Humphries Boerdery (Pty) Ltd

Humphries Boerdery Wean-to-Finish Site – Draft Environmental Management Programme

LEDET Ref: 12/1/9/1-W125

NEAS Ref: LIM/EIA/0000259/2016

Locality: Bela-Bela

Date: 8 November 2016

SHANGONI
Management Services (Pty) Ltd

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

Humphries Boerdery (Pty) Ltd

Humphries Boerdery Wean-to-Finish Site – Draft Basic Assessment Report

LEDET Ref: 12/1/9/1-W125

NEAS Ref: LIM/EIA/0000259/2016

Locality: Bela-Bela

8 November 2016

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PROJECT DETAILS	
Department of	Limpopo Department of Economic Development, Environment and Tourism
LEDET Reference No.:	12/1/9/1-W125
NEAS Reference No.:	LIM/EIA/0000259/2016
Project Title:	Humphries Boerdery Wean-to-Finish Site
Project Number:	HUM-BEL-15-09-29
Compiled by:	Karien Venter
Date:	8 November 2016
Location:	Bela-Bela
Technical Reviewer:	Jan Nel
Technical Review Sign-off	

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LIST OF ABBREVIATIONS

BAR - Basic Assessment Report
BID - Background Information Document
CRR - Comments Response Report
DWS - Department of Water and Sanitation

EAP	-	Environmental Assessment Practitioner
ECA	-	Environmental Conservation Act of 1989
EIA	-	Environmental Impact Assessment
EIR	-	Environmental Impact Report
EMF	-	Environmental Management Framework
EMP	-	Environmental Management Programme
GN	-	Government Notice
I&AP	-	Interested and Affected Party
LEDET	-	Limpopo Department of Economic Development, Environment and Tourism
NEMA	-	National Environmental Management Act (Act No. 107 of 1998), as amended
NEM:WA	-	National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	-	National Heritage Resources Act (Act No. 25 of 1999)
NWA	-	National Water Act (Act No. 36 of 1998)
R	-	Regulation
SAHRA	-	South African Heritage Resources Agency

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1. INTRODUCTION

Humphries Boerdery (Pty) Ltd is an established pig farm near Bela-Bela in the Limpopo Province. The farm is located on Portion 50 of the Farm Tweefontein 463 KR.

Humphries Boerdery has been operational for more than 22 years. The pig farm currently houses 17 500 pigs in 29 houses. The farm is also equipped with a biodigester that enables Humphries Boerdery to treat the wastewater generated at the piggery.

1.1 The EMPr in terms of the requirements of NEMA

Appendix 4 the 2014 EIA Regulations indicates aspects that must be included in the EMPr. Table 1 below indicates the parts where information has been provided as part of this EMPr.

Table 1: The EMPR in terms of the requirements of NEMA

Regulation No:		Description	Section of EMPr
GN982 Appendix 4 (1) (a)	(i)	the EAP who prepared the EMPr; and	2
	(ii)	the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	
GN982 Appendix 4 (1) (b)		a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	2
GN982 Appendix 4 (1) (c)		a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	2
GN982 Appendix 4 (1) (d)		a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	5
	(i)	planning and design;	
	(ii)	pre-construction activities;	
	(iii)	construction activities;	
	(iv)	rehabilitation of the environment after construction and where applicable post	

Regulation No:		Description	Section of EMPr
		closure; and	
	(v)	where relevant, operation activities;	
GN982 Appendix 4 (1) (e)		a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	5
GN982 Appendix 4 (1) (f)		a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -	5
	(i)	avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	
	(ii)	comply with any prescribed environmental management standards or practices;	
	(iii)	comply with any applicable provisions of the Act regarding closure, where applicable; and	
	(iv)	comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	
GN982 Appendix 4 (1) (g)		the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	
GN982 Appendix 4 (1) (h)		the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	7
GN982 Appendix 4 (1) (i)		an indication of the persons who will be responsible for the implementation of the impact management actions;	7
GN982 Appendix 4 (1) (j)		the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	7
GN982 Appendix 4 (1) (k)		the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	7

Regulation No:		Description	Section of EMPr
GN982 Appendix 4 (1) (l)		a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	
GN982 Appendix 4 (1) (m)		an environmental awareness plan describing the manner in which-	6
	(i)	the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	6
	(ii)	risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
GN982 Appendix 4 (1)(n)		any specific information that may be required by the competent authority.	8

1.2 Specific triggered listed activity

Humphries Boerdery wishes to establish a wean-to-finish site. The development will entail the following:

- The development of a wean-to-finish unit where weaner piglets are grown until they are ready for slaughter. These pigs are called baconers.
- The construction of seven (7) wean-to-finish platforms. Each platform will have one (1) house and each house will have one (1) room (therefore a total of 7 rooms). Each room houses 810 wean-to-finish pigs. The total capacity within the wean-to-finish rooms is therefore 5 670 baconers. The dimensions of one platform: 12m x 67.5m (810m2) x 7 platforms = 5 670m2.
- The total footprint size of all the wean-to-finish platforms is therefore 5 670m2 (0.567ha).
- The total development footprint, including the platforms and open spaces between and surrounding the platforms is: 205m x 100m = 20 500m2 (2.05ha).
- The construction of an office block that will include a store room and ablution facilities. The office block will have the following dimensions: 5m x 10m (50m2).

The following describes the basic process that will be followed to raise the baconer pigs:

- Weaner piglets will be delivered to the wean-to-finish unit at three weeks of age. Each fourth week, 810 weaner piglets will be delivered.
- Once the pigs are 21-24 weeks old, they will be collected and taken to an abattoir for slaughter.

Table 2: Listed activities in terms of GNR 983 of 4 December 2014

Number and date of the relevant notice	Activity No	Description
GNR 983 Listing Notice 1 4 December 2014	4(ii)b	The development and related operation of facilities or infrastructure for the concentration of animals for the purpose of commercial production in densities that exceed- **(ii) 8 square metres per small stock unit and;** **b. more than 250pigs per facility excluding piglets that are not yet weaned;**
		The construction and operation of a wean-to-finish unit. The unit will have a capacity to house 5 670 wean-to-finish pigs, at any point in time.
GNR 983 Listing Notice 1 4 December 2014	27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) The undertaking of a linear activity; or (ii) Maintenance purposes undertaken in accordance with a maintenance management plan.
		The total development footprint, including piggery houses, office, ablution facilities, store room and open spaces between and surrounding the houses will be approximately 2.05ha. Therefore, more than 1 hectare, but less than 20 hectares of indigenous vegetation will be cleared. The vegetation type is Central Sandy Bushveld.

The proposed locality of the Humphries Boerdery Wean-to-Finish Unit is shown in the figure below.

