TOPIGS SA (PTY) LTD

TOPIGS SA MERINO PIGGERY – BASIC ASSESSMENT REPORT

Locality: The Farm Merino, Mpumalanga

Departmental Ref No: 17/2/3/GS-281

Date: 3 June 2015

SHANGONI
Management Services (Pty) Ltd

DRAFT BASIC ASSESSMENT REPORT

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PROJECT DETAILS

Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs

Reference No.: 17/2/3/GS-281

Project Title: Topigs SA Merino Piggery

Project Number: TOP-VIL-14-04-09

Compiled by: Karien du Plessis and Lizette Crous

Date: 3 June 2015

Technical Reviewer: Lourens de Villiers

HL de Villiers

EXECUTIVE SUMMARY

The Applicant

Topigs SA was established in 1995 by pig farmers, for pig farmers. The company is based in Gauteng and services customers throughout South Africa. Topigs SA also has clients in Malawi, Nigeria, Namibia, Swaziland, Zimbabwe and Zambia.

The TOPIGS 40 sow and TEMPO boar are ideally suited for African conditions and many top commercial farmers in Africa have invested in the breed with great success.

Background description

The project property, Portion 0 (remaining extent) of the farm Merino 641, IR, Mpumalanga, has historically been used for agricultural activities, namely crop production and livestock grazing. Topigs SA has identified a need to expand their operations and have identified the project property as an ideal location for the construction of their new piggery.

Project description

The proposed project will entail the following:

- The development of a piggery-grower unit where weaner piglets are grown until they are ready for slaughter. These pigs are called baconers.
- The construction of two (2) Weaner platforms. Each platform will have two (2) houses and each house will have four (4) rooms (therefore a total of 16 rooms). Each room houses 450 piglets. The total capacity within the weaner rooms is therefore 7 200 piglets. The dimensions of one platform is: 75m x 15m (1 125m^2) x 2 platforms = 2 250m^2.
- The construction of seven (7) grower platforms. Each platform will have two (2) houses and each house will have two (2) rooms (therefore a total of 28 rooms). Each room houses 450 baconer/grower pigs. The total capacity within the grower rooms is therefore 12 600 baconers/growers. The dimensions of one platform: 145m x 15m (2 175m^2) x 7 platforms = 15 225m^2.
- The total footprint size of all the weaner and grower platforms is therefore 17 475m^2 (1.7475ha).
- The total development footprint, including the platforms and open spaces between and surrounding the platforms is: 285m x 175m = 49 875m^2 (4.9875ha).
- The construction of an office block that will include a store room and ablution facilities. The office block will have the following dimensions: 6m x 20m (120m^2).

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

- Each week, 900 weaner piglets (three weeks old) will be delivered to the piggery.
- One weaner room will accommodate 450 piglets.
- Weaner piglets will be transferred to grower rooms at ten and a half weeks of age.

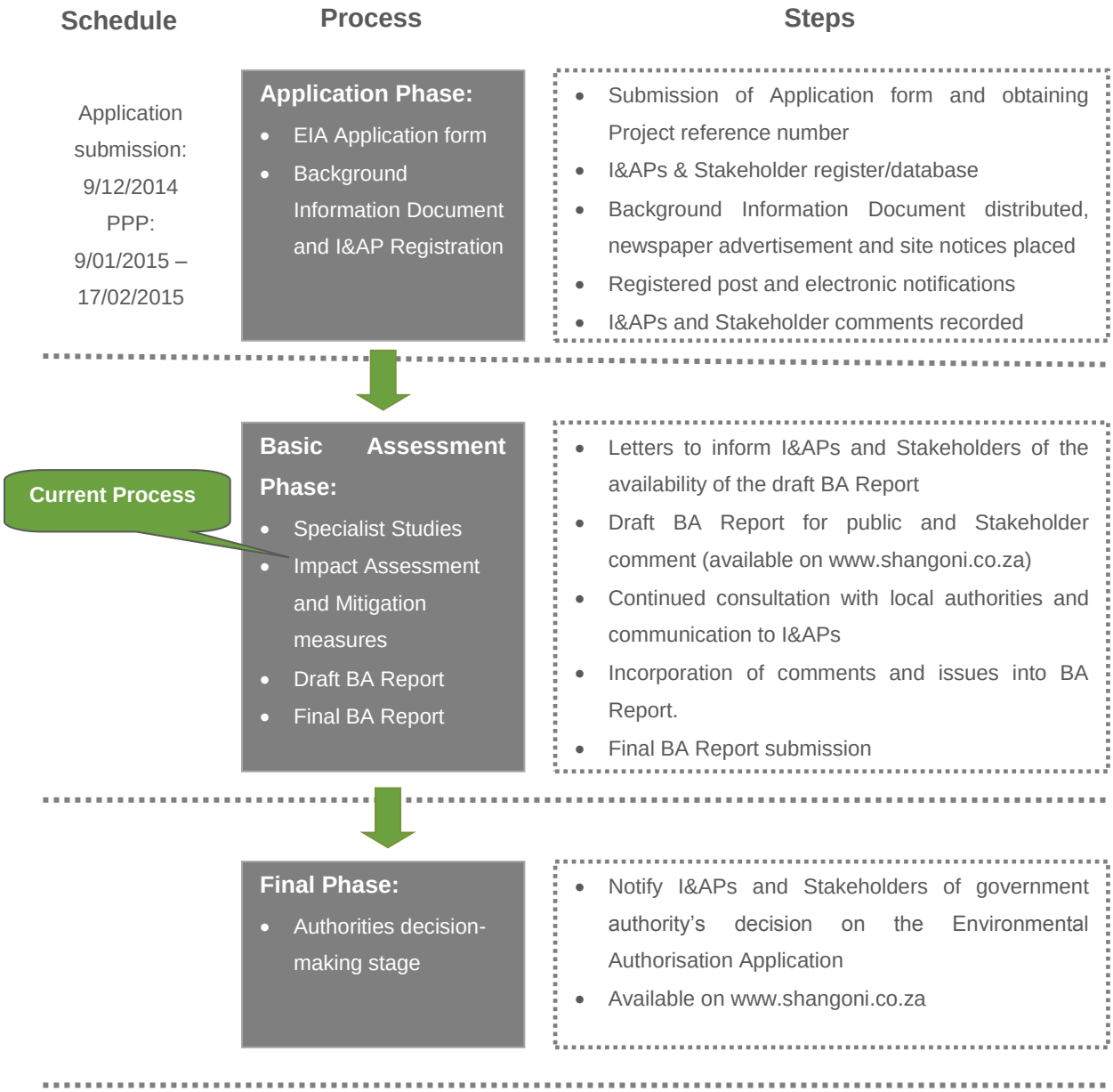
- Once the pigs are 23 weeks old, they will be collected and taken to an abattoir for slaughter.

Legal requirements and legislative process

As part of the proposed project, listed activities defined under the National Environmental Management Act, Act No. 107 of 1998 (NEMA, 1998), as amended, and the regulations there under will take place. Relevant listed activities triggered by the proposed activities are described further in this Basic Environmental Assessment Report (BAR) (refer to Part 1.5).

It is the intention of this BAR to provide the necessary information pertaining to the proposed activities associated with the project, as required in terms of the Environmental Impact Assessment Regulations (EIA Regulations R543: EIA Regulations in terms of Chapter 5 of the NEMA, 1998, dated June 2010) under the NEMA, 1998. This BAR intends to highlight all information relevant to the proposed piggery project.

The diagram below provides a visual representation of the Basic Assessment approach followed in terms of NEMA, 1998, and the Environmental Impact Assessment Regulations, dated 2010.


Schedule
Process
Steps
Application submission: 9/12/2014
PPP: 9/01/2015 – 17/02/2015
Application Phase:
EIA Application form
Background Information Document and I&AP Registration
Submission of Application form and obtaining Project reference number
I&APs & Stakeholder register/database
Background Information Document distributed, newspaper advertisement and site notices placed
Registered post and electronic notifications
I&APs and Stakeholder comments recorded
Current Process
Basic Assessment Phase:
Specialist Studies
Impact Assessment and Mitigation measures
Draft BA Report
Final BA Report
Letters to inform I&APs and Stakeholders of the availability of the draft BA Report
Draft BA Report for public and Stakeholder comment (available on www.shangoni.co.za)
Continued consultation with local authorities and communication to I&APs
Incorporation of comments and issues into BA Report.
Final BA Report submission
Final Phase:
Authorities decision-making stage
Notify I&APs and Stakeholders of government authority's decision on the Environmental Authorisation Application
Available on www.shangoni.co.za

Anticipated impacts

The purpose of this document is to supply the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs with the requested information pertaining to the National Environmental Management Act (NEMA), as amended, and Regulation 28 of the Environmental Impact Assessment Regulations, dated 2010. Contained in this document is a detailed investigation of the activity and site-specific, potential impacts associated with the proposed piggery project.

The application for environmental authorisation of the previously mentioned activities entails conducting a Basic Environmental Assessment process.

Regulation 31 (of Regulation 543) of the EIA Regulations, 2010, under the NEMA, 1998, requires that an Basic Assessment Report (BAR) includes an assessment of the status, extent, duration, probability, reversibility, replaceability of resources and mitigatory potential of the major potential environmental impacts of the proposed project be undertaken. Refer to Part 7 for the detailed risk assessment.

Potential significant impacts that have been identified during the basic assessment process are provided in the table below:

Potential Impact	Environmental Significance Pre Mitigation			Environmental Significance Post Mitigation		
	P[1]	M[2]	S[3]	P	M	S
Design and Planning						
Harm to moist grassland and watercourses due to inadequate planning and design.						
Site Alternative 1	3	3	M	2	2	L
Site Alternative 2	4	3	H	3	2	M
Site Alternative 4 (preferred alternative site)	2	3	M	2	2	L
Soil, surface water and groundwater pollution from the ineffective containment of the piggery wastewater. All Site Alternatives	3	4	H	1	3	L
Environment in general						
Harm to the environment in general (including pollution of soil and water resources, as well as harm to employees). All Site Alternatives	3	3	M	2	2	L
Geology and Soil						
Exposure of soil to erosion. Erosion can lead to destruction of natural habitats and sedimentation of the proximate watercourses. All Site Alternatives	3	3	M	2	2	L
Degradation and loss of valuable resource (topsoil) due to exposure of topsoil to the elements. All Site Alternatives	3	2	M	2	2	L
Vegetation establishment, as part of the rehabilitation of cleared areas and the construction site, not being effective and leading to erosion of bare areas. All Site Alternatives	2	3	M	2	2	L
Atmosphere and Noise						
Degradation of ambient air quality and nuisance due to odour generation from the piggery, ammonia emissions, its wastewater management practices and mortality management. All Site Alternatives	4	3	H	3	3	M

[1] Probability
[2] Magnitude
[3] Severity

Potential Impact	Environmental Significance Pre Mitigation			Environmental Significance Post Mitigation		
	P[1]	M[2]	S[3]	P	M	S
Degradation of ambient air quality due to dust and exhaust emissions generation. All Site Alternatives	3	2	M	2	2	L
Noise pollution and nuisance to neighbours. All Site Alternatives	3	3	M	2	2	L
Soil, surface water, stormwater and groundwater pollution						
Soil and surface water pollution due to spillages and/or improper handling-, storage-, mixing- or disposal- of cement and concrete. All Site Alternatives	3	3	M	2	3	M
Soil and surface water pollution as a result of contaminated wash water entering the environment. All Site Alternatives	3	3	M	2	2	L
Soil, surface water and groundwater pollution due to poor waste management. All Site Alternatives	3	3	M	2	2	L
Soil, surface water and groundwater pollution from unsanitary conditions onsite. All Site Alternatives	2	3	M	1	3	L
Soil, surface water and groundwater pollution, including hydrocarbon pollution due to poor management and accidental spills of hazardous chemical substances. All Site Alternatives	2	3	M	1	3	L
Hydrocarbon pollution of soil, surface water and groundwater due to spilling of fuel, grease or oil or leaking equipment and vehicles. All Site Alternatives	2	3	M	1	3	L
Soil, surface water and groundwater pollution from the piggery, its wastewater management practices and mortality management. All Site Alternatives	2	3	M	1	3	L
Soil, surface water and groundwater pollution due to the contamination of clean stormwater runoff. All Site Alternatives	2	2	L	1	2	L
Soil, surface water and groundwater pollution due to the incorrect management of the solid fraction of wastewater on site. Nuisance due to management of the solid fraction. All Site Alternatives	3	3	M	2	2	L
Vegetation						

Potential Impact	Environmental Significance Pre Mitigation			Environmental Significance Post Mitigation		
	P[1]	M[2]	S[3]	P	M	S
Destruction of natural vegetation due to construction, access to the site and operational activities.						
Site Alternative 1	4	3	**H**	4	2	M
Site Alternative 2	4	3	**H**	4	2	M
Site Alternative 4 (preferred alternative site)	4	4	H	4	3	H
Exposure of the soil to erosion and subsequent sedimentation of wetlands. All Site Alternatives	3	3	M	2	2	L
Modification of habitats and destruction of vegetation due to soil compaction by the movement of heavy machinery.						
Site Alternative 1	3	3	M	2	2	L
Site Alternative 2	3	3	M	2	2	L
Site Alternative 4 (preferred alternative site)	3	2	M	2	1	L
Possible destruction of plants of conservation concern.						
Site Alternative 1	2	4	M	1	3	L
Site Alternative 2	2	4	M	1	3	L
Site Alternative 4 (preferred alternative site)	4	4	H	4	2	M
Spread of alien invasive species from current infestation to disturbed. All Site Alternatives	3	3	M	2	2	L
Negative impacts on moist grassland and watercourse as well as loss of stabilising vegetation.						
Site Alternative 1	4	4	**H**	3	3	M
Site Alternative 2	4	4	**H**	3	3	M
Site Alternative 4 (preferred alternative site)	3	4	**H**	2	3	M
Loss of ecological function of moist grassland and deterioration of watercourses.						
Site Alternative 1	3	4	**H**	2	3	M
Site Alternative 2	3	4	**H**	2	3	M
Site Alternative 4 (preferred alternative site)	2	4	**H**	2	3	M
Fauna						
Destruction of natural habitat due to construction activities and consequential displacement of vertebrates.						
Site Alternative 1	4	3	H	4	2	M
Site Alternative 2	4	3	H	4	2	M

Potential Impact	Environmental Significance Pre Mitigation			Environmental Significance Post Mitigation		
	P[1]	M[2]	S[3]	P	M	S
Site Alternative 4 (preferred alternative site)	4	3	H	4	2	M
Destruction of sensitive vertebrate habitat which can lead to the relocation of certain species.						
Site Alternative 1	4	3	H	4	2	M
Site Alternative 2	4	3	H	4	2	M
Site Alternative 4 (preferred alternative site)	4	4	H	4	3	H
Loss of ecosystem function such as reduction in water quality, soil pollution and underground water contamination and the consequent negative impacts on vertebrate species richness and population numbers.						
Site Alternative 1	4	3	H	4	2	M
Site Alternative 2	4	3	H	4	2	M
Site Alternative 4 (preferred alternative site)	4	3	H	4	2	M
Loss of ecological function of the wetland due to alteration of the landscape by the development. This may place faunal species under pressure.						
Site Alternative 1	4	3	H	3	2	M
Site Alternative 2	4	3	H	3	2	M
Site Alternative 4 (preferred alternative site)	4	3	H	3	2	M
Exposure of soil to erosion may lead to damage to the basal cover which may influence species richness and population numbers.						
Site Alternative 1	4	3	H	3	2	M
Site Alternative 2	4	3	H	3	2	M
Site Alternative 4 (preferred alternative site)	4	3	H	3	2	M
Poaching of wildlife in the area of the development. Increased human activity in the area may lead to more animals being killed. All Site Alternatives	3	3	M	2	2	L
Disturbance of faunal species due to light pollution. All Site Alternatives	4	3	H	2	3	M
Displacement of indigenous fauna species. All Site Alternatives	3	2	M	2	1	L
Increased amounts of surface water runoff from hard surfaces can increase the chance of flash floods. This may	3	3	M	2	2	L

