



Application for Works Approval

Part V Division 3 of the *Environmental Protection Act 1986*

Works Approval Number	W6598/2021/1
Applicant	CXTGD Investment Pty Ltd
ACN	641 676 628
File number	DER2021/000020
Premises	Erim Downs Cattle Feedlot 19094 Brand Hwy WARRADARGE WA 6518 Legal description – Lot 10804 on Plan 210800 As defined by the coordinates in Schedule 2 of the works approval
Date of report	02/11/2022
Decision	Works approval granted

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1. Purpose and scope of assessment

CXTGD Investment Pty Ltd (the applicant) proposes to remediate an existing damaged cattle feedlot that was previously subject to licence L9061/2017/1. An application for works approval was submitted under Division 3 Part V of the *Environmental Protection Act 1986* (EP Act) on 20 August 2021.

This Decision Report sets out the Delegated Officer's assessment of potential risk events arising from emissions and discharges during remediation works and subsequent operations 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 remediate the 'Erim Downs' cattle feedlot, an existing intensive open-air cattle feedlot located near Warradarge, about 210 km north of Perth and 160 km south-east of Geraldton. The feedlot infrastructure was only operated for a few months before being damaged in 2018, where it remained in care and maintenance. The Licence ceased to have effect on 12/04/2021.

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.	12,000 SCU at any time
Category 55: Livestock saleyard or holding pen: premises on which live animals are held pending their sale, shipment or slaughter.	

The applicant has applied for a works approval including time-limited operations to operate a Category 68 cattle feedlot with a potential capacity of up to 12,000 SCU and additionally, the periodic operation of a Category 55 live export facility (cattle).

2.2 Background

The existing partially constructed feedlot infrastructure on the premises was constructed in 2017 without a works approval. The original owner, Kalimpa Park Pty Ltd (Kalimpa), was subsequently convicted under section 52 of the EP Act for causing a premises to become prescribed without the necessary authorisation.

Kalimpa subsequently applied for approvals to complete construction of the cattle feedlot and live export facility, comprising 40 pens and associated drainage and storage/evaporation ponds, and manure storage and carcass composting areas. A review of the information identified several deficiencies in the as-constructed infrastructure, including significant erosion, and dams and other infrastructure being built to different dimensions and in different locations to plans submitted with the application. It was also unclear to what standard the feedlot had been designed and constructed to.

Licence L9061/2017/1 was issued in April 2018 for a period of 3 years, which allowed the site to operate, subject to the completion of a design audit (as-constructed plans, survey information and other details), submission of an environmental improvement plan, and improvements to key infrastructure.

Only 20 of 40 planned pens had been constructed by the time the feedlot commenced operations in 2018, which only operated for a few months before all the constructed pens and other key infrastructure were extensively damaged (vandalised). The feedlot has remained in care and maintenance since this time.

Kalimpa went into voluntary administration in 2019 and licence L9061/2017/1 was transferred to Erim Downs Pty Ltd (Erim Downs) in May 2020. Licence L9061/2017/1 subsequently expired on 12 April 2021.

In August 2021, CXTGD made application for a works approval to remediate the damaged infrastructure, complete the full feedlot construction and put it back into service. It acquired the premises from Erim Downs in October 2021.

2.3 Existing infrastructure

2.3.1 Feedlot design and layout

The original design of the feedlot from 2017 comprised two groups of two rows (total 4 rows) laid out in a terraced configuration (Figure 1). Each row comprised 10 individual pens (total 40 pens). Only the first group of two rows (20 pens) was constructed and operated, prior to the feedlot being damaged.

Each pen measured 50 m (L) x 60 m (W), giving a floor area for each group of two rows of 500 x 120 m (60,000 m²), and overall total pen floor area of 120,000 m². It was proposed to stock the pens at a density of 10 m²/SCU, which equated to 300 SCU/pen and 12,000 SCU overall design capacity.

The existing feedlot is located on a sloping site with a gradient of about 3% on the long, downslope axis, in which the natural slope of the land was used to manage surface water runoff. 'Side drains' were constructed along the outer flanks of each row to direct runoff northwards to a 'collector cross-drain' and into a sedimentation basin for settling of solids, prior to transfer to a primary effluent holding pond and overflow to a secondary holding pond.

2.3.2 Controlled drainage infrastructure and specifications

The feedlot contains two separate controlled drainage areas (CDA) – one which encompasses the induction yards, feed supplies area and manure stockpile area which connects to a 'stormwater sump' (CDA 1), and another that encompasses the constructed feedlot pens, cattle lanes and accessways that connect to a sedimentation basin and effluent holding pond (CDA 2).

The original application (May 2017) indicates all key infrastructure had been constructed with in-situ soils, using gravel over clayey substrate of low permeability (i.e., 1 x 10⁻⁹ m/s or less). The Delegated Officer notes that no permeability testing of the construction materials or post-construction testing of the feedlot pen floors, drains or containment ponds was conducted at any stage to confirm the permeability standard, prior to the commencement of operations.

Side drains and collector cross drain

Given the significant gradient, the design provided in the drawings of May 2017 indicated the side drains were designed to be constructed to ensure flow capacity would be less than 1 m³/sec.

To achieve this, the lower end of the drain would be constructed with a floor at least 4.5 m wide with 1:3 batters and a maximum water depth of around 150 mm and be rock-filled (100 – 200 mm rubble) to achieve a Manning coefficient (roughness) of about 0.030. Where the gradient exceeds 3%, it would be lined with a geomembrane to prevent scouring.

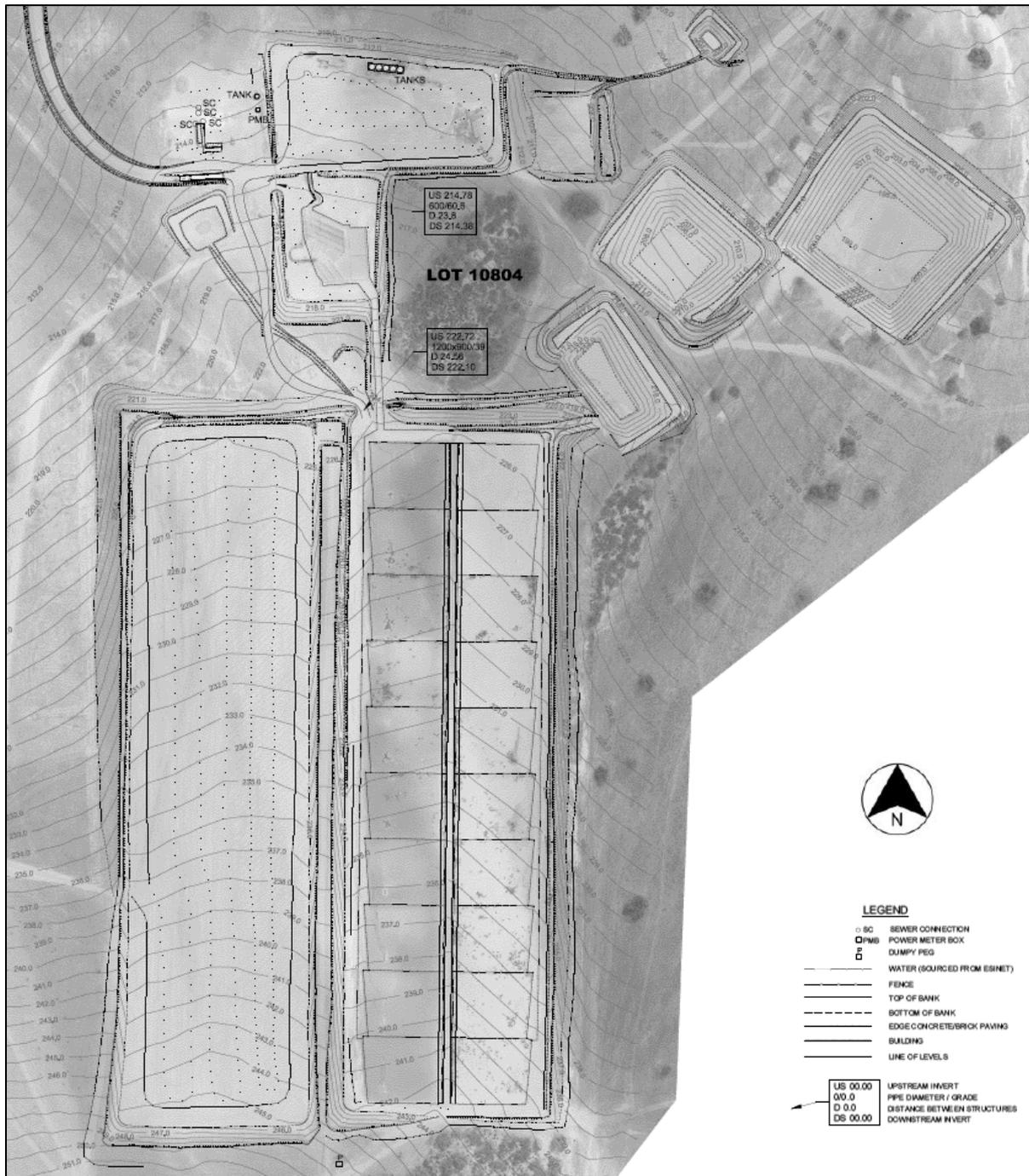


Figure 1: Existing feedlot design and layout

'High-energy drain structures' were to be constructed at the lower end of the drainage system to reduce the flow velocities entering the lower-level cross drain. These structures were designed to capture effluent runoff through a grate and into a system of concrete caissons (septic tank liners), that would then convey to a floor drain through a 40 – 50 cm underground pipe and flow into a perforated concrete caisson located centrally within the floor of the cross drain.

A lower collector cross drain would be constructed at the lowest point of the side drains, to direct effluent runoff to the sedimentation pond. The drain was to be constructed with a floor at least 4.5 m wide with 1:3 batters.

An audit conducted shortly after operations commenced in 2018 found the as-constructed drains to be only simple, basic excavations into the in-situ gravelly, silty clay soils. Compaction and layering was not evident, nor had any rubble, geomembranes or high-energy drain structures been installed. Some earthen material had been placed at selected points in some drains, however no other flow modification devices had been installed.

Sedimentation basin

A small sedimentation basin was constructed for the purpose of separating solids in the effluent runoff from CDA 2.

Initial runoff estimates provided in the original May 2017 application indicated an expected inflow rate of about 3.2 m³/sec, which according to the National Guidelines (MLA 2012b) would require a cross-sectional area of at least 640 m² to achieve the recommended flow rate within the sedimentation system of 0.005 m/sec.

A review of the as-built basin indicated it had a surface area of just 146 m² below the spillway level. The May 2017 application indicated this dam would be expanded to achieve the required 640 m², and the existing spillway was to be refurbished with rubble and lined with a geomembrane to prevent scouring.

A small pipe with diameter 25 – 30 cm x 70 m long was to be installed to convey effluent from the sedimentation basin to the primary holding pond, which was intended to reduce the flow rate to the pond to between 0.3 and 0.4 m³/sec.

An audit conducted shortly after operations commenced in 2018 found that it was still unclear to what dimensions and standards the sedimentation basin had been constructed to, or that it had sufficient storage capacity to ensure it did not overtop at an unreasonable frequency. It was also identified the connecting pipe between the basin and the primary effluent holding pond had not been installed, and the spillway to the holding pond had only been partially constructed with no rubble or geomembrane installed.