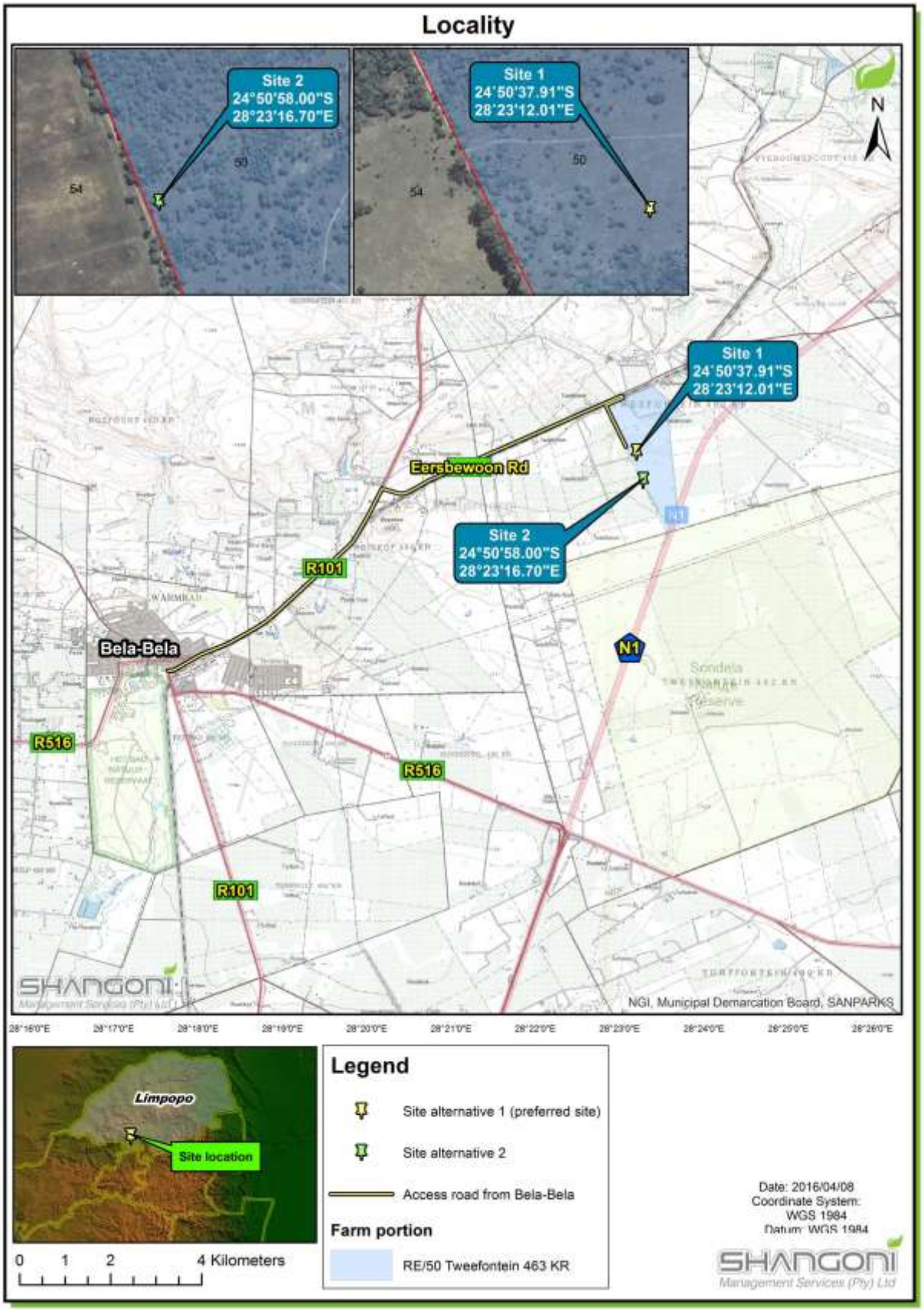

Figure 1: Locality Map

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

Name of firm	Shangoni Management Services	
Postal address	PO Box 74726 Lynwood Ridge 0040	
Telephone No.	012 807 7036	
Fax	012 807 1014	
E-mail	karien@shangoni.co.za	
Team of Environmental Assessment Practitioners on project		
Name	Qualifications & experience to conduct the EIA	Responsibility
Mr Jan Nel	• MSc Environmental Management (University of the Free State) • More than 20 years' experience conducting Environmental Impact Assessments and Waste Management License Applications	Project Director
Ms Karien Venter	• B.Sc. (Hons) Environmental Management • More than 1.5 years' experience conducting Environmental Impact Assessments and Waste Management License Applications.	EAP

3. SITE DOCUMENTATION

The following documentation must be available at the site office at all times:

- A copy of the Environmental Impact Assessment (EIA) Report;
- A copy of this Environmental Management Programme (EMP); and
- A copy of the Environmental Authorisation.

4. LEGISLATION

Table 3: Applicable legislation, policies and / or guidelines

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline	Reference where in the document it is applied
Laws of General Application			
Environment Conservation Act, 1989 (Act 73 of 1989 as amended)	Limpopo Department of Economic Development, Environment and Tourism	To control environmental conservation.	Section 5
National Environmental Management Act, 1998 (Act 107 of 1998)	Limpopo Department of Economic Development, Environment and Tourism	To provide for the integrated management of the environment, and to regulate the 'Duty of Care' Principle.	Section 1.2
Air Quality and Noise			
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Waterberg District Municipality	To reform the law regulating air quality to protect the environment by providing reasonable measures for the prevention of pollution. To provide for national norms and standards regulating air quality monitoring, management and control.	Section 5.1.4
Water Management			
National Water Act (NWA), 1998 (Act No 36 of 1998)	Department of Water and Sanitation	To provide for fundamental reform of the law relating to water resources.	Sections 5
Waste Management			
National Environmental	National Department of	To reform the law	Section 5

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline	Reference where in the document it is applied
Management: Waste Act (Act No 59 of 2008)	Environmental Affairs	regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation.	
Biodiversity			
National Environmental Management Biodiversity Act, 2004 (Act No 10 of 2004)	Limpopo Department of Economic Development, Environment and Tourism	To provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998.	Section 5.1.6 and 5.1.7
Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983)	Limpopo Department of Agriculture and Rural Development	To provide for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants.	Section 5
Agricultural Pest Act, 1983 (Act No 36 of 1983 as amended) – GN R276 of 5 March 2004	Limpopo Department of Agriculture and Rural Development	To regulate plants, plant products and other regulated articles when imported into South Africa.	Section 5
Soil and Land Management			
National Environmental Management Act, 1998 (Act 107 of 1998).	Limpopo Department of Economic Development, Environment and Tourism	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.	Section 5
Environment Conservation Act, 1989 (Act 73 of 1989 as amended)	Limpopo Department of Economic Development, Environment and	To control environmental conservation.	Section 5

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline	Reference where in the document it is applied
	Tourism		
Heritage and Archaeological Resources			
National Heritage Resources Act No 25 of 1999 (Act No 25 of 1999 as amended)	South African Heritage Resources Agency	To introduce an integrated and interactive system for the management of the national heritage resources; to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations	Section 5.1.8
Protected Areas			
National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003 as amended)	Limpopo Department of Economic Development, Environment and Tourism	To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.	Section 5
Planning of New Activities			
National Environmental Management Act, 1998 (Act 107 of 1998)	Limpopo Department of Economic Development, Environment and Tourism	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.	Sections 1.2
EIA Regulations R 983, R 984, R 985, dated December 2014) under the NEMA, 1998	Limpopo Department of Economic Development, Environment and Tourism	To regulate and control the authorisation of certain listed activities.	Sections 1.2
Waterberg District Municipality Integrated Development Plan	Waterberg District Municipality	To provide a strategic programme of action aimed at setting short, medium and long term strategic and budget	Section 5

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline	Reference where in the document it is applied
		priorities to create a development platform.	
Bela-Bela Local Municipality Integrated Development Plan	Bela-Bela Local Municipality	Management tool for assisting municipalities in achieving their development mandates.	Section 5

5. ENVIRONMENTAL MANAGEMENT PROGRAMME

Refer to the tables below for the EMP. Responsibility is assigned to the relevant parties, keeping in mind Humphries Boerdery (Pty) Ltd is ultimately still responsible for ensuring implementation of the EMP. The EMP must be updated should any significant changes occur to the operations with regards to the Humphries Boerdery Wean-to-Finish Unit.