Potential Impact	Environmental Significance Pre Mitigation			Environmental Significance Post Mitigation		
	P[1]	M[2]	S[3]	P	M	S
cause fatalities of terrestrial vertebrates as refuges such as burrows are inundated. All Site Alternatives						
Human activities could disturb fauna species that depend on the natural, sensitive vegetation present on site. All Site Alternatives	3	2	M	2	1	L
Construction activities may impact upon the drainage and status of wetland areas and connectivity along the watercourses. This will in turn have a negative impact upon the vertebrate species richness. All Site Alternatives	1	3	L	1	1	L
Heritage						
Construction activities may disturb or destroy sites, features or artefacts of archaeological and/or historical importance.						
Site Alternative 1	5	4	H	5	3	H
Site Alternative 2	5	4	H	5	3	H
Site Alternative 4 (preferred alternative site)	5	4	H	5	3	H
Wetlands						
Disturbance or degradation of the wetland due to site clearance, consequential sedimentation of the wetland, increased human activity, alternation of the landscape and the loss of natural vegetation.						
Site Alternative 1	3	4	H	2	3	M
Site Alternative 2	3	4	H	2	3	M
Site Alternative 4 (preferred alternative site)	3	3	M	2	2	L
Eutrophication of wetlands due to the potential release of piggery wastewater into the environment and the subsequent accumulation of nutrient rich material within the wetland zones. All Site Alternatives	3	3	M	1	3	L
Biosecurity						
Flies, mice and rats can carry infectious vectors that are detrimental to the health of pigs. All Site Alternatives	3	3	M	2	2	L
Potential injury to employees working with biological waste. All Site Alternatives	3	2	M	1	2	L
Unauthorised access to the site as well as the entry of other animals into the biosecurity zone of the piggery can	3	2	M	1	2	L

Potential Impact	Environmental Significance Pre Mitigation			Environmental Significance Post Mitigation		
	P[1]	M[2]	S[3]	P	M	S
compromise its biosecurity buffer. All Site Alternatives						
Death of pigs at the piggery, including mass mortalities and the potential spread of the disease to other farms. All Site Alternatives	3	4	H	2	2	L
Resource usage						
Waste or depletion of valuable resources (electricity and groundwater) due to inefficient or redundant usage. All Site Alternatives	3	3	M	2	2	L
Infrastructure						
Wear of access roads, accidents on access roads, unpermitted transport of pigs and loss of pigs being transported on access roads. All Site Alternatives	3	2	M	2	2	L
Visual impact upon receptors surrounding the piggery, including adjacent land owners and passing motorists on the N4 and R54. All Site Alternatives	4	3	H	3	2	M

Appropriate mitigation measures will assist in minimising the potential impacts on the surrounding environment during the construction and operational phases of the development. A draft Environmental Management Programme (EMP) has been compiled, with the aim of serving as a working document in order to manage and/or mitigate the identified potential impacts. Refer to Addendum A for a copy of the draft EMP.

The main mitigation measures identified in the Basic Assessment include the following:

- Environmental Awareness Training of contractors, subcontractors and employees.
- “Irreplaceable” grassland in terms of the Mpumalanga Biodiversity Sector Plan must not be disturbed, as far as possible.
- The archaeological resources within Zone 1, as well as the cemetery, should be protected.
- For the archaeological resources within Zone 2, a destruction permit should first be obtained prior to disturbance of the resources in order to construct the piggery.
- Management measures must be implemented to minimise the generation of odours from the piggery.
- All areas susceptible to erosion should be protected.
- Only the vegetation essential for construction should be removed.
- No disturbance of moist grassland areas may occur.
- Open areas should be re-vegetated and it should be ensured that the rehabilitation is successful.
- Stormwater Management Measures should be implemented.
- The pig houses should be cleaned and maintained on a regular basis.
- The wastewater management systems should be well maintained.
- The wastewater sludge must be irrigated onto land in a responsible manner and in compliance to the relevant regulations and guidelines.
- Mortalities must be managed in a responsible manner.
- The generation of excessive noise must be prevented.
- Existing roads and tracks should be used as far as possible.
- Waste should regularly be removed to an approved landfill site, whether general or hazardous.
- Access to sensitive vegetation should be avoided.
- Consumption of resources (electricity and water) should be minimised.
- Adequate biosecurity measures should be implemented.
- A complaints register should be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how the concern was addressed.

Based on the outcomes of the Environmental Impact Assessment conducted as part of this Basic EIA, as well as the alternatives assessment, the following recommendations are made:

1. The proposed project/activity should be authorised and allowed to proceed on the preferred site (26°56'59.18"S; 28°31'16.85"E).
2. Alternatively, the development should be authorised and allowed to proceed on Site Alternative 1 (26°56'48.00"S; 28°31'14.90"E).
3. The mitigation measures proposed in this report and the draft Environmental Management Programme must be implemented during all phases of the proposed project.
4. It is assumed that the mitigation measures proposed in this report and the draft Environmental Management Programme will be correctly implemented by the applicant and that they will be effective.
5. A communications pathway must be established that would allow the designated ECO to accept and deal with stakeholder complaints.
6. Proposed mitigation measures should be incorporated as far as possible into the operational plan for the piggery.
7. Strict monitoring and enforcement of requirements of the EMP must be undertaken to ensure that contractors and operators adhere to these requirements.

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DEFINITIONS

Baconer

A market pig of between 70 and 100kg (ARMCANZ/ANZECC, 1999).

Building and Demolition Waste

Means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition *[NEM: WA, (Act No. 59, 2008)].*

Composting

A controlled biological process in which organic materials are broken down by micro-organisms (DEA, 2014).

Demography

The scientific study of human population, especially, with reference to their size, structure and distribution.

Domestic Waste

Means waste, excluding hazardous waste, that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes *[NEM: WA, (Act No. 59, 2008)].*

Environment

The surroundings (biophysical, social and economic) within which humans exist and that are made up of

(i). the land, water and atmosphere of the earth;
(ii). micro-organisms, plant and animal life;
(iii). any part or combination of (i) and (ii) and the interrelationships among and between them; and
(iv). the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Aspects

Elements of an organisation's activities, products or services that can interact with the environment.

Environmental Degradation

Refers to pollution, disturbance, resource depletion, loss of biodiversity, and other kinds of environmental damage; usually refers to damage occurring accidentally or intentionally as a result of human activities.

Environmental Impacts

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

Environmental Impact Assessment

A study of the environmental consequences of a proposed course of action.

Environmental Impact Report

A report assessing the potential significant impacts as identified during the environmental impact assessment.

Environmental impact

An environmental change caused by some human act.

General Waste

Means waste that does not pose immediate hazard or threat to health or to the environment, and includes-

(a) domestic waste;
(b) building and demolition waste;
(c) business waste; and
(d) inert waste *[NEM: WA, (Act No. 59, 2008)].*

Hazardous waste

Means any waste that contains organic or inorganic elements compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment *[NEM: WA, (Act No. 59, 2008)].*

Land application

The spraying of wastewater sludge onto the surface of land to condition the soil and fertilise crops and/or vegetation grown on the land (WRC, 2006).

Land use

The various ways in which land may be employed or occupied. Planners compile, classify, study and analyse land use data for many purposes, including the identification of trends, the forecasting of space and infrastructure requirements, the provision of adequate land area for necessary types of land use, and the development or revision of comprehensive plans and land use regulations.

Pollution

Pollution means any change in the environment caused by -

(i) substances;

(ii) radioactive or other waves; or

(iii) noise, odours, dust or heat,

emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future *[NEM: WA, (Act No. 59, 2008)].*

Pollution Prevention

Any activity that reduces or eliminates pollutants prior to recycling, treatment, control or disposal.

Public Participation Process

A process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development.

Registered Interested and Affected Party

In relation to an application, means an interested and affected party whose name is recorded in the register opened for that application.

Topography

Topography, a term in geography, refers to the "lay of the land" or the physio-geographic characteristics of land in terms of elevation, slope and orientation.

Vegetation

All of the plants growing in and characterising a specific area or region; the combination of different plant communities found there.

Waste

As per the definition of the National Environmental Management Waste Act, Act 59 of 2008 - means any substance, whether or not that substance can be reduced, re-used, recycled and recovered—

(a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;

(b) which the generator has no further use of for the purposes of production;

(c) that must be treated or disposed of; or

(d) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but—

(i) a by-product is not considered waste; and

(ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste.

Weaner

A piglet that has been removed from its mother at two to five weeks and grown to between 20 and 30kg (ARMCANZ/ANZECC, 1999).

ABBREVIATIONS

BID	-	Background Information Document
BAR	-	Basic Assessment Report
CRR	-	Comments and Response Report
DARDLEA	-	Department of Agriculture, Rural Development, Land and Environmental Affairs, Mpumalanga
DWS	-	Department of Water and Sanitation
EAP	-	Environmental Assessment Practitioner
ECA	-	Environmental Conservation Act of 1989
EIA	-	Environmental Impact Assessment
EMF	-	Environmental Management Framework
EMP	-	Environmental Management Programme
GN	-	Government Notice
I&AP	-	Interested and Affected Party
NEMA	-	National Environmental Management Act, Act No. 107 of 1998, as amended
NEM:WA	-	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	-	National Heritage Resources Act, Act No. 25 of 1999
R	-	Regulation
SAHRA	-	South African Heritage Resources Agency

1. INTRODUCTION

This Basis Assessment Report forms part of an application for environmental authorisation for the proposed Topigs SA piggery project near Villiers in the Mpumalanga Province. The application is made in terms of the EIA Regulations, dated 2010, under the National Environmental Management Act, 1998 (NEMA, 1998) (Act No. 107 of 1998), as amended.

The application process is undertaken on behalf of the applicant, Topigs SA (Pty) Ltd, by Shangoni Management Services (Pty) Ltd. Shangoni was appointed as independent environmental practitioner, to assist the applicant in undertaking the process as prescribed in the before mentioned environmental legislation.

An application for Environmental Authorisation was submitted to the identified competent authority, the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs Economic (formerly the Development of Economic Development, Environment and Tourism). The Department subsequently registered the project and the formal process was thereby initiated.

This BAR is divided into the following parts:

- Part 1: Introduction (including a description of the project).
- Part 2: Nature and extent of the environment affected by activity.
- Part 3: Applicable legislation and guidelines.
- Part 4: Public Participation Process.
- Part 5: Need and desirability for the activity.
- Part 6: Consideration of alternatives.
- Part 7: Environmental Impact Assessment.
- Part 8: Environmental Impact Statement.
- Part 9: Conclusion.

1.1 Process followed

1.1.1 The BAR in terms of the requirements of NEMA, 1998

Regulation 2(2) of the EIA Regulations, 2010 under the NEMA, 1998, lists aspects that must be included in Basic Assessment Reports (BARs). The table below indicates the parts where information has been provided as part of this BAR.

Table 1: The BAR in terms of the EIA Regulations, 2010, under the NEMA, 1998

Regulation No:		Description	EIR Part
R543 Regulation 22(2)(a)		Details of the Environmental Assessment Practitioner (EAP).	Part 1 & Appendix F
	(i)	Details of the EAP who prepared the report.	
	(ii)	Details of the expertise of the EAP to carry out the environmental impact assessment.	
R543 Regulation 22(2)(b)		A description of the proposed activity.	Part 1
R543 Regulation 22(2)(c)		A description of the property on which the activity is to be undertaken and the location of the activity on the property.	Part 1
R543 Regulation 22(2)(d)		A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.	Part 2
R543 Regulation 22(2)(e)		An identification of all legislation and guidelines that have been considered in the preparation of the basic assessment report.	Part 3
R543 Regulation 22(2)(f)		Details of the public participation process conducted:	Part 4 & Appendix D
	(i)	Steps taken to notify potentially interested and affected parties of the proposed activity.	
	(ii)	Proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given.	
	(iii)	A list of all persons, organisations and organs of state that were registered as interested and affected parties.	
	(iv)	A summary of the issues raised by interested and affected parties, the date of receipt and the response of the EAP to those issues.	
R543 Regulation 22(2)(g)		A description of the need and desirability of the proposed activity.	Part 5
R543 Regulation 22(2)(h)		A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.	Part 6, 7 & 8
R543 Regulation 22(2)(i)		An assessment of each identified potentially significant impact, including:	Part 7
	(i)	Cumulative impacts.	
	(ii)	The nature of the impact.	

Regulation No:		Description	EIR Part
	(iii)	The extent and duration of the impact.	
	(iv)	The probability of the impact occurring.	
	(v)	The degree to which the impact can be reversed.	
	(vi)	The degree to which the impact may cause irreplaceable loss of resources.	
	(vii)	The degree to which the impact can be mitigated.	
R543 Regulation 22(2)(j)		Any environmental management and mitigation measures proposed by the EAP	Part 7 and Addendum A
R543 Regulation 22(2)(k)		Any inputs and recommendations made by specialists to the extent that may be necessary.	Part 2 and 7
R543 Regulation 22(2)(l)		A draft environmental management programme containing the aspects contemplated in regulation 33.	Addendum A
R543 Regulation 22(2)(m)		A description of any assumptions, uncertainties and gaps in knowledge.	Part 9 (if applicable)
R543 Regulation 22(2)(n)		A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Part 9
R543 Regulation 22(2)(o)		Any representations and comments received in connection with the application or the basic assessment report.	Part 4
R543 Regulation 22(2)(p)		The minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants.	Appendix D (if applicable)
R543 Regulation 22(2)(q)		Any responses by the EAP to those representations, comments and views.	Appendix D
R543 Regulation 22(2)(r)		Any specific information that may be required by the competent authority.	N/A*
R543 Regulation 22(2)(s)		Any other matters required in terms of sections 24(4)(a) and (b) of the Act.	N/A*

** No specific requests have been received from the competent authorities to date.*

1.2 Details of the project applicant

Name of Applicant	Topigs SA (Pty) Ltd
Postal Address	P.O. Box 35492, Menlopark, 0102
Telephone No.	012 348 3676
Fax No.	012 348 8474
Farm name and portion on	Portion 0 (remaining extent) of the farm Merino 641, IR, Mpumalanga

which the activities take place	
Title Deed Number and 21 Digit Code	T0IR00000000064100000

1.3 Appointed Environmental Assessment Practitioner

Name of firm	Shangoni Management Services	
Postal address	P.O. Box 74726 Lynnwood Ridge Pretoria 0400	
Telephone No.	012 807 7036	
Fax	012 807 1014/086 643 5360	
E-mail	lizette@shangoni.co.za	
Team of Environmental Assessment Practitioners on project		
Name	**Qualifications & experience to conduct the EIA**	**Responsibility**
Mr Lourens de Villiers	• MSc. Water Resource Management (UP) • BSc. (Hons) (PU for CHE) • More than 12 years' experience conducting Environmental Impact Assessments and Waste Management License Applications	Project Director
Ms Lizette Crous	• MSc Environmental Management (University of London) • More than 3 years' experience conducting Environmental Impact Assessments and Waste Management License Applications	EAP
Ms Karien Venter	• B.Sc. (Hons) Environmental Management • Less than 1 years' experience conducting Environmental Impact Assessments and Waste Management License Applications.	EAP

** Detailed CVs for the project team are attached (Appendix F).*

1.4 Current situation

The project property is currently zoned for Agricultural use and is used for maize production and grazing by cattle, sheep and game. The extent of the entire property is 685.23ha.

Table 2: Owner(s) of the project property

Farm Name	Title deed	Owner
Portion 0, Merino 641 IR	T7675/2014	Topigs SA (Pty) Ltd

1.5 Proposed activities

The proposed project will entail the following:

- The development of a piggery-grower unit where weaner piglets are grown until they are ready for slaughter. These pigs are called baconers.
- The construction of two (2) Weaner platforms. Each platform will have two (2) houses and each house will have four (4) rooms (therefore a total of 16 rooms). Each room houses 450 piglets. The total capacity within the weaner rooms is therefore 7 200 piglets. The dimensions of one platform is: 75m x 15m (1 125m^2) x 2 platforms = 2 250m^2.
- The construction of seven (7) grower platforms. Each platform will have two (2) houses and each house will have two (2) rooms (therefore a total of 28 rooms). Each room houses 450 baconer/grower pigs. The total capacity within the grower rooms is therefore 12 600 baconers/growers. The dimensions of one platform: 145m x 15m (2 175m^2) x 7 platforms = 15 225m^2.
- The total footprint size of all the weaner and grower platforms is therefore 17 475m^2 (1.7475ha).
- The total development footprint, including the platforms and open spaces between and surrounding the platforms is: 285m x 175m = 49 875m^2 (4.9875ha).
- The construction of an office block that will include a store room, ablution facilities, laundry room and kitchen. The office block will have the following dimensions: 6m x 20m (120m^2).

