Decision Report

Application for works approval

Division 3, Part V *Environmental Protection Act 1986*

Works approval number	W6492/2021/1
Applicant	Central Stockcare Pty Ltd
ACN	122 321 500
DWER file number	DER2021/000020
Premises	Coalara Feedlot 2530 Coalara Road BADGINGARRA WA 6521 Legal description – Lot 10331 on Plan 206634
Date of report	22 June 2021
Status of report	Final

1. Purpose and scope of assessment

Central Stockcare Pty Ltd (the applicant) proposes to construct a cattle feedlot near Badgingarra, about 230 km north of Perth. An application for works approval was submitted under Division 3 Part V of the *Environmental Protection Act 1986* (EP Act) on 7 January 2021.

This report sets out the delegated officer's assessment of potential risk events arising from emissions and discharges during construction and operation of infrastructure relating to the prescribed activity.

In completing the assessment documented in this report, the department has considered and given due regard to its regulatory framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2. Application details

2.1 Overview

The applicant proposes to construct an intensive open-air cattle feedlot with a design capacity of up to 8,000 standard cattle units (SCU) on a greenfield site. It is proposed to stage the feedlot development over a 5-year period.

Additional activities include the production (milling) of animal feed. In addition, composting of manure and dead animals generated as part of the feedlot operation and spreading the composted manure over the premises as soil conditioner is also a proposed activity.

Table 1 describes the prescribed premises categories that the application is subject, as defined in Schedule 1 of the Environmental Protection Regulations 1987.

Table 1: Prescribed premises category

Classification of premises	Assessed design capacity (as per application)
Category 68: Cattle feedlot: premises on which the watering and feeding of cattle occurs, being premises – (a) situated more than 100 metres from a watercourse; and (b) on which the number of cattle per hectare exceeds 50.	8,000 SCU at any one time
Category 23*: Animal feed manufacturing: premises (other than premises within category 15 or 16) on which animal feed is manufactured or processed.	29,200 tonnes per annual period

The delegated officer advises that category 23 applies to any premises on which animal feed manufacturing is conducted above the prescribed threshold of 1,000 tonnes per year, regardless of whether or not the feed is used on that premises.

2.2 Proposal details

The proposal involves constructing and operating a large-scale beef cattle feedlot for growing and finishing prime beef cattle for slaughter within Western Australia.

The applicant has given due regard to the *National Guidelines for Beef Cattle Feedlots in Australia* (MLA 2012a) (National Guidelines) and the *National Beef Cattle Feedlot Environmental Code of Practice* (MLA 2012b) (National Code of Practice), to ensure the proposed feedlot is appropriately sited, designed, constructed and managed.

A key aspect of the proposal is the separation to human receptors, which is a common constraint for new and existing feedlot developments in Western Australia.

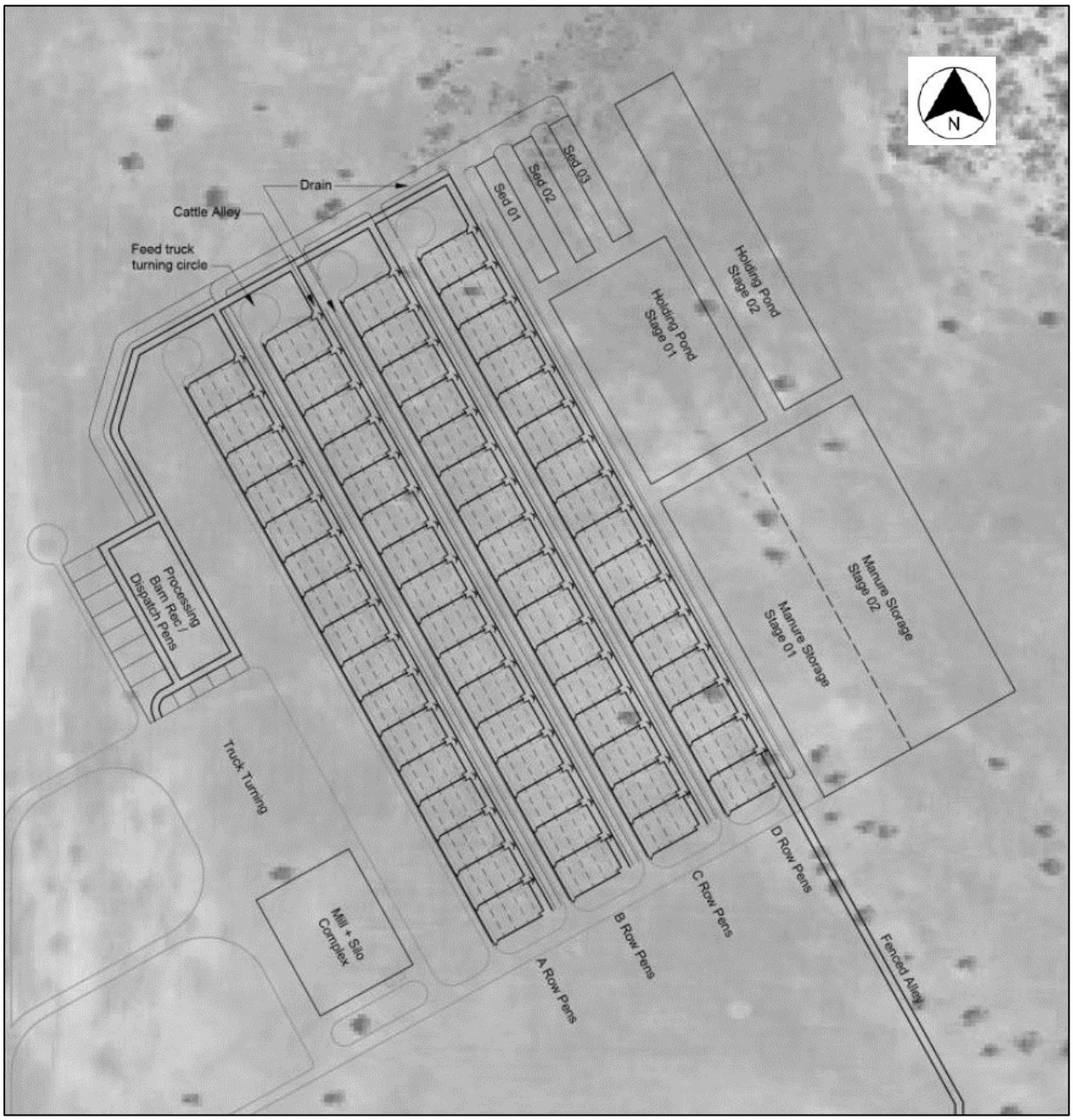
2.2.1 Feedlot design and layout

The completed project will be laid out in 4 rows using a terraced configuration, in accordance

with the National Guidelines (MLA 2012a). Each row will comprise 16 individual pens, giving a total of 64 pens (Figure 1).

Each pen will measure 30 m (L) x 45 m (W), giving a floor area of each row of 480 x 45 m (21,600 m^2), and overall total pen floor area of 86,400 m^2 (480 m x 180 m). For the proposed design capacity of 8,000 SCUs, this equates to a maximum stocking density of 10.8 m^2/SCU, which complies with the National Guidelines (MLA 2012a).

Feedlot pens will be sloped to facilitate surface water runoff, by either cut or fill. Each pen will comprise an effluent drain constructed at the lowest point of each row, with each drain connecting to a main drain that directs effluent to a sedimentation system for settling of solids, prior to transfer to a large holding pond.