Note: Mitigation measures, as contained in the tables below, have taken the various alternatives into consideration.

5.1 SPECIFIC TRIGGERED LISTED ACTIVITY

5.1.1 Planning and Design Phase

Table 4: EMP – Planning and Design Phase

Activity:
- Design and planning of the proposed piggery.
- Design and planning of the wastewater transportation system.
- Planning for the construction phase of the piggery.

Aspect:
- **Inadequate planning and design of the piggery.**
- **Inadequate design and planning of the wastewater transportation system.**
- **Inadequate planning for the construction phase of the piggery.**

Nature and significance of environmental impact

Impact Description			Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring Compliance and Reporting	Timeframe	Responsibility
Project Phase Applicability	Planning and Design Phase	X					
	Construction						
	Operation						
	Decommissioning						
Harm to the environment due to inadequate planning and design of the piggery unit.			To prevent harm to the environment through effective and thorough planning and design, taking the environment into consideration.	• Development planning, including stormwater and wastewater management, must ensure that the construction and operation of the piggery will not impact on the environment. • Project engineers should compile a method statement, outlining the construction methodologies. Mitigation measures should be included in this method statement which must be approved by the ECO and be available on site. Mitigation measures will be included in the EMP where relevant.	Humphries Boerdery must verify the implementation of the mitigation measures proposed in this EMP.	During the planning and design of the piggery.	• Facility manager • Design engineer
Soil, surface water and groundwater pollution from the ineffective containment of the piggery wastewater.			To ensure effective design of the wastewater handling system so that no environmental harm results when the system becomes operational.	• The wastewater handling system should be properly designed and installed so that the piggery waste is effectively removed from the houses. • The wastewater handling system must have an impermeable concrete floor. • Overflow of the wastewater handling system must be prevented. Ensure sufficient freeboard to guarantee facility integrity during heavy rainfall events.	Humphries Boerdery must verify the implementation of the mitigation measures proposed in this EMP.	During the planning and design of the piggery.	• Facility manager • Design engineer
• Delays due to poor planning. • Legal non-compliances to the Environmental Authorisation and EMP.			To ensure pro-active planning for the construction phase of the piggery.	• The approved EMP and Environmental Authorisation must be binding on the construction contractor and included in the contracts. • Adequate planning and scheduling of the construction activities to allow for disruptions caused by rain	Humphries Boerdery must verify the implementation of the mitigation measures proposed in this EMP.	During the planning and design of the piggery.	• Facility manager • Design engineer

• Harm to the environment.		and wet conditions. The scheduling must make provision for environmental training/awareness raising for workers prior to the commencement of construction. Records of training must be maintained. • Appoint an independent Environmental Control Officer (ECO) prior to the commencement of the construction phase. • Ensure that a complaints register is kept at the construction site from the first day of construction. • Ensure that the Environmental Authorisation and EMP are kept at the construction site from the first day of construction. • A construction site plan must be compiled and approved by Humphries Boerdery and the ECO. The site plan must include the location of the construction camp, toilets, stores and site office.			

5.1.2 Environment in General

Table 5: EMP – Environment in General

Activity:						
• Construction activities for the establishment of a new piggery. • Operational activities at the piggery.						
Aspect:						
• **Lack of knowledge amongst workers and contractors in terms of the impact their actions may have on the environment.**						
Nature and significance of environmental impact						
Impact Description			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring Compliance and Reporting**	**Timeframe**	**Responsibility**
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					
	Decommissioning						
Harm to the environment in general (including pollution of soil and water resources, as well as harm to employees).			To prevent harm to the environment due to lack of knowledge.	• Compliance to the Environmental Authorisation and Environmental Management Programme must form part of agreements with all construction or operational phase contractors. • The contractor is to ensure that all employees, including subcontractors and their employees, attend onsite Environmental Awareness Training prior to commencing work onsite. • Follow-up Environmental Awareness Training may be required from time to time as new subcontractors, crews or employees commence work or for specific activities that may potentially impact upon the environment. • The contractor and facility manager is to maintain accurate records of any training undertaken. • The ECO shall monitor the contractor's compliance with the requirement to provide sufficient environmental awareness training to all site staff. • All construction workers shall be issued with ID badges and clearly identifiable uniforms. • Training is to cover all aspects of the EMP and procedures to be followed. • A complaints register must be maintained on site. The register must record the following: Date when the complaint was received, name of the person who reported the complaint, details of the complaint and when and how the concern was addressed.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	• Construction contractor • Facility manager • ECO	• NEMA, 1998

5.1.3 Geology and Soil

Table 6: EMP – Geology and Soil

Activity:

- Construction and operation of the wean-to-finish unit.
- Stockpiling of topsoil and cleared vegetation.
- Site clearance.
- Replacement of topsoil and revegetation.
- Vegetation establishment as part of the rehabilitation.

Aspect:

- **Soil erosion.**
- **Topsoil being exposed to the elements.**
- **Prolonged exposure of cleared areas.**
- **Poor topsoil replacement and establishment of vegetation.**
- **Unsatisfactory establishment of vegetation.**

Nature and significance of environmental impact

Impact Description			Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring Compliance and Reporting	Timeframe	Responsibility
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					
	Decommissioning						
Exposure to soil erosion. Erosion can lead to destruction of natural habitats and sedimentation of proximate watercourses.			To prevent soil erosion and subsequent sedimentation of proximate watercourses.	• The contractor is to ensure that all reasonable measures are taken to limit erosion during the construction phase. • All areas susceptible to erosion should be protected. Erosion protection measures include sand bags, cut-off drains and/or berms. • Do not allow erosion to develop to a large scale before taking action. • Existing roads and tracks should be used as far as possible. • Retain vegetation and soil in position as long as possible. It should only be removed immediately ahead of construction (DWAF, 2005). • Remove only the vegetation essential for construction. No disturbance of adjoining vegetation should be allowed. • Colonisation of the disturbed areas should be monitored to ensure that vegetation cover is sufficient within one growing season. If not, the area has to be rehabilitated. • Stormwater Management Measures should be implemented. ▪ Clean stormwater runoff generated upstream and from the roofs of the pig houses will be channelled between the group houses via stormwater runoff channels. ▪ Stormwater channels should be regularly monitored for impeding structures.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority.	During the construction phase.	• Construction contractor • Facility manager • ECO
Degradation and loss of valuable resource (topsoil) due to exposure of topsoil to the elements.			To reduce the duration and extent of exposure of topsoil in order to preserve and protect it as a resource.	• Disturbance of areas shall only take place as per the approved construction plan signed by the ECO and representatives from Humphries Boerdery thus limiting disturbance to the approved areas. • Topsoil is to be stockpiled in discrete areas and retained for future landscaping. • Any sub-soil or rocks removed should also be stockpiled separately and be used during rehabilitation. • If sterilisation of the topsoil has occurred during stockpiling, inorganic fertilisers can be used to supplement the soils before seeding of the areas take place. • Replace topsoil concurrent with construction, whenever possible. • Cordon off areas under rehabilitation using danger tape or similar demarcation to prevent vehicular,	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections.	During the construction and operational phases.	• Construction contractor • Facility manager • ECO