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

- Each week, 900 weaner piglets (three weeks old) will be delivered to the piggery.
- One weaner room will accommodate 450 piglets.
- Weaner piglets will be transferred to grower rooms at ten and a half weeks of age.
- Once the pigs are 23 weeks old, they will be collected and taken to an abattoir for slaughter.

Site Alternatives for the project

The following site alternatives have been identified

Table 3: Site Alternatives

Site Alternatives	GPS Coordinates
Site Alternative 1	26°56'48.00"S; 28°31'14.90"E
Site Alternative 2	26°56'52.24"S; 28°31'21.02"E
Site Alternative 3	26°56'42.92"S; 28°31'35.41"E
Site Alternative 4 (preferred alternative)	26°56'59.18"S; 28°31'16.85"E

Water Use

Existing boreholes present on the property will be used to supply water to the piggery for domestic use, drinking water, cooling water, to pre-charge the cement wastewater canals (fill them with water) and to clean the houses. The table below shows the water use requirements for the piggery per day.

Table 4: Weaner and grower unit water use requirements

Livestock Category	Numbers per category	Water Use (L/day)
Weaners (3 weeks – 11 weeks)	7 200	14 400
Growers (11 weeks – 23 weeks)	12 600	79 380
Other: Domestic use, wash water and cooling water	19 800	16 469
Total Water Requirement		**110 329L/day (110.3m^3/day)**
Water use per annum: 40 270 m^3		

To determine if the existing boreholes are sufficient for the water use requirements of the piggery, two identified boreholes were subjected to yield testing procedures by Geo-logic Hydrogeological Consultants (2014). The results of the yield testing procedures are given in Section 2.8.3 of this report.

Water Storage

A combined total of 200m^3 of groundwater will be stored at the piggery in a central reservoir and site header tanks on site (Meyer, 2014).

Wastewater Handling Practices

A deep pit, flush system will be utilised for the management of pig waste from the houses. The pigs are housed on slats that allow the pig manure and urine to fall down into a cement chamber underneath the pig houses. The chamber covers the entire floor area of each house and contains a layer of water and the manure and urine falls into this water. The chambers are flushed and the wastewater is periodically released into an enclosed, central cement channel via a pull-plug system. Washwater, from house cleaning and maintenance, also enters these chambers and channels. As the chambers are pre-charged with water, the waste and wash water will therefore be emptied into the central canal in a diluted form.

Wastewater will thereafter be channelled to a concrete slurry collection pit where a screw press separator will separate the wastewater into a liquid and solid fraction. The separator stage will be in accordance with the Vector Reduction Guidelines as prescribed in the Precautionary Practices of GN 665 6 September 2013. This stage will allow for improvements to the wastewater quality and the subsequent classification of the liquid and solid fractions to comply with unrestricted use conditions. The screw-press separator will reduce the volume of wastewater to be disposed on agricultural land, improve the quality of the solid fraction produced and reduce offensive odours by reducing organic matter and suspended solids in the liquid fraction. This allows for less anaerobic generation of offensive odours and increases the efficacy of the settling and aerobic stages.

The liquid fraction will temporarily be held in a plastic lined holding dam from where it will be collected by a tanker for disposal on agricultural land, specifically onto planted pastures of *Eragrostis*, which will be harvested for sale. The wastewater will comply with the definition of "biodegradable industrial wastewater" as defined in GN 665 of 6 September 2013 and can therefore be re-used in accordance with the recommendations for the application of wastewater to agricultural land. The disposal of the wastewater on agricultural land triggers Section 21(e) of GN 665 of 6 September 2013 under the National Water Act, 1998 (Act No. 36 of 1998) (Meyer, 2014).

The solid fractions will be collected on a cement floor and composted for two weeks, then air dried in windrows. By subjecting the solid fraction to the aerobic process for 14 days at 40°C and reducing its moisture content, odour generation and vector attraction is reduced. The material will thereafter be used for organic soil amendment on the farm or be made available as a saleable product with unrestricted use.

Once the piggery is operational, the following wastewater samples will be obtained for compliance and monitoring purposes:

- Raw, biodegradable wastewater generated at the piggery;
- Liquid fraction (after separation); and
- Solid fraction (after separation).

In order to ensure compliance with quality guidelines, monitoring of discharge quality will be conducted. Source as well as discharge quality will be monitored. Analytical procedures will also be conducted, including the following:

- Inorganic chemical analysis;
- Microbiological indicator organism assessments; and
- Physico-chemical parameters.

In order to determine whether wastewater can be used as irrigation water on agricultural land, wastewater production and water use on site had to be determined. Wastewater production was assessed by using a combination of pig water requirements (water utilisation, actual water intake and wash water used) and correlations to feed consumptions. Wastewater production values applicable to the proposed project are shown in the table below.

Table 5: Weaner and grower unit wastewater calculations

Livestock Category	Numbers per category	Estimated Raw Wastewater Production (L/day)
Weaners (3 weeks – 11 weeks)	7 200	2 880
Growers (11 weeks – 23 weeks)	12 600	50 400
Other: Domestic use, wash water and cooling water	19 800	9 900

Total Wastewater Produced	**63 180L/day (63.1m^3/day)**
Wastewater production per annum: 23 060 m^3	

The nutrient load of the wastewater is shown in the table below.

Table 6: Nutrient load calculations

	Wastewater generated (L/year)	**Wastewater generated (liquid fraction) after separation (L/year)[4]**
	20 060 700	19 601 595
Nutrient loading	Raw N produced: 80 712kg N/year	Liquid fraction N produced: 68 605kg N/year

The total area available for irrigation with wastewater is calculated using the following formula: *Hectares available for irrigation: Total area minus non-application areas*. For the proposed project, the available area for irrigation is therefore 600ha – 158ha = 442ha. Typical allowable application rates and pig wastewater sludge composition are shown in the table below.

Table 7: Pig wastewater sludge composition and allowable application rates

Typical Pig Slurry Composition[5]			
Dry Matter (DM)%	**Kg N/1 000L**	**Kg P/1 000L - (P_2O_5)**	**Kg K/1000L - (K_2O)**
2%	3	1.0	2.0
4%	4.2 (3.5 post screw press separator)	1.4	2.2
Recommended Upper Limit Application Rates When deemed to contain 4.2 kg N and 0.8 kg P/ton (or 1 000L) and a DM of 4-5%			
Recommended Maximum Nutrient Loading		**Resultant Maximum Land Application**	**Effective DM Application Loads**
170 kg N/ha/year[6]		40.5 m^3/ha/year	1 620 DM/ha/year (DM of 4%)
150-200 kg N/ha/year[7]		35.7 – 47.6 m^3/ha/year	1 428 – 1 904kg DM/ha/year (DM of 4%)

[4] *The separator stage will reduce the N load in the liquid fraction by approximately 15%.*

[5] *Lukehurst et al., 2010.*

[6] *US EPA, European Union and Canadian guidelines (and recent literature, notably EC 2006 Good Agricultural Practices for the Protection of Water) – median value.*

[7] *Australian and New Zealand Guidelines. RSA Department of Agriculture, Forestry and Fisheries: Gauteng Chief State Veterinarian: Biosecurity. Biosecurity, Dr D Petty recommendation.*

320-450 kg N/ha/year[8] (for domestic sludge)	76-107 m^3/ha/year	Upper limit = 10kg DM/ha/year

After considering the wastewater generated on the site, as well as the wastewater treatment measures that will be implemented, it was concluded that the wastewater generated on the site will be suitable to use as irrigation water on agricultural land. The proposed land application rate of the wastewater is shown in the table below.

Table 8: Proposed wastewater application rates

Composition of wastewater	**Recommended application rate of slurry**
Total N content[9] = 3.5 kg N/1 000 L	At 200 kg N/ha/year = **47 619 L/ha/year[10]**
Facility Details – nutrient loading	
N load	68 605 kg N/year
Hectares required for compliance[10]	68 605 kg N/200 kg per ha = **343 ha**
Hectares required for compliance[11]	68 605 kg N/450 kg per ha = **152 ha**
Hectares available	442ha
Proposed application rate	68 605kg N/442 ha = **155 kg N/ha**
Proposed application volumes	**100%** of conservative EU limit, **34% of DWS Upper Limit[11]**

As shown in the table above, the available land is sufficient for the irrigation of all the wastewater that will be produced at the piggery, at the conservative EU limit. The application rate will only be at 34% of that which is permitted[11].

Water Monitoring

Groundwater will be monitored to assess its inherent quality, seasonal variation and to ensure no impacts occur. Surface water will also be monitored for the same parameters. The raw wastewater and liquid fraction (after separation in the screw press) will be monitored to assess nutrient content and separator efficacy. The tests will be conducted in accordance with GN 665 to establish the pollutant, microbiological and stability class, from which irrigation application restrictions may be established. Inorganic chemical analysis will be conducted using ICP-AEL and ICP-MS techniques and using full quantitative and semi-qualitative procedures. Microbiological Indicator Organism Assessments will be performed according to SANS 241:2011 (Edition 1). The physico-chemical

[8] Department of Water Affairs and Forestry, Water Research Commission. WRC TT 262/06. Guidelines for the utilization and disposal of wastewater sludge, Volume 2.

[9] This is a median value for typical nutrient composition obtained after screw press separation of piggery wastewater.

[10] The 200 kg EU value is used as a best practice in order to cater for reduced buffer zone restriction setbacks.

[11] An upper limit of 450 kg N/ha/year is permissible in accordance with the Precautionary Practices stipulated for Section 21(e) water use activities.

parameters will be conducted in accordance with SANS 241:2006 (Edition 6.1). Compost tests on the solid fraction and soil samples for ICP-MS determination will be performed in accordance with the relevant guidelines.

Biosecurity

The piggery will be fenced and will have one access point to control entry into the facility. Disinfectant sprayers will be installed at the entrance to the piggery to disinfect all vehicles entering the farm.

Mortality Management

The expected mortality rate at the piggery is 0.25% per week. Mortalities will be disposed of into a biodigester.

Electricity

The farm will be connected to the Eskom power grid.

Sewage

A septic tank, connected to a French drain, will be installed at the piggery for the collection of human sewage.

1.5.1 Applicable listed activities in terms of GN No R544, 545 and 546, dated 2010 under NEMA, 1998

The following listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) are being applied for:

Table 9: Listed activities in terms of GN. No R 544, 545 and 546, dated 2010 under NEMA, 1998

Number and date of the relevant notice	Activity No	Description
GN. No. R 544 Listing Notice 1 of 18 June 2010	4	The construction of facilities or infrastructure for the concentration of animals for the purpose of commercial production in densities that exceed— (i) 20 square metres per large stock unit and more than 500 units, per facility; (ii) 8 square meters per small stock unit and; a. more than 1 000 units per facility excluding pigs where (b) will apply; b. more than 250 pigs per facility excluding piglets that are not yet weaned; (iii) 30 square metres per crocodile at any level of production, excluding crocodiles younger than 6 months; (iv) 3 square metre per rabbit and more than 500 rabbits per facility; or (v) 250 square metres per ostrich or emu and more than 50 ostriches

Number and date of the relevant notice	Activity No	Description
		or emus per facility; or 2500 square metres per breeding pair.
		The construction of infrastructure for a piggery for the growing of weaner piglets until they are ready for slaughter. The piggery will have a capacity to house 7 200 piglets and 12 600 baconer/grower pigs at any point in time.
GN. No. R 544 Listing Notice 1 of 18 June 2010	23	The transformation of undeveloped, vacant or derelict land to – (i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or (ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; - except where such transformation takes place – (i) for linear activities; or (ii) for purposes of agriculture or afforestation, in which case Activity 16 of Notice No. R. 545 applies.
		The total development footprint of the piggery, including the platforms for the pig houses and open spaces between and surrounding the platforms, will be 4.9875ha. Therefore, more than 1ha of undeveloped land outside of an urban area will be transformed to construct the piggery.
GN. No. R 544 Listing Notice 1 of 18 June 2010	37	The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: (a) the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more– excluding where such expansion: (i) relates to transportation of water, sewage or storm water within a road reserve; or (ii) where such expansion will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.
		Existing bulk infrastructure to the property will be expanded to the proposed piggery. This includes water, sewage and storm water infrastructure. The infrastructure will be expanded by more than 1km.
GN. No. R 544 Listing Notice 1 of 18 June 2010	47	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre - (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8

Number and date of the relevant notice	Activity No	Description
		metres – excluding widening or lengthening occurring inside urban areas.
		An existing access road on the property will be lengthened and expanded by approximately 2km. The road will be approximately 4m in width and wider than 4m in places, such as at turns.
GN. No. R 546 Listing Notice 3 of 18 June 2010	4	The construction of a road wider than 4 metres with a reserve less than 13,5 metres. **(a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces:** ii. Outside urban areas, in: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
		An access road to the piggery will be built from an existing access road on the property. The road will be wider than 4m in places, such as at turns, but will be approximately 4m wide in straight sections. The site lies within a “Highly Significant” Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI’s Biodiversity GIS database.
GN. No. R 546 Listing Notice 3 of 18 June 2010	12	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (b) Within critical biodiversity areas identified in bioregional plans.
		The total development footprint of the piggery, including the platforms for the pig houses and open spaces between and surrounding the platforms, will be 4.9875ha. Therefore, more than 300m^2 of vegetation will be cleared to construct the piggery. The vegetation on site is classified as Soweto Highveld Grassland which is an “Endangered” vegetation type in terms of section 52 of the NEM:BA, 2004. The site also lies within a “Highly Significant” Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI’s Biodiversity GIS database.

Number and date of the relevant notice	Activity No	Description
GN. No. R 546 Listing Notice 3 of 18 June 2010	13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list. (2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010. (a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.
		The total development footprint of the piggery, including the platforms for the pig houses and open spaces between and surrounding the platforms, will be 4.9875ha. Therefore, more than 1ha of vegetation will be cleared to construct the piggery. The site lies within a "Highly Significant" Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI's Biodiversity GIS database.
GN. No. R 546 Listing Notice 3 of 18 June 2010	19	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **(a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces:** ii. Outside urban areas, in: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.
		An existing access road on the property will be lengthened and expanded by approximately 2km. The road will be approximately 4m in width. The site lies within a "Highly Significant" Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI's Biodiversity GIS database.

1.5.2 Proposed locality

The proposed site for the piggery project is located on Portion 0 (remaining extent) of the farm Merino 641, IR. The site is situated within the Dipaleseng Local Municipalities' jurisdiction. This local municipality forms part of the Gert Sibande District Municipality, Mpumalanga province.

Table 10: Administrative and water management boundaries

Province	Mpumalanga
District Municipality	Gert Sibande
Local Municipality	Dipaleseng
Ward	5
Department of Water and Sanitation (DWS) Local Office	Pretoria
Quaternary Catchment Zone	C12L
Water Management Area	Upper Vaal

Table 11: Direction and distance to the nearest town(s)

Closest town	Distance from site	Direction from site
Villiers	±11.2km	South-east

The site locality map is given below as Figure 1 and is also attached in Appendix A. Site photographs are also provided below [refer to Figure 2(a-r)].