Effluent holding ponds

Two holding ponds, a primary pond and secondary/overflow pond, were constructed for the purpose of containing effluent runoff from CDA 2. The original May 2017 application did not seek approval to irrigate effluent; therefore, it is assumed these ponds were designed with evaporation being the sole means of water abstraction.

According to an audit conducted shortly after operations commenced in 2018, the primary pond has been constructed with a design storage capacity of 35,000 m³ and the secondary pond 60,000 m³, providing a total storage capacity of 95,000 m³. The original May 2017 application indicated this was based on capturing runoff during a 1:20 year ARI event from a total pen area of 16.9 ha, however no runoff calculations were provided to demonstrate how this was determined or whether this would be sufficient to ensure the ponds did not overtop at an unreasonable frequency.

A review by the applicant identified several key design flaws with the controlled drainage infrastructure, such as:

- the absence of controls to prevent the ingress of clean surface water runoff into CDA1 & 2;
- the side drains are not adequately sized, or designed to manage high velocity flows;
- the sedimentation ponds are undersized;
- CDA 1 does not have a holding pond;

- CDA 2 two holding ponds only have adequate capacity for 1 in 10-year annual rainfall events;
- Ponds are not adequately protected with weirs and spillways in the event of overtopping or spill events;
- Sedimentation systems are not designed to provide for low flow velocities;
- Sedimentation systems and holding ponds do not have spillways to handle extreme rainfall events.

2.4 Application details

This application involves extensive remediation of existing infrastructure (maintenance and modification) and construction of new infrastructure, to support the recommencement of feedlot operations.

The applicant has given due regard to the *National Beef Cattle Feedlot Environmental Code of Practice* (MLA 2012a) (Code of Practice) and the *National Guidelines for Beef Cattle Feedlots in Australia* (MLA 2012b) (National Guidelines), which the department considers to be the minimum requirements for the environmentally relevant aspects of the establishment and operation of beef cattle feedlots in Australia.

The Department also notes that adherence to the Code of Practice (MLA 2012a) is a requirement of the Australian cattle feedlot industry's quality assurance system, the National Feedlot Accreditation Scheme (NFAS), for accredited feedlots.

2.4.1 Proposed infrastructure

Table 2 lists infrastructure associated with prescribed premises categories.

Table 2: Cattle feedlot Category 55 and Category 68 – key infrastructure

Prescribed activity – categories 55 & 68	
Holding pen & Cattle feedlot: full capacity 12,000 SCU @ maximum stocking density 11.5 m ² /SCU	
1	Induction yard holding a maximum 600 cattle – includes 6x 5m x 5m holding pens
2	60 feedlot pens – 50 pens measuring 51m x 42m with a nominal area of 2142m ² and 10 pens measuring 60m x 51m with a nominal area of 3,060m ² holding up to 200 SCU capacity allowing 11.5m ² /SCU
3	Drainage network for the controlled drainage area 1
4	Sedimentation pond – Top RL: 100m x 50m/ Base RL: 60m x 20m (6,950m ³) for CDA 1
5	Effluent holding ponds x 2 for CDA 1 Effluent holding pond 1 – Top RL: 94m x 86m / Base RL: 46m x 43m (16,425m ³) Effluent holding pond 2 – Top RL: 131m x 125m / Base RL: 69m x 73m (72,100m ³)
6	Manure storage/composting pad – 65m x 50m (3,250m ²)

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.

2.4.2 Infrastructure construction and remediation

Key infrastructure and specifications

All feedlot pens, induction yard surfaces, manure storage pad surfaces and effluent drains, will be located within a controlled drainage area (CDA), to contain and divert all surface water runoff and effluent to a sedimentation pond.

Induction yard and feedlot pens

The induction yard is designed to hold 600 cattle and will be used to (un)load cattle on to and from single and twin deck cattle trucks. Six holding pens (5m x 5m) will also be constructed to use for any cattle that do not meet specifications or need immediate care on arrival or despatch. The applicant has advised that ramps, lanes and pens in this area have already existing. The induction yard will be located within the CDA.

60 feedlot pens are proposed for construction, each designed to hold up to 200 SCU, providing 11.5m²/SCU. The nominal pen size for 50 pens is 2,142m² and for 10 pens is 3,060m² giving a total production pen area of 137,700m³. Each pen will have a concrete feed bunk, a concrete feed apron and a water trough, plus a shade structure covering 25% of each pen area. Existing damaged pen infrastructure such as fencing, railing, gates, feed bunks and water troughs will be removed and replaced where required.

The applicant has proposed the feedlot pens and induction yard ground surfaces to be constructed of in-situ compacted gravel and clay to achieve an average permeability of $\leq 1 \times 10^{-7}$ m/s. This proposed permeability is not in line with the National Guidelines (MLA 2012a) requirements for an impermeable base designed with a 300mm clay liner with $\leq 1 \times 10^{-9}$ m/s permeability. After consultation with the Department of Primary Industries and Regional Development (DPIRD), the Delegated Officer considers the applicants proposed permeability for these areas acceptable due to the following:

- The significant setback distance from the feedlot pad and induction yard surface to groundwater (estimated at approximately 113-140m);
- The presence of deep in-situ low permeability clay/sand soils to be compacted to the required compaction to ensure the required permeability is achieved;
- Construction of a sufficient ground slope gradient of at least 2.5% to ensure leachate and surface water runoff is able to flow freely to the effluent drainage infrastructure; and
- Once operations commence, the formation of a low permeability soil-manure interface layer will form in these areas.

Effluent drains

Drainage channels will be constructed to surround CDA 1 to capture all surface water runoff and effluent from the induction yard, temporary holding pens, the feedlot production pens, manure pad, roadways, cattle lanes and accessways. Lateral cut off drains will be installed between pens to drain pen runoff into the drainage channels.

Existing open drainage channels will be realigned to shape into a new spillway that will drain into the sedimentation pond. Drainage infrastructure has been designed and sized in accordance with the National Guidelines (MLA 2012a) to meet the following:

- Underlain with a minimum 300mm of in-situ compacted gravel and clay and topped with a suitable material to stabilise the drain, achieve a permeability of $\leq 1 \times 10^{-9}$ m/s and prevent scouring;
- Able to convey a 1 in 20-year ARI storm event without overflowing;
- Constructed to allow a flow rate greater than 0.5m/s without causing scouring;

- Bunds and berms will be constructed around CDA 1 where required to prevent the ingress of clean stormwater.

The applicant has indicated that existing drains are significantly damaged and therefore earthworks repairs will be undertaken to reform all drains with a 150mm to 300mm bentonite material mix to provide a stabilised and bound surface beneath a 30mm spray-crete top layer.

Drainage channels are trapezoidal shaped, open channel drains with dimensions as listed in Table 3:

Table 3: Drainage infrastructure dimensions

Drainage infrastructure	Drain base width	Total drain width	Depth	Top Water Level	Slope
Feedlot channel drains	0.5m	3m	0.2m	0.35m	1:3
Feedlot lateral cut-off drains	0.5m	2m	0.2m	0.2m	1:3
Induction yard channel drains	0.5m	2.5m	0.2m	0.2m	1:3
Manure pad channel drains	0.5m	3m	0.2m	0.25m	1:3

Sedimentation pond

The drainage infrastructure of CDA1 is to drain into an existing pond to be remediated with an engineered soil liner where effluent and surface water run-off will flow through the sedimentation pond to settle solids before flowing to a control weir before being discharged into effluent holding pond 1.

The sedimentation pond has been designed in accordance with the National Guidelines (MLA 2012a) to:

- Cater for the peak flow from a 1 in 20-year ARI storm event using runoff coefficients of 0.8 from induction yard, temporary holding pens, the feedlot production pens, manure pad, roadways, cattle lanes and accessways;
- Provide a maximum flow velocity in the sedimentation pond of 0.005 m/s;
- Install control weirs on sedimentation pond to regulate drainage and sediment collection;
- Ensure a minimum freeboard of 0.9m is provided between each weir crest and the crest of the sedimentation pond embankment;
- Ensure the sedimentation pond is cleaned of solids before sludge takes up 60% of the total capacity of the pond; and
- Ensure the sedimentation pond is constructed with an engineered soil liner or a synthetic liner to achieve a permeability of $\leq 1 \times 10^{-9}$ m/s;

The applicant has noted that a engineered soil liner will be used to line the sedimentation pond, however no specifications on the liner type has been provided. The Delegated Officer considers the inclusion of installation requirements necessary to ensure any engineered soil liner is installed appropriately. An excerpt with installation requirements from *Water Quality Protection Note 27: Liners for containing pollutants, using engineered soils* has been added to the works approval.

The applicant has proposed the following sedimentation pond dimensions in Table 4:

Table 4: Sedimentation terrace system dimensions

Controlled Drainage Area	Sedimentation pond infrastructure	Base RL Length x Width	Top RL Length x Width	Capacity
1	Sedimentation pond 1	60m x 20m	100m x 50m	6,950m ³

Effluent holding ponds

The existing two effluent holding ponds in CDA 1 will also undergo remedial earthworks with the installation of a synthetic liner to meet permeability requirements. Effluent pond 1 will receive effluent from the sedimentation pond and subsequently drain into effluent pond 2 with control weirs installed on each pond discharge point. The effluent ponds have been designed in accordance with the National Guidelines (MLA 2012a) to ensure the following:

- Both ponds will be lined with a HDPE liner to achieve a permeability of $\leq 1 \times 10^{-9}$ m/s;
- A minimum freeboard of 0.5m will be provided and maintained for both ponds between the crest of the discharge weir and the crest of the holding pond embankment;
- Sludge levels not to exceed 10% of the design capacity of any pond;
- Both ponds will be able to hold a 1 in 20-year ARI storm event without breaching freeboard; and
- All ponds will have a weir and by-wash capable of discharging the peak flow from a 1 in 50-year ARI storm event.

The applicant has proposed the following effluent holding pond dimensions in Table 5:

Table 5: Effluent holding pond dimensions

Controlled Drainage Area	Effluent pond infrastructure	Base RL Length x Width	Top RL Length x Width	Pond Surface Area	Capacity	Total capacity
1	Effluent pond 1	46m x 43m	94m x 86m	8,084m ²	16,425m ³	88,525m ³
	Effluent pond 2	69m x 73m	131m x 125m	16,375m ²	72,100m ³	
Total:				25,179m ²	89,135m ³	

The applicant has not proposed to irrigate wastewater from these ponds and therefore evaporation will be the sole means of disposal.

The applicant has noted that a synthetic liner will be used to line the effluent holding ponds, however no specifications on the liner type has been provided. The Delegated Officer considers the inclusion of installation requirements necessary to ensure any synthetic membrane is installed appropriately. An excerpt with installation requirements from *Water Quality Protection Note 26: Liners for containing pollutants, using synthetic membranes* has been added to the works approval.

Manure storage pad

The applicant has indicated that a new pad will be installed with a suitable liner that achieves a permeability of $\leq 1 \times 10^{-9}$ m/s. The size of the pad is to be 65m x 50m with a total area of 3,250m². This area will be used for the storage of manure and passive composting of deceased animals. The pad will be constructed to facilitate drainage of effluent and contaminated surface water runoff to the drains surrounding CDA 1.