		pedestrian and livestock access. • Aim to replace topsoil to its original depth (approximately 150mm). • If there is not enough topsoil available from a particular soil zone, topsoil of a similar quality may be used to replace it. The suitability of substitute topsoil should be determined by a soil analysis. • Compacted soil should be ripped to ensure effective re-vegetation. • Work necessary additives, as indicated by the soil analysis, into the soil. • Re-vegetation with indigenous grass species. • If areas show no specific vegetation growth within three months, the areas shall receive additional topsoil, be ripped to a depth of 100mm and re-planted. • Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/20m^2), applying mulching or brush packing, or creating windbreaks using brush or bales. • The site must have an adequate and effective stormwater management system in place. • Stormwater measures should be inspected on a regular basis in order to ensure that the structures are functional and not causing soil erosion. • Where necessary, place culverts underneath road foundations.	• Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.		
Vegetation establishment, as part of the rehabilitation of cleared areas and the construction site, may not be effective and this may lead to erosion of bare areas.	To prevent erosion of bare areas by ensuring vegetation establishment.	• Re-vegetated areas should be continuously monitored to verify whether the vegetation is growing and covering bare areas. • If areas show no specific vegetation growth within three months, areas must receive additional topsoil, be ripped to a depth of 100mm and re-planted. • Fertilisers can also be used to promote growth of vegetation.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Facility manager • ECO

5.1.4 Atmosphere and Noise

Table 7: EMP – Atmosphere and Noise

Activity: • Construction activities. • Excavation activities, loading and offloading activities and vehicles travelling to and from the site. • Increased traffic to and from the site. • Operational activities at the piggery. • Waste management on site.					
Aspect: • **Release of emissions and odours from the piggery, mortalities and wastewater irrigation handling system, and subsequent nuisance.** • **Dust generation.** • **Generation of noise and nuisance.**					
Nature and significance of environmental impact					
Impact Description		**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring Compliance and Reporting**	**Timeframe**	**Responsibility**
Project Phase Applicability	**Construction** X **Operation** X **Decommissioning**					
Degradation of ambient air quality and nuisance due to odour generation from the piggery, ammonia emissions, its		To minimise atmospheric emissions, odour generation	• Ventilation points on the piggery houses must be as high as possible (>1.0m) so that the exiting gases enter the air column as high as possible.	**Construction Phase:** • ECO to verify implementation of the	During the construction and	• Construction contractor

wastewater management practices and mortality management. The generation of odours depend on the design of the piggery, the wastewater handling system as well as how the piggery is managed. The impact of any odours that are generated depends upon the topography and clime of the site (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/odour). The main sources of odours at intensive piggery operations include the following: • Poorly maintained pig houses; • Inadequate housekeeping; and • Inadequate or poorly maintained wastewater system and storage of wastewater (ARMCANZ/ANZECC, 1999). Odours are also generated from the decomposition of manure and waste food at the piggery (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/odour). The main constituents of piggery wastewater that need to be considered from an environmental protection perspective include potassium, dissolved solids, sodium, ammoniacal compounds, organic matter, phosphorous and nitrogen from urine and faeces. The wastewater generally has elevated levels of volatile organic solids, nutrients and possibly salts and can also contain disinfectants sued to wash the houses, veterinary chemicals and metals such as copper and zinc. The organic components are readily biodegradable (ARMCANZ/ANZECC, 1999). Toxic compounds in the wastewater sludge, such as heavy metals and pathogens, can, however, also be detrimental to the environment. The proposed management of the piggery wastewater will entail canals to relay wastewater to an existing biodigester.	and the subsequent nuisance it causes.	• Covering the wastewater irrigation system can reduce odorous emissions. The released gas can also be captured as part of a biogas plant. • Wastewater spillages must be prevented. • Effective housekeeping and best management practices must be implemented. Houses should be cleaned and maintained on a regular basis. • Drains and treatment systems should be well maintained. • Disposal of wastewater should be done in accordance with DWS and WRC guidelines. • Ensure adequate ventilation of houses. • Keep wastewater drains clean. • Avoid ponding and irrigation with biodegradable industrial wastewater during wet conditions. • Avoid excessive build-up of manure within the houses and below the floor area. • Regularly flush wastewater from the houses. • If, existing tree cover is insignificant, trees should be planted around the piggery to act as buffers (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/odour). • Mortalities must be removed on a daily basis. • Mortalities must be stored in enclosed areas prior to being taken to the crocodile farm. • The biodigester must be well managed and monitored. • Any runoff from the pits should be contained and taken to the wastewater handling system (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/pig-carcass-composting). • Inform neighbours in advance of any maintenance activities that my lead to odour nuisance.	mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	operational phases.	• Facility manager • ECO
Degradation of ambient air quality due to dust and exhaust emission generation.	To minimise the impact of construction activities, excavation activities, loading and offloading activities and increased traffic to and from the site on the ambient air quality.	• A water cart should be onsite to water down dusty roads. • Speed bumps and traffic signs should be erected to reduce speeding onsite. • Open areas should be re-vegetated. If the soil is compacted, it should be ripped and fertilised. • Regular maintenance of vehicles and equipment should be undertaken. Optimal engine combustion will allow for “cleaner” exhaust emissions.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and	During the construction and operational phases.	• Construction contractor • Facility manager • ECO

			records kept onsite. Shortcomings must immediately be addressed.		
According to Jorgensen & Johnson (1981), the noise levels created by general construction activities on a building site can reach levels of approximately 70 dB, caused by for instance heavy machinery. It can therefore be assumed that the proposed development will have a negative impact on the environmental noise of the area once construction starts. Sound is inversely proportional to the distance from the source and can get absorbed by buildings and vegetation barriers. Noise intensities (dB) will be at their highest on site and will decrease as one moves away from their sources. The noise decline curve gives an indication of how noise generated at the site will decrease with distance. It gives an indication of the distance that the sound would have travelled upon reaching a level of 60 dB, prescribed by the SABS as being the acceptable limit for environmental noise. According to noise decline curve, at a distance of 27 metres from the construction site, the generated noise would have decreased to a level of 60 dB and at a distance of 45 metres it would have decreased to approximately 55dB. It can therefore be said that noise travelling further than 45 metres will have a low impact on neighbouring farms and residential areas. The distance to sensitive noise receptors (residences) is more than 45 metres in all cases. During the operational phase, noise will be generated by the ventilation equipment, transport vehicles and the pigs themselves. Noise levels at the piggery should not exceed 55dB during daytime hours and 45dB during night time hours. Increased noise levels during the operational phase can be caused by the animals, when they are unsettled, disturbed or excited. For example, pigs that are fed at designated times during the day become exciting when the feed cart approaches. At the proposed piggery, the pigs will have permanent access to feed and will therefore not routinely become excited during the day. The piggery houses will be solidly constructed and will largely contain noise generated by the pigs.	To minimise noise generation on the site.	• Activities that will generate the most noise should be scheduled during times of the day that will result in least disturbance to neighbours. • Site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) regarding hearing protection and noise control measures. • Regular maintenance of vehicles, equipment and fans should be done. • Conveyors/augers should not be run when empty. • Working hours should be restricted to daylight hours. • No sound amplification equipment such as sirens, loud halers or hooters are to be used on site except in emergencies. • No amplified music is permitted on site. • If work is to be undertaken outside normal work hours, permission must be obtained from the ECO and the facility manager. • No noisy work is to be conducted over the weekends or on public holidays. • Unnecessary disturbance of the pigs should be avoided. • Vehicles travelling to and from the site during night time hours must be kept to a minimum.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility manager • ECO

5.1.5 Soil, Surface Water, Stormwater and Groundwater

Table 8: EMP – Soil, Surface Water, Stormwater and Groundwater

Activity:

- The handling, storage, mixing and disposal of cement and concrete.
- The cleaning of equipment and construction areas.
- Handling, storage and disposal of general, domestic and hazardous waste.
- Installation and use of ablution facilities.
- Storage and handling of hazardous chemical substances including fuel, greases and oils.
- Vehicle and equipment maintenance and refuelling.
- Construction and operation of the piggery, its wastewater transportation system and mortality management system.
- Stormwater runoff on site.

