Decision Report

Application for Licence Amendment

Division 3, Part V *Environmental Protection Act 1986*

Licence Number	L8539/2011/1
Licence Holder	Stephen Peter Hoffrichter Deborah Hoffrichter
File Number	2011/003064
Premises	Shark Lake Piggery Location 585 Myrup Road Myrup WA 6450 Legal description - Lot 585 on Plan 88889; Lot 1045 On Plan 152905; and Lot 8 on Plan 94347.
Date of Report	10/09/2020
Status of Report	Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number.
BC Act	*Biodiversity Conservation Act 2016*
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations.
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DPIRD	Department of Primary Industry and Regional Development
DWER	Department of Water and Environmental Regulation.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth).
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review.
Licence Holder	As specified on the front of this document.
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA).
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	As described in *Guidance Statement: Risk Assessment*.

2. Purpose and scope of assessment

Mr Stephen Peter Hoffrichter and Mrs Deborah Hoffrichter (the Licence Holders) operate an intensive piggery (the premises) with a licensed capacity of up to 8,000 animals under licence L8539/2011/1. This piggery is situated on Myrup Road in Myrup, Western Australia. The cadastral boundaries of the premises the subject of this application are shown in Figure 1.

The Licence Holder lodged a licence amendment application on 25 March 2020 to construct a new wastewater treatment pond and a new sludge drying pad. The establishment of this infrastructure will not result in an increase in the design capacity of the piggery. This Decision Report documents the Delegated Officer's assessment and determination of the application consistent with DWER's Regulatory Framework. The scope of the risk assessment includes potential impacts from emissions and discharges during the proposed infrastructure's construction and operational phases.

The Delegated Officer also noted that the licence is due to expire on 26 October 2021 and that the Licence Holder could expect to be invited to apply to renew this licence shortly after its amendment. Consequently the Delegated Officer has extended the duration of the licence until 26 October 2031 (20 years in aggregate from its granting on 27 October 2011). In extending the duration of the licence through this amendment, the Delegated Officer has amended existing conditions to ensure they are contemporary and consistent with Regulatory Framework guidance for condition setting.

2.1 Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Completed licence amendment application form and covering letter.	25 March 2020
Additional information regarding the proposed wastewater treatment pond and sludge drying pad.	11 June 2020
Information regarding the intensive accommodation shed authorised for construction by a licence amendment issued on 5 August 2016.	11 June 2020

2.2 Proposed Infrastructure

The infrastructure proposed for construction at the premises, as it relates to Category 2, is detailed in Table 3. A site layout depicting the proposed location of this infrastructure is shown in Figure 2. The proposed infrastructure is discussed in more detail in the following sections of this report.

Table 3: Proposed infrastructure

Prescribed Activity Category 2			
Proposed Infrastructure		**Proposed key infrastructure design and construction information**	**Site Plan Reference**
1	Wastewater treatment pond	a) A three sided pond with dimensions of approximately 65 metres by 65 metres by 100 metres. The pond will have a depth of at least six metres. b) The pond embankments will be at least 2 metres in height. c) The embankments must have batter slopes not exceeding a gradient of one vertical to three horizontal (1:3), to enable proper access during compaction of the subgrade and placement of the clay liner. d) A spillway constructed from concrete troughs will channel wastewater into the new pond. e) The troughs the spillway will be comprised of will be elevated to meet the existing drainage pipe from the piggery shed, which is up to six feet off the ground. The troughs will have a 1 in 3 fall over a distance of approximately 34 metres to meet the new wastewater treatment pond. f) Where the spillway meets the wastewater treatment pond, the embankment will be lined with rock armouring or rubber matting to prevent embankment erosion. g) The wastewater treatment pond will overflow into anaerobic pond A and will be connected to anaerobic pond A by a 400mm diameter pipe. h) The base and embankments of the wastewater treatment pond will contain a minimum 150 mm thickness compacted subgrade layer that is smooth and free of stones and proof-rolled to identify and troubleshoot zones that require subgrade improvement. i) The compacted subgrade layer of the wastewater treatment pond must be lined with a compacted clay liner with a minimum thickness of 300 mm (constructed in two layers of 150 mm following compaction) and an in-situ coefficient of permeability of less than 1×10^{-9} m/s. j) The clay liner material is to be well graded, of low permeability and tested for its conformance against particle size distribution, plasticity index and other characteristic requirements, prior to the wastewater treatment pond being placed into use.	Figure 2
2	Sludge drying pad	a) The sludge drying pad will be built to be approximately 82 metres in length on its western side, 35 metres in width and 75 metres in length on its eastern side. The sludge drying pad will have a depth of at least 1 metre. b) The sludge drying pad embankments will have a minimum height of 1 metre. No embankment will be built where the sludge drying pad meets settlement pond A, to ensure liquid leaving the deposited soilds can flow into settlement pond A. c) The northern extent of the sludge drying pad will be built directly onto the southern embankment of settlement pond A. d) The sludge drying pad will feature a filter system comprised of straw bales and pine posts along its northern extent. e) The embankments of the sludge drying pad must have batter slopes not exceeding a gradient of one vertical to three horizontal (1:3) to enable proper access during the compaction and grading of the floor of the sludge drying pad. f) The floor of the sludge drying pad will have a minimum slope of 1:100 towards the north;	Figure 2

Prescribed Activity Category 2			
Proposed Infrastructure		**Proposed key infrastructure design and construction information**	**Site Plan Reference**
		g) The floor of the sludge drying pad must be compacted by mechanical means and graded to create an even surface free of pot holes, cracks or other imperfections. h) A 300mm diameter pipe will be buried underneath the sludge drying pad to convey rainwater flowing along the southern embankments of anaerobic pond A and settlement pond A into an existing freshwater supply dam to the east of settlement pond A. i) The above pipe must be buried at a depth where it does not interfere with the integrity of the sludge drying pad floor.	