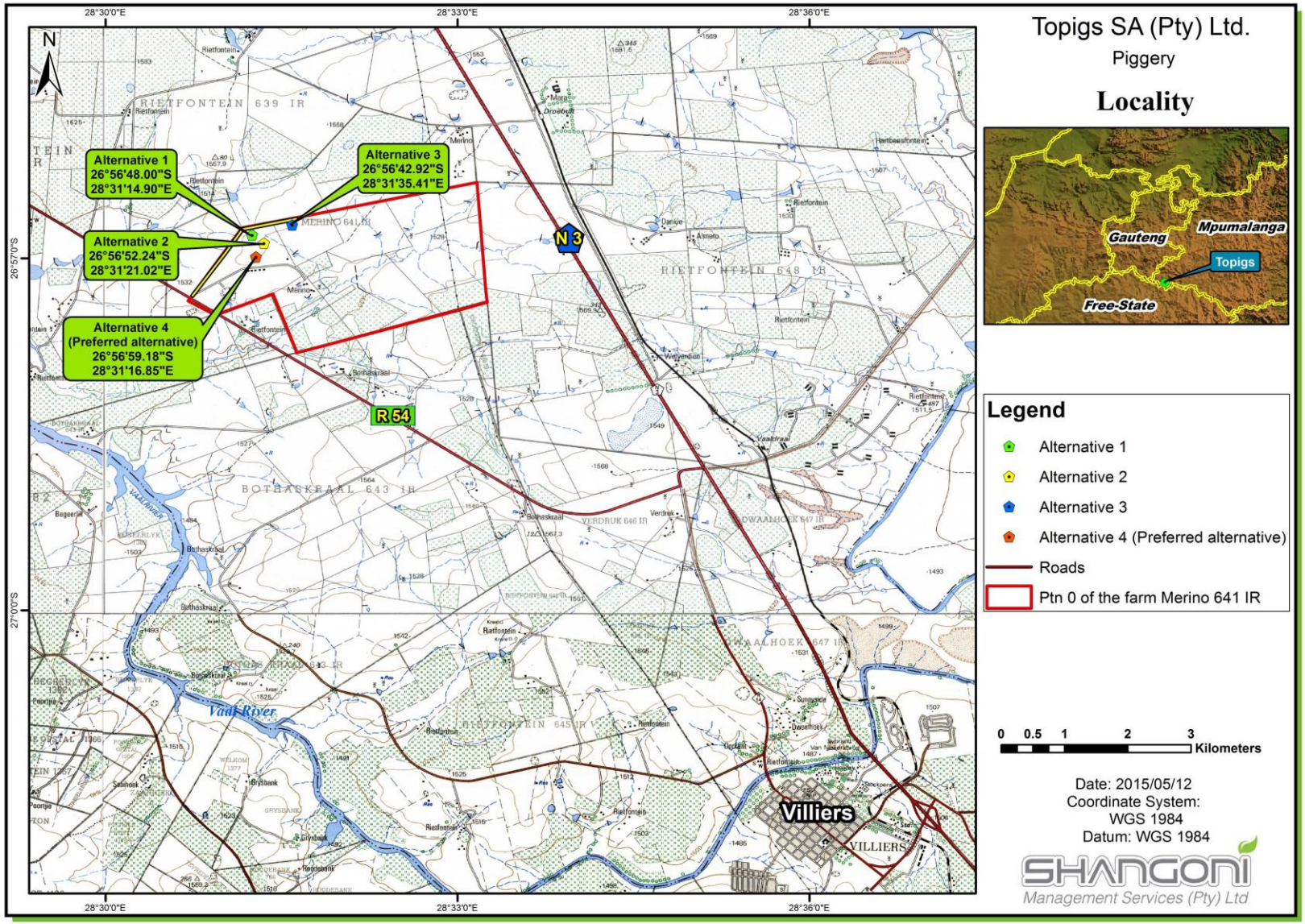


Figure 1: Locality of the site

a – Access point to the property from the R54

b – Access gate to the property

c – Project site (1)

d - Project site (2)

e - Project site (3)

f - Project site (4)

g - Project site (5)

h - Project site (6)

i - Project site (7)

j - Project site (8)

k - Project site (9)

l - Project site (10)

m - Project site (11)

n - Project site (12)

o - Project site (13)

p - Project site (14)

q - Project site (15)

r - Project site (16)

Figure 2(a-r): Site photographs

Photographs of a similar piggery to the one proposed as part of this application, are given in the figures below, for example purposes.

a – Typical access control to a piggery

b – Typical disinfection spray station for incoming vehicles

c – Typical platform at a piggery with a fence surrounding the entire operation

d – Typical water storage reservoir and JoJo tanks

e – Typical feed storage silos at each platform

f – Inside a typical weaner room showing drinker system

g - Inside a typical weaner room showing feeder system

h – Inside a typical grower room showing the feed distribution system

i – Typical ventilation system within the grower rooms

j – Typical ramp to load fully-grown pigs onto trucks for transport to the abattoirs

Figure 3(a-j): Photographs showing what a typical piggery looks like (example farm)

1.5.3 Land tenure and use of immediately adjacent land

The properties adjacent to the site are used for agricultural purposes such as maize production, livestock grazing and the raising of chickens.

The adjacent land owners of the proposed site are listed in the table below and are also shown in Figure 4. Refer also to Part 4 for more detail regarding the Public Participation Process.

Table 12: Adjacent land owners of the proposed site

Farm Name	Title deed	Owner
Portion 1 of the farm Merino 641 IR	T10431/2005	Mr Hannes Britz
Portion 2 of the farm Merino 641 IR	T73775/2004	Mr Flip Cronje
Portion 3 of the farm Merino 641 IR, Portion 32 of the farm Rietfontein 639 IR	T96364/1994, T96364/1994	Mr Henru Correia
Portion 1 of the farm Rietfontein 639 IR, Portion 6 of the farm Bothas Kraal 643 IR	T124346/1997, T124346/1997	Mr Gallie Giliomee
Portion 1 of the farm Rietfontein 648 IR	T41428/2007	Mr Stephen Hendrick Mahlangu
Portion 16 of the farm Rietfontein 648 IR, Portion 2 of the farm Leeuwspruit 606 IR	T68661/2003, T68661/2003	Mr Daantjie Jordaan
Portion 1 of the farm Bothas Kraal 643 IR	T14350/1971	Mr Mike Muller
Portion 19 of the farm Leeuwspruit 606 IR	T11686/2014	South African National Roads Agency Soc Ltd

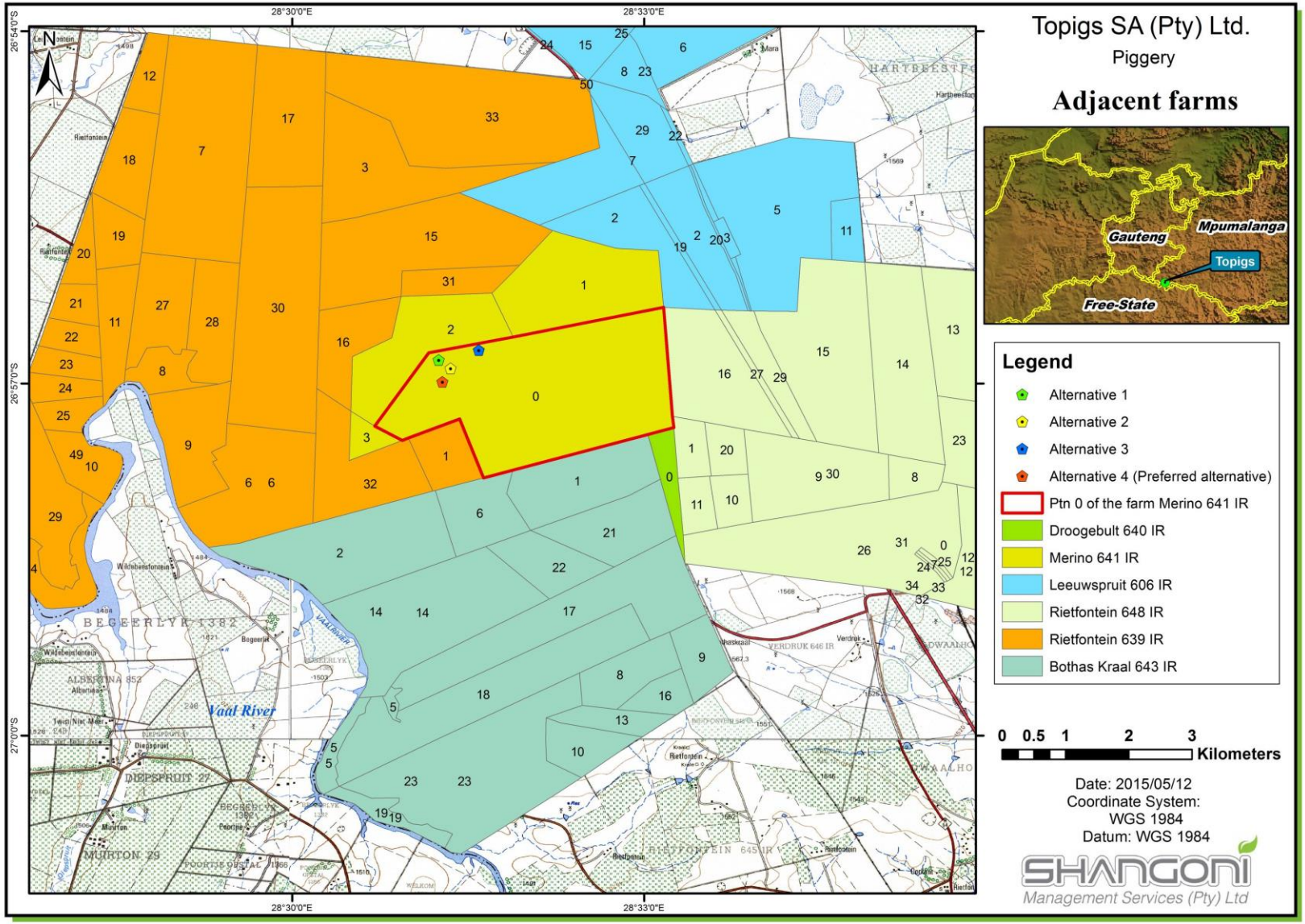


Figure 4: Farm portions adjacent to the site

2. NATURE AND EXTENT OF THE ENVIRONMENT AFFECTED BY ACTIVITY

2.1 Geology and Soil

The geology and soils underlying the site and surrounding areas are shown in the figures below. The site is underlain with Karoo Dolorite Sui rocks. Shale, sandstone or mudstone of the Madzaringwe Formation, Karoo Supergroup or the intrusive Karoo Suite dolerites are prominent in the area (Mucina & Rutherford, 2006).

Rossouw and Associates – Soil and Water Science (Pty) Ltd assessed the soil types present at the project site. The Arcadia soil form was identified on site. Arcadia soils consist of a vertic A-horizon, with a strongly developed structure, that overlies unspecified material. Slickensides are clearly visible and occur regularly in some parts of the horizon or in the transition to the underlying layer. The horizon has a high clay content, is dominated by smectite clay and can swell and shrink markedly in response to moisture changes. The A-horizon ranges in depth from 10cm to 100cm. The underlying material mainly comprises of weathering dolerite or saprolite (Rossouw and Associates, 2014).

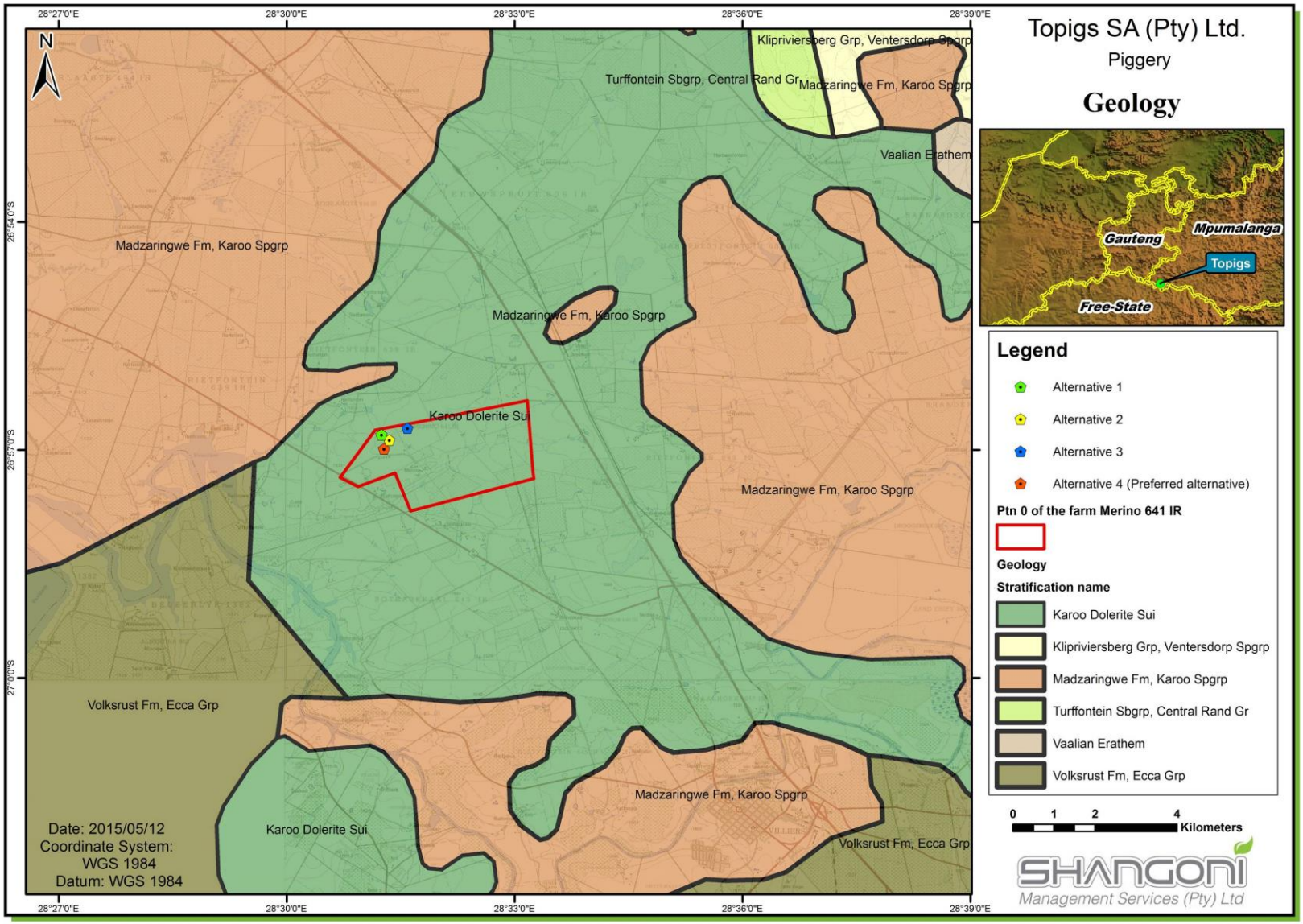


Figure 5: Geology at the site

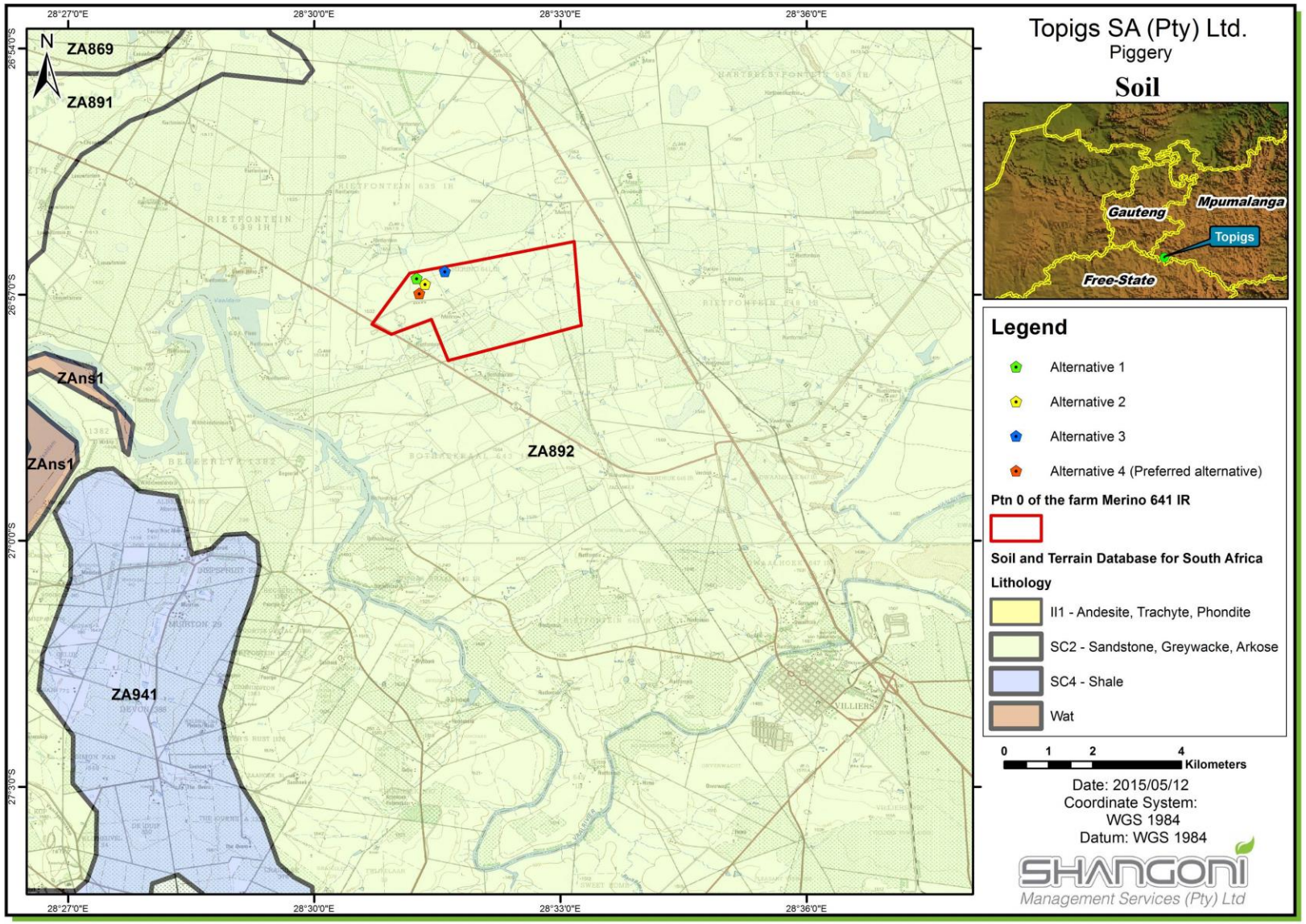


Figure 6: Soil types present at the site

2.2 Regional climate

2.2.1 Rainfall

The site occurs in a summer rainfall area. According to the AGIS Comprehensive Atlas (2007), the mean annual rainfall at the site area is 601-800mm per annum. The figure below shows the long-term mean annual rainfall for the study area.