Aspect:

- **Concrete and cement spillage.**
- **Generation and runoff of contaminated wash water.**
- **Poor waste management.**
- **Unsanitary conditions on site.**
- **Poor management and spills of hazardous chemical substances including fuel, greases and oils.**
- **Leaking and/or spilling of fuels, greases and oils.**
- **Inadequate construction and management of the piggery, its wastewater transportation system and mortality management system.**
- **Contamination of clean runoff water.**

Nature and significance of environmental impact

Impact Description			Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring Compliance and Reporting	Timeframe	Responsibility
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					
	Decommissioning						
Soil and surface water pollution as a result of spillage, improper handling, storage, mixing or disposal of cement and concrete.			To prevent pollution of soil and surface water.	• Cement may only be mixed on an impermeable surface (not bare soil). • Dry cement must be removed from the soil surface to prevent an impermeable layer forming on top of the soil. The cement must be disposed of with building rubble. • Ready-mix trucks are not permitted to clean chutes onsite. Cleaning into foundations or a dedicated cleaning pit is permitted. • Bricklayers and plasterers are to minimise any cement spills or runoff in their work area. They also have to ensure that the work area is cleaned of all cement spillage at the end of each workday. • Both used and unused cement bags are to be stored in weatherproof containers so as not to be affected by rain or runoff. • Soil contaminated by cement or concrete, including residue produced by the washing of cavities, are to be removed immediately after the spillage has occurred and disposed of appropriately. • Measures must be taken to prevent dirty water (wash water) from contaminating a watercourse. Water has to be contained by excavations or berms. • The following measures should be implemented at the concrete mixing area: ▪ Concrete may only be mixed in designated and demarcated areas. ▪ The mixing area must be established on a compacted earth platform. ▪ Stormwater must be diverted around the mixing area. ▪ Any concrete spillages must be removed by the contractor and disposed of at a licensed disposal	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority.	During the construction phase.	• Construction contractor • Facility Manager • ECO

		site. ▪ After use, all waste remaining at the mixing area must be removed and disposed of at a licensed disposal site.			
Soil and surface water pollution through contaminated wash water.	To prevent soil and surface water pollution.	• No vehicles are permitted to be washed on site. • A dedicated, temporary cleaning area (such as a plastic lined pit, plastic or metal drums located close to a water point) is to be identified to facilitate washing of cement and painting equipment. • No wastewater/wash water may be disposed of on site, onto the soil or into any water body. • Runoff from the washing of equipment is to be contained against the building by excavations of berms around the foundations.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO
Soil, surface water and groundwater pollution due to poor waste management (including biological waste generated on site).	To prevent soil, surface water and groundwater pollution.	• Building waste must be disposed of at a landfill site. • Sufficient waste bins, skips or bulk containers should be installed. Containers must be available on site at all times. • All containers (bins, skips and bulk containers) must be kept clean and hygienic. • Containers (bins, skips and bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly. • Waste material may only be temporarily stored in areas demarcated for such storage. • General waste must be stored in a manner that prevents the harbouring of pests. • General waste should always be stored or disposed of separately from hazardous waste. • Skips or bulk containers should be removed to a licensed landfill site on a regular basis. No build-up of waste is permitted onsite. • A waste management plan should be implemented. The waste management plan should consider the type of waste, description, source, storage, disposal method, disposal facility and responsible person. • No incineration of any kind of waste will be permitted onsite. • The facility should be fenced off in order to ensure high health herd status. • Strict biosecurity measures should be employed. Such measures include: ▪ Limit nonessential access and traffic to the farm. ▪ Clean and disinfect livestock and feed haulers. ▪ Keep a record of all visitors and deliveries. ▪ Have one combined entrance and exit. ▪ Provide disinfectant and appropriate footwear. ▪ Implement policies with regards to visiting livestock facilities. ▪ Take precaution when buying livestock, feed and equipment. ▪ Prevent contact between healthy and sick animals. ▪ Implement pest control measures. ▪ Prevent contact between livestock and waste generated on the site. • The piggery should consist of platforms in which specific categories of pigs are housed. • Animal housing should have slatted floors that capture waste in a sealed biodegradable industrial wastewater store facility of 50 – 60cm deep with a storage capacity of at least 28 days. • All biodegradable industrial wastewater receiving and conducting canals should be concrete canals. • The concrete biodegradable industrial wastewater collection pit to which wastewater is fed should have an additional 10 days' collection capacity.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO

Soil, surface water and groundwater pollution due to unsanitary conditions onsite.	To prevent soil, surface water and groundwater pollution.	• Sufficient ablution facilities shall be provided – minimum of 1 toilet per 15 workers. • Ablution facilities should be on impermeable surfaces and at least 50m from wetlands, drainage lines or places where stormwater may accumulate. • The location of the ablution facilities is to be approved by the ECO prior to site establishment, but shall be located within 100m of any work point. • Ablating anywhere other than in the toilets shall not be allowed. • Ablution facilities are to be secured. • The contractor shall ensure that no chemicals and/or waste from the ablution facilities are spilled on the ground at any time. • Ablution facilities should be serviced weekly or more frequently if required. • Contents are to be removed from site on a regular basis. • Ablution facilities should be inspected and maintained to prevent and minimise blockage and leakages. • Toilets should have properly closing doors and be supplied with toilet paper. • Awareness of the importance of proper hygiene should be created among employees. • The septic tank should be cleaned and de-sludged at least once a year.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO
Soil, surface water and groundwater pollution due to poor management and accidental spills of hazardous chemical substances including fuel, greases and oils used onsite.	To prevent soil, surface water and groundwater pollution by hazardous chemical substances.	• Identify all hazardous chemical substances used onsite including fuel, greases and oils. • Obtain the material safety data sheet of each of the hazardous chemical substances. • Ensure that the material safety data sheets have sufficient information to enable the user to take the necessary measures to protect his/her health and safety and that of the environment. • Material Safety Data Sheets for all hazardous chemical substances must be readily available on site. • Keep a stock inventory register of all chemicals in the store. • Powders must be stored above liquids. • Proper storage of chemicals in a lockable, well ventilated building. • Use chemicals with low toxicity and low water contamination potential, as far as possible. • Ensure adequate access control for the storage area. • Storage areas for hazardous chemicals are to comply with standard fire safety regulations. • Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, are to be clearly displayed in areas housing chemicals. • Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water. • Chemicals are to be properly labelled and handled in a safety conscious manner. • All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE). • Ensure that diesel/fuel tanks are in a bunded area with capacity of holding 110% of the total storage volume. • If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel. • Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis. • Immediately clean all spillage of fuels, lubricants and other petroleum based products. • The contaminated material must be disposed of in accordance with the waste management procedure. • No hazardous chemical must be discarded in the sewage or stormwater system. • Train staff on the use of chemicals in accordance with the risks as described in the material data sheets. • Soil contaminated with hazardous chemical substances shall be treated as hazardous waste and	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO