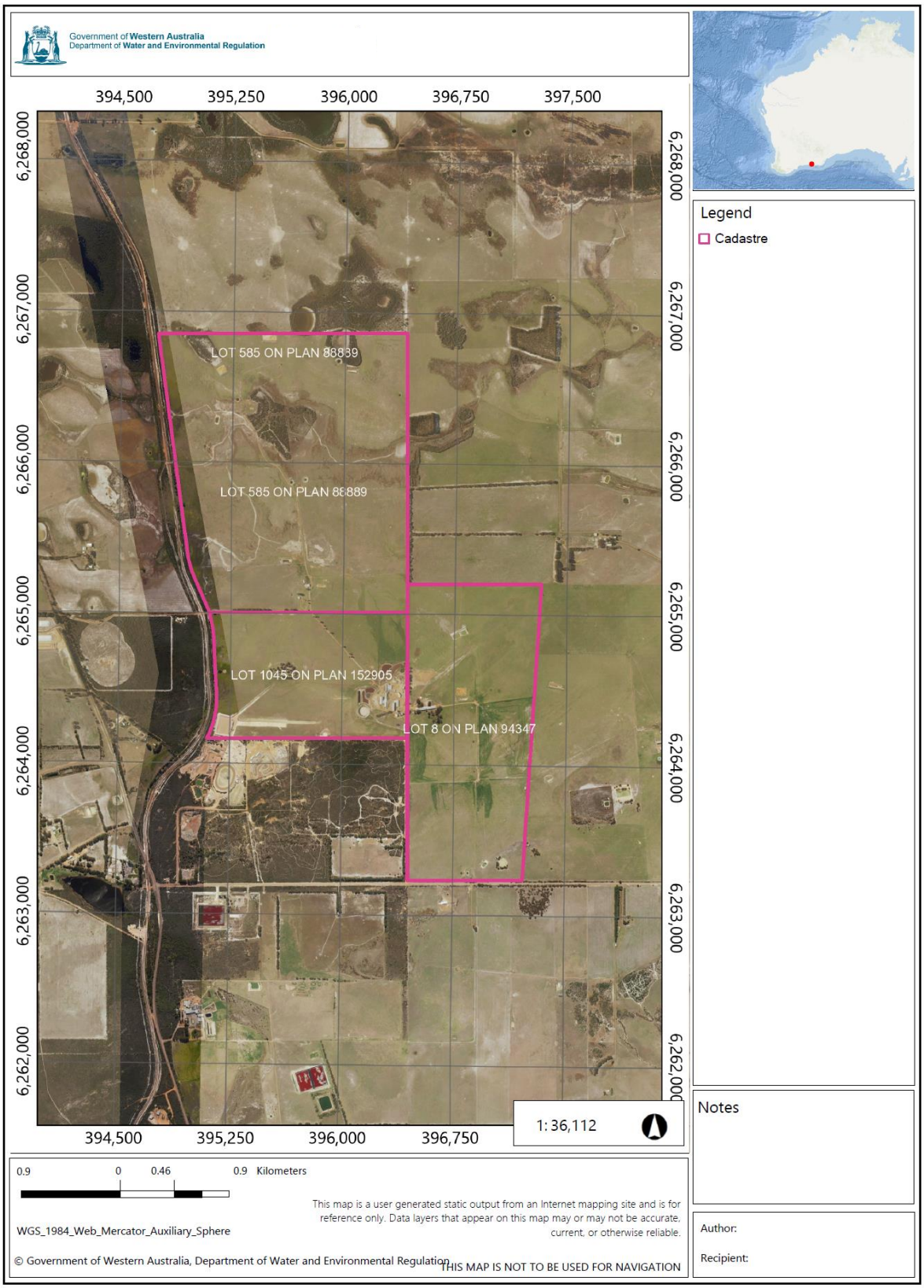

Figure 1: Prescribed premises boundary (depicted in magenta). This boundary corresponds to the cadastral boundaries for the Lots depicted in this image.

Figure 2: Proposed locations for the wastewater treatment pond and sludge drying pad. The narrow segment of the waste water treatment pond corresponds to the spillway which will channel waste water into this pond.

3. Background

The Shark Lake Piggery was constructed over approximately 80 hectares in 1983. The greater farm which comprises the prescribed premises covers approximately 570 hectares, with the piggery operations situated approximately in the middle of the farm on top of a hill. The premises is located approximately 6.3 kilometres north of the town of Esperance.

The premises became licensed under the *Environmental Protection Act 1986* through Licence L8539/2011/1 in October 2011. Prior to October 2009, the premises operated without a licence under the EP Act.

A new evaporation pond, an upgrade of the existing drainage system from the main piggery shed and a new piggery shed were completed through a works approval in 2012 (W5179/2012/1). The compliance documentation for this infrastructure was received on 3 December 2012.

3.1 Current Operations

The Shark Lake Piggery comprises a farrowing to finish operation. The piggery produces live pigs which are transported to abattoirs for slaughter. The piggery operations intensively house between 5,000 and 8,000 pigs at any time, in sheds on both straw and concrete flooring.

Table 4 lists the prescribed premises categories applicable to the current piggery operations and the proposed upgrades to the wastewater treatment infrastructure.

Table 4: Prescribed premises categories in the existing licence

Classification of Premises	Description	Approved Premises production or design capacity or throughput
Category 2	Intensive piggery: premises on which pigs are fed, watered and housed in pens.	Up to 8,000 animals.