The applicant has provided information from a supplier that asphalt is being considered for use to line this pad. The Delegated Officer notes that this information indicates asphalt may not be suitable, given potential susceptibility to degradation from constant exposure to organic substances (manure). The Delegated Officer advises the applicant that the material choice for this area should be fit-for-purpose and the required permeability must be maintained. This maintenance requirement will be implemented in the works approval as an operational control.

2.4.3 Surface water management

Clean stormwater 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 into the drainage channels, the sedimentation pond or effluent holding ponds.

Effluent runoff and capture

Runoff effluent from all manured surfaces and trough wastewaters will be contained within the controlled drainage areas and diverted to the sedimentation pond for settling of solids, prior to transfer to the effluent holding ponds. Stored water in these ponds will be evaporated.

Water balance review

CDA1 which encompasses the induction yard, temporary holding pens, the feedlot production pens, manure pad, roadways, cattle lanes and accessways and effluent catch drains, covers a total area of 226,36m². The applicant has provided a water balance calculation prepared by DPIRD, which notes the following:

- The applicant does not propose to irrigate wastewater to land, thus evaporation is the sole means of disposal;
- A runoff coefficient of 0.31 has been calculated using daily SILO data with a cumulative rainfall model, assuming a 0.82 pan evaporation factor from the catchment area;
- A pond safety factor of 10% has been applied to cater for any solid build ups in the ponds;
- Location specific climate data has been used to ensure pond sizing for a 1:20 winter rainfall year (544 mm).

The applicant has proposed the following effluent holding pond dimensions in Table 6:

Table 6: Minimum effluent holding pond requirements

Effluent holding pond requirement	Required size	Proposed size
Pond area	27,024 m ²	30,179m ²
Pond depth (including 0.5m freeboard)	2.08 m	2.08 m
Pond volume	42,780 m ³	95,475m ³

2.4.4 Solid waste management

The applicant has developed a Nutrient and Manure Management Plan in collaboration with DPIRD. The plan seeks to address:

- Describe how manure will be stored and transported onsite, including monthly mass balance demonstrating the storage capacity;
- Estimate quantities of manure/nutrients generated from the feedlot;
- Identify potential nutrient export pathways from manure utilisation.

Manure generation and feed pen cleaning

The applicant has calculated an annual total solids (TS) manure harvest from the premises to be about 400-420 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, if the feedlot is to run at full capacity, annual TS manure harvested annually is to be approximately 5,040 t/yr. The applicant has indicated that on average the feedlot will be operated at approximately 65% of its full capacity and therefore would likely generate about 3,276 t/yr on average.

Feedlot pens in use will be cleaned on a frequency of every 13 weeks on average and after destocking to ensure the depth of dry manure does not exceed 50 mm. Bobcats, front-end loaders and cartage trucks will be the primary equipment used to mound manure and clean pens.

Manure storage and deceased animal composting

Manure will be harvested from the feedlot pens and stored on the manure storage pad, where it will dry out over time without processing. Deceased animals will be transported to the manure storage pad where they will be placed on a bed of straw (600mm deep) to absorb liquid material and then covered with at least 500mm of manure to retain heat and prevent scavenging by vermin. Carcasses will be turned periodically (2 to 4 months) to aid the composting process. To ensure minimal odour and fire risk is acceptable the applicant will ensure manure and carcass composting is conducted in accordance with the National Guidelines (MLA 2012a) by ensuring the carbon to nitrogen ratio, moisture content, oxygen levels and temperature are maintained at an acceptable range.

The manure storage pad provides an area of about 3,250m² (65m x 50m). In ensuring this pad is of sufficient size for manure storage and deceased animal composting, the applicant has provided the following information:

- Deceased animal composting will utilise approximately 500m²;
- Manure storage will utilise approximately 2,750m²
- MLA 2015 indicates manure density at 650kg/m³;
- Manure to be piled at 2m;

$2,750\text{m}^2 \times 2\text{m} \times 0.65\text{t/m}^3 = 3,575\text{t}$ of manure could be stored on the manure storage pad. Given the manure generated exceeds the storage area, the applicant has indicated that oversupply manure will be sold to local markets.

2.4.5 Manure utilisation

The applicant has indicated that approximately 1,620 ha of land is considered to be arable and available for dryland cropping. The applicant has mapped and designated the areas in which manure won't be spread, the Delegated Officer in consultation with DPIRD consider this insufficient and require a map of areas that will receive the manure waste product (waste utilisation area) to be included in the works approval.

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. Based on the cropping nutrient balance provided with the application, it indicates that phosphorus is likely to be the limiting nutrient. To ensure a sustainable annual spreading rate of manure, the following has been proposed for each annual agronomic take-off plan:

- Sampling and analysis of dry aged manure and compost before it is applied to land to confirm the specific nutrient content of the batch;

- Soil sampling to ensure the receiving environment is suitable for manure spreading and no excessive accumulation of nutrients are present;
- Prediction of the expected nutrient uptake associated with the planned cropping program, which will be specific to the type of crop proposed for that year's farming activities.
- Application of manure to land that it intends to crop ahead of seeding at the predetermined rate of application matched to the limiting nutrient (most likely phosphorus).
- Recording of the areas to which manure has been applied.

The applicant proposes to crop grass hay, oaten hay and cereal grains and has reported based on information provided from DPIRD that grass hay/cereal grains are expected to use 2 to 3 kg P per tonnes of hay/grain produced.

An oaten hay crop may yield 4 to 5 tonnes per ha in the Warradarge area. At these rates (2.5 kg/t x 4.5 t/ha) about 11.25 kg/ha of P is expected to be used from the soil. Using the expected nutrient concentration of 0.8% P in dry aged manure (MLA 2012a), about 1.47 tonnes/ha of manure could be applied to land, matching the phosphorus uptake of the crops planted. If all of the 1,620ha is available for manure application then, 2,381 tonnes of manure (approximately half of the manure that could be generated) may be utilised in the farm's cropping program. Manure that exceeds the farm's requirements will be sold to local markets.

The applicant's first main business goal is to turn-out 54,000 animals each year and this expected intensity of operation represents operating the feedlot at about 65% of its full capacity. As such, about 3,250 tonnes of manure may be collected from feedlot pens each year at 65% production.

If only a portion of the arable land is cropped (~50%) each year then, the amount of manure utilised on the farm would in a corresponding manner reduce and the amount of manure sold to local markets would increase. Likewise, if the feedlot is operated more intensively then, more manure will be sold to local markets.

To ensure manure applications to land are sustainable, the Delegated Officer has considered information provided by DPIRD and advises the following;

- 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 (CaCl₂) 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, 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 as the manure application to meet phosphorus requirements will be insufficient to meet potassium and sulphate requirements.

3. Other approvals

Planning approvals

The Shire of Coorow (Shire) granted development approval (D2017/001) to the previous licence holder to allow 12,000 head of cattle to be held on the premises at any one time on 19 July 2017, subject to conditions that predominantly relate to the applicant's use of Coorow-Green Head Road to support activities on the premises, the establishment and adherence to a management plan developed in accordance with the National Guidelines (MLA 2012b) and the management of stormwater.

4. Risk assessment

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.

4.1 Source-pathways and receptors

4.1.1 Location and siting

The premises is located on farming land approximately 28 kilometres south-south-east from the town of Eneabba. The premises boundary follows the lot boundary (Lot 10804 on Plan 210800). The feedlot infrastructure area occupies about 80ha of land in the north-eastern section of the lot, while the remaining area will continue to be used for agricultural activities (cropping and grazing of animals) occupying about 1,620ha and used for spreading manure within designated waste utilisation areas at the applicable rates.

4.1.2 Climate

The Warradarge area experiences a Mediterranean-type climate with hot dry summers and mild to cool winters. Climate data obtained from the Badgingarra Research weather station, which is located approximately 40 km south of the site identifies that the mean maximum temperate ranges from 34.6°C (February) to 17.6°C (July). The mean minimum temperate ranges from 17.8°C (February) to 7.1°C (August) (BoM, 2021). Average annual rainfall is about 537.6 mm/yr, with most rainfall occurring between May and September. In a 10-year period (July 2011 - June 2021), the site has recorded 13 months in which the monthly rainfall has exceeded the monthly evaporation. On average, those 13 months exceeded the evaporation by 34.9mm in the month (1.1mm/day above the evaporation rate).

4.1.3 Soils and landscape

The Statewide Soils Database shows that soils at the site are characterised by surface leached sands underlain by lateritic gravels and mottled clays that occur at a progressively greater depth downslope. A bore log for a groundwater bore previously installed on the premises indicate soils to range between the following soil types:

Table 7: Onsite bore soil description log

From (m)	To (m)	Strata description
0	1	Sand
1	3	Yellow clayey sand
3	9	Gravelly clay
9	76	Yellow sandy clay
76	90	White – yellow mottled sandy clay
90	105	Sand – fine to medium coarseness
105	121	Bands of clay with some sand

The Erim Downs cattle feedlot has been constructed using a 'cut and fill' construction method into existing soils on site. The cut sections of the feedlot can be seen at the southern end of the eastern feedlot pad and the southern end of the induction yard and in the banks of the effluent holding ponds.

The applicant has reported to have conducted 8 permeability tests across the site that range from 4.8×10^{-6} (northern end of the western feedlot pad) to 4.1×10^{-8} m/s (previous manure storage pad). The average of all 8 measurements taken to date is 7.2×10^{-7} m/s. Soils encountered indicate a general pale brown gravelly clay-clayey sand.

4.1.4 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 2012a).

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.

At full capacity (12,000 SCUs at stocking density $9.6 \text{ m}^2/\text{SCU}$), the calculated separation distance to the nearest receptor, being a single rural or farm dwelling, is 1.731 km, which is within the actual distance of about 1.8 km. The calculated separation distance to the nearest town, being the medium-sized town of Watheroo (~200 persons), is 6.343 km, which also is well within the actual distance of about 28 km.

4.1.5 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this decision report are detailed in Table 8 below. Table 8 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 8: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction works including excavation, earthworks and operation of various machinery	Air / windborne pathway	<ul style="list-style-type: none"> • Separation distance – 1.8kms to nearest residence; • Water cart available on site for dust suppression where required; • Implementation of a complaints management system.
Noise			<ul style="list-style-type: none"> • Separation distance – 1.8kms to nearest residence; • Facility operator to ensure compliance with the <i>Environmental Protection (Noise) Regulations 1997</i>; • Construction equipment selected, operated and maintained to minimise noise impacts and where necessary fitted with silencers and “smart” reversing safety devices; • Implementation of a complaints management system.
Spills/unintended releases of hydrocarbons or chemicals	Chemical handling and storage Equipment breakdown and failure	Seepage to soil and groundwater	<ul style="list-style-type: none"> • Regular maintenance of vehicles and equipment; • Refuelling to take place at Warradarge Roadhouse; • Spill kits available to all vehicles and equipment.
Operation			
Dust	Vehicle movements	Air / windborne pathway	<ul style="list-style-type: none"> • Water cart available on site for dust suppression where required; • Dust generating activities such as grain movement, manure turning, pen cleaning will be ceased during periods of high wind; • Implementation of a complaints management system.
Noise	Operation of vehicles and machinery		<ul style="list-style-type: none"> • All plant and equipment to be serviced regularly; • Facility operator to ensure compliance with the <i>Environmental Protection (Noise) Regulations 1997</i>; • Implementation of a complaints management system.