		removed from site.			
Hydrocarbon pollution of soil, surface water and groundwater due to spilling of fuel, grease or oil or leaking equipment and vehicles.	To prevent hydrocarbon pollution of soil, surface water and groundwater.	• All equipment, generators, diesel tanks and vehicles are to be inspected and maintained on a regular basis. • Equipment and vehicles are to be repaired immediately upon developing leaks. • Drip trays shall be supplied for all repair work undertaken on machinery on site. • Drip trays are to be utilised during greasing and re-fuelling of machinery and to contain incidental spills and pollutants. • Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow. • Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks and drums or containers for contaminated water. • Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site. • If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel. • All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids. • Inspect vehicles on entering the facility to ensure vehicles are in sound condition to reduce the risk of oil or diesel spillages. • Diesel storage tanks and bund walls must undergo yearly integrity assessments. • Generators must be stored on concrete floors in bunded areas.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO
Soil, surface water and groundwater pollution from the piggery, its wastewater management practices and mortality management. The main constituents of piggery wastewater that need to be considered from an environmental protection perspective include potassium, dissolved solids, sodium, ammoniacal compounds, organic matter, phosphorous and nitrogen from urine and faeces. The wastewater generally has elevated levels of volatile organic solids, nutrients and possibly salts and can also contain disinfectants used to wash the houses, veterinary chemicals and metals such as copper and zinc. The organic components are readily biodegradable (ARMCANZ/ANZECC, 1999). Toxic compounds in the wastewater sludge, such as heavy metals and pathogens, can, however, also be detrimental to the environment. The proposed management of the piggery wastewater will entail canals to relay wastewater to an existing biodigester.	To ensure responsible management of the piggery wastewater and to prevent the pollution of soil, surface water and groundwater.	• The Pollutant, Microbial and Stability Classes of the wastewater should be established. • The wastewater irrigation handling system must regularly be maintained and inspected to ensure that it is in working condition. This will prevent the development of leaks. • Spillages must be prevented. • Avoid excessive build-up of manure within the houses and below the floor area. • Mortalities must be stored in enclosed areas prior to being taken to the crocodile farm. A vulture restaurant can also be considered, based on the prescribed guidelines.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Facility Manager • ECO
Soil, surface water and groundwater pollution due to the contamination of clean stormwater runoff.	To ensure effective management of stormwater and the prevention of contamination of stormwater runoff.	• Stormwater should be diverted away from piggery houses. • No stormwater should be allowed to reach the mortality holding area or wastewater handling system. • The wastewater handling system should be regularly maintained to prevent spillages of wastewater. • The composting area should be bunded and a collection pit/sump should be installed to contain any runoff from the composting area.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Site Manager

Soil, surface water and groundwater pollution due to the incorrect management of wastewater on site. Nuisance caused by the management of the wastewater.	To prevent soil, surface and groundwater pollution and nuisance as a result of poor management of the wastewater.	• No incineration of any kind of waste will be permitted onsite. • Implement a surface- and groundwater monitoring programme.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Site Manager

5.1.6 Vegetation

Table 9: EMP – Vegetation

Activity:
- The removal of surface vegetation and movement of heavy machinery.
- Construction activities in the area where plants of conservation concern occur. Maintenance and edge effects in the operational phase, could trample on these plants if they are present.
- Disturbance and stockpiling of soil. Movement of construction vehicles and equipment.
- Construction and operational activities associated with the piggery.

Aspect:
- **Exposure of soil to erosion and soil compaction.**
- **Removal or destruction of plants of conservation concern.**
- **Spread of alien invasive plant species through contaminated soil or the movement of construction vehicles and equipment.**
- **Degradation of adjacent secondary bushveld and sandy bushveld.**

Nature and significance of environmental impact

Impact Description			Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring Compliance and Reporting	Timeframe	Responsibility
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					
	Decommissioning						
The removal of vegetation will expose the soils, and potentially lead to soil erosion. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully. The movement of heavy machinery could result in soil compaction that will modify habitats, destroy vegetation and inhibit re-vegetation. Soil compaction as a result of vehicles and traffic, could lead to a decrease of water infiltration and an increase of water runoff.			To prevent soil erosion and soil compaction.	• Protect all areas susceptible to erosion (especially stockpiled soils and materials such as sand and tar) and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Do not allow erosion to develop on a large scale before taking action. • A temporary fence or demarcation must be erected around the construction area (include the servitude, construction camps, areas where material is stored and the actual footprint of the development) to prevent access to sensitive environs. • Vehicles may not veer from the dedicated roads. • Once construction is complete, obsolete roads should be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion, while the natural species composition should be re-established. • Colonisation of the disturbed areas by plants species from the surrounding natural vegetation must be monitored to ensure that vegetation cover is sufficient within one growing season. If not, then the areas need to be rehabilitated with a grass seed mix containing species that naturally occur within the study area. • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases	• Construction contractors and workers • Facility manager • ECO

Although no threatened or protected plant species were recorded there is a possibility that some of these plants may occur particularly in the *B africana-T rehmanni* sandy bushveld. Edge effects or pollution may impact on suitable habitat (the moist grasslands) of threatened species.	To avoid impact on suitable habitat of threatened/protected species.	*Construction Phase:* • At the time of this assessment, no protected or threatened plant species were recorded within either of the two sites. However, site 2 is more likely to harbour these species than site 1 and therefore site 1 should be utilised for the proposed piggery. • However, if any geophytes (or bulbous species) are unearthed during construction, these should be relocated (with assistance or advice from a botanist/ecologist/horticulturist) to similar habitat outside of the development footprint. Any other species deemed to be of concern must be photographed and identified by a botanist/ecologist. • The development layout should avoid the removal of any marula trees. *Operational Phase:* • Maintenance to the piggery or associated activities should be restricted to the previously disturbed footprint of construction and avoid edge effects into the sandy bushveld.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	Prior and during the construction and operational phases.	• Planning team • Facility manager
Spread of alien invasive plant species from the transformed areas to the natural vegetation, which will result in the deterioration of the natural bushveld vegetation.	To remove alien invasive plant species from the site and immediate surrounds and monitor re-emergence.	• Alien invasive species, that were identified within the study area should be removed (prioritizing category 1 species), prior to the construction. Be removing these species, the spread of seeds into disturbed soils will be prevented which could thus have a positive impact on the surrounding natural vegetation. • All alien seedlings and saplings must be removed as they become evident for the duration of construction. • Manual / mechanical removal is preferred to chemical control. • All construction vehicles and equipment, as well as construction material should be free of soil and plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access to the study area. This should be verified by the ECO.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority.	During the construction phase.	• Construction contractors and workers • Facility manager • ECO
Edge effects from the construction and operational area could degrade secondary bushveld or sandy bushveld vegetation outside the development footprint. In addition, fire will likely be excluded from the landscape and the altered fire regime could impact on the natural bushveld processes and therefore lead to degradation thereof. Operational vehicles driving within bushveld, not impacted on during the construction, will lead to the destruction of naturally occurring vegetation and compaction of soils and subsequent erosion or colonisation by alien invasive plant species.	To limit impact on adjacent vegetation during construction and operation to maintain functioning vegetation cover.	• Construction activities must be restricted to the development footprint and no access or impacts to the surrounding vegetation should be allowed. • Ensure that maintenance work does not take place haphazardly, but according to fixed plan. • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. • Operational or maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to. • After construction, the land must be cleared or rubbish, surplus materials and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. • Allow natural fires to burn across the vegetation, except if infrastructure and lives are threatened. • Delay the re-introduction of livestock to all rehabilitation areas until an acceptable level of re-vegetation has been reached. • Ensure that no operational activities impact on naturally vegetated areas outside the development footprint.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractors and workers • Facility manager