4. Overview of Premises

4.1 Existing waste streams

When the piggery is operating at full capacity, approximately 30 tonnes of waste is generated each day. Spilt feed, faces and urine are directed to a sump located towards the centre of the sheds, which connects to anaerobic pond A. The wastewater from the sump passes through a screening process where solids are removed, prior to the liquid component being discharged into anaerobic pond A. Solids are collected on a concrete bunded area, with the leachate directed into anaerobic pond A. Anaerobic pond A is linked to settlement pond A by a spillway, with settlement pond A also linked to evaporation pond A by a spillway. Anaerobic pond B is linked to settlement pond B by an open clay lined drain, with evaporation pond B linked to settlement pond B by a spillway.

The existing wastewater treatment ponds were constructed in clay soils approximately 30 years ago. The capacity of the existing wastewater treatment pond circuit is approximately 39 megalitres. This capacity allows the wastewater treatment ponds to be operated with a freeboard of 400mm. A water balance calculation undertaken to support the assessment of Works Approval W5179/2012/1 determined the existing wastewater treatment ponds had sufficient capacity to accommodate the wastewater produced by the expanded piggery operations approved through this Works Approval. Evaporation pond B, installed in accordance with this Works Approval, provided additional wastewater storage and treatment capacity as a contingency measure.

Straw based eco-shelters have also been established at the site. These are cleaned out every six weeks, with the soiled straw pushed outside the shed and deposited into a large pile on a dedicated clay pad, where it awaits spreading on paddocks at the premises or removal from the site.

Animal carcasses are disposed of in on-site burial pits, where they are covered with at least 500mm of soil immediately.

4.2 Proposed wastewater treatment pond

The new waste water treatment pond will be constructed at least 5 metres south of anaerobic pond A and will be connected to this pond by a 400mm diameter pipe. The new wastewater treatment pond will be created by excavating the pond into the clay soil profile found on the hill accommodating the piggery operations. This wastewater treatment pond will be lined with a compacted clay liner with a minimum thickness of 300 mm, constructed in two layers of 150 mm and will have an in-situ coefficient of permeability of less than 1×10^{-9} m/s. The new wastewater treatment pond will be linked to the existing drainage pipe from the piggery operations by a spillway created from concrete troughs.

The construction of this new wastewater treatment pond will allow anaerobic pond A and settlement pond A to be taken offline for drying and desludging, before being returned into service. The drying and desludging campaign is anticipated to require approximately 12 months to complete. However, these ponds will be maintained for contingency storage and disposal (by evaporation) of water which enters these ponds. After anaerobic pond A and settlement pond A have been desludged, the new wastewater treatment pond will be operated as an anaerobic pond in the northern waste water treatment pond circuit.

4.3 Proposed sludge drying pad

The proposed sludge drying pad will be built to dry solids from the piggery operations, as well as solids sourced from the northern and western wastewater treatment pond circuits. The sludge drying pad's northern extent will be built directly onto the southern embankment of settlement pond A. Residual liquid from the stored solids will pass through a filter system constructed out of straw bale's supported by pine posts on the northern extent of the sludge drying pad and will be deposited into settlement pond A, where it will be treated prior to entering evaporation pond A. The floor of the sludge drying pad will have a minimum slope of 1:100 towards the north.

Solids from the existing wastewater treatment ponds will be pumped into the sludge drying pad, deposited to a depth of 200 - 300mm and allowed to dry for up to a month, before being utilised as fertiliser on site. The dried solids will be removed from the sludge drying pad using mechanical equipment. Intercepted rainfall will be captured in the sludge drying pad and will pass through the straw bale and pine post filter system before passing into settlement pond A. Solids from wastewater leaving the piggery sheds will be screened through the existing wastewater screen established on site, before being deposited in the back of a truck and sent to the sludge drying pad for drying.

5. Legislative context

5.1 Part V of the EP Act

5.1.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations. In completing the assessment documented in this Decision Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents, which are available at https://www.der.wa.gov.au.

5.1.2 Works Approval and licence history

Table 5 summarises the Works Approval and licence history for the premises.

Table 5: Works approval and licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment
L8539/2011/1	27/10/2011	New application
L8539/2011/1	5/07/2013	Licence amendment to new format
L8539/2011/1	12/02/2016	Licence amendment to correct administrative errors and clarify waste management activities
L8539/2011/1	5/08/2016	Licence amendment for an additional piggery shed, alteration of site plan and removal of sludge drying process requirement from licence conditions. Extension of licence duration.
W5179/2012/1	2/08/2012	Works approval for the construction of a new piggery shed, a new wastewater pond and changes to the existing effluent drainage circuit on site. These changes allowed the piggery to expand from 5,000 animals to up to 8,000 animals.

6. Location and siting

6.1 Siting context

The piggery operations are situated approximately 6.3 kilometres north of the town of Esperance. The piggery is situated atop a hill once comprised of sand, gravel and clay, with the gravel layer removed to facilitate the construction of the nearby Esperance speedway. The Piggery is situated at an elevation of approximately 100 metres Australian height datum (AHD) on the aforementioned hill. The surrounding landscape levels to 70 metres AHD approximately 660 metres to the south east and approximately 580 metres south of the current piggery operations.

The predominant land use in the local area is agriculture and rural smallholdings. The Esperance speedway and the Esperance kart club are situated approximately 660 metres to the southwest of the piggery operations. The piggery is situated with the Shire of Esperance Noxious Industry Zone. Other land uses in the local area include conservation reserves, residential and rural small holdings.

The proximity of the piggery operations to residential and sensitive receptors is detailed in Table 6, with the proximity of the piggery to residential receptors depicted in Figure 3.