▲ ***Figure 1: Proposed feedlot design and layout***

2.2.2 Key infrastructure and specifications

All feedlot pens, yard surfaces and effluent drains, including processing, receival and dispatch yards will be located within a controlled drainage area, to contain and divert all surface water runoff and effluent to a sedimentation system.

Pen and yard surfaces and cattle alleys will be capped and compacted with local subgrade materials, in 150 mm layers, to achieve 95% standard compaction at optimum moisture (± 2%) added by watercart.

Effluent drains

Each row will contain an effluent drain reserve, in which earthen catch drains will be constructed along the foot of the pens. The drains have been designed to carry the peak flow rate resulting from a 20-year ARI design storm, which the applicant has estimated to be 0.18 m^3/sec (15,800 kL/d) at the end of one row of pens, using the formula outlined in the National Guidelines (MLA 2012a).

Based on the National Guidelines (MLA 2012a), an earthen channel with a 4 m bed width, 1:5 batter flowing 0.1 m deep with a 0.75% slope would be sufficient for the estimated peak flow rate. The actual drains to be constructed will exceed these requirements, with a 4 m bed width, 1:7.5 m batters and 0.2 m deep, which will enable drain line maintenance and management during the summer months.

The drains will be constructed with local materials that have been tested to indicate a permeability in the order of 7.941×10^{-9} m/s (95% standard compaction at optimum moisture (± 2%)), with subsequent testing indicating the possibility of achieving 1×10^{-9} m/s with the addition of bentonite.

Sedimentation system

Three shallow, flat sedimentation basins are proposed to be constructed in series for settlement of entrained solids. The system has been designed to cater for the peak flow from a 5% AEP (annual exceedance probability) event (equivalent to a 1 in 20 year ARI storm), which the applicant has estimated the volumetric capacity to be 3,060 m^3, using the formula outlined in the National Guidelines (MLA 2012a). This estimation assumes the entire controlled drainage area of 25.93 ha is draining to the sedimentation system, including the manure storage area.

The applicant proposes to construct three separate basins, each with an operational holding capacity of 1,020 m^3, to enable one or more ponds to be taken off-line for drying out and maintenance, when required.

With a minimum freeboard of 0.9 m between the weir crest and the crest of the embankment, the dimensions of each basin will measure 100 m x 16.7 m, 1:3 batters and 0.8 m depth (1,560 m^3 total capacity).

A slatted concrete weir discharge assembly will be constructed on the discharge point of each basin, to enable differential release of cleaner surface layers and longer retention of loaded lower layers of water and solids.

Each basin will be constructed with the same material and to the compaction and permeability standard of the feedlot pens (see above).

Effluent holding pond

A holding/evaporation pond is proposed to be constructed for storing water from the sedimentation system.

The first stage to be constructed will have a holding capacity of 30,300 kL and the second and final stage 20,600 kL (total 50,900 kL); with the pond design and required storage capacity based on the annual water balance for a 95 percentile wet year (see section 2.4.2). Water is proposed to be used in composting operations.

The pond will be constructed with the same material and to the compaction and permeability standard of the feedlot pens (see above), however, if final permeability of <1 x 10^{-9} m/s cannot be achieved, a polymer plastic lining will be installed.

Manure storage area

A large manure storage area is proposed to be constructed, for the storage and processing (composting) of manure and deceased animals.

A pad with total area of 4.86 ha is proposed to be constructed in two stages, constructed with the same material and to the compaction and permeability standard of the feedlot pens (see above).

The pad is sized to accommodate double the maximum developed manure storage and processing area of 7,000 m^3 and includes designated areas for composting up to 100 deceased animals as well as machinery storage (grader, front-end loaders, compost turners, irrigation plant and equipment, etc.).

The pad will be constructed with a long fall of at least 1.0%, to facilitate drainage of effluent and contaminated surface water runoff to the effluent holding ponds.

2.2.3 Other infrastructure

Feedmill

Existing feedmill infrastructure and mobile plant will be used to manufacture the required feed for the feedlot on the premises. The applicant proposes to relocate existing grain storage, mill elements and mobile plant it owns from another property and establish them in the south-western corner of the feedlot.

Grain receival will be via a drive-over, flatbed grain dump, in which grain will be transferred to enclosed elevators and stored within sealed silos on the premises. Grain processing will initially be setup for dry rolling and developed over time to a tempering system.

At normal operating capacity, the feedmill will process about 64 tonnes of grain per day as a sub-set of 84 tonnes of mixed ration fed to cattle on the premises.

2.3 Construction schedule

The applicant proposes to develop the feedlot in 3 stages:

- Stage 1 – earthworks for the first 2 rows (A & B rows; 32 pens) with design capacity 2,000 SCUs per row (4,000 SCU total), including all bunks, feed roads, cattle alleys, drains, 3 sedimentation basins and stage 1 effluent holding pond. Cattle receival-dispatch facilities will be constructed; a mill area concrete pad will be constructed and silos, mill equipment and mobile plant will be installed;
- Stage 2 – construction of an additional, third row (C row; 16 pens), with total design capacity expanded to 6,000 SCUs; stage 2 effluent pond and stage 2 manure pad will be constructed; and
- Stage 3 – construction of the fourth, and final row (D row; 16 pens), with total design capacity expanded to maximum 8,000 SCUs.

The applicant anticipates construction of Stage 1 to be completed within 2 years of date of approval, Stage 2 within 1 year of the completion of Stage 1, and Stage 3 within 2 years of the completion of Stage 2.

2.4 Operational aspects

2.4.1 Feedlot operations

Purchased feeder cattle will be brought onto the premises and unloaded into the receival-dispatch pens, where they will be inspected for fitness and grouped into feeding lots, before being placed in pens with other animals of similar weight and fed and watered for an average of 112 days. Animals will initially start on high fibre rations, prior to transitioning over 3 weeks

to a nutrient-dense finisher ration. Rations will be prepared daily according to the appetite of the pens lots on feed.

Entry weight will be about 400 kg and average exit weight about 635 kg, depending on market requirements. Once the animals have grown to the required criteria, they will be trucked off-site directly to clients for slaughter.

2.4.2 Surface water management

Clean water diversion

The applicant advises the controlled drainage area will have upgradient diversion banks and channels constructed to ensure clean surface water runoff does not flow to the effluent holding ponds.

In Stage 1 development, surface water runoff from within the footprint for feedlot rows C and D will be captured and directed away from the effluent pond system. Once these rows have been constructed, all runoff will be directed via the effluent drain systems to the effluent sedimentation and storage systems.

Effluent runoff and capture

Runoff effluent from all manured surfaces and trough wastewaters will be contained within the controlled drainage area and diverted to the sedimentation system for settling of solids, prior to transfer to the effluent holding pond. Stored water will be allowed to evaporate and be used in the composting process.

Water balance

The controlled drainage area, which encompasses the feedlot pens, bunks, feed rows, cattle alleys, effluent catch drains, mill and silo complex, and processing barn and receival-dispatch pens, covers a total area of 25.93 ha.

The applicant has provided rainfall runoff calculations, based on the 95th percentile rainfall year for the nearest town of Watheroo (576.6 mm), which indicate the estimated storage capacity to ensure the holding pond spills less than an average of one in 20 years is 46,250 kL, with a pond surface area of 18,500 m^2. The proposed holding pond to be constructed will provide a total storage capacity of 50,900 kL; however, it is noted the calculations are relatively conservative, being based on a pond system that relies solely on evaporation to control water volumes.