Emission	Sources	Potential pathways	Proposed controls
Odour	Manure and nutrient-laden leachate accumulated in feedlot pens, drains, sedimentation terraces, effluent holding ponds Manure storage on manure storage pad Composting of deceased animals Mass death events		<ul style="list-style-type: none"> • Stocking density of 11.5m² per SCU; • Pens to be cleaned once the depth of dry manure on the pen surface exceeds 50 mm, or at least once every 13 weeks on average during pen utilisation and thoroughly cleaned after pen destocking; • Carcasses for composting to be placed on a minimum 600mm bed of straw and covered with a minimum 500mm layer of manure on the manure storage pad. Carcasses will be turned every 2-4 months to aid composting and applied to land with manure once fully composted; • Mass death events, should they occur, will be managed and coordinated with the support of vets and DPIRD staff and may involve construction of a mass burial pit on high ground at Erim Downs. A particular area has not been decided; • Implementation of a complaints management system.
Spills/unintended releases of hydrocarbons or chemicals	Chemical handling and storage	Seepage to soil and groundwater	<ul style="list-style-type: none"> • Hazardous materials that are to be stored on site will be kept in designated areas and within secondary containment compounds or on top of secondary containment catch bunds (for 200L oil drum); • One self-bunded (double lined) diesel storage tank (~20,000L) will be located on site. Dispensing of diesel will occur on a concrete hard stand designed to capture spills; • Spill kits available on site where required.
Wastewater and solid waste overflow from infrastructure	Infrastructure and equipment failure Maintenance works		<ul style="list-style-type: none"> • Natural evaporation from ponds; • Feedlot infrastructure located >50m above groundwater; • Drainage infrastructure, sedimentation terrace system and effluent holding ponds are sized and designed in accordance with the National Guidelines (MLA 2012a) (See Section 2.4.1); • Sludge will be monitored and measured annually to ensure levels do not exceed 10% of a holding ponds depth; • Maintain freeboard on effluent holding ponds (0.5m) and sedimentation pond (0.9m); • Installation of bunds and/or cut-off drains to divert uncontaminated stormwater where required.

Emission	Sources	Potential pathways	Proposed controls
Leachate	Infrastructure failure and/or damage		<ul style="list-style-type: none"> • Feedlot pens and induction yard surface constructed with compacted in-situ clay and gravel to meet a permeability $\leq 1 \times 10^{-7}$ m/s; • Manure storage pad, drainage infrastructure, sedimentation pond and effluent holding ponds are designed in accordance with the National Guidelines (MLA 2012a) and lining will meet a permeability of $\leq 1 \times 10^{-9}$ m/s; • Feedlot pens will be cleaned in a manner that does not disturb the soil-manure interface layer, which provides an effective low permeability barrier; • Pond embankments and drainage network to be regularly checked for erosion/damage and repair works implemented where required; • Vegetation on infrastructure embankments to be removed as required to maintain structure and permeability integrity; • Integrity of sedimentation and holding ponds and drainage channels to be checked annually and after desludging/ cleaning events and any lining damage to be repaired prior to use.
Vectors/vermin	Storage of cattle feed/spilt feed, manure, deceased carcasses and general waste	Attraction and harbouring of pests which may impact health and amenity of closest sensitive receptors	<ul style="list-style-type: none"> • Spilt feed removed daily from feed bunks and other areas and stored on the manure pad; • Manure periodically removed from the pens and stored on the manure pad; • Sludge from ponds routinely removed and stored on the manure pad; • General waste stored in sealed receptacles and transferred to landfill where required; • Implementation of a pest management program to control pest animal species already present, using acceptable methods as well as identifying potential pest species, their likely distribution and methods to prevent their spread; • A Stable Fly Management Plan will be developed as part of the quality assurance program of the Feedlot and incorporated into the NFAS manual; • Carcasses for composting to be covered with manure on the manure storage pad.

Emission	Sources	Potential pathways	Proposed controls
Solid waste to land	Application of manure to land	Excessive nutrients to soil and groundwater	<ul style="list-style-type: none"> • Manure only applied to waste utilisation areas and only at sustainable rates in accordance with the Nutrient and Manure Management Plan; • Manure will not be applied to land when a high rainfall event (>25mm) is likely and within a day after a high rainfall event; • Excess manure to be sold to local farming enterprises and markets; • Soil testing and sampling prior to spreading manure on a waste utilisation area for the first time. Ongoing soil testing and sampling to ensure sustainable application rates; • Sampling and analysis of dry aged manure and compost before it is applied to land to confirm the specific nutrient content of the batch; • Recording of areas to which manure has been spread; • Cropping program to be implemented in accordance with Nutrient and Manure Management Plan.

4.1.6 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 9 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

Table 9: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Rural dwelling	≈ 1.8 km west-north-west
Rural dwelling	≈ 2.8 km east
Warradarge roadhouse	≈ 3 km west
Rural dwelling	≈ 4.2 km west-north-west
Environmental receptors	Distance from prescribed activity
Hill River and Tributaries Catchment (Proclaimed under the RIWI Act 1914)	Located within this proclaimed surface water area
Arrowsmith Groundwater Area (Proclaimed under the RIWI Act 1914)	Located within this groundwater area
Threatened and Priority Flora	Approximately 9 flora species located within 5km of the prescribed activity area.
Threatened Fauna	Approximately 2 species located within 5km of the prescribed activity area.
Unnamed major non-perennial watercourse	≈ 800m north and 2.4km west
Warradarge Creek	≈ 650 m north
Warradarge Spring	≈ 1.5 km south-east
Groundwater	Onsite groundwater bore located 3km south-west of the feedlot reports a depth to groundwater at ≈ 58 mbgl. Another nearby bore (WIN ID: 20007331) shows a historical depth to groundwater at ≈ 63 mbgl.

4.2 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 potential source-pathway and receptor linkages as identified in Section 5.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 5.1), 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 Table 10.

Works approval W6598/2021/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 10 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.

Table 10: Risk assessment of potential emissions and discharges from the premises during construction and operation

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								
Earthworks and construction of feedlot pens, internal roads, effluent drains, sedimentation terraces, effluent storage ponds and manure storage/carcass compost pad, etc.	Noise and fugitive dust	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors	Refer to Table 4	Low level impacts to amenity on local scale Minor	May only occur in exceptional circumstances Rare	Low Acceptable, based on applicant controls being implemented	The Delegated Officer considers there is sufficient separation in place (1.8 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.	<u>Works approval controls:</u> No regulatory controls specified - applicant controls sufficient.
Chemical handling and storage Equipment breakdown and failure	Spills/unintended releases of hydrocarbons or chemicals	Seepage/ infiltration causing soil and groundwater contamination	Refer to Table 4	Minimal onsite impact Slight	May only occur in exceptional circumstances Unlikely	Low Acceptable, based on applicant controls being implemented	The Delegated Officer considers the applicants controls sufficient in managing any chemical spills during construction.	<u>Works approval controls:</u> No regulatory controls specified – applicant controls sufficient.
Time-limited operations								
Feedlot and holding yard operations								
Vehicle movements on unsealed road Operation of plant and equipment for feedlot operations	Noise and fugitive dust	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors	Refer to Table 4	Low level impacts to amenity on local scale Minor	May only occur in exceptional circumstances Rare	Low Acceptable, based on applicant controls being implemented	After reviewing the National Guidelines (MLA 2012a) s-factor calculations provided by the applicant for the nearest human receptors, the Delegated Officer considers there is sufficient separation in place (1.8 km to nearest rural dwelling, 28 km to nearest town), and therefore does not reasonably foresee that noise and dust during operations will impact on the amenity or health of off-site human receptors.	<u>Works approval controls:</u> No regulatory controls specified – applicant controls sufficient.
Unloading, holding, feeding and watering of animals within uncovered pens Transfer of manure and deceased animals from feedlot pens, generation of manure and composting windrows, disturbance of stockpiles and windrows, etc.	Odour, from manure accumulated in feedlot pens, stored on manure storage pad and deceased animal composting		Refer to Table 4	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	Providing the stocking density in pens does not exceed 11.5 m ² /SCU and pens are cleaned and operated in accordance with the National Guidelines (MLA 2012a), the Delegated Officer considers it unlikely that odour from feedlot operations will significantly impact on the amenity or health of off-site human receptors. Odour will also be generated from manure storage and deceased animal composting. 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. Review of the National Guidelines (MLA 2012a) s-factor calculations provided by the applicant for the nearest human receptors, also shows sufficient separation in place (1.8 km to nearest rural dwelling, 28 km to nearest town). In accordance with the <i>Guide to Licensing</i> (DWER 2019), as the proposed controls are necessary for maintaining a low level of risk, they will be imposed on the works approval as operational controls.	<u>Works approval controls:</u> - Stocking density must be no less than 11.5 m ² /SCU in pens; - Pens must be cleaned once the depth of dry manure on the pen surface exceeds 50 mm, during pen utilisation and thoroughly cleaned after pen destocking; - Manure harvested from pen surfaces must only be stockpiled on the manure storage/deceased animal composting pad; - Deceased animals to be removed from pens daily and stored on the deceased animal composting pad prior to composting or removal off-site to a disposal facility that is licensed to accept that kind of waste. - Optimum conditions for rapid composting, as per National Guidelines (MLA 2012a); - Only low risk feedstocks brought onto the premises for incorporating into composting process.