Table 6: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Residential Premises	• One residence situated approximately 1.5 kilometres west southwest of the piggery operations at its closest point; • One residence situated approximately 1.5 kilometres northeast of the piggery operations at its closest point; • One residence situated approximately 1.9 kilometres northwest of the piggery operations at its closest point; • One residence situated approximately 1.9 kilometres southwest of the piggery operations at its closest point; • Four residences situated between approximately 2.1 and 2.6 kilometres southwest of the piggery operations at their closest point; • One residence situated approximately 2.5 kilometres northeast of the piggery

Sensitive Land Uses	Distance from Prescribed Activity
	operations at its closest point; • One residence situated approximately 2.6 kilometres east southeast of the piggery operations at its closest point; • Two residencies situated approximately 2.6 kilometres southeast of the piggery operations at their closest point; • One residence situated approximately 2.9 kilometres northeast of the piggery operations at its closest point; and • One residence situated approximately 3 kilometres east of the piggery operations at its closest point.
The Esperance Speedway and Kart Club facilities	These receptors are situated approximately 660 metres southwest of the piggery operations at their closest point.
Town of Esperance	Situated approximately 6.3 kilometres south of the premises at its closest point.

Figure 3: The proximity of residential receptors to the piggery operation. Cadastral boundaries are shown in black.

6.2 S-factor odour separation distances calculation

Odour emissions are a key environmental issue associated with piggery operations, due to their potential to cause nuisance and disturbance to nearby sensitive receptors. The NEGIP (2018) provides a methodology for calculating recommended minimum separation distances (the S-Factor calculation) between a piggery operation and sensitive receptors. A number of factors are taken into account when the recommended minimum separation distance is calculated. The recommended separation distance for each receptor type and other factors is determined using the following formula:

Separation distance (D: S-*Factor*) = $N^{0.55}$ x S1 x S2 x S3 where:

- N = number of standard pig units (SPU);
- 0.55 = piggery size exponent determined using results of modelling;
- S1 = piggery design factor for estimating the relative odour potential for the piggery design selected for a particular size;
- S2 = piggery siting factor for estimating the relative odour dispersion potential for the selected piggery site; and
- S3 = terrain weighting factor for estimating the potential changes to odour dispersion in situations where meteorological conditions may be influenced by local terrain influences.

The Licence Holder has previously advised that their piggery operations can hold up to approximately 6,070 SPU (8,000) animals. This comprises approximately 3,990 SPU in conventional sheds and 2,080 SPU in sheds with a flooring comprising straw.

Table 7 depicts the S-Factor calculation for the piggery operations at the maximum design capacity for conventional flushing sheds and the straw sheds and contains the recommended separation distances for local rural residential receptors.

Table 7: Minimum calculated separation distance and methodology

Attribute	Attribute Calculation	Combined Factor	
Exponent	0.55		
SPU	Up to 6,070 (comprising approximately 3,990 in conventional sheds and approximately 2,080 in a straw floored sheds).		
S1R (Effluent Removal System Factor)	1 (Conventional shed - static pit, pull plug or flushing system)	S1 Factor (S1R *S1T)	0.763
	0.63 (Deep litter system, pigs on single batch of bedding <7 weeks)		
S1T (Effluent Treatment Factor)	1 (Pond with <25% separation of volatile solids before pond)		
	0.63 (Deep litter system – spent bedding stockpiled / composted on-site)		
S2R (Receptor Type Factor)	15 (Rural Residential)	S2 Factor (S2R * S2S)	15
S2S (Surface Roughness Factor)	1 (Limited ground cover, grass)		
S3 (Terrain Weighting Factor)	1 (Flat: 0-1% slope).		
Recommended Separation Distance	Approximately 1,378 metres.		

6.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. The distances to specified ecosystems are shown in Table 8. Table 8 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting.*

Table 8: Environmental values

Specified ecosystems	Distance from the Premises
Ramsar Sites in Western Australia	The Lake Warden System (which comprises Ewans Lake, Mullet Lake, Station Lake, Wheatfield Lake, Woody Lake, Windabout Lake and Lake Warden) is situated approximately 5.1 kilometres to the south of the piggery operations at its closest point.
Important wetlands – Western Australia	The Lake Warden System is situated approximately 5.1 kilometres to the south of the piggery operations at its closest point. Pink Lake is situated approximately 8.4 kilometres to the south of the piggery operations at its closest point.
South Coast Significant Wetlands	The Lake Warden System is situated approximately 5.1 kilometres to the south of the piggery operations at its closest point. Pink Lake is situated approximately 8.4 kilometres to the south of the piggery operations at its closest point. An unnamed conservation class wetland is situated approximately 6.8 kilometres to the north west of the piggery operations at its closest point. The Benje Benjenup Lake is situated approximately 5 kilometres to the northeast of the piggery operations at its closest point. Lake Monijingup wetland is situated approximately 9 kilometres to the southwest of the piggery operations at its closest point.
Parks and Wildlife Managed Lands and Waters	The Helms Arboretum is situated approximately 4.3 kilometres northwest of the piggery operations at its closest point. This land has been reserved for forestry purposes. The Shark Lake Nature Reserve is situated approximately 1.8 kilometres southwest of the piggery operations at its closest point. This land has been reserved for the conservation of flora and fauna. The Mullet Lake Nature Reserve is situated approximately 10.6 kilometres southeast of the piggery operations at its closest point. This land has been reserved for the conservation of flora and fauna. The Woody Lake Nature Reserve is situated approximately 4.1 kilometres southeast of the piggery operations at its closest point. This land has been reserved for recreation and conservation of flora and fauna. The Lake Warden Nature Reserve is situated approximately 5.4 kilometres south of the piggery operations at its closest point. This land has been reserved for recreation and conservation of flora and fauna. An unnamed nature reserve is situated approximately 9.2 kilometres southwest of the piggery operations at its closest point. This land has been reserved for the conservation of flora and fauna. An unnamed nature reserve is situated approximately 14 kilometres southwest of the piggery operations at its closest point. This land has been reserved for the conservation of flora and fauna and water resources.
Threatened Ecological Communities and Priority Ecological	Numerous occurrences of the Priority 3 "*Proteaceae* dominated kwongkan shrublands of the southeast coastal floristic province of Western Australia" priority ecological community occur within 5 kilometres of the piggery operations. This ecological community is also classified as an 'Endangered' threatened ecological community