The applicant proposes to use stored effluent to supplement water use in the manure compost production process. In an average rainfall year, about 30,000 kL will be used in composting operations, while in the 95th percentile year, up to 50,000 kL will be used. Water balance calculations provided indicate that both holding ponds will be fully evaporated and empty by the end of the summer period.

DWER technical review

DWER has reviewed the water balance calculations and notes the following:

- it is unclear why more water will be used in the manure compost production process in a 95th percentile (i.e. wetter) year, when it would be expected the manure would receive more moisture from rainfall;
- it is noted the manure compost area has been allocated a lower runoff coefficient than other areas within the controlled drainage area, which is assumed to be due to the soakage of rainfall into the manure;
- the National Guidelines (MLA 2012a) recommend daily step hydrological modelling, however the design approach used is based a monthly step series. This is likely to underestimate the volume of surface water runoff due to the following:
    - the runoff coefficients for summer and winter have been averaged to provide a single figure, which is likely to provide a similar result to a ‘weighted by area’ averaging approach (minor consideration only);

- the increase in winter runoff coefficients are proportionately higher for some areas than others, with no rationale for this variation. Specifically:
  (a) a 30% increase between feedlot pen floor area and receival/dispatch/ processing barn area from 50% to 80%;
  (b) only a 10% increase for bottom of row reserve areas, and other reserve and top of row reserve areas increase from 40% to 50%; and
  (c) manure storage area could be seen to be more stable over summer and winter in view of soakage into stored manure, however, the runoff coefficient for open areas would be greater than areas of stockpiled manure;
- the tables indicate an end of year residual in the effluent holding ponds of 15,290 kL at the end of December, and even taking into account the negative volume for January to April. This residual will not be evaporated nor used in the manure composting process. Therefore, there will be a cumulative increase year on year of water stored in the ponds, which has not been taken into account by the applicant;
- it is noted the residual in the effluent holding ponds at the end of December is identical (15,290 kL) for both the 90th and 95th percentile mean rainfall simulations. It is expected a higher residual volume would be calculated for higher rainfall probabilities;

- the calculations for the effluent catch drains and sedimentation system have been based on the National Guidelines (MLA 2012a) and the proposed capacity of these structures seem appropriate.

2.4.3 Solid waste management

Manure generation and feed pen cleaning

The applicant has calculated an annual total solids (TS) manure harvest from the pen floors to be about 410 kg TS/SCU, based on the proposed design feedlot pen floor interface layer being well maintained and there being no bedding used.

Based on the above, the applicant expects TS manure harvested annually to be about 2,624 t/yr. With an average harvest moisture of 50% and a bulk density of 0.6 t/m^3, this equates to about 8,750 m^3/yr.

Feedlot pens will be cleaned on a frequency to ensure the depth of dry manure does not exceed 50 mm. Tractor-drawn box scrapers and front-end loaders will be the primary equipment used to mound manure and clean pens, in addition to skid-steer loaders.

On the nominated design criteria stocking density for the feedlot on a continuous stocking regime, the pens will be cleaned about every 13 weeks, including in autumn to ready the yard for winter, and in spring to clean up after winter. Heat hazard manure load will be reduced in another concerted campaign prior to the end of December each year.

Manure storage and processing

Manure will be harvested from the feedlot pens in dry conditions and stored in dry peaked windrows on the manure storage pad, where it will dry out over time without processing. Winter effluent moisture will be seasonally available from the holding ponds and added to manure to initiate and facilitate the composting process.

A base of at least 100 mm of compost will be maintained on the pad floor at any one time. Manure windrows as ‘composting work in progress’ toward production of compost, will sit upon this base pad as they are watered and turned.

Manure will initially be stacked in low profile windrows (150 cm x 3 m spaced 5 m apart – 8 m centre to centre) and processed with a windrow turner using effluent additions from the holding ponds to ensure the product is processed and produced to optimum moisture specifications. Once friable and stable, the composted manure will be stacked in larger profile windrows (250 cm x 10 m spaced 5 m apart – 10 m centre to centre) for storage, until it can be used for spreading over cropland on the premises.

In addition, provision has been made for composting deceased animals in a designated area on the manure storage pad. The applicant estimates that manure windrows with a profile 230 cm x 6 m will be required to hold dead animals for composting. Providing 1.15 m per head/year of linear windrow for each dead animal, about 150 m for 100 dead animal composting windrows will be allowed on the pad area.

Table 2 provides details of planned windrows to be laid out on the manure storage pad, which will cover up to 37,605 m^2 on a pad with a total size of 48,600 m^2.

Table 2: Windrows within the proposed manure storage pad

Windrow type	Depth (cm)	Width (m)	Length (m)	No. rows	Total footprint
Processing	150	5	3,000	40	24,750 m^2
Storage	350	10	600	8	9,750 m^2
Dead animal composting	230	6	150	2	3,105 m^2
Total					37,605 m^2

The applicant intends to retain at least 7,000 m^3 of windrowed manure and stored compost on the manure storage pad at any time during operations. At any stage of development, the pad will have minimum capacity to hold up to 24 months of feedlot manure being composted and stored. Manure produced will be both aged and composted, which will affect the elemental and mineral composition of the manure to be used as soil conditioner.

2.4.4 Manure utilisation

The premises includes about 1,056 ha of dryland cropping land (Figure 2), which the applicant proposes to crop cereal grains and hay as base ingredients in the feed rations for the feedlot operation. As the soils on the premises are low in soil organic matter and other nutrients, the applicant proposes to spread the composted manure to enhance the soil carbon, water holding capacity and nutrient deficits.

▲ Figure 2: Waste utilisation area 1 – crop areas 1,197 ha

The primary nutrients used in determining limits for cropping soil are nitrogen, phosphorus and potassium. Phosphorus is the only nutrient with significant capacity for soil storage and the surplus amount that can be added to the soil annually depends on the life of the feedlot, which the applicant considers to be about 30 years.

Based on the cropping nutrient balance provided with the application, which indicates that potassium is the limiting nutrient upon which the sustainable annual spreading rate for manure should be determined by, the applicant has proposed two possible strategies, being:

- an annual spreading rate of 8.2 t/ha/yr for an oat crop yielding 7 t/ha; or
- one application every 4 years in a "2 oat crops, 1 pasture year, 1 fallow" rotation, with an application rate of 16.4 t/ha in each manure spreading pass.

The feedlot at the developed capacity of 8,000 SCUs will generate about 1,706 tonnes of aged manure or compost per year. To use the tonnage generated annually using a 4-year spreading rotation on a crop such as oats for hay will require about 416 ha of land to sustainably utilise the available nutrients.

In addition to the premises, the applicant controls the following cropping land on adjoining properties (Figure 3):

• Coalara feedlot premises dryland	1,197 ha
• Sendem Downs south block dryland	842 ha
• Hallswood Park dryland	1,120 ha
	3,159 ha

In addition to the land listed above, cropping land to the east of the premises (84 ha) is available as additional land for manure spreading. In the case the soil storage capacity for phosphorus is found to be significantly lower than the applicant's calculations (14 t/ha/yr), the applicant proposes to spread the manure over a larger area, and if required, additional licences under the EP Act (category 67A) would be applied for to enable district farmers to access the manure for their own purposes.

