisfactory
Magnesium	meq/100g	6.2 (34.4%CEC)	1.7 - 3.3	Very High
Sodium	meq/100g	2.6 (14.4%CEC)	0.1 - 0.4	High
Base Saturation	%	94.9	80 - 87	High
Exchangeable Acidity	meq/100g	0.9 (5.1%CEC)	13 - 20 %CEC	Very Low
Aluminium Saturation	%	0.00		
Ca:Mg Ratio	(ratio)	1.19	3 - 5	Very Low
K:Mg Ratio	(ratio)	0.1	0.3 - 0.5	Very Low



This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analysis by the Australian Soil and Plant Analysis Council (ASAPAC). Tests for which proficiency has been demonstrated are highlighted in this report by an \* next to the analyte name.

#### Analysis by AgVita Analytical

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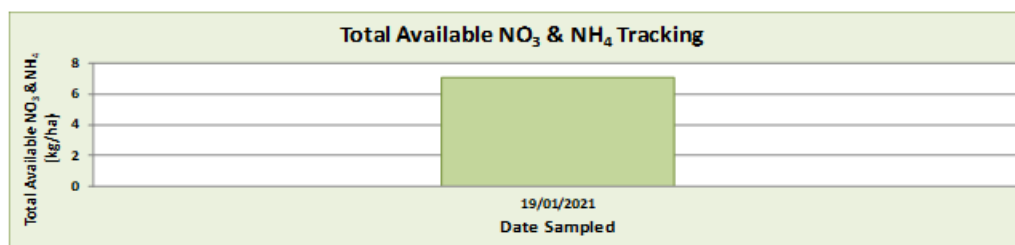
### Nutrient Status and Imbalances\*

PICKINNEY WEST (Sampled: 19/01/2021)

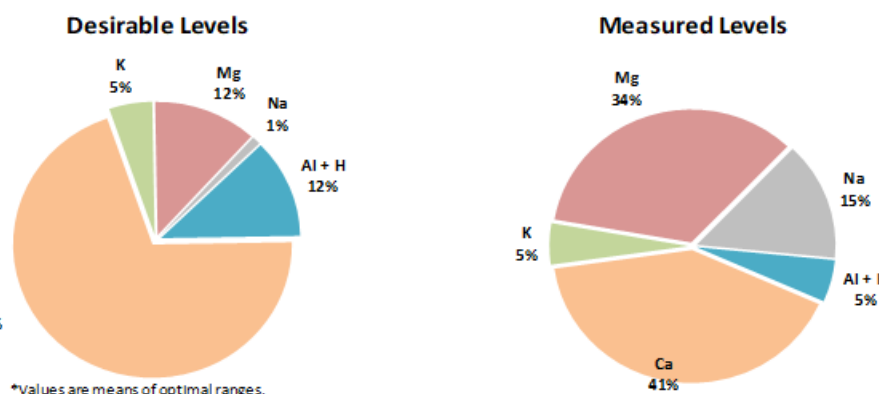
Analyte	Desired Level (kg/ha)	Measured Level (kg/ha)
NO <sub>3</sub> + NH <sub>4</sub>		7.1
Phosphorus	20.9	1.4
Potassium	96.4	113.2
Sulphur	9.16	4.11
Calcium	694.0	475.7
Magnesium	96.4	243.7
Boron	1.3	0.8
Iron	42.57	38.91
Manganese	14.1	46.2
Copper	2.0	0.9
Zinc	2.1	0.1



\* For further explanation, please see our [expressSoil Users Guide](#) [here](#)



### Soil Cation Ratio (as % CECe)



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Client Details			
Client: SWAN HILL CHEMICALS	Date received: 19/01/2021		
Grower: BEN MCINNES	Current Paddock: BAY 4 (Sampled: 19/01/2021)		
Order No.: 321581	Date reported: 22/01/21		
Sample ID: 21001723	Profile sampled (cm): 15		
Lab code: ES25	Client agronomist: MAX BALDISSERA		
Crop: SOIL	Soil Type: Heavy Soil (CEC >12meq)		

N-Check Results			
NO3-N:	6.64ppm	Nitrate:	30.4 kg/ha
NH4-N:	0.28ppm	Ammonium:	1.3 kg/ha
Total available NO3 + NH4:		31.7 kg/ha	
Total req. NO3 + NH4 (kg/ha):		7.9 kg/ha	
Total available NITROGEN =		7.9 kg/ha	
Bulk Density:	1.09g/cm	Rootzone Moisture	17 mm
% Moisture:		10.66% W/W	