Specified ecosystems	Distance from the Premises
Communities	(TEC) under the Federal *Environment Protection and Biodiversity Conservation Act 1999*. The closest recorded occurrence of this TEC to the piggery operations is situated approximately 140 metres south of the piggery operations at its closest point.
Biological component	**Distance from the Premises**
Threatened/Priority Flora	A review of DWER's databases determined that five flora species of conservation significance have been recorded within 5 kilometres of the piggery operations. These species comprises three Priority 3 and two Priority 2 ranked flora species.

6.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 9.

Table 9: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
Public drinking water source areas	The Esperance Water Reserve is situated approximately 9.7 kilometres south west of the piggery operations at its closest point. The Gibson Water Reserve is situated approximately 9.7 kilometres north northwest of the piggery operations at its closest point	Components of the Esperance and Gibson Water Reserve's are recognised as either Priority 1, 2 or 3 public drinking water source area (PDWSA) protection areas.
Minor water courses	Several minor watercourses are situated with 10 kilometres of the piggery operations. The closest watercourse is situated approximately 2.9 kilometres to the east of the piggery operations at its closest point.	These watercourses have been classified as minor non-perennial watercourses.
Groundwater	During the installation of a groundwater bore in 2012 on the property (approximately 210 metres northwest of the piggery operations), it was determined the local standing groundwater level was approximately 3.2 metres below ground level. At approximately 5 metres below ground level, this bore location reached solid bedrock which prevented further deepening of the bore. This location is situated off the hill the piggery operations are located on and the ground surface in this location is 10 metres lower (90m AHD) than that found at the piggery operations. In recent years, due to poor rainfall in the Esperance area, this bore location has been consistently dry. The premises is above the Bremer East fractured rock aquifer, with groundwater quality which is typically brackish to saline. A review of DWER databases determined groundwater quality is brackish with a total dissolved solids content of 3,000 mg/L to 7,000 mg/L.	The piggery operations are situated on the northern fringe of the Esperance Groundwater Area, which was proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act) in 1973. The groundwater resources of the Esperance Groundwater Area comprise a shallow unconfined aquifer which contains the only major fresh groundwater supply for the Esperance region. This aquifer is highly vulnerable to contamination. Groundwater abstracted from the Esperance Groundwater Area is used for public water supply purposes; the irrigation of recreational areas, parks and gardens, as well as domestic, agricultural and industrial purposes. The water demands of the Esperance region are forecast to grow significantly in the future as the region's population grows, the local agricultural industry diversifies and in response to increases in local industrial activity. A reliable supply of suitable quality water will be key to supporting these developments in the Esperance region.

6.5 Soil type

6.5.1 Database review and site based soil classification

A review of DWER databases determined the premises is situated within the Esperance 9E1d Phase soil profile. This soil profile is described in

Table 10. The findings of Soil classification work previously undertaken at the premises are also detailed in

Table 10.

Table 10: Soil and sub-soil characteristics

Soil profile	Source	Soil profile characteristics.
Esperance 9E1d Phase soil profile	DWER Databases	Gravelly, yellow mottled duplex soil. Up to 30 centimetres of sand over a gravel layer on undulating low rises to low hills. This soil profile is characterised by a slight slope of 3-10%.
Soil profile previously classified at the piggery operations.	Site based soil classification work	Soil types across the site are a loamy sand, grey, grey brown and grey yellow in colour. The pH is consistently low ranging from 4.4 to 6.2 at 20cm-30cm in depth. The hill the piggery operations are situated on comprised sand over gravel over clay. Most of the gravel at the piggery site was used to build the Esperance Speedway prior to the piggery being established. The removal of the gravel from the hill exposed the clay layer and resulted in the creation of a rainwater catchment area, which is used as a drinking water source for the current piggery operations. Soil permeability testing was conducted at the Shark Lake Piggery in September 2011 to assess the coefficient of permeability of the soil. Three samples were taken from different locations on the premises, which produced results of 4.5×10^{-10} m/s, 6.6×10^{-10} m/s, and 8.5×10^{-10} m/s.

A review of DWER databases determined the piggery operations are situated in an area not at risk of developing acid sulphate soils in response to disturbance.

6.5.2 Soil advice received from DPIRD

The Delegated Officer sought additional advice from Department of Primary Industry and Regional Development (DPIRD) regarding the properties of the clay regolith soil profile found at the premises. This was in response to comments from the Applicant during the comment period on the draft decision report and works approval. DPIRD undertook a desktop assessment of the clay regolith's properties from the premises and nearby farms and a literature review of regolith hydraulic conductivity. Further information regarding soil characteristics at the premises was derived from a bore at the premises (200 metres north west of the piggery operations) constructed by DPIRD in 2011.