▲ ***Figure 3: Manure Utilisation Areas 2 (Sendem Downs) & 3 (Hallswood Park)***

DPIRD technical review

The Department of Primary Industries and Regional Development (DPIRD) has reviewed the proposed manure and compost utilisation and cropping nutrient balance and advises the yearly application (8.2 t/ha) of manure/compost is the most appropriate method to maintain the soil's capacity to absorb nutrients and to limit water repellence, which can affect the agronomy of crops and pastures.

Given the soils occurring on the premises are low in soil organic matter and other nutrients,

the applicant rightly states that spreading composted manure will enhance the soil carbon, water holding capacity and nutrient deficits. However, due to the characteristically low clay content of the soil and the Mediterranean climate, the elevated levels of organic matter and nutrients will not be sustained over the long term. Therefore, a 4 yearly application of the equivalent 21.9 t/ha of compost is likely to both overload the soil's capacity to retain nutrients in the short term and limit expected productivity returns over the following years until the next application. Application of nutrients in excess of requirements can lead to increased saturation in the soil surface, which can result in leaching or runoff.

DPIRD considers it is unlikely the soils will be replenished in carbon and nutrients after about 10 years of continual application of compost, as this type of carbon (labile) is effective for supplying nutrients seasonally, providing adequate rainfall is received, and will turn over very quickly in a cropping situation. The organic carbon is likely to increase only while higher inputs are sustained, however it is unclear how long lasting this impact would be, especially on soils that are so typically low in clay content.

DPIRD advises that research by their agronomists and others has shown that high organic matter inputs into sandy soil will also result in a build-up of water repellence over time, which will negatively impact plant establishment and limit the expected productivity benefits of added carbon. If water repellence increases, the risk of runoff and nutrients leaching into groundwater – already a high risk – becomes a greater issue. Increased water repellence could drive more runoff, meaning that fewer plants and less roots can take up nutrients. An associated increase in preferential flow through the soil profile may push solutes deeper.

In addition to the extremely low phosphorus holding capacity (sorption) of many of these soils, they also have a high risk of soil acidification and many typically have a pH < 6. DPIRD considers that soil acidity needs to be corrected on the manure utilisation areas before application of solid wastes, otherwise the crops will not perform as expected to use up the phosphorus and other nutrients.

DPIRD has calculated the nutrient balance based on the information supplied in the application and agrees, in principle, there is adequate cropping area to dispose of the amount of manure expected to be produced, with the following recommendations;

- soil testing is required to monitor the movement of phosphorus down the soil profile, to assess the potential for saturation of phosphorus in the soil and the progress of leaching, and should be done before and after the application of manure;
- manure should not be applied to soil with a pH($CaCl_2$) below 5.5. Lime applications should be applied to lift soils below 5.5 (lime requirements may be calculated using the DPIRD iLime calculator (https://agric.wa.gov.au/apps/ilime));
- soil testing is also required to determine the agronomic requirements for phosphorus on the paddocks. Manure should not be applied at an application rate greater than that required for an agronomic optimum (not exceeding 95% maximum production);
- soil testing should be used to determine optimum manure application rates. Agronomic soil samples are recommended 0 – 10 cm deep with multiple cores to be combined to make a single sample of the paddock. The samples should be taken in accordance with DPIRD soil sampling guidelines (https://agric.wa.gov.au/high-rainfall-pastures/soil-sampling-high-rainfall-pastures-western-australia);
- Soil samples should be analysed at an Australia Soil and Plant Analysis Council (ASPAC) accredited laboratory, with nutrient application rates derived from the results using the DPIRD nutrient calculator (https://agric.wa.gov.au/soil-nutrients/introduction-nutrient-calculator-high-rainfall-pastures-western-australia);
- the manure should be analysed for total phosphorus, potassium and sulphate concentration and applied as required by the nutrient calculator to meet the requirements for 95% protection; and
- to avoid increased leaching of phosphorus, application of manures should be made in conjunction with fertilisers containing potassium and sulphate if soil tests require application and the manure application to meet phosphorus requirements will be

insufficient to meet potassium and sulphate requirements.

2.4.5 Feedmill operations

At full capacity in Stage 3 of the development, the feedmill will process about 64 tonnes of grain per day as a subset of 84 tonnes of mixed ration delivered to the animals.

Grain receival will be via a drive-over, flatbed grain dump, with grain transferred to on-site silo storage using enclosed elevators. A negative pressure, fully enclosed grain scalper and aspirator will be in place to extract large particles and condense dust in the grain cleaning process. All augers and elevators will be fully enclosed to minimise dust emissions.

Grain processing will initially be setup for dry rolling in Stage 1 using a new generation side roll mill and developed over time to a tempering system in Stage 3. Stored ingredients to be processed will include grains, lupins and pre-mixed pellets.

In the out-loading sector of the mill, augers from the prepared ingredient detention silos will be used to transfer the stored ingredients to a batch bin before being conveyed to a ration mixed wagon. Hay and straw will be cut to the specified length in the bale pressing process at the time of haymaking, which will remove the need to process hay at the feedmill.

3. Infrastructure

Table 4 lists infrastructure associated with each prescribed premises category.

Table 1: Cattle feedlot Category 68 and Category 23 infrastructure

Prescribed activity – category 68	
Cattle feedlot: full capacity 8,000 SCU @ maximum stocking density 10.8 m^2/SCU	
1	Feedlot pens – rows A to D, each 2,000 SCU capacity
2	Processing shed, including “supply and take” races and holding pens
3	Sedimentation basins x 3, each with 1,020 m^3 capacity
4	Holding pond – 50,600 kL capacity
5	Manure storage/composting pad – 48,000 m^2
Prescribed activity – category 23	
Animal feed manufacturing: 29,200 tonnes per year	
1	Feedmill, including enclosed grain handling system
2	Grain storage silos

Exclusions to this assessment

The following matters are out of the scope of this assessment and have not been considered within the risk assessment detailed in this report:

- other general farming activities being conducted on the premises, including but not limited to machinery movements, centre pivot irrigation, land application of synthetic fertilisers, paddock grazing of sheep and cattle, etc.; and
- vehicle (i.e. livestock truck) movements on private or public roads.

The works approval is related to category 68 and 23 activities only and does not offer the defence to offence provisions in the EP Act (see sections 74, 74A and 74B) relating to emissions or environmental impacts arising from non-prescribed activities, including those listed above.

4. Other approvals

Planning approvals

The Shire of Dandaragan (Shire) granted development approval for the feedlot proposal in March 2021, subject to conditions that predominantly relate to the applicant’s use of Coalara

Rd to support activities on the premises.

The approval requires the design and operation of the feedlot to be generally in accordance with the National Code of Practice (MLA 2012a) and the National Guidelines (MLA 2012b).

Condition 4 of the approval states the maximum head of cattle is not to exceed 8,000 at any one time. The delegated officer sought clarification of this aspect, as the application submitted for assessment refers to 8,000 SCUs and not head of cattle. The Shire has advised the condition is intended to represent SCUs and not just aggregate head of cattle.

The feedlot proposal is summarised in the council minutes as representing an intensive form of agricultural land use that will contribute to a more diverse land use profile in the Shire's rural zone, is consistent with the Shire's strategic land use planning direction, and is seen as having no potential for conflict with the established amenity of the locality.

5. Consultation

The application was referred to relevant public authorities and advertised for public comment on the department's website during January and February 2021. No public submissions were received in the timeframe specified.

5.1 Public authorities

DPIRD advises that, in principle, it supports the expansion of the beef industry in Western Australia, providing that activities comply with the National Guidelines and the National Code of Practice.