5.1.7 Fauna

Table 10: EMP – Fauna

Activity: • Construction and operation of the wean-to-finish unit.
Aspect: • **Loss of wooded bushveld habitats.**

Nature and significance of environmental impact						
Impact Description			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring Compliance and Reporting**	**Timeframe**	**Responsibility**
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					
	Decommissioning						
Damage to mature wooded Central Sandy Bushveld. The development will effectively transform about 2ha of bushveld on the 240ha site, but this could be exceeded if measures are not taken to restrict the construction operations to within what will be the final footprints of the development's components, including the water/waste pipeline.			To minimise destruction and disturbance of natural bushveld.	• Design and construction of minimum length and width of access routes. • Demarcation of intended footprints and organisation of all successive activities within the available footprints. • Proper estimation and control of rainwater runoff from the site and its access roads, with the assumption that wastewater generated on site is already addressed by its own facility. • Provision of temporary staff shelter and ablution facilities within these footprints. • Care with materials used and any spills occurring within these footprints to prevent surrounding contamination. • Disposal of waste from these footprints to appropriate off-site facilities. • No extra tracks, material dumps or staff activities should take place anywhere in the area surrounding the construction site. • Any fauna attracted to the development to be chased back or captured and returned to the surrounding bushveld. • Direct any lighting on and around the sites away from the surrounding bushveld. Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible. • Offset bushveld loss by improved management of remaining bushveld on and around the site, by control of invasive exotic plants, in particular Lantata and Jacaranda.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During construction and operational phases.	• Construction contractors and workers • Facility manager • ECO

5.1.8 Heritage and Palaeontological

Table 11: EMP – Heritage and Palaeontological

Activity:
• Construction and operation of the wean-to-finish unit.
Aspect:
• **Disturbance of artefacts or sites of cultural heritage (archaeological and historical) significance.**
• **Disturbance of fossils and bedrock of Palaeontological sensitivity.**

Nature and significance of environmental impact						
Impact Description			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring Compliance and Reporting**	**Timeframe**	**Responsibility**
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					
	Decommissioning						
Construction activities may disturb or destroy sites, features or artefacts of archaeological and/or historical importance.			To protect artefacts or sites of cultural heritage	• If during any construction or operational activities, any site, features and objects of a cultural heritage (archaeological or historical) nature are exposed, an expert should be called in to investigate and	**Construction Phase:** • ECO to verify implementation of the	During the construction and	• Construction contractor

No sites, features or artifacts of significant cultural and heritage importance have been found on site. From a heritage point of view, the development should be allowed to continue, taking the necessary mitigation measures into account.	(archaeological and historical) significance.	suitable mitigation measures must be implemented. All activities in the area should be halted until the situation has been resolved.	mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	operational phases.	• Facility Manager • ECO
Construction activities may disturb or destroy fossils or bedrock of palaeontological sensitivity. It is unlikely that any fossils will be observed as the site is covered by deep sandy soils.	To protect fossils and features of palaeontological significance.	• The EAP as well as the ECO for this project must be made aware of the fact that the Clarens Formation sediments is Highly significant for fossil remains of vertebrates, including the dinosaurs. • If bedrock will be exposed during excavations for foundations, a qualified palaeontologist must be appointed to inspect the excavations for the presence of fossils. If excavations will not expose bedrock, no further mitigation for palaeontological heritage is recommended. • These recommendations should form part of the EMP of the project.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO

5.1.9 Sensitive Landscapes – Wetlands

Table 12: EMP – Sensitive Landscapes – Wetlands

Activity: • The moving of soil, vegetation and building materials. • Construction and operational activities associated with the piggery.					
Aspect: • **Introduction and spread of exotic vegetation.** • **Changes in water quality due to toxic contaminants and increased nutrient levels.**					
Nature and significance of environmental impact					
Impact Description		**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring Compliance and Reporting**	**Timeframe**	**Responsibility**
Project Phase Applicability	**Construction** X **Operation** X **Decommissioning** X					
Invasions of alien plants can impact on hydrology by reducing the quantity of water entering a wetland and outcompete natural vegetation, decreasing the natural		To prevent the introduction and spread of invasive alien plants.	• Ensure proposed feed does not contain exotic vegetation or seeds. • Weed control. • Monitor the establishment of alien invasive species within the areas affected by the construction and	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this	During the construction, operational and	• Construction contractor • Facility Manager

biodiversity. Once in a system, alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users. Exotic vegetation could come from proposed feed for the pigs.		maintenance and take immediate corrective action where invasive species are observed to establish. • Rehabilitate or revegetate disturbed areas.	EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	decommissioning phases.	• ECO
Operational and decommissioning activities will result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands and a reduction in wetland function as well as human and animal waste. Could possibly impact on groundwater.	To prevent changes in water quality and subsequent loss of ecological function of wetland.	• Effluent ponds should be considered to avoid manure contaminating groundwater. • Provision of adequate sanitation facilities located outside of the watercourse/riparian area or its associated buffer zone. • Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. • After construction, the land must be cleared of rubbish, surplus materials and equipment and all parts of the land shall be left in a condition as close as possible to that prior to use. • Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer. • Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects. • Control waste discharges and do not allow dirty water from operational activities to enter the watercourse. • Regular independent water quality monitoring should form part of operational procedures in order to identify pollution. • Treatment of pollution identified should be prioritised accordingly.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction, operational and decommissioning phases.	• Construction contractor • Facility Manager • ECO

5.1.10 Biosecurity

Table 13 - EMP – Biosecurity

Activity: • Operation of the piggery.					
Aspect: • **The attraction of flies, mice and rats to the piggery.** • **The use of vaccines at the piggery.** • **Pedestrian and vehicular access to the site.** • **Outbreak of diseases at the piggery.**					
Nature and significance of environmental impact					
Impact Description		**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring Compliance and Reporting**	**Timeframe**	**Responsibility**
Project Phase Applicability	**Construction**					
	Operation	**X**				
	Decommissioning					

Flies, mice and rats can carry infectious vectors that are detrimental to the health of pigs. Flies are attracted to moist and decaying organic matter. A risk exists of fly populations increasing in the vicinity of the piggery.	To prevent the attraction of flies to the piggery and the harbouring of pests such as mice and rats.	• Mortalities must be removed from the houses on a daily basis. • The feed storage and distribution systems must be designed and maintained in a manner that deters the presence and breeding of vermin. • Attention to effective sanitation at the piggery will minimise the area where flies can rest and breed. • Regular flushing of the wastewater from the houses will minimise fly breeding. • Regularly clean the feeding areas and collect wasted feed. This will prevent the attraction of flies to the piggery.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Facility Manager
Potential injury to employees working with biological waste. Biological or bio-hazard waste includes syringes for vaccines.	To ensure the correct management of biological waste.	• The collection and disposal of biological waste must be conducted in a responsible manner, in conjunction with a consulting veterinarian. • Recognised safe storage equipment/containers must be used for the collection of this waste. • Awareness must be created amongst employees on the safe placing of this material into the designated containers.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Facility Manager
Unauthorised access to the site, via foot or vehicles, as well as the entry of other animals into the biosecurity zone of the piggery can compromise its biosecurity buffer.	To ensure that there is no unauthorised access to the site.	• A security fence must be erected around the piggery. • Access to the piggery must be controlled via one access point. • Access to the property itself must also be controlled. • Entrance gates must be manned during operational hours and locked outside of operational hours. • Access to the premises should only be by prior arrangement. • The condition of the fence around the piggery must be inspected every six months.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Facility Manager
Death of pigs at the piggery, including mass mortalities and the potential spread of the disease to other farms.	To ensure that any outbreak of disease is contained and does not spread to neighbouring farms or further afield.	• Should there be an outbreak of disease at the piggery, the cause or source of the disease should be identified as soon as possible, in consultation with a veterinarian. • Neighbouring landowners should be informed of the outbreak. • The diseased animals should be separated/isolated and treated (when possible). • Inform the relevant state department of the outbreak. • Emergency plans/procedures must be developed to deal with outbreaks of diseases. • Mass mortalities must be managed in a responsible manner, in consultation with a veterinarian. • Bait stations should be used for rodent control and can also be used for fly control. • Bait stations must be placed where they cannot be reached by the pigs. They must be placed where rodents and flies are active and should have sufficient levels of bait. • An owl box programme could be considered as an alternative rodent control initiative.	**Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the operational phase.	• Facility Manager