The advice received from DPIRD noted it is unlikely the clay regolith soil profile the site is established within would prevent the seepage of wastewater from the wastewater treatment pond in its natural state. The clay regolith on the premises is likely to have permeability several orders of magnitude higher than a permeability of 1×10^{-9} m/s criteria. The assessment of the clay regolith's permeability stems from the presence of macro-pores (greater than 0.1mm in diameter) throughout an otherwise poorly-permeable pallid clay. In addition, the clay regolith soil layer is suspected to contain large preferential flow channels consisting of coarse material.

In addition to the above, evidence from past groundwater bores established at the piggery operations suggests that a thin saprock aquifer may be present beneath the proposed wastewater treatment pond and sludge drying pad location. The wastewater contained in these structures must remain isolated from this aquifer to prevent seepage entering the aquifer, which

could facilitate the rapid movement of wastewater offsite.

In addition to the above, DPIRD advised that the characteristics of the clay regolith soil profile found at the Shark Lake Piggery suggest it should be suitable as a raw material for forming engineered clay liners. However, DPIRD cautioned that engineering tests will be required to verify this and any clay liner constructed using the clay regolith soil profile found at the Shark Lake Piggery should be tested by a suitability qualified geotechnical engineer according to accepted standards, to ensure the finished liner meets the required specifications.

6.6 Meteorology

A review of climate data obtained from the Bureau of Meteorology (BoM) Esperance weather station (No. 009789) was undertaken to support this assessment. This review found the piggery operations are situated within a region characterised by a Mediterranean climate of cool wet winters and hot dry summers. The maximum average temperature of 26.2˚C has been recorded in both January and February, with the minimum average temperature of 8.3˚C recorded in July. The mean annual rainfall is 618.1mm.

7. Risk assessment

7.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

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. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 11 and Table 12. The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 11 and Table 12 below.

Table 11. Identification of emissions, pathway and receptors during construction

Risk Events				Consequence rating	Likelihood rating	Risk	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Sources/Activities	**Potential emissions**	**Potential receptors, pathway and impact**	**Licence Holder controls**					
Vehicle and equipment movements on unsealed areas. Construction of the wastewater treatment pond and sludge drying pad.	Noise	Air and windborne pathway's causing impacts to the health and amenity of the closest human receptors. The Esperance Speedway and Kart Club are situated approximately 660 metres southwest of the piggery operations. Fourteen residencies are situated between 1.5 and 3 kilometres from the piggery operations.	Proposed infrastructure will be situated within the existing piggery boundaries.	Slight	Unlikely	Low - Acceptable, generally not controlled.	The construction of the proposed wastewater treatment pond and sludge drying pad are temporary activities, which are anticipated to be short term in their duration. In addition, this infrastructure will be established within the footprint of an existing piggery, which comprises a large area devoid of vegetation. The Esperance Speedway and Kart Club are anticipated to be areas with high noise levels when in use, which would be expected to mask any noise emissions from construction activities. The nearest residence to the piggery operations is situated 1.5 kilometres from the premises. No changes to the proximity of the piggery to local sensitive receptors will result from the proposed works. When the above is considered, it is not anticipated sensitive receptors in the local area will be adversely impacted by noise and dust emissions from the construction of the wastewater treatment pond and sludge drying pad. The Delegated Officer does not consider that these risks require further assessment.	Conditions 1, 3, 4.and 5.
	Dust							

Table 12: Identification of emissions, pathway and receptors during operation

Risk Events				Consequence rating	Likelihood rating	Risk	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Sources/Activities	**Potential emissions**	**Potential receptors, pathway and impact**	**Licence Holder Controls**					
Use of the proposed wastewater treatment pond to store and treat wastewater. Use of the sludge drying pad to dry sludge prior to use as fertiliser onsite.	Noise	Air and windborne pathway's causing impacts to the health and amenity of the closest human receptors. The Esperance Speedway and Kart Club are situated approximately 660 metres southwest of the piggery operations. Fourteen residencies are situated between 1.5 and 3 kilometres from the piggery operations.	Proposed infrastructure will be situated within the existing piggery boundaries. No change to animal numbers at the premises.	Slight	Unlikely	Low - Acceptable, generally not controlled.	The operation of the proposed infrastructure is not anticipated to change the noise emissions profile of the premises. Given the above, the Delegated Officer has determined that the operation of the proposed infrastructure is unlikely to result in unreasonable impacts to the amenity of local receptors.	Conditions 1, 3, 4 and 5; and Condition 9.
	Dust		Proposed infrastructure will be situated within the existing piggery boundaries. The infrastructure surfaces will be covered with deposited sludge or wastewater stripped of its solid component.				The proposed wastewater treatment pond and the sludge drying pad will be both constructed such that their base and embankments will comprise compacted clay. These structures will also be operated in a manner where their large open surfaces are covered with wastewater or sludge to be dried. The above attributes are anticipated to inhibit potential dust emissions during the operation of these structures. Given the above, the Delegated Officer has determined that the operation of the proposed infrastructure is unlikely to result in unreasonable impacts to the amenity of local receptors.	Conditions 1, 3, 4 and 5; and Conditions 6, 8 and 10.
	Odour		Proposed infrastructure will be situated within the existing piggery boundaries. No change to animal numbers at the premises. No change to the volume of effluent produced at the premises.	Slight	Unlikely	Low - Acceptable, generally not controlled.	The Delegated Officer does not expect the operation of the proposed infrastructure to significantly alter the existing odour emissions risk profile of the piggery operations. The Delegated Officer notes that the S-Factor calculation undertaken in Section 6.3 of this report recommended a minimum separation distance of approximately 1,378 metres between the piggery operations and rural residential receptors. The nearest rural residential receptor is situated 1.5 kilometres from the piggery operations and no changes to the proximity of the piggery to rural residential receptors will result from the installation of the proposed infrastructure. In addition, no change to animal numbers, or the amount of waste produced at the premises, will result from the installation of the proposed infrastructure. Given the above, the Delegated Officer does not anticipate that the installation of the proposed infrastructure will result in the amenity of sensitive receptors being adversely impacted by significant odour emissions.	Conditions 1, 3, 4 and 5; and Condition 9; and Conditions 6 and 10.