DPIRD has identified some details addressing the National Code of Practice require clarification, with these aspects discussed in the following sections. It has also addressed some statements made by the applicant regarding the proposal to apply solid wastes on the premises (see section 2.4.4).

6. Location and siting

6.1 Siting context

The premises is located on farming land northeast of Badgingarra, about 190 km north of Perth. It is located over two land titles, dissected by the unmade road reserve of Boothendarra Rd. The feedlot infrastructure will be located on the northern section (Lot 10331) of about 1,550 ha, while the remaining area and southern section (Lot 10332) of 1,430 ha will remain broad acre farming and used for spreading composted manure, if required.

6.1.1 Land use and sensitive receptors

The premises has historically been used for extensive livestock grazing and grain production and as a result, is largely cleared with no significant remnant vegetation.

The premises is well separated from human sensitive receptors, with the nearest residential dwelling not associated with the proposal located about 6 km southwest of the feedlot pens, and is currently unoccupied. The next closest dwelling is about 12 km to the southwest. The nearest towns are Watheroo (28 km east) and Badgingarra (30 km southwest).

The Watheroo National Park borders the premises along the northern, eastern and part of the southern boundary, with land owned by the applicant to the south and west. The Boothendarra Nature Reserve is located about 3 km to the west of the premises boundary. No other specified ecosystems or areas of high conservation value have been identified in proximity that may be directly impacted by the proposed activities.

6.1.2 Climate

The Badgingarra area experiences a Mediterranean-type climate with hot dry summers and cool wet winters. Weather patterns are dominated by the regular passage of rain-bearing cold

fronts from the Indian Ocean in winter, and dry easterly air flows from inland areas in summer.

Average annual rainfall is about 530 mm/yr, with most rainfall occurring between April and October with little or no rain during the summer months. Annual evaporation is about 2 m per year and exceeds rainfall for all months except June and July.

6.1.3 Physiography

The premises is located in the middle of the Dandaragan Plateau, which is described as an 'undulating plateau that overlies the Jurassic and Cretaceous rocks and comprises many sporadic and ephemeral watercourses'. The Dandaragan and Gingin Scarps form the western boundary and the Darling Scarp marks the eastern boundary of the plateau.

6.1.4 Soils and landscape

Soil landscape mapping (DPIRD 2021) indicates the premises lies almost entirely within the Coalara 5 Soil-landscape Zone. This system is described as a 'Partially dissected plateau with crests, slopes and sandy valley plains on weathered Cretaceous sandstones in the western margin of the Dandaragan Plateau. Soils are mainly Pale and Yellow deep sands, sandy gravels and sand over gravel'. Bore logs for groundwater bores installed on the premises indicate the soil type present is the Gravelly pale deep sand of this association.

An investigation of the soils present on the site indicates the area is gently undulating, with generally poor coverage of annual pastures. Topsoil of about 20 cm depth consists of sand with fine fragments that are insufficient to allow the formation of a consistent bolus when wet.

The B horizon also consists of sand, with very limited root development. Readily Available Water (RAW) holding capacity is very low, due to the sandy nature of the soil and restricted root depth. The C horizon consists of either sand, loamy sand or clay sand, with varying degrees of coarse fragments.

Only one of 6 sites tested for soil properties on the premises comprised of materials suitable for construction of a clay liner (site 3). This site had a broad layer of clayey sand, with signs of sodicity and mottling, indicating suitability as a clay liner when compacted.

The applicant considers the soils at the location of the proposed feedlot infrastructure is most suitable, given the combination of a slope (leading to runoff, higher water holding capacity), and an increasing percentage of clay at depth. The applicant also considers the soils on the premises will benefit from the application of manure, by likely increasing the RAW holding capacity and reduce the leaching of nutrients.

DPIRD technical review

DPIRD technical review identified that the soil texture terminology in the application uses non-standard descriptions, for example, the subsoil identified as being 'suitable' as a clay liner for the ponds and hardstand areas is has been identified as 'Clay Sand', which technically means there is only up to 10% clay, which is a relatively low percentage of clay that would be sufficient to act as an impermeable barrier. It is likely the applicant meant 'Sandy clay', which would indicate a clay content of about >35%, which would meet the requirements for a low permeability barrier.

The amount of clay in the subsoil could not be clarified as the 6 soil sheets and photos of each sample site were not provided in the application; however, DPIRD assumed the latter, a sandy clay textured soil, was sampled for testing.

DPIRD agronomists suggest soil ameliorants such as clay may assist with reducing the risk of nutrient leaching on paddocks by increasing phosphorus adsorption. However, indicated that this will not prevent the leaching of nitrogen and that the addition of good quality lime to the clay before spreading will further enhance the ability of phosphors to be adsorbed and improve the soil pH (see section 2.4.4). DPIRD recommended that soil amendments be monitored and reapplied periodically as their nutrient absorbing capacity can decline over time.

DPIRD also recommended regular soil testing is conducted to monitor all nutrients, including phosphorus holding capacity (sorption), at depths down the soil profile. This will allow the ability to track movement of P and other nutrients and indicate if there is leaching at greater depths.

DPIRD identified that wind erosion risk is a limitation for productivity at the premises, given the subject soils have a generally poor capability for grazing, exhibit strong water repellence, low pH, poor nutrient and water holding capacity. These soil characteristics, combined with a loose, sandy surface, make exposed soil very vulnerable to prevailing winds in the summer, decaying cyclones, and especially to strong prefrontal winds in autumn, until the winter rains moisten the soil. DPIRD recommended that 50% ground cover is maintained for any pastures and after crop harvest, including maintenance of good standing crop stubble.

6.2 Groundwater

The premises is underlain by the Leederville-Parmelia aquifer, a significant multi-layered aquifer system in the Northern Perth Basin.

Regional hydrogeological information indicates the shallowest depth of the Leederville-Parmelia aquifer beneath the premises ranges from 30 to 40 mbgl, in the northeastern corner near the location of the proposed feedlot infrastructure. The closest DPIRD groundwater monitoring site to the premises (BD1 located about 10 km west) measures groundwater at about 12 m bgl, and indicates rising groundwater trends.

The closest DWER bore ‘Agaton 12’, located on the south side of Boothendarra Rd adjacent to the proposed feedlot location, shows a depth to watertable as 61.8 m below ground level (bgl), however as this bore is screened against deeper sections of the Parmelia aquifer, its water level is unlikely to be representative of the water table in the area.

The Leederville-Parmelia aquifer has historically been significant for town water supply in the region, however more recently there has been significant development of the aquifer for irrigated horticulture and pasture. The applicant has obtained a groundwater licence (GWL205125) to take up to 2,250,950 kL of groundwater from the Leederville-Parmelia aquifer for centre pivot irrigation, intensive stock watering and dust suppression. Abstraction at these volumes of groundwater should minimise the risk of increasing the rate of groundwater rise in the local area.