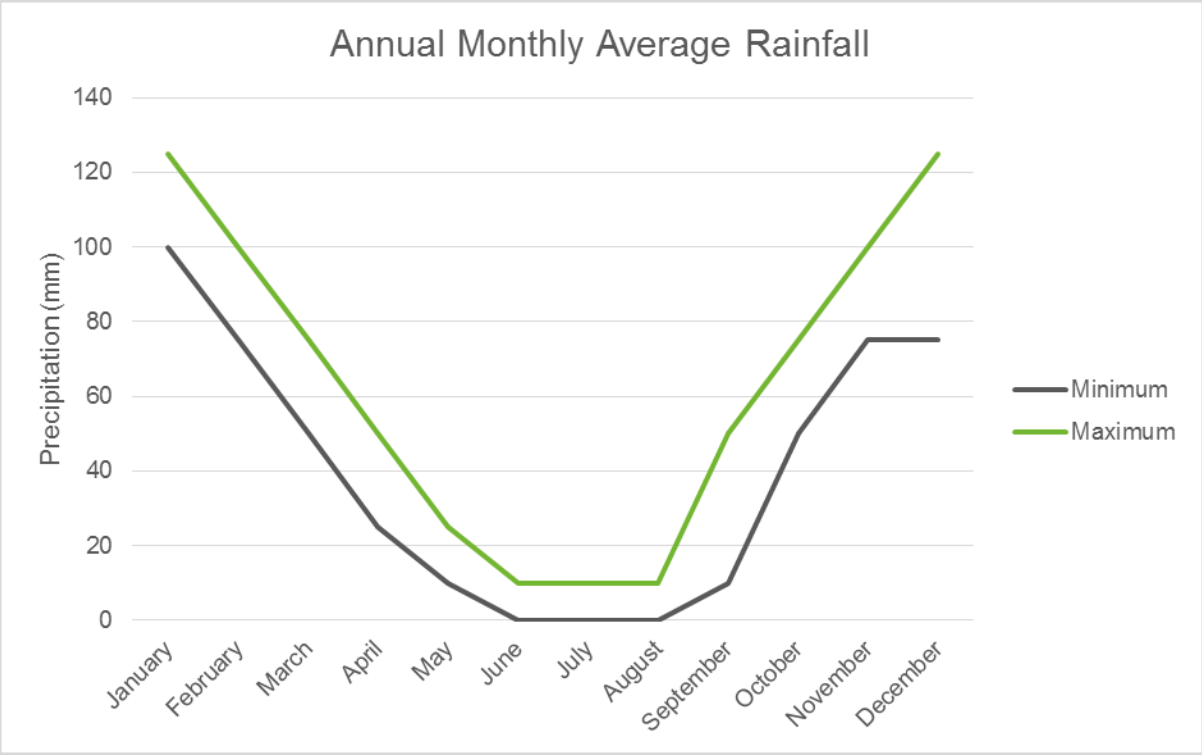


Figure 7: Annual monthly average rainfall at the site

2.2.2 Temperature

The maximum mean annual temperature for the site is between ≤25.1°C and 29°C and the minimum mean annual temperature for the site area is between -1.9°C and 2°C (AGIS, 2007). The figure below shows the long-term mean annual temperature for the study area.

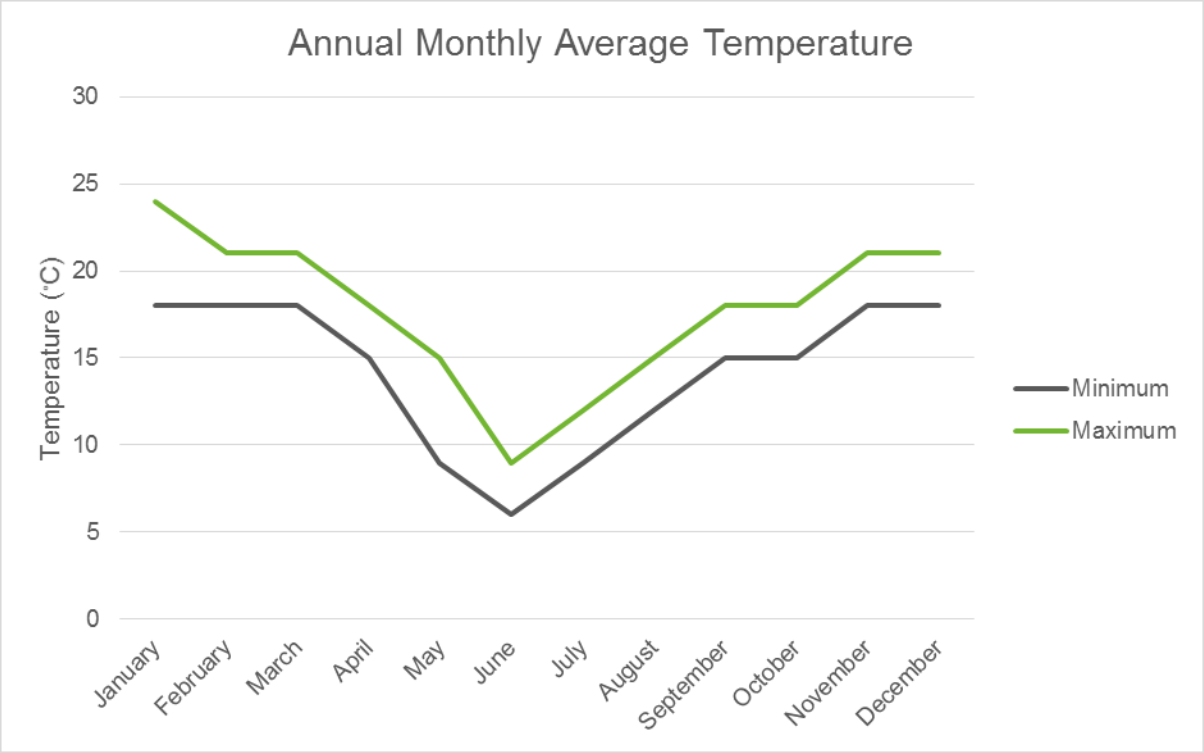


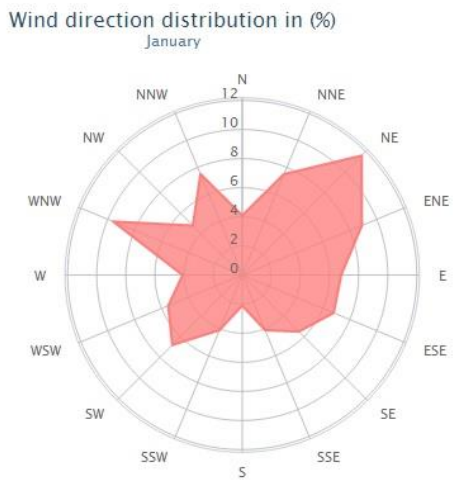
Figure 8: Annual monthly average temperature at the site

2.2.3 Evaporation

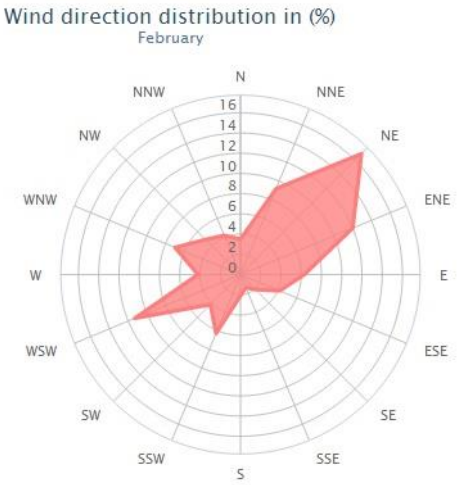
The Mean Annual Evaporation (MAE) of the area is 1 601mm – 1 800mm per annum (AGIS, 2007).

2.2.4 Wind

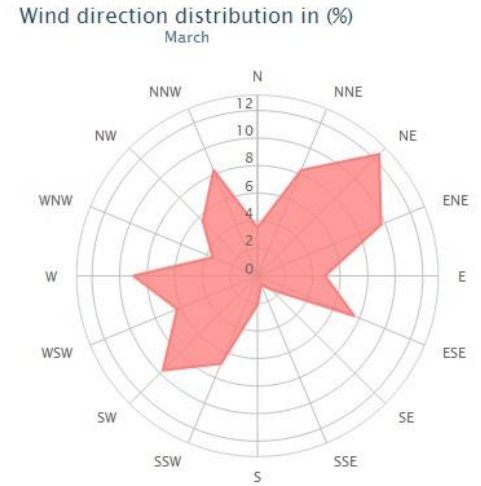
The Frankfort weather station is approximately 37km south of the project site. The figures below give an indication of wind direction distributions near Frankfort, as compiled from www.windfinder.com, for the period of December 2011 to March 2015. The most prevalent wind direction is West-southwest.


Wind direction distribution in (%)
January
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0
2
4
6
8
10
12

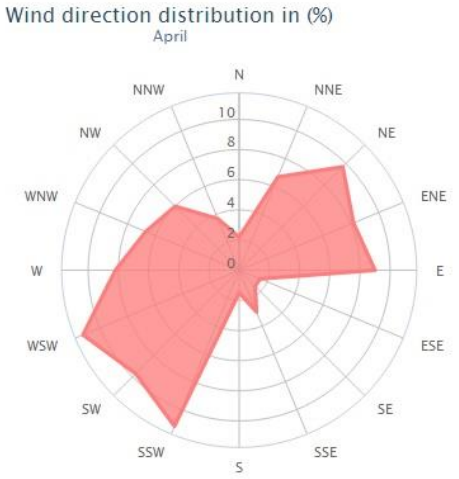
a


Wind direction distribution in (%)
February
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0
2
4
6
8
10
12
14
16

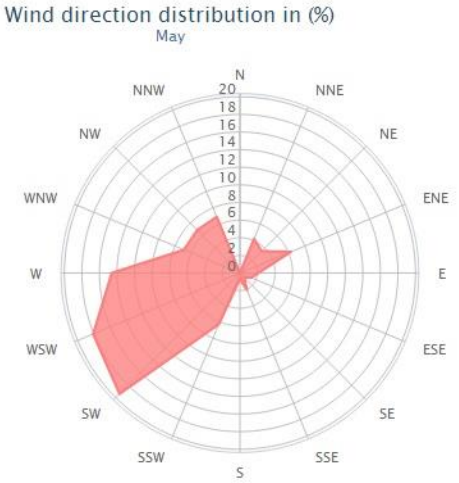
b


Wind direction distribution in (%)
March
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0
2
4
6
8
10
12

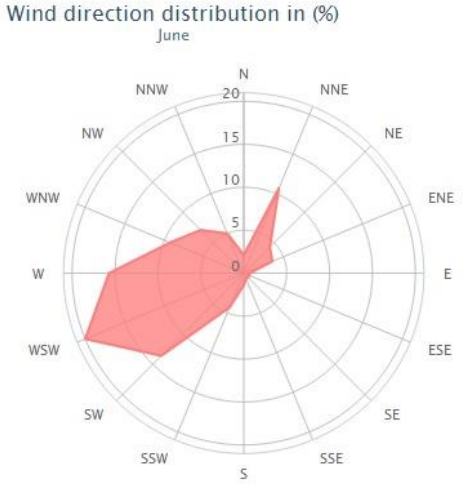
c


Wind direction distribution in (%)
April
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0
2
4
6
8
10

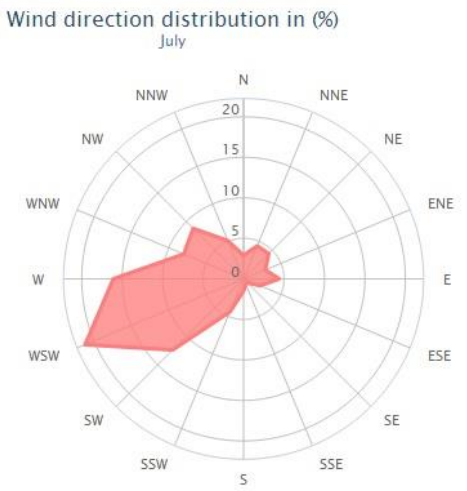
d


Wind direction distribution in (%)
May
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0
2
4
6
8
10
12
14
16
18
20

e


Wind direction distribution in (%)
June
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0
5
10
15
20

f



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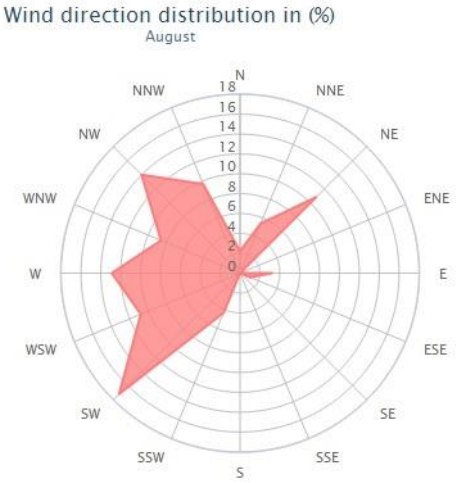

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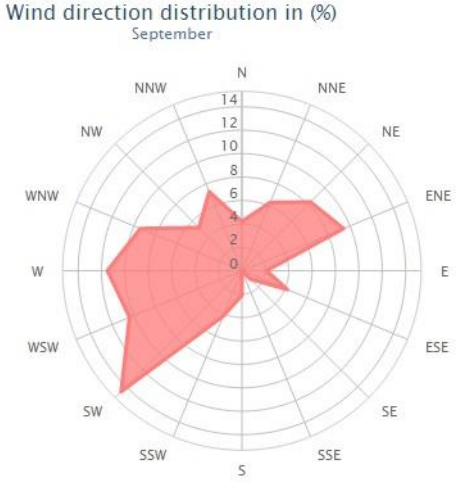

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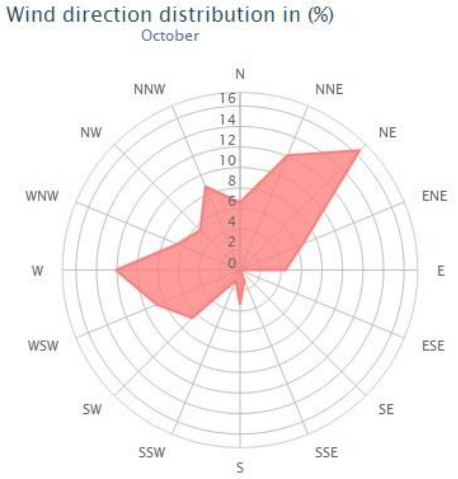
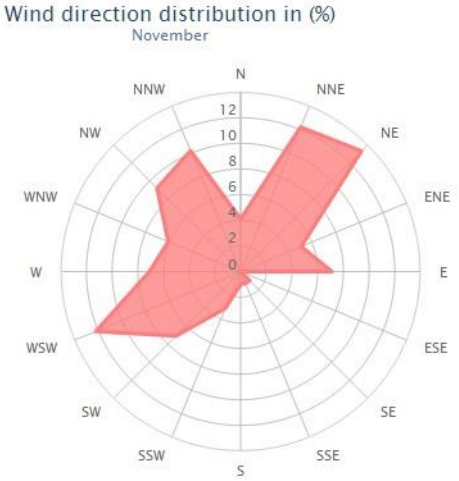
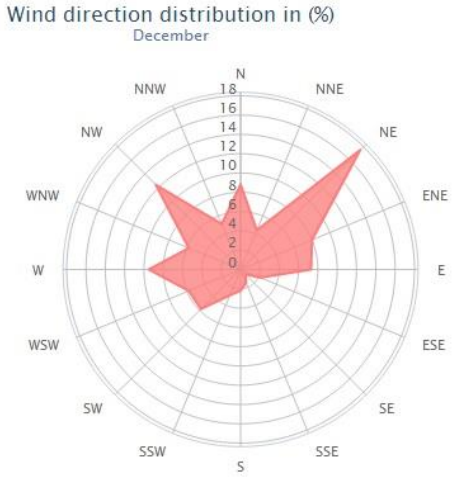


j



k



l

Figure 9: Wind roses showing the monthly wind direction close to the site

2.3 Topography

The figure below shows that the elevation of the project property ranges between 1 485 and 1 575 masl (metres above sea level). Most of the property is at an elevation of 1 510-1 540 masl. The four alternative sites are also located within this elevation range. Numerous drainage lines are present on the property.