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 and nutrient-laden leachate build up in effluent drainage infrastructure, sedimentation system and effluent holding ponds		Refer to Table 4	Low level impacts to amenity on local scale Minor	May only occur in exceptional circumstances Rare	Low Acceptable, based on applicant controls being implemented	<p>Providing the effluent drainage infrastructure, sedimentation pond and effluent holding ponds are maintained in accordance with the National Guidelines (MLA 2012a), the Delegated Officer considers it unlikely that odour from these sources will significantly impact on the amenity or health of off-site human receptors.</p> <p>Review of the National Guidelines (MLA 2012a) s-factor calculations provided by the applicant for the nearest human receptors, also shows sufficient separation in place (1.8 km to nearest rural dwelling, 28 km to nearest town).</p> <p>In accordance with the <i>Guide to Licensing</i> (DWER 2019), 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.</p>	<p><u>Works approval controls:</u></p> <ul style="list-style-type: none"> - Controlled drainage area 1 must be maintained to ensure all leachate and surface water runoff is able to flow to the sedimentation pond without scouring; - Sedimentation pond must be cleaned of solids before sludge takes up more than 60% of the design capacity of the pond; - Effluent holding ponds must be cleaned of solids before sludge takes up more than 10% of the design capacity of the pond.
	Nutrient-laden leachate from manure, urine, mobilised by surface water run-off	Seepage/ infiltration causing soil and groundwater contamination	Refer to Table 4	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	<p>In order to protect the surrounding soils and underlying groundwater resource, the feedlot has been designed in accordance with the National Guidelines (MLA 2012a), namely:</p> <ul style="list-style-type: none"> - Effluent drainage infrastructure, sedimentation pond, effluent holding ponds and the manure storage pad will be constructed and tested to achieve a permeability of at least 1×10^{-9} m/s. - All infrastructure downslope gradients within controlled drainage areas to be constructed to ensure effluent and surface water flows towards drainage infrastructure. <p>The applicant has proposed the feedlot pens and induction yard ground surfaces will be constructed of in-situ compacted gravel and clay to achieve a permeability of $\leq 1 \times 10^{-7}$ m/s. This proposed permeability is not in line with the National Guidelines requirements for an impermeable base designed with a 300mm clay liner with $\leq 1 \times 10^{-9}$ m/s permeability. After consultation with DPIRD, the Delegated Officer considers the applicants proposed permeability for these areas acceptable due to the following:</p> <ul style="list-style-type: none"> - The significant setback distance from the feedlot pad and induction yard surface to groundwater (estimated at approximately 113-140m); - The presence of deep in-situ low permeability clay/sand soils to be compacted to the required compaction to ensure the required permeability is achieved; - Construction of a sufficient ground slope gradient of at least 2.5% to ensure leachate and surface water runoff is able to flow freely to the effluent drainage infrastructure; and - Once operations commence, the formation of a low permeability soil-manure interface layer will form in these areas. <p>The applicant has noted that an engineered soil liner will be used to line the sedimentation pond and a synthetic liner will be used to line the effluent holding ponds, however no specifications on the liner types has been provided. The Delegated Officer considers the inclusion of installation requirements necessary to ensure both of these liner types is installed appropriately. An excerpt from both <i>Water Quality Protection Note 26: Liners for containing pollutants, using synthetic membranes</i> (WQPN 26) and <i>Water Quality Protection Note 27: Liners for containing pollutants, using engineered soils</i> (WQPN 27) has been added to the works approval.</p> <p>The Delegated Officer also considers the maintenance and protection of all geosynthetic clay liners (GCL) important to ensure the specified permeability is maintained and has added a condition requiring a minimum 450mm thick surcharge layer is maintained above any existing or installed GCL.</p> <p>The Delegated Officer considers the above controls will ensure the risk of groundwater contamination from feedlot activities is acceptable.</p> <p>In accordance with the <i>Guide to Licensing</i> (DWER 2019), as the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval.</p>	<p><u>Works approval controls:</u></p> <ul style="list-style-type: none"> - Ground surface of induction yard and feedlot pens to be constructed of in-situ compacted gravel and clay or similar material to achieve a permeability of $\leq 1 \times 10^{-7}$ m/s, and demonstrated by geotechnical testing by a suitably qualified person in accordance with WQPN 26 or WQPN 27; - Induction yard and feedlot pen floors must be constructed with a downslope gradient of at least 2.5% and flow towards the CDA1 effluent catch drains; - Effluent drains, sedimentation pond and manure pad to be constructed of modified in-situ soils with a minimum 10% bentonite mix or other suitable compactible material or a concrete or synthetic liner to achieve a minimum permeability $\leq 1 \times 10^{-9}$ m/s demonstrated by geotechnical testing by a suitably qualified person; - Effluent holding ponds to be lined with a synthetic liner by a suitably qualified person to achieve a permeability of $\leq 1 \times 10^{-9}$ m/s; - All infrastructure within controlled drainage area must be maintained to ensure integrity is sustained and leachate is able to flow freely; - All drainage infrastructure to be maintained free of vegetation and accumulations of debris, manure and sediment. - Where a GCL is installed, the works approval holder must ensure a minimum 450 mm thick surcharge layer is maintained above the GCL (± 75 mm).

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls
Source/ Activities	Potential emissions	Potential receptors, pathway and impact	Applicant controls					
		Uncontrolled discharge, causing soil contamination or groundwater contamination	Refer to Table 4	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 including the induction yard, manure storage pad and feedlot pen infrastructure will be located within a bunded controlled drainage area. This area will contain all contaminated or potentially contaminated surface water runoff and divert it into a sedimentation pond and effluent holding ponds that combined will have sufficient capacity to contain the volume of runoff from a 1 in 20-year ARI storm event without breaching freeboard. The Delegated Officer considers the above controls will ensure the risk of uncontrolled discharges, resulting in soil or groundwater contamination, is acceptable. In accordance with the <i>Guide to Licensing</i> (DWER 2019), as the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval as minimum infrastructure requirements.	<u>Works approval controls:</u> - CDA1 must be constructed to contain all effluent and surface water runoff from the induction yard, feedlot pen infrastructure and manure storage pad; - CDA1 must be sloped to facilitate drainage to the drainage channels, sedimentation pond and holding ponds; - CDA1 must be maintained to ensure all leachate and surface water runoff is able to flow freely to the sedimentation pond without scouring.
		Overtopping of sedimentation basins or holding ponds, causing soil contamination or groundwater contamination	Refer to Table 4	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	CDA1 will comprise of one sedimentation pond connected to two interconnected effluent holding ponds. All ponds combined will have sufficient design capacity to cater for the volume of surface water runoff from the controlled drainage area during a 1 in 20-year ARI storm event without breaching freeboard. The applicant has provided a water balance indicating a required pond area of 27,024m ² , required pond depth (including freeboard) of 2.08m and a required pond volume of 42,780m ³ . The proposed pond sizes in Table 6 shows this capacity will be sufficient in catering for a 1 in 20-year ARI storm event without breaching freeboard. The Delegated Officer considers the above controls will ensure the risk of overtopping of containment infrastructure, resulting in soil or groundwater contamination, is acceptable. In accordance with the <i>Guide to Licensing</i> (DWER 2019), as the proposed controls are critical for maintaining an acceptable level of risk, they will be imposed on the works approval as minimum infrastructure requirements.	<u>Works approval controls:</u> - Containment infrastructure must be constructed in accordance with National Guidelines (MLA 2012a), with minimum sizing's and design capacity specified; - Installation of bunds and/or cut-off drains to divert uncontaminated stormwater where required; - Operational freeboard requirement of 0.5 m must be maintained on effluent holding ponds, 0.9 m on sedimentation pond; - Sedimentation pond and effluent drainage channels must be maintained to ensure effluent flows freely after rainfall events; - Effluent ponds must be cleaned of solids before sludge takes up more than 10% of the design capacity of the pond. - Sedimentation pond must be cleaned of solids before sludge takes up more than 60% of the design capacity of the terrace.
	Harbourage of disease vectors and vermin	Attraction and harbouring of pests which may act as vectors for pathogens, potentially causing health and amenity impacts to closest sensitive receptors.	Refer to Table 4	Low level impacts to amenity on local scale Minor	May only occur in exceptional circumstances Rare	Low Acceptable, based on applicant controls being implemented	The applicant has proposed the implementation of a pest management program to identify potential pest species, distribution across the site and implementing physical, chemical and biological control principles where required. Pest prevention will be maintained through minimising feed spillage, cleaning practices and appropriate deceased carcass management. The Delegated Officer considers there is sufficient separation in place (1.8 km to nearest rural dwelling, 28 km to nearest town), and therefore does not reasonably foresee that pest activity from this operation will impact on the amenity or health of off-site human receptors, providing applicant controls are implemented.	<u>Works approval controls:</u> - All deceased animals must be composted on the designated composting pad, or taken off-site to a disposal facility that is licensed to accept that kind of waste; - Deceased animals must be placed on a minimum 0.6m bed of straw or similar absorbent material and covered with a minimum 0.5m of organic matter on top and on the sides of the carcass; - Pens to be cleaned once the depth of dry manure on the pen surface exceeds 50mm during pen utilisation and thoroughly cleaned after pen de-stocking.

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls
Source/ Activities	Potential emissions	Potential receptors, pathway and impact	Applicant controls					
Chemical handling and storage Equipment breakdown and failure	Spills/ unintended releases of hydrocarbons or chemicals	Seepage/ infiltration causing soil and groundwater contamination	Refer to Table 4	Low-level on-site impacts Minimal off-site impacts on local scale Minor	May only occur in exceptional circumstances Rare	Low Acceptable, based on applicant controls being implemented	The applicant has proposed to install a 20,000L capacity fuel storage tank on the premises to refuel plant and equipment. The tank will be self-bunded (double lined tank) and located on a bunded concrete hardstand that is separate to the controlled drainage area. The applicant has specified that chemicals/hazardous materials will be stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management. The Delegated Officer considers the applicants controls sufficient in ensuring the fuel storage tank is sufficiently contained and any chemical spills are cleaned up and controlled.	<u>Works approval controls:</u> No regulatory controls specified – applicant controls sufficient.
Manure/compost spreading operations								
Spreading of composted manure over approximately 1,620 ha of arable cropping land	Leaching or runoff of nutrients from spread compost / manure	Seepage/ infiltration causing groundwater contamination Soil acidification Excessive build-up of soil nutrients	Refer to Table 4	Mid-level on-site impacts Moderate	Could occur at some time Possible	Medium Acceptable, subject to regulatory controls	The Delegated Officer has consulted with DPIRD on the applicant's proposed Nutrient and Manure Management Plan to spread composted manure on the premises and has determined the yearly application of up to 1.47t/ha over the available 1,620 ha of cropping land is the most sustainable method to maintain the soil's capacity to absorb nutrients and to limit soil acidification. This will be dependent on each annual agronomic take-off plan informed by soil and manure testing. The applicant has mapped and designated the areas in which manure won't be spread, the Delegated Officer in consultation with DPIRD consider this insufficient and require a map of areas that will receive the manure waste product (waste utilisation area) to be included in the works approval. In accordance with the <i>Guide to Licensing</i> (DWER 2019), 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.	<u>Works approval controls:</u> - Composted manure must only be spread at an application rate of no more than 1.47 t/ha/yr; - Only manure and composted carcasses must be spread across the waste utilisation area, 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; - The amount and location of manure spread is to be recorded; - Waste utilisation area to be harvested every 12 months; - Manure is not to be spread before or after a high rainfall event, within 25m of significant stands of native vegetation or within 100m of drainage lines, creek lines and the Warradarge Creek
	Odour, from spread manure/ compost	Unreasonable interference with the health, welfare, convenience, comfort or amenity of nearby sensitive receptors	Refer to Table 4	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 (1.8 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. In accordance with the <i>Guide to Licensing</i> (DWER 2019), 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.	<u>Works approval controls:</u> - Manure to be evenly distributed over the waste utilisation area; - Manure must be incorporated into the soil profile within 7 days of spreading.

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

5. Decision

The Delegated Officer has determined the proposal to construct and operate an intensive open-air cattle feedlot and an associated animal holding facility on the premises, with an assessed design capacity of not more than 12,000 SCUs at any time, 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 11.5 m²/SCU;
- effluent drainage infrastructure, sedimentation pond, effluent holding ponds and manure storage pad to be constructed with a permeability of $\leq 1 \times 10^{-9}$ m/s;
- feedlot pens and induction yard to be constructed with a permeability of $\leq 1 \times 10^{-7}$ m/s;
- fit-for-purpose controlled drainage system;
- effluent drainage infrastructure and sedimentation pond 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 in accordance with the premises cropping program.

The above controls proposed by the applicant are considered critical for maintaining an acceptable level of risk of environmental impacts, and in accordance with the *Guide to Licensing* (DWER 2019), they will be imposed on the works approval as infrastructure controls.

5.1 Works approval and licence

Works Approval W6598/2021/1 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 feedlot and animal holding 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.

6. Consultation

Table 11 provides a summary of the consultation undertaken by the department.