Risk Events				Consequence rating	Likelihood rating	Risk	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Sources/Activities	**Potential emissions**	**Potential receptors, pathway and impact**	**Licence Holder Controls**					
Use of the proposed wastewater treatment pond to store and treat wastewater. Use of the sludge drying pad to dry sludge prior to use as fertiliser onsite.	Seepage of wastewater through the base of the wastewater treatment pond and sludge drying pad.	Seepage of wastewater through the base of the waste water treatment pond and sludge drying pad, causing adverse impacts to the quality of the underlying groundwater resources.	The proposed infrastructure will be designed and constructed in accordance with the requirements contained in Table 3. Solid and liquid waste components will not be stored outside of designated storage areas at the piggery operations. The operational controls applied to the existing waste water treatment ponds to maintain the integrity of these ponds during operation will be applied to the new wastewater treatment pond. Groundwater monitoring to determine whether the operation of wastewater treatment infrastructure at the premises is adversely impacting groundwater quality will continue.	Moderate	Unlikely	Medium - Acceptable, generally subject to regulatory controls.	The piggery operations are situated on the northern fringe of the Esperance Groundwater Area. As discussed in Section 6.6.2, the clay regolith soil profile is not likely to be suitably impermeable to inhibit the seepage of wastewater from the proposed waste water treatment pond into the underlying soil profile. Therefore, the Delegated Officer has conditioned that the proposed wastewater treatment pond be constructed with a 300mm compacted clay liner with a maximum permeability of 1 x 10^{-9} m/s. It is anticipated that if the wastewater treatment pond is constructed with this clay liner in place, the use of the proposed wastewater treatment pond will be unlikely to significantly alter the risk of wastewater seepage into the underlying groundwater resources. As detailed in Section 6.6.2 of this report, the Delegated Officer has determined that the establishment of a clay liner will not be required within the sludge drying pad. This is due to the distance between the base of the sludge drying pad and known groundwater resources. In addition, this structure will be used to temporarily store shallow layers of solid material for drying, with residual liquid or intercepted rainfall diverted to an existing settlement pond for storage and evaporation. Additional construction and operational controls to those proposed by the Licence Holder have been placed onto the licence by the Delegated Officer to ensure this structure operates as intended. If this structure is constructed and operated in accordance with these requirements, the Delegated Officer does not anticipate this structure will significantly alter the risk of waste water seepage into the underlying groundwater. The Licence Holder has also committed to remove sludge from the existing waste water treatment ponds using pumps, instead of through excavation using mechanical equipment. This will protect the base of these ponds from the damage which could result from the use of mechanical equipment to remove deposited sludge from these ponds. Therefore, the desludging of the existing waste water treatment ponds is not anticipated to increase the risk of wastewater seepage from these ponds into the underlying groundwater resources.	Conditions 1, 2, 3, 4 and 5. Conditions 6 and 10; Condition 8; and Conditions 15, 16 and 17.
	Loss of wastewater into the surrounding environment.	Loss of wastewater to the surrounding environment as a result of capacity constraints in the waste water treatment pond and sludge drying pad. No surface water features are present in the local area.	Proposed infrastructure will be situated within the existing piggery boundaries. The proposed infrastructure will be connected to the existing wastewater treatment infrastructure. The sludge drying pad and waste water treatment pond will be operated to maintain a freeboard of 400mm. Solid and liquid waste water components will not be stored outside of designated storage areas at the piggery operations. No change to the volume of effluent produced at the premises. No change to animal numbers at the premises.	Slight	Unlikely	Low - Acceptable, generally not controlled.	The proposed wastewater treatment pond and the sludge drying pad will be connected to the piggery operations existing wastewater treatment pond circuits. The installation of the proposed wastewater treatment pond therefore represents an increase in the capacity of the existing wastewater treatment infrastructure. As detailed in Section 4.1 of this report, a water balance calculation undertaken to support the assessment of Works Approval W5179/2012/1 determined the existing wastewater treatment ponds had sufficient capacity to accommodate wastewater volumes produced at the premises. This was prior to the installation of evaporation pond B under the same Works Approval. The sludge drying pad will reduce the solids loading of the existing wastewater treatment infrastructure by containing solids which would otherwise be deposited into the wastewater treatment ponds. This will in effect increase the capacity of the existing waste water treatment infrastructure at the premises over time. When the above is considered alongside the proposed controls the Licence Holder will apply to the proposed infrastructure, the Delegated Officer determined that the operation of this infrastructure is unlikely to result in the loss of wastewater into the surrounding environment. The Delegated Officer has determined that further assessment of this risk is not necessary.	Conditions 1, 3, 4 and 5;; Condition, 8 Conditions 6 and 10; and Condition 9.