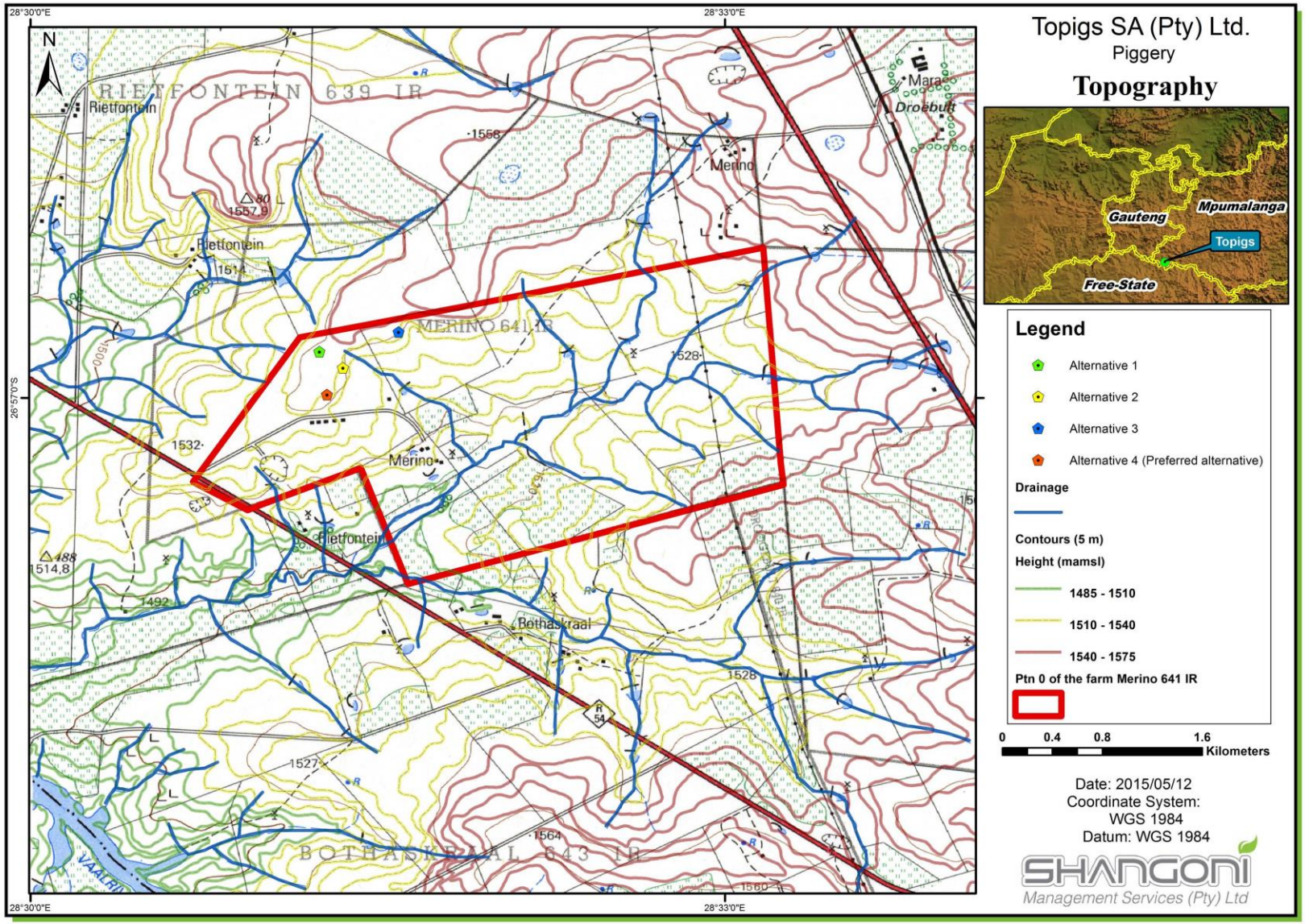


Figure 10: Topography of the Site

2.4 Land use and land capability

The project property is zoned for Agricultural land uses. As shown in the figure below, the majority of the project property is in a natural state and has been used for grazing of livestock and game. A large portion of the southern part of the property is used for crop cultivation. There are also a number of water bodies on the property, as indicated in blue.

According to the AGIS Comprehensive Atlas (2007) the land capability of the property is “Moderate potential arable land”. The dominant land uses surrounding the property are also agricultural activities.

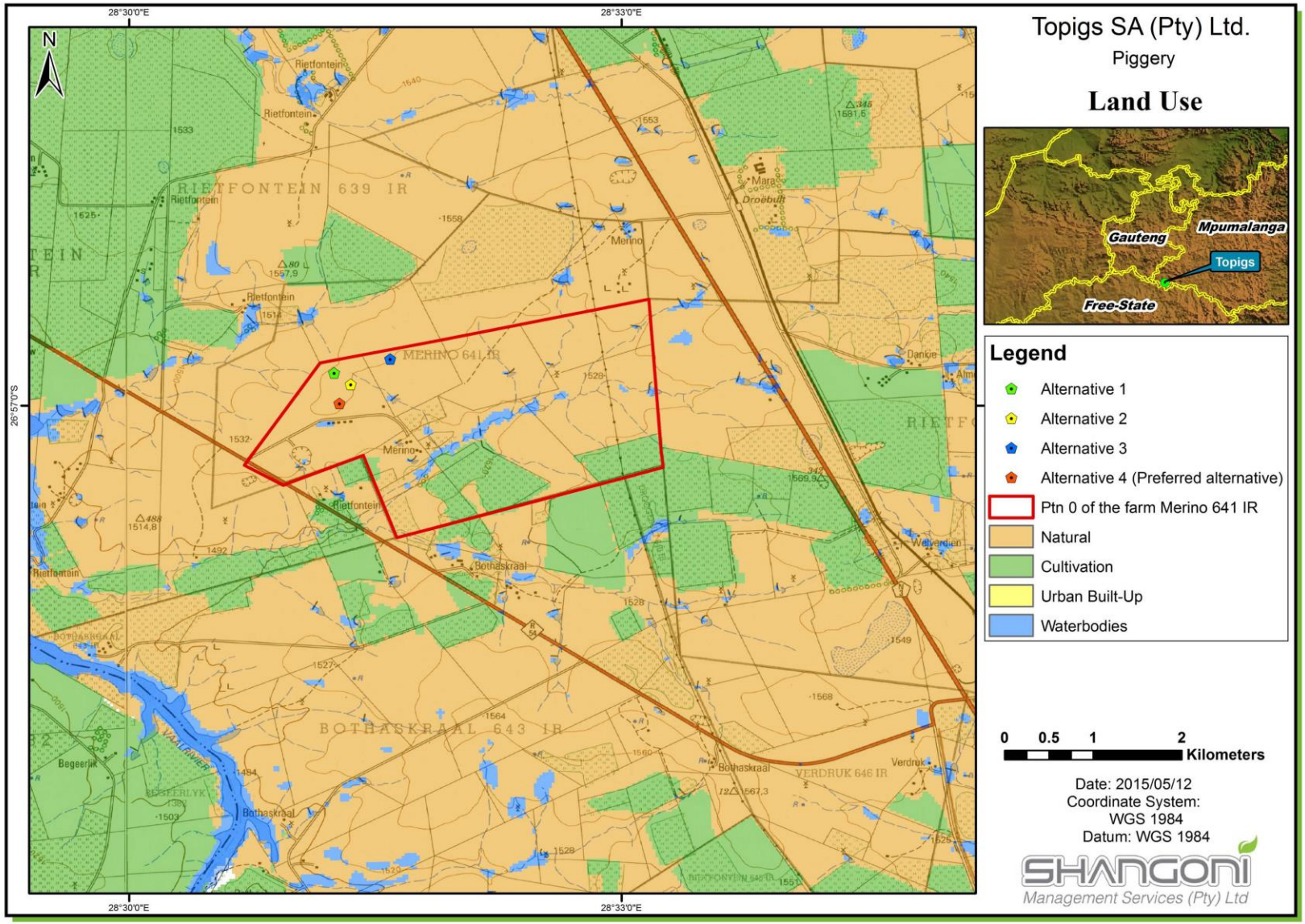


Figure 11: Land use of the site and adjacent areas

2.5 Vegetation

A vegetation assessment was conducted by Dimela Eco Consulting on the 5th and 6th of February 2015. The assessment included a literature review of plants of conservation concern [using SANBI (2009), Raimondo *et al*. (2009) and information received from the Mpumalanga Tourism and Parks Agency (MTPA, 2015)] that could occur in the area as well as a field survey to determine the plants that are actually present on the project property. The study area was the entire project property. At the time of the site assessment, three alternative sites had been identified (Site alternatives 1, 2 and 3). Based on the results of all of the specialist studies, another site alternative, Site alternative 4, was also identified. Findings regarding Site alternative 4 are contained in an addendum to the Fauna Assessment Report.

The property is located in the Grassland Biome of South Africa and according to Mucina and Rutherford (2006), the site is dominated by Soweto Highveld Grassland. A small patch of Frankfort Highveld Grassland is also present on the eastern side of the property. The Soweto Highveld Grassland is classified as "Endangered" as most of this vegetation type has been transformed by cultivation, mining and urbanisation, with only limited areas that are statutory conserved. Frankfort Highveld Grassland has also been transformed and is classified as Vulnerable.

Both of these vegetation types mainly grow on black clay soils, suggested by the fact that they were previously grouped under Moist Clay Highveld Grassland and Turf Highveld.

2.5.1 Vegetation type(s)

Vegetation types recorded during the site visit include Themeda grassland (Rocky Themeda grassland and overgrazed/trampled grassland), moist grassland along the river and drainage lines as well as Transformed Areas.

2.5.1.1 *Themeda* Grassland

The site is dominated the *Themeda* grassland with the most abundant species being *Themeda triandra* (red grass). Also present in the grassland are the *Eragrostis curvula* (weeping lovegrass), *Setaria sphacelata* (golden setaria), *Eragrostis plana* (tough lovegrass) and *Cymbopogon pospischilii* (narrow-leafed turpentine grass). A total of 47 species were recorded in the *Themeda* grassland, consisting of 33 forbs, 12 grasses and two suffretexes.

Rocky *Themeda* Grassland is also present on the site, along the river and northern boundary of the property. This sub group consisted of 20 forbs, eight grasses, two suffretexes and two small trees. The grass species of this sub group are similar to the rest of the Themeda Grassland present on the property [*Themeda triandra* (red grass) and *Eragrostis plana*]. Unique species of small trees, *Searsia megalismontana* (bergtaaibos) and *Diospyros lycioides* (bluebush) were also observed. The rocky

areas could potentially support the provincially protected geophyte *Haemanthus humilis* subsp *humilis*.

The property also had portions of overgrazed and trampled *Themeda* Grassland. Only thirteen species (seven forbs and 6 grasses) were recorded in these areas.

2.5.1.2 Moist Grassland

A non-perennial river flows from east to west across the property. Drainage lines or seepage areas that drain towards the river are also present. These areas are covered by moist grassland. These grasslands are characterised by hydrophytic plants (plants that are typically found in wet habitats). A total of 26 species were recorded in the moist grassland and included 11 forbs, 10 grasses and five sedges. The moist grassland have been disturbed by grazing but, the vegetation contributes towards the prevention of soil erosion and the health and functioning of the wetland system.

2.5.1.3 Transformed Vegetation

Transformed vegetation is vegetation that is different in species composition and/or structure to the reference state of untransformed vegetation or the perceived natural state. The site consists of farm buildings and maize fields which are considered to be transformed vegetation with no ecological function or potential to support species of conservation concern.

The vegetation of the project property is shown in the image below, followed by the vegetation sensitivity of the site, as determined from the Vegetation Assessment that was conducted.