6.3 Surface water

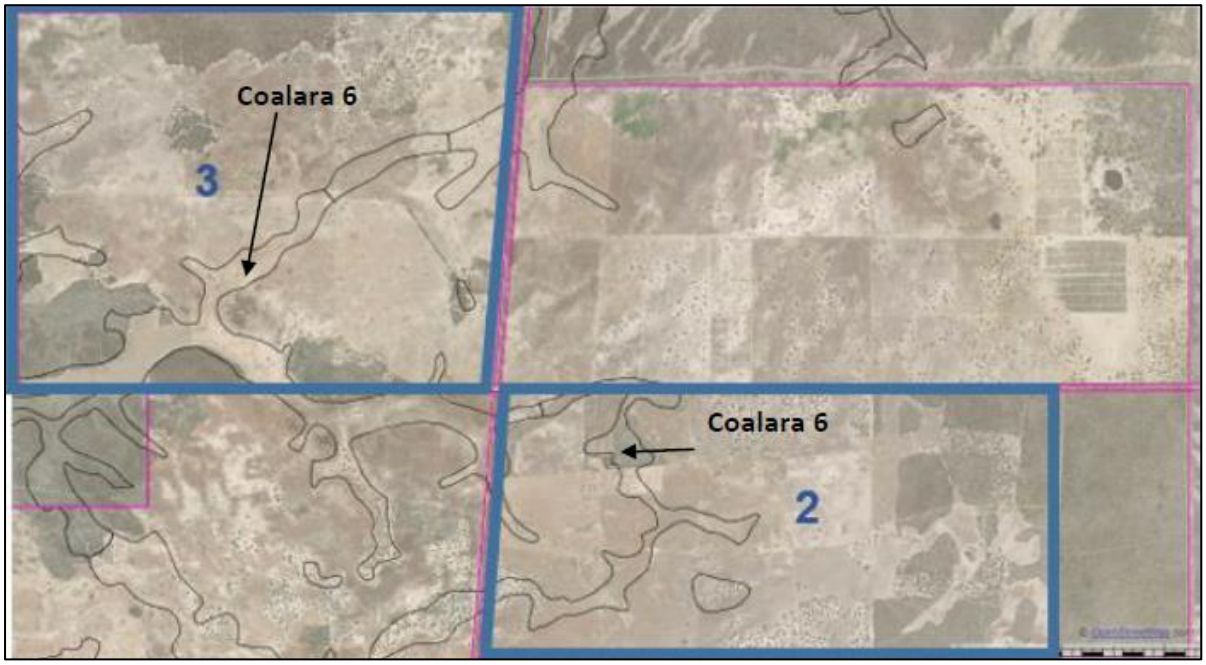
There are no significant surface water features on the premises. The closest are non-perennial watercourses and drainage lines that flow through Boothendarra Nature Reserve and are part of the Hill River surface water catchment area. Elevation declines around these watercourses, bringing the water level of the Leederville-Parmelia aquifer to within 20 m of the land surface in some locations.

DPIRD’s soil-landscape mapping also identifies narrow, sand-filled valleys (Coalara 6 Soil-landscape map unit) on the Manure Utilisation Areas 2 & 3 (Figure 4). These areas may receive a concentration of surface water runoff which may be intensified by the prevalence of water repellent sandy soils in the area (see section 6.1.4).

6.4 Separation distances

The applicant has calculated the minimum separation distances to nearby sensitive receptors using a readily applied formula (the ‘s-factor’ formula) outlined in the National Guidelines (MLA 2012b).

The s-factor method was originally devised in Queensland and allows for a rapid and simple assessment of potential air quality impacts (mainly odour) that does not require technically specialised and complex air quality modelling.



▲ ***Figure 4: Location of sand-filled valleys on Manure Utilisation Areas 2 & 3***

At full capacity (8,000 SCUs at stocking density 10.8 m^2/SCU), the calculated separation distance to the nearest receptor, being a single rural or farm dwelling, is 1.6 km, which is well within the actual distance of about 6 km. The calculated separation distance to the nearest town, being the medium-sized town of Watheroo (~200 persons), is 6.85 km, which also is well within the actual distance of about 28 km.

7. Risk assessment

7.1.1 Determination of emission, pathway and receptor

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

7.1.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account identified potential source-pathway and receptor linkages. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls, these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in the below table.

7.1.3 Risk assessment table

The table below describes the risk events associated with the proposal consistent with the *Guideline: Risk Assessments* (DWER 2020). The table identifies whether the risk events are acceptable and tolerated, or unacceptable and not tolerated, and the appropriate treatment and degree of regulatory control, where required.

Risk Event				Consequence rating[1]	Likelihood rating[1]	Risk[1]	Reasoning	Regulatory controls
Source/ Activities	**Potential emissions**	**Potential receptors, pathway and impact**	**Applicant controls**					
Construction works								
Construction of feedlot pens, internal roads, effluent drains and controlled drainage areas, dams and manure holding/ storage/compost infrastructure, etc. Mobilisation of feedmill and storage silos, etc.	Noise and fugitive dust associated with construction civil excavation, earthworks, construction works, etc.	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors (>6 km)	Adequate separation to nearby receptors (>6 km)	Minimal impacts to amenity on local scale **Slight**	May only occur in exceptional circumstances **Rare**	**Low** Acceptable, not subject to controls	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town), and therefore does not reasonably foresee that noise and dust from construction works will impact on the amenity or health of off-site human receptors.	Works approval controls: None specified.
Time limited operations and full operations								
Category 1: Feedlot operations								
Holding, feeding and watering of animals within uncovered pens	Nutrient-laden leachate from manure, urine, mobilised by surface water runoff	Seepage/infiltration causing groundwater contamination	Pens constructed with compacted clay floors (95% MDD at 2% moisture) Effluent drains to be constructed to divert leachates to lined sedimentation system, which will settle out solids Supernatant water from sedimentation basins overflows into lined holding ponds for storage, pending evaporation and use in composting process	Mid-level on-site impacts Low-level off-site impacts on local scale **Moderate**	Not likely to occur in most circumstances **Unlikely**	**Medium** Acceptable, subject to regulatory controls	In order to protect the underlying groundwater resource, the feedlot has been designed in accordance with the requirements outlined in the National Guidelines (MLA 2012a), namely: - Pen and yard surfaces and cattle alleys will be capped and compacted in layers to achieve 95% standard compaction at optimum moisture (±2%); - Effluent catch drains, sedimentation basins, holding pond floors and manure storage pad will be constructed and tested to achieve a permeability of at least 1 x 10^{-9} m/s; and - If compaction criteria cannot be achieved for the holding pond floor, a polymer plastic liner will be installed. The delegated officer considers the above controls will ensure the risk of groundwater contamination from feedlot activities is acceptable. As the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval, and required to be maintained on the licence as minimum infrastructure requirements.	Works approval controls: - Pen and yard surfaces and cattle alleys must be capped and compacted in accordance with prescribed standards; - Effluent catch drains, sedimentation basins, holding ponds and manure storage pad must be constructed as per design plans, and demonstrated through testing the permeability of the surface achieves 1x10^{-9} m/s or less; Licence controls: - All infrastructure within controlled drainage area must be maintained to ensure integrity is sustained.
		Uncontrolled discharge, causing soil contamination or groundwater contamination	Feedlot infrastructure constructed within a controlled drainage area, comprising a bunded hardstand that diverts surface water runoff to the sedimentation system	Mid-level on-site impacts Low-level off-site impacts on local scale **Moderate**	Not likely to occur in most circumstances **Unlikely**	**Medium** Acceptable, subject to regulatory controls	All feedlot infrastructure will be located within a bunded controlled drainage area, which will comprise a sloped hardstand in which all contaminated or potentially contaminated surface water runoff will be contained and diverted to a sedimentation system and holding ponds that combined will have sufficient capacity to contain the volume of runoff from a 95th percentile rainfall year. The delegated officer considers the above controls will ensure the risk of uncontrolled discharges, resulting in soil or groundwater contamination, is acceptable. As the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval, and required to be maintained on the licence as minimum infrastructure requirements.	Works approval controls: - Controlled drainage area must be constructed, with bunded hardstand area containing all key feedlot infrastructure; - CDA must be sloped to facilitate drainage to a sedimentation system and holding ponds. Licence controls: - Controlled drainage area must be maintained to ensure all contaminated surface water runoff is fully contained within.
		Overtopping of sedimentation basins or holding ponds, causing soil contamination or groundwater contamination	Sedimentation basins and holding ponds designed with sufficient storage capacity during a 95th percentile rainfall year	Mid-level on-site impacts Low-level off-site impacts on local scale **Moderate**	Not likely to occur in most circumstances **Unlikely**	**Medium** Acceptable, subject to regulatory controls	The sedimentation system will comprise three separate basins that are designed to cater for the peak flow from a 20-year ARI design storm. The holding ponds will comprise two ponds that combined will have sufficient design capacity to cater for the volume of surface water runoff from the entire controlled drainage area during a 95th percentile rainfall year. The delegated officer considers the above controls will ensure the risk of overtopping of containment infrastructure, resulting in soil or groundwater contamination, is acceptable.	Works approval controls: - Containment infrastructure must be constructed in accordance with National Guidelines, with minimum design capacity specified. Licence controls: - Operational freeboard requirement of 0.5 m must be maintained on