Table 11: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 22/10/2021 – 13/11/2021	None received	N/A
Local Government Authority advised of proposal on 25/10/2021	None received.	N/A
Department of Primary Industries and Regional Development advised of proposal on 25/10/2021	<p>Comments were received from DPIRD on 15/11/2021 after their review of the application and follow up requested information received from the applicant on 29/09/2021.</p> <p>After requesting and receiving further information from the applicant on 18/12/2021, follow up comments were received from DPIRD on 21/12/2021 advising the following:</p> <ul style="list-style-type: none"> - The applicant's report has indicated an average site permeability of 7.2×10^{-7} m/s <i>and</i> that the site contains deep clays. If this is the case, then DPIRD is satisfied that this will function in a similar fashion as 300mm of 1×10^{-9} m/s across feedlot pen floors. - DPIRD considers dry aged manure to be a form of solid waste, as nutrients remain part of the manure unless exported offsite via other means. - Apart from the exact location of the manure application areas, DPIRD believes there is sufficient information in the Nutrient and Manure Management Plan (NMMP). DPIRD is satisfied with the principles used to determine the details of the NMMP, and that this addresses previous areas of uncertainty. - The principles applied in the future cropping program - based on regional averages - would appear to be sufficient in terms of forming a nutrient balance. 	<p>The Department considered the comments provided by DPIRD on 15/11/2021 and subsequently requested further information from the applicant on 18/11/2021.</p> <p>The follow up comments received from DPIRD on 21/12/2021 have better informed the Department's risk assessment and subsequent conditions on the works approval.</p>
Applicant was provided with draft documents on 09/05/2022 and 19/10/2022	<p>Refer to Appendix 1 for applicant's comments to draft package received on 22/07/2022.</p> <p>Applicant responded to the revised draft package on 28/11/2022 and provided some further information requested on the dimensions of the sedimentation and holding ponds. The applicant waived the remaining consultation period.</p>	<p>Refer to Appendix 1 for Department's response to applicant's comments received on 22/07/2022.</p> <p>Revised instrument granted in response to applicant's 28/11/2022 response.</p>

7. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

1. MLA 2012a, *National Guidelines for Beef Cattle Feedlots in Australia, 2nd Ed.* Meat & Livestock Australia Limited. Accessed from www.mla.com.au
2. MLA 2012b, *National Beef Cattle Feedlot Environmental Code of Practice, 2nd Ed.* Meat & Livestock Australia Limited. Accessed from www.mla.com.au
3. MLA 2015, *Beef cattle feedlots: waste management and utilisation.* Meat & Livestock Australia Limited. Accessed from www.mla.com.au
4. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia. Accessed from www.dwer.wa.gov.au
5. Department of Water and Environmental Regulation (DWER) 2019, *Guideline: Industry Regulation Guide to Licensing*, Perth, Western Australia. Accessed from www.dwer.wa.gov.au
6. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia. Accessed from www.dwer.wa.gov.au
7. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia. Accessed from www.dwer.wa.gov.au
8. Department of Primary Industries and Regional Development (DPIRD) 2021, *Soil Landscape Mapping (DPIRD-027)*. Accessed from www.data.wa.gov.au.
9. Coterra Environment 2021, *Technical documentation and Environmental Assessment – Erim Downs Feedlot (August)*. Accessed from DWER Record No: DWERDT493689.
10. Coterra Environment, 2021, *DWER Request for Information – Erim Downs Feedlot (September)*. Accessed from DWER Record No: DWERDT509490.
11. Coterra Environment, 2021, *DWER Request for Information – Erim Downs Feedlot (December)*. Accessed from DWER Record No: DWERDT540699.
12. Coterra Environment, 2022, *Response to Draft Works Approval W6598 and Decision Report – Erim Downs Feedlot (July)*. Accessed from DWER Record No: DWERDT637934.

Appendix 1: Summary of applicant's comments on risk assessment and draft conditions

Table 12: Applicant's requested changes to infrastructure

	Infrastructure	Previous infrastructure proposed	Requested change to infrastructure	Department's response
1.	Cattle feedlot pens	76 production pens arranged in four rows of 19 pens affording on average about 9.6m ² /SCU (114,000m ² total).	60 pens arranged in six rows of 10 pens (137,700m ²). <ul style="list-style-type: none"> • 50 of the pens will have an area of about 2,142m² (about 51m x 42m). • 10 pens will have an area of about 3,060m² (about 51 x 60m). Each pen will hold about 200 animals affording, on average, 11.5m²/SCU. 	The Delegated Officer accepts the increase in the total pen area, as this change will provide an increase in area per SCU with the area's effluent and surface water run-off still being captured by a controlled drainage area. The works approval has been updated accordingly.
2.	Feedlot pad	Two feedlot pads, eastern pad and western pad each with 2 rows of pens with centre laneways and perimeter cattle lanes. The two feedlot pads are divided by a raised centre section dividing the two feedlot pads.	One feedlot pad having 6 rows of pens.	The Delegated Officer considers this pen configuration change acceptable as it will still allow for necessary cleaning and maintenance to occur. Works approval updated accordingly, and pen configuration figure added to Schedule 1 of the works approval.
3.	Controlled drainage areas	Two controlled drainage areas. CDA1 connected to a sediment terrace and a holding pond which overflows to CDA2 holding pond 2. CDA 2 connected to sedimentation terraces and two holding ponds. Spill frequency of the ponds is less than once in every 20 years. No irrigation is planned.	One controlled drainage area (CDA) connected to three ponds. Spill frequency of the ponds is less than once in every 20 years. No irrigation is planned.	The applicant has advised that this change has increased the overall area of the former controlled drainage area 2 by 48,560m ² (total of 226,360m ²). This equates to a 12.6% increase to 42 780m ³ which is the required minimum storage capacity to contain surface water flow from a 1 in 20-year ARI storm event without breaching freeboard. As the sedimentation pond and effluent holding ponds 1 and 2 provide 95,475m ³ of storage capacity, the Delegated Officer considers this change acceptable as the capacity still accommodates for a 1 in 20-year ARI storm event without breaching freeboard. Works approval updated accordingly.
4.	Drainage system	No change to the original as built infrastructure other than to repair damaged drains.	Additional drains are to be constructed as per drawing numbers A-002 and A-004.	The Delegated Officer considers the construction of additional drainage acceptable to ensure all effluent and surface water runoff is captured by the controlled drainage area and directed to the effluent holding pond system. Channel drain plan added to Schedule 1.
5.	Pond system	Construction of two sedimentation terraces and removal of the first holding pond connected to the feedlot pad. The two large holding ponds are to be repaired.	The three existing ponds connected to the feedlot pens on site are to remain. The first pond will act as a holding pond and sedimentation pond. The two large ponds are to be remediated as per the former proposal.	As the ponds capacity is still able to contain surface water flow from a 1 in 20-year ARI storm event without breaching freeboard and the permeability remains unchanged, the Delegated Officer considers this change acceptable providing permeability requirements and the sedimentation pond is constructed/modified where required to ensure it can still readily remove the settleable fraction of the solids entrained in effluent. Works approval updated accordingly. The Delegated Officer notes that the applicant has included and labelled Sedimentation Pond 2 however it is unknown what the use of this pond will be. If it's use will be for anything other than clean stormwater, a works approval amendment will be required, authorising its use.
6.	Manure storage area	One manure storage pad with nominal dimensions of 65m x 50m, to the north of the feedlot pads and near the induction yard.	The location of the manure storage area has changed to be on the eastern side of the feedlot and shown on drawing number A-001 through to A-004. The dimensions of the manure storage pad remain unchanged at about 65m x 50m. The manure pad will be within CDA1 and connected to the second holding pond.	The Delegated Officer notes that the manure storage pad will direct leachate and surface water runoff directly to holding pond 1 and not through the sedimentation pond. Due to the likely high level of sediment that may be in this runoff, it is predicted that holding pond 1 will require de-sludging on a more frequent basis by the applicant.
7.	Truck parking area (new infrastructure)	Not included.	The raised hardstand area to the north of the induction yards will be made larger to allow for parking of trucks and machinery. Material collected from removing the existing centre section of the feedlot pad will be used as base for the truck parking area.	Providing the permeability of the areas used for the prescribed activities remain the same as previously assessed, the Delegated Officer considers this change to have no impact on the risk assessment.

	Infrastructure	Previous infrastructure proposed	Requested change to infrastructure	Department's response
8.	Office and accommodation module	No change to the original as built infrastructure.	These items of infrastructure are proposed to be moved to new locations as shown on drawing numbers A-001 through to A-004.	Providing the permeability of the areas used for the prescribed activities remain the same as previously assessed, the Delegated Officer considers this change to have no impact on the risk assessment. Note on accommodation module: If a wastewater treatment system is to be installed for onsite wastewater disposal, approvals from the local government and/or WA Department of Health may be required.
9.	Roadways	No change to the original as built roadways.	Additional roadways are to be built as per drawing number A-003.	The Delegated Officer notes that internal roads will be used for heavy vehicle access. The applicant is to ensure that all roads are constructed to allow this traffic without compromising the controlled drainage area permeability, drainage or pond infrastructure.

Table 13: Applicant's response to DWER's request for further information

	Condition/Table/Item	Summary of applicant's comment	Department's response
1.	Table 1, Item 1 - induction yard	The induction yard is within an area of about 65m x 100m	Works approval updated accordingly.
2.	Schedule 1, Figure 2 - manure utilisation area	The areas intended to be utilised for the application of manure are shown in an attached figure.	Figure added to Schedule 1 of the works approval.
3.	Works approval expiry date	The Applicant notes in normal circumstance DWER would most likely grant a works approval for 3-year duration. However, COVID-19 related matters have on many occasions caused delays to the approval and construction schedules of this project and they are likely to cause further delays into the future. Request: Please grant the works approval for 5 years duration – until 2027.	The Delegated Officer considers this a reasonable request and has extended the standard works approval duration to 5 years.
4.	Condition 1, Table 1, Item 1(a) - induction yard	Observation: This condition requires, "Ground surface [of the induction yard] to be constructed of in-situ compacted gravel and clay or similar material to achieve a permeability of $\leq 1 \times 10^{-7}$ m/s." Comment: The Applicant notes: <ul style="list-style-type: none"> The induction yard was constructed in 2017 and the Applicant has not applied to modify the base of the induction yard as part of the remediation of the feedlot. Information provided to DWER on 18 December 2021 advised that the permeability of the 'as built' feedlot pad, induction yard and manure storage pad are as follows: "Permeability test results range from 4.8×10^{-6} (northern end of the western feedlot pad) to 4.1×10^{-8} m/s (manure storage pad). The average of all 8 measurements taken to date is 7.2×10^{-7} m/s." The draft Decision Report (p 6) notes: "After consultation with the Department of Primary Industries and Regional Development, the Delegated Officer considers the Applicant's proposed permeability for these areas acceptable due to the following." Request: Please modify the conditions to reflect the 'as built' infrastructure by removing, "to achieve a permeability of $\leq 1 \times 10^{-7}$ m/s."	Although the induction yard was constructed in 2017, it is unknown to what standard it was constructed to. A previous review of information provided by the previous licence holder and subsequent site visit identified significant erosion of ground surfaces in various areas across the premises, therefore the Delegated Officer requires appropriate testing to be completed across the controlled drainage area to confirm surface suitability for premises operations. After DWER's follow up consultation with DPIRD it was accepted that an average permeability of 7.2×10^{-7} m/s is acceptable providing deep clays are present across this area. The word 'average' has been added into the condition to allow some flexibility in the permeability testing results.
5.	Condition 1, Table 1, Item 1(b) - induction yard	Observation: This condition requires, "Floor must be constructed with a downslope gradient that directs effluent and surface water runoff to the CDA1 effluent catch drains" Comment: The Applicant notes: <ul style="list-style-type: none"> The induction yard was constructed in 2017 and the Applicant has not applied to modify the base of the induction yard as part of the remediation of the feedlot. The existing induction yard was constructed so that surface waters flow to the eastern and the western drains. Examination of the site on 12 March 2021 shows that the induction yard drains both eastwards and westwards to drains – see Plate 1. Request: Please modify the conditions to reflect the 'as built' infrastructure by removing, "constructed" and inserting "maintained" Alternatively, the condition could be removed.	The Delegated Officer expects that if the induction yard testing finds the surface to not meet the required average permeability, works will be completed to ensure the surface meets the required permeability. Schedule 3 – excerpt from WQPN 27 (Engineered soils liner installation and certification requirements) has been added to the works approval. The works approval holder is to refer to this Schedule which specifies permeability testing and liner requirements for engineered soils.
6.	Condition 1, Table 1, Item 1(c) - induction yard	Observation: This condition requires, "Permeability and compaction requirements must be demonstrated by geotechnical testing conducted by a suitably qualified person and in accordance with AS 1289." Comment: The Applicant notes: <ul style="list-style-type: none"> The induction yard was constructed in 2017 and the Applicant has not applied to modify the base of the induction yard as part of the remediation of the feedlot. Permeability testing has not been undertaken in the immediate vicinity induction yard though its construction method was similar to the method used for the manure storage pad. It can be tested to show that its permeability in the range permeabilities determined to date. See also the comments made in Item 2 of this table. The condition requires the demonstration of the compaction requirement though there are no compaction specifications detailed in the draft works approval. Request: Please modify the conditions to reflect the 'as built' infrastructure and by requiring two permeability tests to be taken.	If GCL repairs and/or compaction is required to meet the permeability requirements, it is required to be completed by a suitably qualified person as defined in the works approval and in accordance with Schedule 3 with any GCL being maintained in time-limited operations. Works approval updated accordingly.