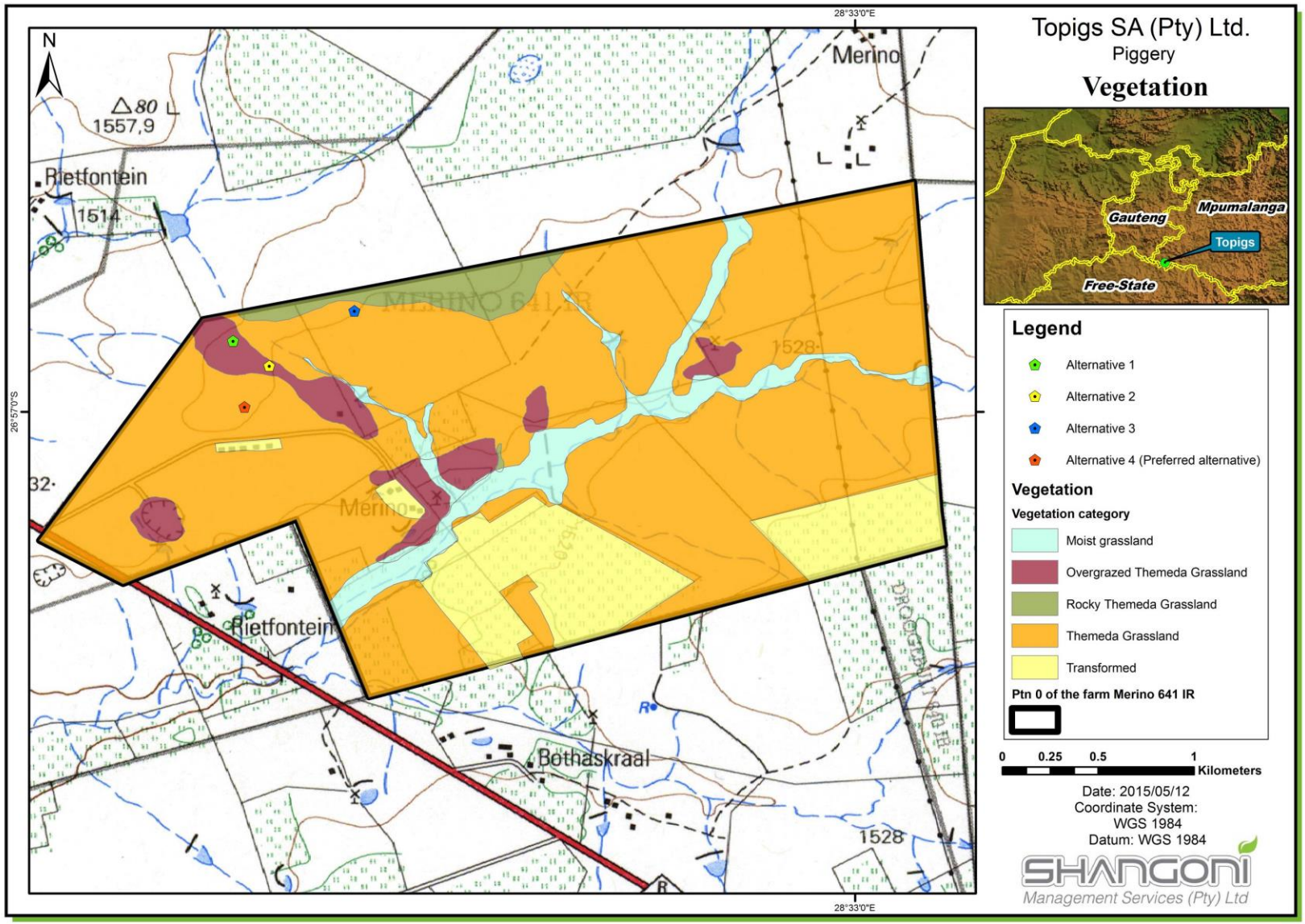


Figure 12: Vegetation types of the project property

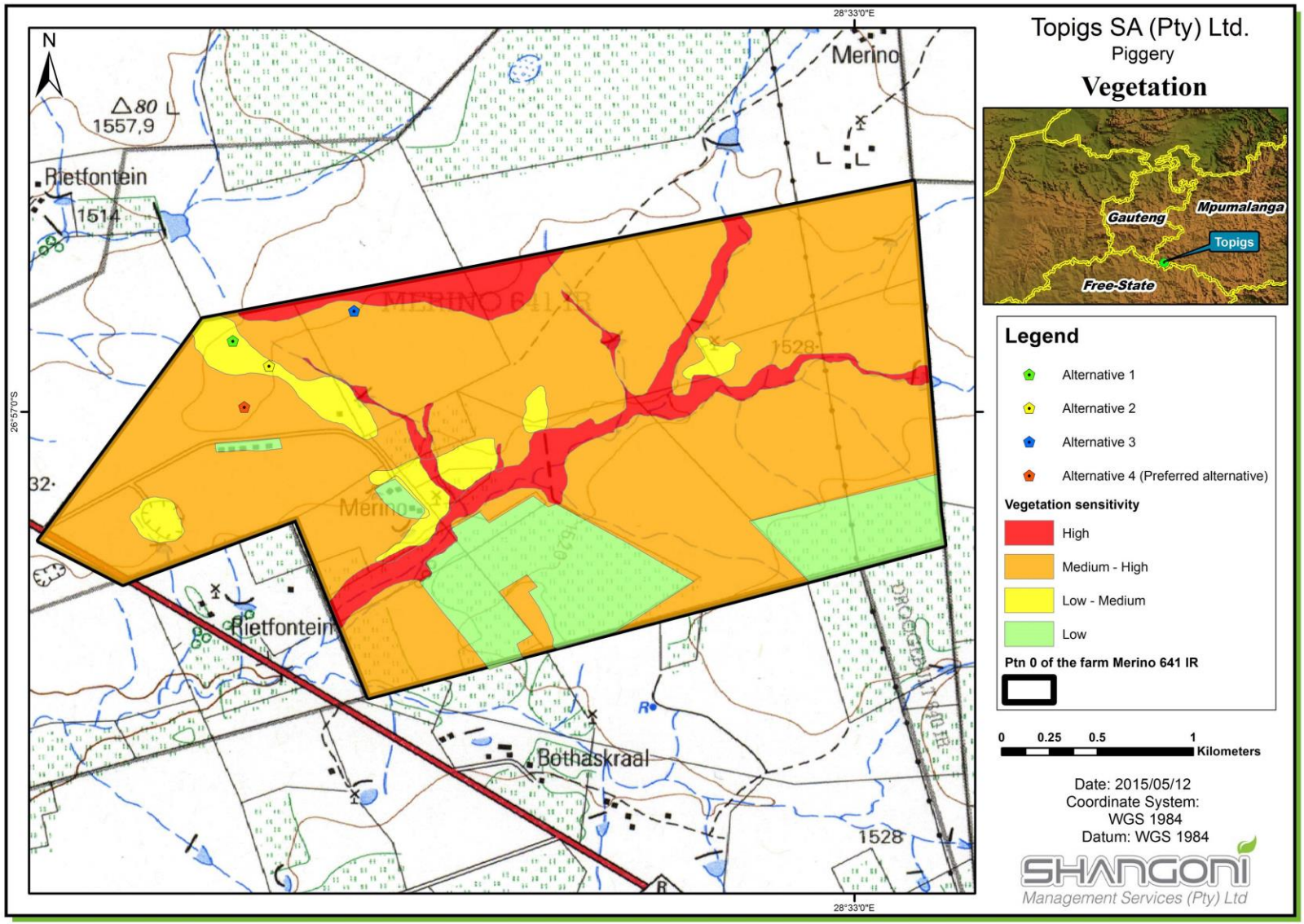


Figure 13: Vegetation sensitivities of the project property

2.5.2 Dominant species

The vegetation of the study area is dominated by *Themeda triandra* (red grass).

2.5.3 Endangered or rare species

Six species of conservation concern can possibly occur in or around the property, as identified through the South African National Biodiversity Institute's Plants and Southern Africa checklist (SANBI, 2009), Raimondo *et al*. (2009) and information received from Mpumalanga Tourism and Parks Agency (MTPA, 2015). The information for these species is given in the table below.

Table 13: Plants of conservation concern possibly occurring on the site (the possibility of occurrence is shown in italics)

Species	Threat status	Habitat notes and potential of occurrence
Boophone disticha	Declining	Rocky grasslands on the site, but particularly in proximity or on rocky outcrops. *This plant is easily recognised even when not in flower. The plant was not recorded in sample plots or walked transects in the study area. It is unlikely to occur on or around the three alternative sites (Site alternatives 1-3) as these areas were sampled.*
Crinum bulbispermum	Declining	This bulb occurs near rivers, streams, seasonal pans and in damp depressions. *Suitable habitat exists in the moist grassland in the study site. However, the plant was not identified in sampled areas and walked transects at the time of the field survey.*
Eucomis autumnalis	Declining	Damp, open grassland and sheltered places between rocks. From the coast up to an elevation of 2 450m. *This plant was not indicated to occur in the area by any of the literature reviewed. However, two individuals, thought to be this species, were recorded on the northern portion of the property, just south of the rocky Themeda Grassland. The plants were not in flower and each had only one wavy edged leaf which hampered positive identification. As best practise these are considered to be Eucomis and should be avoided by the proposed development. An individual plant was recorded at alternative Site 3. Coordinated for the two individuals are given in the table below.*
Gladiolus robertsonia	Near threatened	Moist Highveld grasslands, found in rocky sites, mostly dolerite outcrops. Corms are wedged in rocky crevices. Restricted to seeps and stream banks where moisture is available at the end of the dry season. Flowers October to December.

Species	Threat status	Habitat notes and potential of occurrence
		This species was previously recorded within the QDS that the property is situated in. The site visit was undertaken after the main flowering period and if the plant occurs on the site, it may have been overlooked. The possibility of occurring, especially along the moist grasslands could thus not be ruled out. ***Therefore, the suitable habitat (moist grassland) should be regarded as no-go areas for the development or indirect impacts.***
Kniphofia typhoides	Near threatened	Heavy, black clay soil, climax *Themeda triandra* grassland, low lying marshy ground – pans or wetlands. *The site visit was conducted during the flowering period of this species (February-March), but the species was not noted. It is possible that the plant may have been obscured by dense growth of vegetation along the non-perennial river, especially if it was not yet in flower. However, this species is highly likely to occur on the site due to suitable habitat being present. In addition, records from the MTPA indicate that this plant was historically recorded on the farm directly north-east of the site.* ***The suitable habitat (moist grasslands, especially along the non-perennial river) should be regarded as no-go areas for development and indirect impacts must be avoided.***
Trachyandra erythrorrhiza	Near threatened	The plant occurs in marshy areas, grassland, usually in black turf marshes. *This plant was historically recorded in the QDS that the property is situated in. As per MTPA records, a known locality is situated about 20km north-east of the site. Suitable habitat exists on the property and was sampled. However, this species was not observed. The study was undertaken outside of this species' flowering time (September–November). The leaves are glasslike and can easily be overlooked in dense growth. The possibility of occurring, especially along the moist grasslands, could therefore not be ruled out.* ***Therefore, the suitable habitats should be regarded as no-go areas for development or indirect impacts.***

During the field survey three plants that are provincially protected by the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) were identified. Two species that are likely to occur on the property were also identified. These species are shown in the table below.

Table 14: Provincially protected plants confirmed or likely to occur on the site.

Species	Protection	Occurrence
Crinum species	All species in the Crinum genus	A *Crinum* species was identified in the *Themeda* grassland. The species if likely *C. graminicola.* Minimum localities:

Species	Protection	Occurrence
		Lat: 26°57'24.35"S; Long: 28°30'53.24"E
Gladiolus ellioti	All species in this genus	Confirmed sporadic occurrence in the *Themeda* grassland as below. Minimum localities: Lat: 26°56'58.77"S; Long: 28°32'21.79"E Lat: 26°56'43.06"S; Long: 28°31'41.11"E
Eucomis species (pineapple plant)	All species	*E. autumnalis* likely to occur just south of the rocky *Themeda* grassland on the northern boundary of the site. Lat: 26°56'43.00"S; Long: 28°31'35.53"E Lat: 26°56'39.64"S; Long: 28°31'52.38"E
Haemanthus species	All species of paint-brush	Likely occurrence of *Haemanthus humilis* in the rocky *Themeda* grassland and *Haemanthus montanus* in moist grassland (shady areas).
Kniphofia species	All red-hot-pokers (vuurpyle)	Likely to occur along the non-perennial river.

2.5.4 Alien invasive species

In terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), alien invasive plants can be divided into three categories:

Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species must, by law, to be eradicated from the environment. No permits will be issued.

Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestation can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.

Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.

Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Five alien invasive plant species were observed on the property and are listed in the table below. Three of these are Category 1b species, namely *Cirsium vulgare, Persicaria capitata* and *Xanthium spinosum.* According to regulations, a person who has under his or her control a Category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with
  - Section 75 of the Act;
  - The relevant invasive species management programme developed in terms of regulation 4; and
  - Any directive issued in terms of section 73(3) of the Act.

Table 15: Alien Invasive Plant Species observed on site

Species Name	Common Name	Notes
Cirsium vulgare	Scotch Thistle	Category 1b
Oenothera rosea	Rose Evening Primrose	Moist, disturbed places, often in shade
Persicaria capitata	Pink Knotweed	Category 1b
Persicaria lapathifolia	Spotted Knotweed	Invasive weed
Xanthium spinosum	Spiny Cocklebur	Category 1b

2.5.5 Critical Biodiversity Areas

The figure below indicates the Critical Biodiversity Areas of the project property and surrounding areas. Site alternative 1 is situated within an “Other Natural Area” and Site alternatives 2, 3 and 4 area situated within “Irreplaceable” areas in terms of the Mpumalanga Biodiversity Sector Plan. The following table also compares the sensitivity of each of the Site alternatives.

Table 16: Comparison of sensitivity of the four alternative sites

Potential Sensitivity	Alternative Site 1	Alternative Site 2	Alternative Site 3	Alternative Site 4
Mpumalanga Biodiversity Sector Plan category	Other natural area	CBA: Irreplaceable	CBA: Irreplaceable	CBA: Irreplaceable
Vegetation group	Overgrazed/ trampled grassland	Overgrazed/ trampled grassland	Themeda grassland and in close proximity to rocky Themeda grassland	*Themeda* grassland
Plants of conservation concern	None	None	*Eucomis autumnalis* (Declining) *Gladiolus ellioti*	Likely occurrence of *Gladiolus ellioti* protected in Mpumalanga

Potential Sensitivity	Alternative Site 1	Alternative Site 2	Alternative Site 3	Alternative Site 4
			(protected) in Mpumalanga	
Vegetation sensitivity as per the Vegetation Assessment	Low-medium	Low-medium	Medium high	Medium high
Existing access	No formal road, access possible through overgrazed grassland	No formal road, access possible through overgrazed grassland	None	In close proximity to the existing, main access road of the farm and therefore disturbances related to infrastructure will likely be less.

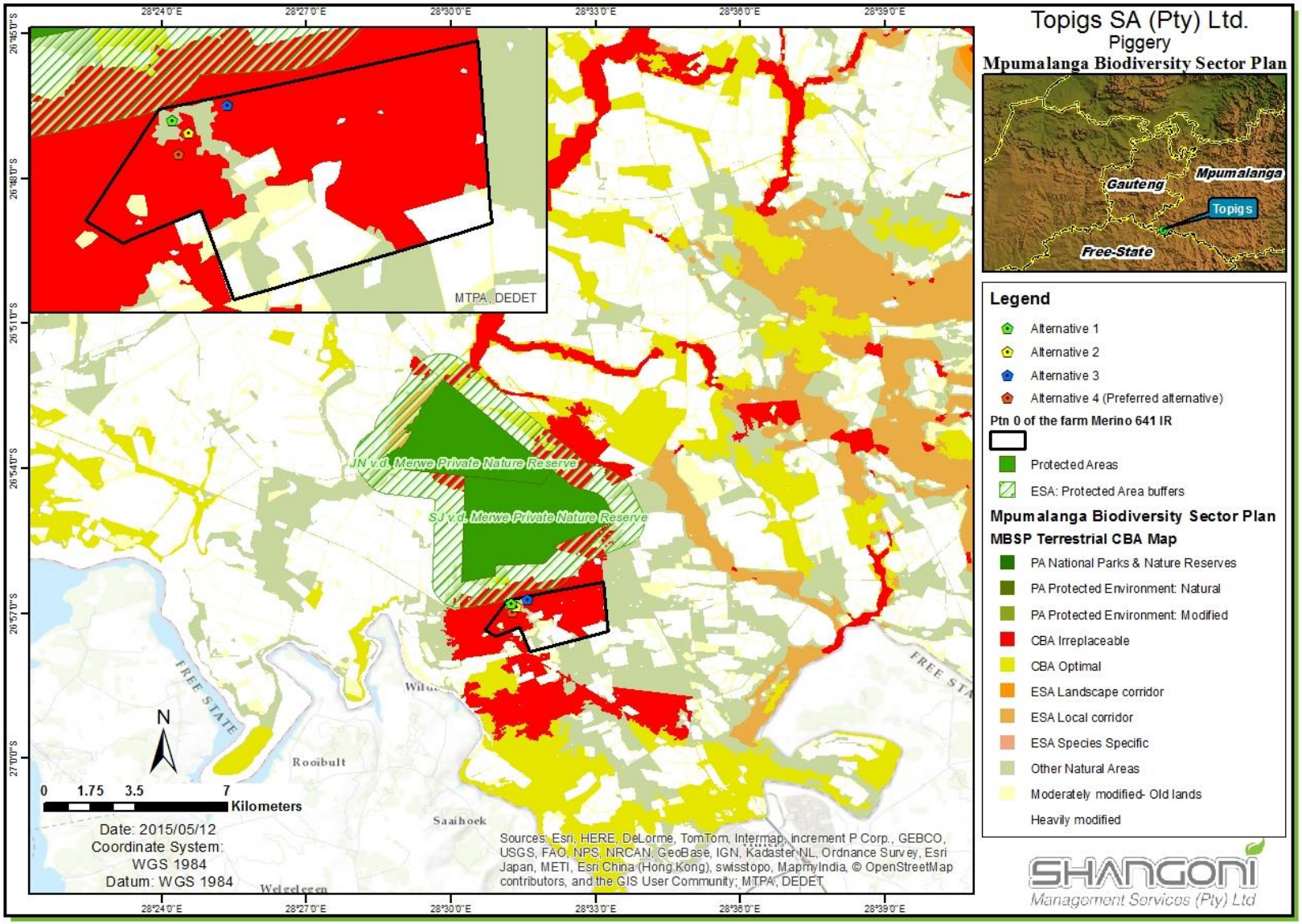


Figure 14: Critical Biodiversity Areas of the project property and surrounding areas

2.6 Animal life

A fauna assessment was conducted by Rautenbach *et al.* (2015) in order to document the vertebrate species richness of the site proposed for the establishment of the new piggery. The assessment consisted of a desktop survey as well as a field survey.

The desktop survey was conducted in order to compile a list of vertebrates that can be expected to occur in the area. During this process, Red Data Species likely to occur in the area were also identified. The probability of occurrences of vertebrate species were determined by using three criteria namely, distributional ranges, habitat preferences and the qualitative and quantitative presences and extents of suitable habitats.

The field survey was conducted on the 5th and 6th of February 2015. During the site visit the site was patrolled with a vehicles and random transect walks were conducted in order to identify mammals, birds, reptiles and frogs. Mammals were also identified by means of spoor, droppings, burrows and roosting sites, while birds were identified through their calls, nests, moulted feathers and other signs.