5.1.11 Resource Usage

Table 14: EMP – Resource Usage

Activity:						
• Usage of resources, such as electricity and water.						
Aspect:						
• **Inefficient and redundant use of valuable resources (electricity and water).**						
Nature and significance of environmental impact						
Impact Description			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring Compliance and Reporting**	**Timeframe**	**Responsibility**
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					

	Decommissioning						
Wastage or depletion of valuable resources (electricity and groundwater) due to inefficient or redundant usage.		To prevent the wastage or depletion of valuable resources (electricity and groundwater).	**General** • Ensure that all employees have been informed of the importance of natural resources (proper environmental training and awareness). • Regular site inspection by supervisors should be conducted. • Inspect operations regularly to determine areas of improvement with regards to resource consumption. • Regular maintenance and inspection of equipment such as hose pipes to prevent leaks. • Monitor resource consumption. • Identify areas where resource consumption can be minimised. • Set targets to minimise resource consumption. • Identify and implement technologies and practices that may reduce resource consumption. **Water** • Regular inspection and maintenance of all boreholes, tanks, reservoirs, toilets, water pipes, valves and taps should be conducted. • Leaking tanks, reservoirs, taps, toilets and pipes must be repaired immediately. • Running water taps and pipes may not be left unattended. • All pipe, hose and tap connections are to be fitted with correct and appropriate plumbing fittings. • The quantity of groundwater abstracted on a daily basis must be metered or gauged. Records must be kept of all abstractions. • The recommended groundwater abstraction rates should be adhered to, to ensure sustainable use of the resource. • It is advised that water level monitoring is conducted on the boreholes used for the piggery as well as any surrounding boreholes. • All measuring devices must be properly maintained, must be in good working order and must be easily accessible. This shall include a programme of checking, calibration and/or renewal of measuring devices. • It is recommended that infrastructure is installed to collect rainwater to be used at the piggery. **Electricity** • Save electricity by turning off lights and computers when not in use. • Energy saving light bulbs should be used. • The flow of wastewater through the wastewater irrigation handling system should be by gravity flow, rather than pumps, as far as possible. • The use of alternative energy can be implemented by the installation of solar panels or the use of methane from the biodigester as an alternative fuel source.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO

5.1.12 Infrastructure

Table 15: EMP – Infrastructure

Activity: • Increased traffic frequency on road infrastructure during construction activities. • Increased traffic on road infrastructure during operation of the piggery (loading and offloading of pigs and feed).

Aspect:

- **Wear of access roads and insufficient vehicle inspections.**
- **Visibility of the piggery to adjacent land owners and passing motorists on the N1 highway.**

Nature and significance of environmental impact

Impact Description			Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring Compliance and Reporting	Timeframe	Responsibility
Project Phase Applicability	**Construction**	**X**					
	Operation	**X**					
	Decommissioning						
Wear of access roads, accidents on access roads, unpermitted transport of pigs and loss of pigs being transported on access roads.			To minimise the impact of the increase in traffic on access roads to the site.	• Ensure that all construction vehicles using access roads are roadworthy. • All loads are to be securely fastened when being transported. • All vehicles are to adhere to the tonnage limitation and acquire a permit as required. • All speed limits and other traffic regulations on the roadways must be adhered to. • Safety signage should be erected along the construction site.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phase.	• Construction contractor • Facility Manager • ECO
Visual impact upon receptors surrounding the piggery, including adjacent land owners and passing motorists.			To minimise the visual impact of the piggery on receptors in the vicinity of the site.	• If the piggery is still visible through the trees present on site, additional trees should be planted around the periphery of the piggery, outside of the piggery fence, to reduce the visibility of the piggery to receptors in the vicinity of the piggery. • Directional lighting can be used at the piggery, but must be directed inwards (towards the piggery) and not outwards towards the neighbouring properties and the nearby roads. • No high floodlights may be erected at the piggery.	**Construction Phase:** • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. **Operational Phase:** • Regular site inspections. • Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.	During the construction and operational phase.	• Construction contractor • Facility Manager • ECO

5.2 CLOSURE PHASE

Decommissioning of the piggery or piggery unit is not anticipated for the foreseeable future. Should the piggery be decommissioned a detailed closure and rehabilitation plan will be submitted to the Limpopo Department of Economic Development, Environment and Tourism prior to decommissioning.

6. ENVIRONMENTAL AWARENESS PLAN

The following Environmental Awareness Plan must be implemented by Humphries Boerdery (Pty) Ltd in order to inform their employees and contractors of the environmental risk that may result from their work. The plan must be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site.

The Environmental Awareness Plan is referred to as the “SHE match” training programme. The training programme focuses on the following aspects:

1. Explaining clearly what the environment is and what the environment consist of namely: air, water, soil, fauna, flora and people.
2. Once participants have grasped the description of what the environment entails, the training focuses on the potential impacts that the construction and operational activities may have on each one of these environmental components. This is done by making use of the aspect register, where each one of the environmental aspects and associated impacts has been identified.
3. To ensure that the training is effective, visual aids are used. Photos are taken of actual and potential impacts occurring on site and in some cases role-play is used to illustrate a potential impact.
4. The participants are then exposed to a poster that reflects the various environmental components. The various photos taken are posted on the poster on a rotational basis and the participants indicate (based on the visual component) what environmental component was or could have been affected by the activities portrayed on the photo.
5. By doing this the participants visualise the action as well as the potential consequence (environmental impact) of their action.
6. This general awareness training must be done before construction commences and also when new employees start work. The training should be done every two years during the Operational Phase. The poster is posted in the communal area where the impacts are visualised and the photos rotated on a monthly basis.

7. MONITORING

Table 16 below refers to the monitoring plan for the Humphries Boerdery Wean-to-Finish Unit.

Table 16: Monitoring to be conducted at the Humphries Boerdery Wean-to-Finish Unit

Method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Environmental Control Officer.
Frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Monthly during the construction phase. Yearly during the operational phase.
Responsible for the implementation of the impact management actions;	Humphries Boerdery (Pty) Ltd.
Time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	During the relevant phases, as indicated in Section 5 of this document.
Mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Independent compliance audits.
Program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Monthly compliance audit reports to be submitted to the competent authority by the designated ECO, for the duration of the construction phase. Yearly compliance audit reports to be submitted to the competent authority by the designated auditor, for the duration of the operational phase.