8. Decision

As outlined in Table 11 and Table 12, given the positioning of the proposed infrastructure and the infrastructure controls proposed by the Licence Holder, it is not anticipated the installation or operation of this infrastructure will result in adverse impacts to the environment, or the amenity of local receptors. In accordance with the outcomes of this assessment, Licence L8539/2011/1 has been amended to include:

1. conditions detailing the construction requirements pertaining to the proposed wastewater treatment pond and the sludge drying pad. These construction requirements mainly arise from the applicants proposed infrastructure design. However, in the absence of detail from the Licence Holder regarding the liner specifications for the wastewater treatment pond, the Delegated Officer specified additional design and construction requirements be applied to ensure liners are installed to an acceptable standard to manage risk outcomes. The Delegated Officer also specified additional design and construction requirements for the sludge drying pad, to manage risk outcomes;
2. conditions detailing the contents of the Environmental Compliance Report to be submitted to the CEO at the completion of the construction of the proposed infrastructure;
3. a condition requiring operation of the proposed infrastructure to be deferred until the Environmental Compliance Report for this infrastructure has been submitted;
4. updated conditions governing the operation of the premises, including a condition which requires the desludging of the existing waste water treatment ponds to be undertaken using pumps to protect the base of these ponds from damage. In addition, a condition requiring the inspection and maintenance of the sludge drying pad floor was also included, to ensure this infrastructure continues to operate according to its design;
5. updated conditions governing emission and discharges from the premises;
6. updated conditions detailing monitoring required at the premises;
7. updated record keeping and reporting conditions;
8. minor formatting changes;
9. removal of redundant conditions;
10. the inclusion of updated premises maps and a map detailing the location of the proposed infrastructure;
11. the removal of redundant maps; and
12. the addition of schedules providing further information to give effect to conditions within the licence.

In accordance with section 59 of the EP Act, the Delegated Officer has granted amendments to licence L8539/2011/1. Details of the amendments are set out in the form of an Amended licence.

9. Licence Holder comments

The Licence Holder was provided with the draft decision report and a draft amended Licence on 28 July 2020 for comment. The Licence Holder provided comments which are summarised, along with DWER's response in Appendix 2.

10. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this

Decision Report (summarised in Appendix 1).

Based on this assessment, it has been determined that an amended licence will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Chris Malley
A/Manager, Process Industries

under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Licence L8539/2011/1 – Shark Lake Piggery, Lot 585 on Plan 88889, Lot 1045 On Plan 152905 and Lot 8 on Plan 94347.	L8539/2011/1	accessed at www.dwer.wa.gov.au
2.	Licence amendment application for L8539/2011/1.	N/A	DWER records (A1883012)
3.	Additional information received regarding the piggery shed constructed under a previous amendment to L8539/2011/1.	N/A	DWER records (A1905938, A1905941-A1905943).
4.	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	N/A	accessed at www.dwer.wa.gov.au
5.	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.		
6.	DER, May 2016. *Guidance Statement: Publication of Annual Audit Compliance Reports.* Department of Environment Regulation, Perth.		
7.	DER, August 2016. *Guidance Statement: Licence duration.* Department of Environment Regulation, Perth.		
8.	DER, November 2016. *Guidance Statement: Environmental Siting*. Department of Environment Regulation, Perth.		
9.	DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.		
10.	DWER, June 2019. Guideline: *Decision Making*. Department of Water and Environment Regulation, Perth.		
11.	DWER, 2018. *Industry Regulation Fact Sheet: Intensive Piggery*. Department of Water and Environment Regulation, Perth.		
12.	DoW, 2013. *Water Quality Protection Note 27: Liners for containing pollutants, using engineered soils.* Department of Water, Perth.	DoW 2013	Accessed at www.water.wa.gov.au
13.	APL, May 2018. *National Environmental Guidelines for Indoor Piggeries (NEGIP).* Published in May 2018. Australian Pork Limited.	NEGIP 2018	Accessed at http://australianpork.com.au/

Appendix 2: Summary of Licence Holder's comments on risk assessment and draft conditions

Section of Report / Licence Condition	Summary of Licence Holder comment	DWER response
Condition 1 and Table 8 in Schedule 2; Condition 2; Condition 4(a); and Condition 8 and Table 10 in Schedule 4.	The Licence Holder disagreed with the need to establish clay liner's within the wastewater treatment pond and sludge drying pad, since the existing piggery operations have been established within an area featuring a clay regolith soil profile.	The Delegated Officer had regard to the Applicant's view that the site already had sufficient containment from natural in-situ clay material in the soils. However, the Delegated Officer requested advice from DPIRD to further consider the scientific merits of the Applicant's view to inform risk-based decision making on proposed infrastructure containment requirements. DPIRD advise is considered in Section 6.6.2. In taking account of the Applicant's comments and DPIRD advice, the Delegated Officer retained requirements for lining of the proposed pond. The Delegated Officer was satisfied that while clayey materials in the soil exist and are appropriate for clay liner formation, the clay requires proper treatment in order to attain the required level of containment to protect groundwater. However, the Delegated Officer agreed to reduce the level of design specification for the drying pad on the basis of including operational requirements to ensure it is maintained in a compacted, graded and smooth state to ensure runoff is directed to the pond. As the drying pad is not designed to hold water, the Delegated Officer determined that a reduced level of specification was reasonable to managed the risk to groundwater, noting that the proposed soils for constructing the pad contain clayey materials. Condition's 2 and 4(a) of the licence were updated to only refer to the waste water treatment pond. Table 10 in Schedule 4 was updated to include operational requirements pertaining to the sludge drying pad, to ensure this infrastructure operates as intended.
	Clarification that the depth of the sludge drying pad would be at least one metre.	The Delegated Officer agreed with this clarification and Table 8 in Schedule 2 of the licence was updated to require the sludge drying pad to have a depth of at least one metre.
Section 6.2 of this report	Clarification of the number SPU's held at the premises and the number of SPU's held in each type of piggery shed.	The Delegated Officer used this information to complete the S-Factor calculation contained in Section 6.2 of this report and determine the recommended separation distance between the premises and rural residential receptors.
General Licence Information		The Delegated Officer agreed with this change and ensured the amended licence referred to a maximum SPU of 6,070.

Attachment 1: Revised Licence L8539/2011/1