Risk Event				Consequence rating[1]	Likelihood rating[1]	Risk[1]	Reasoning	Regulatory controls
Source/ Activities	**Potential emissions**	**Potential receptors, pathway and impact**	**Applicant controls**					
							As the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval, and required to be maintained on the licence as minimum infrastructure requirements.	holding ponds, 0.8 m on sedimentation basins.
	Odour, from manure accumulated in feedlot pens	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors (>6 km)	Stocking density 10.8 m^2/SCU Pens cleaned about every 13 weeks, to ensure manure build up does not exceed 50mm	Low level impacts to amenity on local scale **Minor**	Likely to occur only in exceptional circumstances **Rare**	**Low** Acceptable, based on applicant controls being implemented	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town). Providing the stocking density in pens does not exceed the National Guidelines (10.8 m^2/SCU) and pens are cleaned in accordance with the National Guidelines (i.e. at least once every 13 weeks, to ensure manure build up does not exceed 50 mm), the delegated officer considers it unlikely that odour from feedlot operations will significantly impact on the amenity or health of off-site human receptors. As the proposed controls are necessary for maintaining a low level of risk, they will be imposed on the works approval and the licence as operational controls.	Works approval controls: - Stocking density must not exceed 10.8 m^2/SCU in pens; - Pens must be cleaned once the depth of dry manure on the pen surface exceeds 50 mm, or at least once every 13 weeks, whichever is sooner. Licence controls: As above.
	Odour, from manure and nutrient-laden leachate build up in effluent catch drains and sedimentation basins		Effluent catch drains constructed with at least 0.75% long fall to facilitate drainage during rainfall events 3 x sedimentation basins to be constructed, to enable basins to be taken off-line for maintenance	Low level impacts to amenity on local scale **Minor**	Likely to occur only in exceptional circumstances **Rare**	**Low** Acceptable, based on applicant controls being implemented	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town). Providing the effluent catch drains are maintained in accordance with the National Guidelines (i.e. all leachate and surface water runoff from the feedlot pens can freely flow to the sedimentation system without scouring), the delegated officer considers it unlikely that odour from effluent catch drains or the sedimentation system will significantly impact on the amenity or health of off-site human receptors. As the proposed controls are necessary for maintaining a low level of risk, they will be imposed on the works approval and the licence as operational controls.	Works approval controls: - Effluent catch drains must be maintained to ensure all leachate and surface water runoff from the feedlot pens is diverted to the sedimentation system without scouring. Licence controls: As above.
	Odour, from effluent holding ponds		Sedimentation system in place to settle solids, to ensure cleaner water is stored within holding ponds	Low level impacts to amenity on local scale **Minor**	Likely to occur only in exceptional circumstances **Rare**	**Low** Acceptable, based on applicant controls being implemented	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town). Providing the sedimentation system is maintained in accordance with the National Guidelines (i.e. basins flow freely after rainfall events, basins cleaned of solids before sludge takes up more than 10% of the basin capacity), the delegated officer considers it unlikely that odour from the effluent holding ponds will significantly impact on the amenity or health of off-site human receptors. As the proposed controls are necessary for maintaining a low level of risk, they will be imposed on the works approval and the licence as operational controls.	Works approval controls: - Sedimentation system must be maintained to ensure basins are free flowing after rainfall; - Basins must be cleaned of solids before 10% buildup of sludge; Licence controls: As above.
	Noise, from animals and machinery movements Fugitive dust, from truck movements on gravel/unsealed roads		Sufficient separation distance in place to nearby human receptors	Minimal impacts to amenity on local scale **Slight**	Likely to occur only in exceptional circumstances **Rare**	**Low** Acceptable, not subject to controls	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town), and therefore does not reasonably foresee that noise and dust from vehicle movements as part of feedlot operations will impact on the amenity or health of off-site human receptors.	Works approval controls: None specified. Licence controls: None specified.
Category 1: Manure storage / composting operations								
Transfer of manure and dead animals from feedlot pens, generation of manure and composting windrows, disturbance of stockpiles and windrows, etc.	Nutrient-laden leachate from manure, urine, mobilised by surface water runoff	Uncontrolled discharge, causing soil contamination or groundwater contamination	Manure storage pad to be constructed within a controlled drainage area, comprising a bunded hardstand that diverts surface water runoff to the effluent holding ponds	Mid-level on-site impacts Low-level off-site impacts on local scale **Moderate**	Not likely to occur in most circumstances **Unlikely**	**Medium** Acceptable, subject to regulatory controls	The manure storage area will comprise a bunded hardstand pad that slopes toward the holding ponds, to ensure all surface water runoff is contained and diverted to the holding ponds. The delegated officer considers the above controls will ensure the risk of uncontrolled discharges, resulting in soil or groundwater contamination, is acceptable. As the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval, and required to be maintained on the licence as minimum infrastructure requirements.	Works approval controls: - Manure storage area must be constructed, with bunded hardstand area within the controlled drainage area; - Area must be sloped to facilitate drainage to the effluent holding ponds; Licence controls: - Manure storage area must be maintained to ensure all contaminated surface water runoff is fully contained within.