	Condition/Table/Item	Summary of applicant's comment	Department's response
7.	Condition 1, Table 1, Item 2 - manure storage pad size	<p>Observation: This portion of the condition requires that the manure pad must not be more than 3,250m².</p> <p>Comment: The Applicant notes that a larger area may be built and that the control to a maximum areal dimension is not consistent with the provision of Meat and Livestock Australia's 2012a (MLA 2012a) National Guidelines for Beef Cattle Feedlots in Australia (the Guidelines). The Applicant also notes that it is proposing to relocate the manure storage pad as its current location is close to feedstuff. The proposed new location is provided in drawings A-001 to A-004.</p> <p>Request: Please modify the condition by removing the maximum areal extent of the manure storage pad.</p>	The Delegated Officer notes that the applicant has provided updated site plans that indicates the manure storage pad's dimensions. If a pad of a different size is to be built, this departure from the provided plan is to be addressed in the Environmental Compliance Report in accordance with Condition 7 (b).
8.	Condition 1, Table 1, Item 2 (a) - manure storage pad permeability	<p>Observation: This portion of the condition requires the manure storage pad, "... to be underlain by at least 300mm of modified in-situ soils with a minimum 10% bentonite mix or other suitable compactable material or a concrete liner to achieve a minimum permeability $\leq 1 \times 10^{-9}$ m/s."</p> <p>Comment: The Guidelines require a 300mm clay liner with a minimum permeability of 1×10^{-9} m/s or less and do not specify the means by which this is to be achieved.</p> <p>Request: Please remove the requirement to add 10% bentonite to in-situ soils but, retain the permeability requirement and reference drawings A-001 to A-004.</p>	The Delegated Officer accepts this change in accordance with the Guidelines as the ground surface permeability is the outcome required.
9.	Condition 1, Table 1, Item 2 (c) - manure storage pad construction	<p>Observation: This condition requires, "Permeability and compaction requirements must be demonstrated by geotechnical testing conducted by a suitably qualified person and in accordance with AS 1289."</p> <p>Comment: The Applicant notes that this condition requires the demonstration of the compaction requirement though, there is no compaction specification detailed in the draft works approval.</p> <p>Request: Please modify the condition by removing the compaction requirement.</p>	The Delegated Officer notes the compaction method of the ground surface important in ensuring the clay liners integrity is protected. Schedule 3: Engineered soils liner installation and certification requirements (excerpted from Water Quality Protection Note 27: Liners for containing pollutants, using engineered soils) added to the works approval detailing minimum specifications for installation.
10.	Condition 1, Table 1, Item 3 - controlled drainage area 1	<p>Observation: This condition is now redundant because the former CDA1 no longer exists in the updated remediation plans.</p> <p>Request: Please remove this condition.</p>	2 nd controlled drainage area removed from the works approval in accordance with the updated plans provided.
11.	Condition 1, Table 1, Item 4 - cattle feedlot pen dimensions	<p>Observation: The updated remediation plan is for 6 rows of 10 pens.</p> <p>Request: Please include the word 'nominal' or a similar term for the pen dimensions and the overall area. Please also modify the condition to reflect the updated pen arrangement being, 60 pens in six rows of 10 pens. Table 1 above provides more detail on the new arrangement and size of pens.</p>	Cattle feedlot pen dimensions have been updated in accordance with the updated information provided by the applicant.
12.	Condition 1, Table 1, Item 4 (a) and (b) - cattle feedlot pen slope gradients	<p>Observation: This condition requires:</p> <p>a) "Pen floors and cattle alleys must be constructed with a downslope gradient of at least 2.5% to direct effluent and surface water runoff to CDA2 effluent catch drains;"</p> <p>b) "Cross slope gradients to be less than 1% to minimise pen-to-pen drainage."</p> <p>Comment: The Applicant is now proposing to modify the design of the feedlot pads as per the plans provided in Attachment 3.</p> <p>Request: Please remove these two conditions and reflect the updated remediation plans.</p>	<p>Reference to CDA2 has been changed to CDA1 in accordance with the updated plans.</p> <p>These conditions remain in the works approval in accordance with the requirements for controlled drainage areas in the Guidelines.</p>
13.	Condition 1, Table 1, Item 4 (c) - cattle feedlot pen permeability	<p>Observation: This condition requires, "Pen floors and cattle alley ground surfaces to be constructed of in-situ compacted gravel and clay or similar material to achieve a permeability of $\leq 1 \times 10^{-7}$ m/s."</p> <p>Comment: The Applicant notes:</p> <ul style="list-style-type: none"> The feedlot pads (pen floors) were constructed in 2017 and the Applicant has not applied to modify the way in which the base of the pens have been or to are to be constructed. That is, in-situ soils will be used as they provide an acceptable barrier for the purpose of protecting groundwater. Information provided to DWER on 18 December 2021 advised that the permeability of the 'as built' feedlot pads, induction yard and manure storage pad are as follows: "Permeability test results range from 4.8×10^{-6} (northern end of the western feedlot pad) to 4.1×10^{-8} m/s (manure storage pad). The average of all 8 measurements taken to date is 7.2×10^{-7} m/s." The draft Decision Report (p 6) notes: "After consultation with the Department of Primary Industries and Regional Development, the Delegated Officer considers the Applicant's proposed permeability for these areas acceptable due to the following." <p>Request: Please modify the conditions to reflect the 'as built' infrastructure by removing, "to achieve a permeability of $\leq 1 \times 10^{-7}$ m/s." Test results obtained to date on the feedlot can be provided if they are needed. They were taken by Galt Geotechnical, Pritchard Francis (Civil Engineers) and Western Environmental (Environmental Consultants). Alternatively, additional testing can be undertaken and results provided afterwards.</p>	<p>Although the cattle feedlot pens were constructed in 2017, it is unknown to what standard it was constructed to. A previous review of information provided by the previous licence holder and subsequent site visits identified significant erosion of ground surfaces in various areas across the premises, therefore the Delegated Officer requires appropriate testing to be completed across the controlled drainage area to confirm surface suitability for premises operations.</p> <p>After DWER's follow up consultation with DPIRD it was accepted that an average permeability of 7.2×10^{-7} m/s is acceptable providing deep clays are present across this area. The word 'average' has been added into the condition to allow some flexibility in the permeability testing results.</p> <p>The Delegated Officer expects that if the cattle feedlot pen testing finds the surface to not meet the required average permeability, works will be completed to ensure the surface meets the required permeability.</p>

	Condition/Table/Item	Summary of applicant's comment	Department's response
			<p>Schedule 3 – excerpt from WQPN 27 (Engineered soils liner installation and certification requirements) has been added to the works approval. The works approval holder is to refer to this Schedule which specifies permeability testing and liner requirements for engineered soils.</p> <p>If GCL repairs and/or compaction is required to meet the permeability requirements, it is required to be completed by a suitably qualified person as defined in the works approval and in accordance with Schedule 3 with any GCL being maintained in time-limited operations.</p> <p>Works approval updated accordingly.</p>
14.	Condition 1, Table 1, Item 4 (d) - cattle feedlot pen compaction	<p>Observation: This condition requires, "Permeability and compaction requirements must be demonstrated by geotechnical testing conducted by a suitably qualified person and in accordance with AS 1289."</p> <p>Comments:</p> <p>1) The Applicant notes that this condition requires the demonstration of the permeability requirement and that this information has been provided in the Application and subsequent requests for information. Raw test data can be provided if that is needed.</p> <p>2) The Applicant notes that this condition requires the demonstration of the compaction requirement though, there is no compaction specification detailed in the draft works approval.</p> <p>Request: Please modify the condition by reflecting that the feedlot pad has been constructed, by removing the compaction requirement and making allowance for the provision of permeability testing completed to date.</p>	<p>As mentioned above, if the average permeability testing results do not meet the required permeability specified across the feedlot pad surface and compaction is required, all necessary works are to be completed in accordance with Schedule 3 which has been added to the works approval.</p>
15.	Condition 1, Table 1, Item 5 - controlled drainage area 2	<p>Comment: Please note that the former CDA2 has been renamed as CDA1, being the only controlled drainage area on site.</p> <p>Request: Please modify the condition to be consistent with the updated remediation plan.</p>	<p>Works approval updated accordingly.</p>
16.	Condition 1, Table 1, Item 5 (d) - stormwater control	<p>Observation: This condition requires, "Bunds and/or cut off drains to be installed where required to divert uncontaminated stormwater away from this area."</p> <p>Comment: The Applicant notes:</p> <p>1) Meat and Livestock Australia's 2012b (MLA 2021b) National Beef Cattle Feedlot Environmental Code of Practice (the Code) notes that runoff external to the controlled drainage area is diverted away from the controlled drainage area by the provision of diversion banks upslope of the feedlot.</p> <p>2) The condition does not specify where bunds and cut off drains are required.</p> <p>Request: Please remove the condition or modify it so that it is consistent with the Code.</p>	<p>In accordance with the Guidelines, uncontaminated stormwater is to be diverted from the controlled drainage area. The Delegated Officer has not specified the specification of these bunds and/or cut off drains to allow the applicant flexibility to install them where required to ensure the stormwater diversion outcome is achieved.</p> <p>Works approval condition in Table 1, 3(d) updated to include 'where required' and also added a condition into Table 2, 2(b) to ensure the applicant maintains these bunds and/or cut off drains during operations.</p>
17.	Condition 1, Table 1, Item 6 (d) - drainage infrastructure	<p>Observation: This condition requires, "Drainage infrastructure must be underlain with in-situ soils compacted gravel and clay or other suitable compacted material and/or synthetic liner and topped with a minimum 150mm concrete canvas able to achieve a permeability of $\leq 1 \times 10^{-9}$ m/s." At some of the upper reaches of drainage lines, it may not be necessary to line the drains with concrete because these sections of drains do not handle flows at scouring velocities. The Applicant is not proposing to use concrete canvas but, is proposing to use spray-crete to stabilise drains in its updated remediation plan.</p> <p>Comment: At this point in time drains are proposed to be constructed from in-situ soils (modified) over a 300mm depth and to achieve $\leq 1 \times 10^{-9}$ m/s and subsequently overlain with 30mm of spray concrete to provide scour protection so that drains remain stabilised and do not erode (scour). Concrete canvas at 150mm thick is not available.</p> <p>Request: Please modify the condition to require the permeability of drains to meet $\leq 1 \times 10^{-9}$ m/s without specifying that drains are to be lined with spray concrete.</p>	<p>The Delegated Officer accepts this change and has altered the wording requiring the overlaying material to be suitable to stabilise drains and prevent scouring.</p> <p>Works approval updated accordingly.</p>
18.	Condition 1, Table 1, Item 6 (e) – leaky stone weirs	<p>Observation: This condition requires, "All drains to be constructed with leaky stone weirs where required to allow a flow rate greater than 0.5 m/s towards the sedimentation system without causing scouring."</p> <p>Comment: Leaky stone weirs are likely to be created by placing bricks in drains. They work to slow water flow velocity rather than allowing for greater flow than 0.5 m/s. The updated remediation plan does not include the construction of leaky stone weirs.</p> <p>Request: Please remove the condition.</p>	<p>The Delegated Officer accepts this change and considers the drainage construction material selected by the applicant will prevent scouring under Table 1, 5 (d) and also under Table 2, 2 (a), the drains are to be maintained to ensure leachate and surface water run-off freely flows to the sedimentation pond.</p> <p>Works approval updated accordingly.</p>