expressSoil Results				
Analyte	Units	Result	Optimal Range	Status
pH (H <sub>2</sub> O)*	(pH)	7.77	6 - 7	Alkaline
pH (CaCl <sub>2</sub> )*	(pH)	7.31	5.2 - 6.5	Alkaline
EC*	dS/m	0.238	0 - 0.15	Very High
Lime requirement	t/ha			
ESI	units	0.082	value >0.05	Satisfactory
Total Carbon*	%	1.344		
Total Nitrogen*	%	0.141		
Carbon:Nitrogen Ratio	(ratio)	9.531		
Organic Matter	%	2.1	3.25 - 5.2	Low
M3 PSR	(ratio)	0.08	0.06 - 0.23	Satisfactory
Mehlich Phosphorus*	ppm	41.5	40 - 90	Satisfactory
Potassium*	ppm	162.7	245 - 400	Low
Sulphur*	ppm	36.7	12 - 45	Satisfactory
Calcium*	ppm	2894	1950 - 3450	Satisfactory
Magnesium*	ppm	644.0	220 - 440	Very High
Sodium*	ppm	141.7	32 - 115	High
Chloride*	ppm	41.25	0 - 200	Satisfactory
Zinc*	ppm	2.22	2.2 - 11	Satisfactory
Copper*	ppm	2.10	2.5 - 10	Low
Boron*	ppm	1.37	2.2 - 6	Low
Manganese*	ppm	69.7	18 - 70	Satisfactory
Iron*	ppm	196.0	40 - 250	Satisfactory
CEC	meq/100g	20.7		
Calcium	meq/100g	14.4 (69.6%CEC)	9.7 - 17.2	Satisfactory
Potassium	meq/100g	0.4 (1.9%CEC)	0.6 - 1.0	Low
Magnesium	meq/100g	5.3 (25.6%CEC)	1.8 - 3.6	Very High
Sodium	meq/100g	0.6 (2.9%CEC)	0.1 - 0.5	High
Base Saturation	%	100	80 - 87	High
Exchangeable Acidity	meq/100g	0.0 (0.0%CEC)	13 - 20 %CEC	Very Low
Aluminium Saturation	%	0.00		
Ca:Mg Ratio	(ratio)	2.72	3 - 5	Low
K:Mg Ratio	(ratio)	0.1	0.3 - 0.5	Very Low



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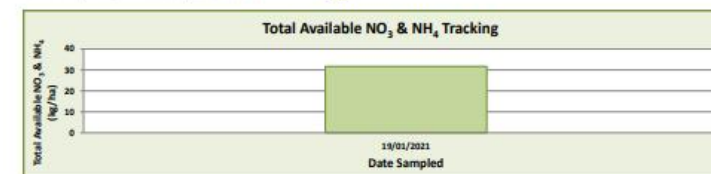
Nutrient Status and Imbalances\*

BAY 4 (Sampled: 19/01/2021)

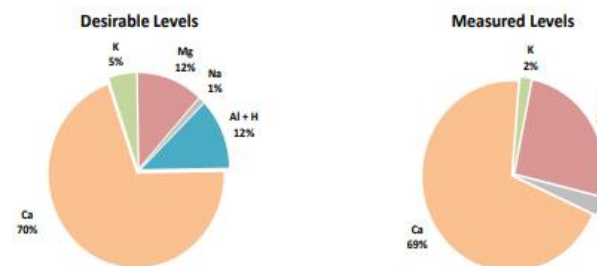
Analyte	Desired Level (kg/ha)	Measured Level (kg/ha)
NO3 + NH4		31.7
Phosphorus	22.3	14.3
Potassium	110.7	55.9
Sulphur	9.79	12.58
Calcium	927.0	993.8
Magnesium	113.3	221.1
Boron	1.4	0.5
Iron	45.79	67.20
Manganese	15.1	23.9
Copper	2.1	0.7
Zinc	2.3	0.8



\* For further explanation, please see our expressSoil Users Guide [Link](#)



Soil Cation Ratio (as % CECe)



\*Values are means of optimal ranges.



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## 13.0 Appendix 2- Feed Analysis

### Ingredient Detail

### INTEGRATED ANIMAL PRODUCTION

Stephen Bonner

Ben McInnes

INTEGRATED  
ANIMAL  
PRODUCTION

Prepared on: December 14, 2020

#### Ingredient Detail (As Fed)

Ingredient Name	R1	R2	R3
Wheat - Disc milled	470.00	580.00	690.00
Barley Hay	330.00	240.00	100.00
Barley Straw	100.00	100.00	110.00
Canola Meal	70.00	40.00	30.00
McInnes Supp 4%	20.00	30.00	40.00
Vegetable Oil			15.00
Limestone	10.00	10.00	15.00
<b>Total</b>	<b>1,000.00</b>	<b>1,000.00</b>	<b>1,000.00</b>

#### Nutrient Analysis(DM %)

Nutrient		R1	R2	R3
Ration DM	%	84.85	85.33	86.52
Protein	%	12.63	12.49	12.86
NPN (%DM)	%	0.61	0.91	1.20
ME MJ/kg	-	11.34	11.68	12.20
NEg	Mcal/kg	1.10	1.17	1.26
NEm	Mcal/kg	1.63	1.73	1.88
NDF	%	31.89	27.61	21.98
eNDF (%DM)	%	19.24	15.62	10.88
Fat	%	1.98	1.88	3.49
Vit A	KIU/kg	0.88	1.32	1.73
Vit E	IU/kg	5.30	7.91	10.40
Calcium	%	0.64	0.61	0.79
Phosphorus	%	0.39	0.38	0.38
Magnesium	%	0.21	0.20	0.20
Potassium	%	0.98	0.91	0.83
Sulfur	%	0.21	0.20	0.20
Salt	%	0.05	0.08	0.10
Monensin	ppm	12.53	18.68	24.57

## 14.0 Appendix 3 – Plans