Risk Event				Consequence rating[1]	Likelihood rating[1]	Risk[1]	Reasoning	Regulatory controls
Source/ Activities	**Potential emissions**	**Potential receptors, pathway and impact**	**Applicant controls**					
	Odour, from manure storage area (stockpiled manure, composting operations, etc.)	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors (>6 km)	Manure stockpiled in low profile windrows, consistent with National Guidelines Composting manure and dead animals in accordance with National Guidelines	Low level impacts to amenity on local scale **Minor**	Not likely to occur in most circumstances **Unlikely**	**Medium** Acceptable, subject to regulatory controls	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town). Providing the manure is handled, stockpiled and composted in accordance with the National Guidelines (i.e. using an aerobic composting process, turning and aerating the material, maintaining suitable moisture levels and temperature, having a suitable C:N ratio, etc.), the delegated officer considers it unlikely that odour from manure storage or composting operations will significantly impact on the amenity or health of off-site human receptors. This also assumes that only low risk feedstocks are brought onto the premises for incorporating into the composting process, such as green waste, untreated timber and natural fibrous organics, which all have low odour potential. As the proposed controls are necessary for maintaining a low level of risk, they will be imposed on the works approval and the licence as operational controls.	Works approval controls: - Optimum conditions for rapid composting, as per National Guidelines; - Only low risk feedstocks brought onto the premises for incorporating into composting process Licence controls: As above.
Category 1: Manure/compost spreading operations								
Spreading of composted manure over 1,056 ha of dryland cropping land	Leaching or runoff of nutrients from spread compost / manure	Contamination of soil, particularly in sand-filled valleys, causing contamination of shallow groundwater Soil acidification Excessive build-up of soil P	Manure / compost to be evenly spread at yearly application of 8.2 t/ha	Mid-level on-site impacts **Moderate**	Could occur at some time **Possible**	**Medium** Acceptable, subject to regulatory controls	The delegated officer has considered the advice provided by DPIRD on the applicant's proposal to spread composted manure on the premises (see section 2.4), and has determined the yearly application of up to 8.2 t/ha over the available 1,056 ha of cropping land is the most appropriate method to maintain the soil's capacity to absorb nutrients and to limit water repellence. As the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval for time limited operations, and on the licence as ongoing operational controls. In addition, the delegated officer considers the suggestion by DPIRD for soil testing before and after the application of manure has merit, to allow the ability to track movement of P and other nutrients down the soil profile and indicate if there is leaching at greater depth.	Works approval controls: - Composted manure must only be spread at an application rate of no more than 8.2 t/ha/yr; - Composted manure must only be spread across Waste Utilisation Area 1, with even distribution and only onto areas growing crops or pasture; - Must conduct soil testing of nutrients, before and after first application; - Soil testing must be conducted at regular depths down the soil profile; Licence controls: As above.
	Odour, from spread manure / compost	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors (>6 km)	Manure stockpiled in low profile windrows, consistent with National Guidelines Composting manure and dead animals in accordance with National Guidelines	Minimal impacts to amenity on local scale **Slight**	Not likely to occur in most circumstances **Unlikely**	**Low** Acceptable, based on applicant controls being implemented	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town). Providing the manure is incorporated into cultivation as soon as possible after application, the delegated officer considers it unlikely that odour from the spreading of composted manure will significantly impact on the amenity or health of off-site human receptors. As the proposed controls are necessary for maintaining a low level of risk, they will be imposed on the works approval and the licence as operational controls.	Works approval controls: - Composted manure must be incorporated into the soil profile within 7 days of spreading; Licence controls: As above.
Category 23: Animal feed manufacturing operations								
Transfer of grains to silos Operation of feedmill	Dust from transfer points Noise and dust from operation of mill and associated machinery	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors (>6 km)	Enclosed augers and elevators Sufficient separation distance in place to nearby human receptors	Minimal impacts to amenity on local scale **Slight**	Likely to occur only in exceptional circumstances **Rare**	**Low** Acceptable, not subject to controls	The delegated officer considers there is sufficient separation in place (>6 km to nearest rural dwelling, >28 km to nearest town), and therefore does not reasonably foresee that noise and dust from operation of the feedmill will impact on the amenity or health of off-site human receptors.	Works approval controls: None specified. Licence controls: None specified.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Guideline: Risk Assessments (DWER 2020).

8. Decision

The delegated officer has determined the proposal to construct and operate an intensive open-air cattle feedlot on the premises, with an assessed design capacity of 8,000 SCUs, does not pose an unacceptable risk of impacts to on- and off-site receptors. This determination is based on the siting, design and proposed construction and management being consistent with the National Guidelines (MLA 2021a):

- sufficient separation to nearby (human) sensitive receptors, groundwater and surface water features;
- proposed stocking density of 10.8 m^2/SCU;
- feedlot pens, bunks, cattle alleys, effluent catch drains, sedimentation basins and effluent holding ponds to be constructed with an impermeable barrier (clay liner with maximum permeability of $1x10^{-9}$ m/s);
- an appropriate controlled drainage system;
- effluent catch drains and sedimentation system designed to cater for the peak flow from a design storm having an ARI of 20 years;
- effluent holding ponds being designed with sufficient storage capacity so that they spill no more frequently than an average of one in 20 years;
- manure and carcass composting to be conducted on a suitably constructed composting pad within the controlled drainage area, with compost to be prepared for spreading on the premises; and
- finished compost and stockpiled manure being spread at acceptable application rates, once per year during the dry period.

The above controls proposed by the applicant are considered critical for maintaining an acceptable level of risk of environmental impacts, therefore they will be imposed on the works approval as infrastructure controls.

The delegated officer has also considered advice provided by DPIRD regarding the proposal to spread composted manure on the premises and has imposed additional controls based on that advice to ensure the risk is acceptable and sustainable.

8.1.1 Works approval and licence

Works Approval W6492/2020/1 that accompanies this report authorises construction and time-limited operations only. The conditions in the issued works approval, as outlined in the above risk table have been determined in accordance with the *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required to authorise emissions associated with the ongoing operation of the premises, i.e. cattle feedlotting activities. A risk assessment for the operational phase has been included in this report, however licence conditions will not be finalised until the department assesses the licence application. Conditions will be imposed to ensure day-to-day operations do not pose an unacceptable risk of impacts to on- and off-site receptors.

8.1.2 Applicant comments on draft decision

The applicant was provided with drafts of the works approval and this report on 10 May 2021 and sought variations to the proposed long slopes for the manure storage area/pen row alleys/effluent catch drains, variations to soil monitoring requirements, and changed the proposed design of the effluent holding ponds from two separate ponds to a single pond, and increased the design holding capacity following a review of surface runoff calculations.

The applicant also commented on the requirement to construct the feedlot pen surfaces to a design permeability of $<1 \times 10^{-9}$ m/s, which it considered to be over and above the National Guidelines (MLA 2021a) and may impose an unbudgeted cost element to the development. Although the National Guidelines (MLA 2021a) do not specifically include feedlot pen surfaces

as requiring a design permeability of <1 x 10^{-9} m/s, the delegated officer notes the National Code of Practice (MLA 2012b) recommend that any area in which there is a risk that soil leachate movement might contaminate groundwater must be underlain by a liner able to mitigate that risk, where the liner materials may include suitable soils or synthetic liners capable of meeting the standards set out in applicable guidelines, codes, etc.

The delegated officer advised the applicant that it considers a design permeability of <1 x 10^{-9} m/s is appropriate for the feedlot pen surfaces, unless it can be demonstrated that protection of groundwater is capable of being met through alternative means.

Conclusion

Based on this assessment, it has been determined the issued works approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Caron Goodbourn
MANAGER, PROCESS INDUSTRIES
REGULATORY SERVICES

Delegated officer
under section 20 of the Environmental Protection Act 1986

9. References

1. Department of Primary Industries and Regional Development (DPIRD) 2021, Soil Landscape Mapping (DPIRD-027). Accessed from www.data.wa.gov.au.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2019, *Guideline: Industry Regulation Guide to Licensing*, Perth, Western Australia.
4. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
5. MLA 2012a, *National Guidelines for Beef Cattle Feedlots in Australia, 2nd Ed.* Meat & Livestock Australia Limited.
6. MLA 2012b, *National Beef Cattle Feedlot Environmental Code of Practice, 2nd Ed.* Meat & Livestock Australia Limited.