	Condition/Table/Item	Summary of applicant's comment	Department's response
19.	Condition 1, Table 1, Item 6 (f) – drainage surface compaction	<p>Observation: This condition requires, "Permeability and compaction requirements must be demonstrated by geotechnical testing conducted by a suitably qualified person and in accordance with AS 1289."</p> <p>Comment: The Applicant notes that this condition requires the demonstration of the compaction requirement though, there is no compaction specification detailed in the draft works approval.</p> <p>Request: Please modify the condition by removing the requirement for compaction testing.</p>	<p>The Delegated Officer notes the compaction method of the drainage infrastructure material important in ensuring the liner integrity is protected. Schedule 3: Engineered soils liner installation and certification requirements (excerpted from Water Quality Protection Note 27: Liners for containing pollutants, using engineered soils) added to the works approval detailing minimum specifications for installation and compaction.</p> <p>Condition updated to reference Schedule 3.</p>
20.	Condition 1, Table 1, Item 7 – sedimentation terraces	<p>Comment: The Applicant notes sedimentation terraces are not proposed as part of the updated remediation plan. The existing holding pond number 1 will be remediated and constructed so that it can be used as both a holding pond and a sedimentation pond.</p> <p>Request: Please remove this condition.</p>	<p>Reference to sedimentation terraces updated to a sedimentation pond and conditioning updated accordingly.</p>
21.	Condition 1, Table 1, Item 8 – holding ponds	<p>Comment: The Applicant notes the updated remediation plan provides one CDA (CDA1) connected to the three existing holding ponds (which are to be remediated).</p> <p>Request: Please modify the condition accordingly to reflect one CDA and the updated arrangement of holding ponds. CDA1 holding pond 1 has the following details:</p> <ul style="list-style-type: none"> • Top RL - approximately 100m x 50m • Base RL - approximately 60m x 20m • Volume – 6,950m³ 	<p>The new pond arrangement as per the remediation plan has been updated to specify a sedimentation pond connected to effluent pond 1 and effluent pond 2.</p> <p>Works approval updated accordingly.</p>
22.	Condition 1, Table 1, Item 8 (d) – overflow drainage	<p>Comment: The Applicant notes that this condition is now redundant with the updated remediation plan.</p> <p>Request: Please remove this condition.</p>	<p>The Delegated Officer accepts that this condition is no longer required due to the changes in the controlled drainage areas and pond configuration.</p> <p>Works approval updated accordingly.</p>
23.	Condition 1, Table 1, Item 8 (e) – holding pond lining	<p>Observation: This condition requires, "All evaporation ponds to be lined with a synthetic liner by a suitably qualified person in accordance with Schedule 2 to achieve a minimum permeability of $\leq 1 \times 10^{-9}$ m/s." The Applicant notes that holding pond 1 in the updated remediation plan is to act as both a holding pond and a sedimentation pond. In this regard, the Applicant may not line the pond 1 with a synthetic liner but, use modified clay soils with a protective gravel layer as pond 1 will need to be cleaned regularly with heavy machinery which may damage a synthetic liner. Pond 1 will be lined however, to achieve a minimum permeability of $\leq 1 \times 10^{-9}$ m/s.</p> <p>Comment: The Applicant notes that Schedule 2 to the Works Approval does not define a suitably qualified person for lining ponds.</p> <p>Request: Please modify the condition accordingly or remove the condition as there is a requirement for the installation to be certified by an Engineer once built. Please also modify the condition to reflect the three-holding pond design and that pond 1 may have a compacted clay liner.</p>	<p>The Delegated Officer accepts the applicant's proposal that the sedimentation pond may be remediated with either a synthetic liner or an engineered soil liner that meets the required permeability and has updated the conditioning accordingly to allow either. The works approval has also been updated to define a suitably qualified person in both installations of engineered soil or synthetic liners. The applicant is required to provide all installation certifications in the compliance reporting submissions.</p>
24.	Condition 1, Table 1, Item 8 (f) – holding pond cut off drains	<p>Observation: This condition requires, "Bunds and/or cut off drains to be installed where required to divert uncontaminated stormwater away from the effluent holding ponds."</p> <p>Comment: The Applicant notes:</p> <ol style="list-style-type: none"> 1) The Code notes that runoff external to the controlled drainage area is diverted away from the controlled drainage area by the provision of diversion banks upslope of the feedlot. 2) The condition does not specify where bunds and cut off drains are required. <p>Request: Please remove the condition or modify it so that it is consistent with the Code.</p>	<p>In accordance with the Guidelines, uncontaminated stormwater is to be diverted from the controlled drainage area which includes sedimentation ponds and evaporation ponds. The Delegated Officer has not specified the specification of these bunds and/or cut off drains to allow the applicant flexibility to install them where required to ensure the stormwater diversion outcome is achieved.</p> <p>Condition added into Table 2, 2(b) to ensure the applicant maintains these bunds and/or cut off drains during operations.</p>

	Condition/Table/Item	Summary of applicant's comment	Department's response
25.	Condition 7, Table 2, Item 1 – deceased animal composting	<p>Observation: This condition set (a) through to (i) do not reflect the Application nor the Guidelines. The Application and the Guidelines outline a passive composting process whereby deceased animals are placed on a bed of straw (about 0.6m deep) and then covered with organic materials (about 0.5m deep). Composting is achieved by periodically turning the compost pile every couple of months and examining the status of the deceased animal. Generally, 4 to 8 months of residence time within the compost pile is needed for a deceased animal to be fully broken-down to the point that only a few large bones may remain and be visible.</p> <p>The draft condition also contains duplications: Row 1 (c) is duplicated in Row 1(i). Row 1(b) and Row 1(d) detail different depths of cover over a deceased animal whereas the Application proposed to cover deceased animals with at least 500mm of manure.</p> <p>Comment: The Applicant also notes the proposed condition set is quite different to those in the 2020 DWER Works Approval (DWER 2020) granted to the Koojan Feedlot in Moora – as detailed in Condition 7 of Works Approval 6330 and as shown in Plate 2 below.</p> <p>Request: Please modify the condition to reflect the Application and be consistent with Works Approval 6330. The Applicant has suggested to following condition set:</p> <p>(b) Unless otherwise removed from the premises, deceased animals must be composted with the manure storage area</p> <p>(c) Composting of deceased animals is to occur such that:</p> <ul style="list-style-type: none"> (i) at least 600mm of carbon source materials such as straw is placed at the base as a bedding; (ii) a deceased animal is placed on the bedding and covered with at least 500mm of manure on all sides (iii) composting occurs in windrows no more than two levels of deceased animals high (iv) windrows are shaped to an apex at the top to shed rainfall (v) windrows are initially turned after no longer than two months of decomposition and thereafter no longer than every 3 months until the completion of the decomposition process and (vi) windrows are no greater than 2m high, 4m wide and are angled to promote drainage towards drainage channels 	<p>The Delegated Officer accepts the applicants proposed composting conditions as they are in accordance with the Guidelines. To prevent the risk of spontaneous combustion, the Delegated Officer considers it necessary to also include a temperature monitoring condition.</p> <p>Works approval updated accordingly.</p>
26.	Condition 7, Table 2, Item 3 (a) – cattle stocking density	<p>Observation: This condition requires, "Stocking density must be no less than 9.6m2/SCU within pens."</p> <p>Comment: the proposed stocking density in the updated remediation plan is 11.5m2/SCU on average.</p> <p>Request: Please modify the condition to reflect the updated remediation plan and provide allowance for periodic and occasion stocking at higher rates in individual pens (which may occur from time to time to facility stock handling). In this regard, please redact '9.6m2/SCU within pens' and insert '11.5m2/SCU within pens on average' into the condition.</p>	<p>The Delegated Officer notes the updated remediation plan and decreased stocking density and has updated the works approval accordingly. The specification of an average stocking density is not considered appropriate and in accordance with DWER's Guidance Statement – Setting Conditions as this this would not be worded so that the requirement for compliance is clear.</p>
27.	Condition 7, Table 2, Item 3 (b) – cattle feedlot pen cleaning	<p>Observation: This condition requires, "Pens must be cleaned once the depth of dry manure on the pen surface exceeds 50mm, or at least once every 13 weeks during pen utilisation and thoroughly cleaned after pen destocking."</p> <p>Comment: The Applicant notes some animals may be held for between 70 and 100 days and that pens would be thoroughly cleaned after then are destocked. The Applicant does expect to clean pens on average, at least once every 13 weeks but, some pens may be cleaned after longer intervals because of the longer holding time in pens (e.g. for 100 day grain fed beef).</p> <p>Request: Please modify the condition to reflect that pens will be cleaned on average once every 13 weeks and that some may be cleaned after longer intervals if, animals have been held for between 70 and 100 days.</p>	<p>The Delegated Officer accepts the applicants request and has removed the 13-week cleaning requirement as the 50mm deep manure on the pen surface and pen de-stocking are considered appropriate trigger points to initiate cleaning.</p> <p>Works approval updated accordingly.</p>
28.	Condition 8, Table 3, Item 1 – Manure application to land	<p>Observation: This condition requires that not more than 1.47t/ha/yr of manure is applied to land.</p> <p>Comment: The Applicant notes that it may apply three years' worth of manure to land at one time as this will be a more economic way to apply manure to land than doing so each year in small quantities.</p> <p>Request: Please modify the condition to reflect that manure may be applied, on average, at not more than 1.47t/ha/yr land.</p>	<p>The Delegated Officer has already considered the calculations and application rate provided by the applicant in liaison with DPIRD. If the applicant would like to increase the application rate after consideration of the soil testing completed, a works approval amendment with all necessary data and supporting information will be required to be submitted to DWER for assessment.</p>