The entire property, as well as a 500 meter zone adjacent to the property was taken into consideration.

2.6.1 Habitat Assessment

2.6.1.1 Mammals

Three major habitat types were identified on the site namely, terrestrial (grassland), wetlands and to a lesser extent, rupicolous habitats. The greatest extent of the site consists of the terrestrial habitat of rolling grassland plains. The wetland areas are sufficiently extensive to support a number of moisture-reliant, small mammals. The rupicolous habitat that is present occurs outside of the borders of the property. This habitat type offers refuge to small species such as Namaqua rock rats and rock elephant shrews.

2.6.1.2 Avifauna

Due to the aerial mobility of birds, habitats distant from or surrounding the property also have to be taken into consideration. Birds may visit the property even though their nests or roosting sites may be located offsite.

Therefore, important regional conservation areas include the Important Bird Areas (IBA) of the Grassland Biosphere Reserve (SA202) to the west and the Blesbokspruit (SA021), Suikerbosrand Nature Reserve (SA022) and Middle Vaal River (SA038) IBAs to the east (Barnes, 1998).

Three principal avifaunal habitat types were identified on and/or adjacent to the site:

Grasslands

The different grassland habitat types are considered to be uniform in basic structure that is utilised by birds. The uniformity of the grassland habitat allows avifaunal species to cover large home ranges and/or to be naturally nomadic. As a result, the grasslands on the site are important within the wider surrounding grassland biome.

Drainage Lines

Seasonal drainage lines are present on the site (east to west). The drainage lines varied form shallow beds in the east to broader valleys in the west were wetland conditions exist. The plant cover condition was affected by grazing and trampling pressures as well as fires and rainfall. The drainage lines offer corridors for movement of wetland avifauna.

A deep, historical borrow pit near the western border of the site, formed an endorheic pan-like water body. However, significant marginal vegetation that could potentially attract bird is absent.

Transformed Manmade Habitats

Human influence such as crop fields and buildings also form potential habitats for various bird species. These structures can also attract species that would not otherwise inhabit the area.

2.6.1.3 Herpetofauna

The occurrences of herpetofauna are closely dependent on the presence of suitable habitat types. The four broadly defined habitat types important to herpetofauna include terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated habitats.

Functional arboreal habitats are absent from the property as no indigenous trees, with higher and denser canopies, are present on the site. Most of the scattered trees present on the study site are non-indigenous trees such as Eucalyptus, weeping willows and wattle trees.

Natural rupicolous habitats, in the form of scattered stones and rocks, are present on and around the property. Buildings present on the site also form good rupicolous habitat.

A fair amount of permanent and temporary water sources are present on the property, including seasonal drainage lines. An endorheic borrow pit on the western side of the property provides an ideal habitat for many amphibian species. A number or artificial wetlands are also present on the property. These wetlands are functional and provide ample habitat to water- and moisture-reliant herpetofauna.

2.6.2 Commonly occurring species

2.6.2.1 Mammals

It was concluded that 39 species of mammals may be present on the property.

Table 17: Mammals likely to be present on the property

Probability of Occurrence	Red Data Ranking	Scientific Name	Common Name
Low	-	*Elephantulus myurus*	Eastern rock elephant shrew
High	-	*Orycteropus afer*	Aardvark
High	-	*Lepus saxatilis*	Scrub hare
Low	-	*Pronolagus randensis*	Jameson's red rock rabbit
High	-	*Cryptomys hottentotus*	African mole rat
High	-	*Hystrix africaeaustralis*	Cape porcupine
High	-	*Xerus inaurus*	South African ground squirrel
High	-	*Rhabdomys pumilio*	Four-striped grass mouse
Medium	-	*Mus minutoides*	Pygmy mouse
Medium	-	*Mastomys natalensis*	Natal multimammate mouse
Medium	-	*Mastomys coucha*	Southern multimammate mouse
Medium	-	*Aethomys ineptus*	Tete veld rat
Low	-	*Aethomys namaquensis*	Namaqua rock mouse
Medium	-	*Otomys angoniensis*	Angoni vlei rat
Medium	-	*Otomys irroratus*	Vlei rat
Medium	-	*Gerbiliscus brantsii*	Highveld gerbil
Medium	-	*Dendromus melanotis*	Grey pygmy climbing mouse
Medium	-	*Dendromus mesomelas*	Brants' climbing mouse
Medium	-	*Dendromus mystacalis*	Chestnut climbing mouse
High	DD	*Crocidura cyanea*	Reddish-grey musk shrew
High	DD	*Crocidura hirta*	Lesser red musk shrew
Medium	NT	*Atelerix frontalis*	Southern African hedgehog
Medium	-	*Tadarida aegyptiaca*	Egyptian free-tailed bat
High	-	*Neoromicia capensis*	Cape serotine bat
High	-	*Scotophilus dinganii*	African yellow house bat
High	-	*Scotophilus viridis*	Greenish yellow house bat
Medium	NT	*Parahyaena brunnea*	Brown hyena
Medium	-	*Felis silvestris*	African wild cat
Medium	-	*Genetta*	Small-spotted genet
Medium	-	*Genetta tigrina*	SA large-spotted genet
High	-	*Cynictis penicillata*	Yellow mongoose
Medium	-	*Galerella sanguinea*	Slender mongoose
Low	-	*Ichneumia albicauda*	White-tailed mongoose
Medium	-	*Canis mesomelas*	Black-backed jackal
Medium	-	*Ictonyx striatus*	Striped polecat

Probability of Occurrence	Red Data Ranking	Scientific Name	Common Name
High	-	*Damaliscus pygargus phillipsi*	Blesbok
High	-	*Sylvicapra grimmia*	Common duiker
High	-	*Antidorcas marsupialis*	Springbok
Medium	-	*Raphicerus campestris*	Steenbok

Red data species rankings as defined in Friedmann and Daly's SA Red Data Book/IUCN (World Conservation Union, 2004) are defined as follows:
CR = Critically Endangered, EN = Endangered, VU = Vulnerable, LR/cd = Lower risk conservation dependent, LR/nt = Lower risk near threatened and DD = Data Deficient

All other species are considered to be of Least Concern (LC).

The occurrence of nine species was confirmed during the site visit and are shown in the table below.

Table 18: Mammal species confirmed to occur on the property

Scientific Name	Common Name	Observation Indicator
O. afer	Aardvark	Burrows
L. saxatilis	Scrub hare	Faecal pellets
C. hottentotus	African mole rat	Tunnel system
H. africaeaustralis	Cape porcupine	Quills
X. inaurus	SA ground squirrel	Sight record
C. penicillata	Yellow mongoose	Sight record
S. grimmia	Common duiker	Sight record
A. marsupialis	Springbok	Sight record
D. pygargus phillipsi	Blesbok	Sight record

2.6.2.2 Avifauna

During the SABAP1 and SABAP2 national bird atlas projects of the 2628DC (Grootvlei) quarter-degree grid cell (QDGC), within which the property occurs, 227-230 bird species were recorded. Only 116 of these species are expected to occur on or around the study property in its present form. The complete list of the bird species expected to occur on the property is attached as Table 7.2.2.1 of the Faunal Assessment Specialist Report in Appendix E.

Fifty-four species (47%) have a high probability of occurrence, fourty-two species (36%) have a medium probability of occurrence and nineteen species (16%) have a low probability of occurrence.

During the site visit 16 species were confirmed to occur on the property. These species are shown in the table below.

Table 19: Avifaunal species confirmed to occur on the property

Scientific Name	Common Name
Numida meleagris	Helmeted Guinea fowl
Alopochen aegyptiaca	Egyptian Goose
Anas erythrorhyncha	Red-billed Teal
Columba guinea	Speckled Pigeon
Streptopelia senegalensis	Laughing Dove
Streptopelia semitorquata	Red-eyed Dove
Afrotis afraoides	Northern Black Korhaan
Burhinus capensis	Spotted Thick-knee
Vanellus armatus	Blacksmith Lapwing
Vanellus coronatus	Crowned Lapwing
Elanus caeruleus	Black-shouldered Kite
Ardea cinerea	Grey Heron
Bubulcus ibis	Cattle Egret
Hagedashia hagedash	Hadedah Ibis
Spermestes cucullata	Bronze Mannikin
Vidua macroura	Pin-tailed Whydah

2.6.2.3 Herpetofauna

It is expected that 52 herpetofauna (38 reptile species and 14 amphibian species) may potentially occur on the property. These species are recorded in the table below.

Table 20: Herpetofaunal species likely to occur on the property

Probability of Occurrence	Scientific Name	Common Name
	CLASS: REPTILIA	**REPTILES**
	ORDER: TESTUDINES	**TORTOISES & TERRAPINS**
	Family: Pelomedusidae	**Side-necked Terrapins**
Medium	*Pelomedusa subrufa*	Marsh Terrapin
	ORDER: SQUAMATA	**SCALE-BEARING REPTILES**
	Suborder: LACERTILIA	**LIZARDS**
	Family: Gekkonidae	**Geckos**
Low	*Lygodactylus capensis*	Common Dwarf Gecko
Low	*Pachydactylus affinis*	Transvaal Gecko
High	*Pachydactylus capensis*	Cape Gecko
	Family: Agamidae	**Agamas**
High	*Agama aculeate distanti*	Ground Agama
Low	*Agama atra*	Southern Rock Agama
	Family: Scincidae	**Skinks**
High	*Trachylepis capensis*	Cape Skink

Probability of Occurrence	Scientific Name	Common Name
High	*Trachylepis punctatissima*	Speckled Rock Skink
Low	*Trachylepis varia*	Variable Skink
Low	*Afroablepharus wahlbergii*	Wahlberg's Snake-Eyed Skink
Low	*Acontias gracilicauda*	Thin-tailed Legless Skink
	Family: Lacertidae	**Old World Lizards or Lacertids**
Low	*Nucras lalandii*	Delanlande's Sandveld Lizard
	Family: Gerrhosauridae	**Plated Lizards**
High	*Gerhosaurus flavigularis*	Yellow-throated Plated Lizard
	Family: Cordyidae	
Low	*Pseudocordylus melanotus*	Common Crag Lizard
Medium	*Cordylus vittifer*	Common Girdled Lizard
	Family: Varanidae	**Monitors**
Low	*Varanus niloticus*	Water Monitor
	Suborder: SERPENTES	**SNAKES**
	Family: Typhlopidae	**Blind Snakes**
Medium	*Afrotyphlops bibronii*	Bibron's Blind Snake
Low	*Rhinotyphlops lalandei*	Delalande's Beaked Blind Snake
	Family: Leptotyphlopidae	**Thread Snakes**
High	*Leptotyphlops scutifrons*	Peter's Thread Snake
	Family: Lamprophiidae	
Medium	*Aparallactus capensis*	Black-headed Centipede Eater
Low	*Homoroselaps lacteus*	Spotted Harlequin Snake
Low	*Homoroselaps dorsalis*	Striped Harlequin Snake
Medium	*Lycodonomorphus rufulus*	Brown Water Snake
High	*Boaedon capensis*	Common House Snake
Medium	*Lycodonomorphus inornatus*	Olive House Snake
Medium	*Lamprophis aurora*	Aurora House Snake
Low	Lycophidion capense	Cape Wolf Snake
Low	*Duberria lutrix*	Common Slug Eater
High	*Pseudaspis cana*	Mole Snake
High	*Psammophylax rhombeatus*	Spotted Grass Snake
Low	*Psammophis brevirostris*	Short-snouted Grass Snake
High	*Psammophis crucifer*	Crossed Whip Snake
Low	*Psammophis triasalis*	Kalahari Sand Lizard
	Family: Colubridae	
High	*Dasypeltis scabra*	Common or Rhombic Egg Eater
Medium	*Crotaphopeltis hotamboeia*	Herald Snake
	Family: Elapidae	**Cobras, Mambas and Other**
High	*Hemachatus haemachatus*	Rinkhals
	Family: Viperidae	**Adders**

Probability of Occurrence	Scientific Name	Common Name
High	*Causus rhombeatus*	Rhombic Night Adder
Medium	*Brits arietans*	Puff Adder
	CLASS: AMPHIBIA	**AMPHIBIANS**
	ORDER: ANURA	**FROGS**
	Family: Pipidae	**Clawed Frogs**
High	*Xenopus laevis*	Common Platanna
	Family: Bufonidae	**Toads**
High	*Amietaophrynus gutturalis*	Guttural Toad
Medium	*Amietaophrynus rangeri*	Raucous Toad
Medium	*Schismaderma carens*	Red Toad
	Family: Hyperoliidae	**Reed Frogs**
High	*Kassina senegalensis*	Bubbling Kassina
High	*Semnodactylus wealii*	Rattling Frog
	Family: Phrynobatrachidae	**Puddle Frogs**
Medium	*Phrynobatrachus natalensis*	Snoring Puddle Frog
	Family: Pyxicephalidae	
High	*Amieta angolensis*	Common River Frog
Low	*Amieta fuscigula*	Cape River Frog
High	*Strongylopus fasciatus*	Striped Stream Frog
High	*Cocosternum boettgeri*	Boettger's Caco
Low	*Pyxicephalus adspersus*	Giant Bullfrog
High	*Tomopterna cryptotis*	Tremolo Sand Frog
High	*Tomopterna natalensis*	Natal Sand Frog

During the site visit, none of the herpetofauna species expected to occur on the property were identified or confirmed to inhabit the property.

2.6.3 Endangered species

2.6.3.1 Mammals

The two shrew species listed as Data Deficient (DD) in Table 17, namely the Reddish-grey musk shrew and Lesser red musk shrew, are not necessarily endangered. Sufficient data is not available to assign an accurate conservation ranking to the two species and they are therefore listed as Data Deficient species.

The African Hedgehog and the Brown Hyena are protected species under the Biodiversity Act (Act No. 10 of 2004) as well as the Mpumalanga Nature Conservation Act (Act No. 10 of 1998). The South African Hedgehog is listed as Near Threatened due to the influence of humans and their pets. However, considering the size of the district and connectivity in all directions, it may be possible that a

population of hedgehogs persists. Brown hyenas have been hunted to the point of being considered as Near Threatened. There is a medium possibility that this species may occur on the site.

2.6.3.2 Avifauna

Twelve Red Data avifaunal species may possibly visit the site and/or surrounding areas, based on the quantity and quality of available habitats. These species as well as their expected frequency of occurrence on the site are recorded in the table below.

Table 21: Expected frequency of occurrence of Red Data Avifaunal Species

Red Data Rating	Scientific Name	Common Name	Expected frequency of occurrence on site			
			Regular Resident	Frequent Visitor	Erratic Visitor	Infrequent Vagrant
Least Concern	*Eupodotis caerulescens*	Blue Korhaan	X			
	Mirafra cheniana	Melodious Lark	X			
Near Threatened	*Anthropoides paradiseus*	Blue Crane				X
	Glareola nordmanni	Black-winged Pratincole			X	
Vulnerable	*Tyto capensis*	African Grass Owl				X
	Eupodotis senegalensis	White-bellied Korhaan				X
	Sagittarius serpentarius	Secretary bird		X		
	Falco biarmicus	Lanner Falcon			X	
	Geronticus calvus	Southern Bald Ibis			X	
Endangered	*Gyps coprotheres*	Cape Vulture				X
	Circus maurus	Black Harrier				X
	Polemaetus bellicosus	Martial Eagle			X	

2.6.3.3 Herpetofauna

Two herpetofaunal species that are expected to occur on the site are listed as Red Data Species.

The striped harlequin snake (*Homoroselaps dorsalis*) is considered to be Near Threatened. The property contains moribund termitaria (termite nests) that provide ideal refuge for this species. It is therefore possible that this species will occur on the property.

The giant bullfrog is also listed as Near Threatened. However, according to the latest literature (Measy (ed.), 2011 and Carruthers and du Preez, 2011), the giant bullfrog's Red Data status has officially changed from Near Threatened to Least Concern in South Africa.

2.6.4 Exotic species

No exotic species were recorded during the site visit.

2.7 Surface water

2.7.1 Catchment areas

The site is situated within the C12L quaternary catchment area as shown in the figure below. This area falls within the Upper Vaal Water Management Area (WMA). The Upper Vaal Water Management Area receives water from two neighbouring areas and transfers large quantities of water to three other water management areas that are dependent on water from the Upper Vaal WMA (DWAF, 2004).

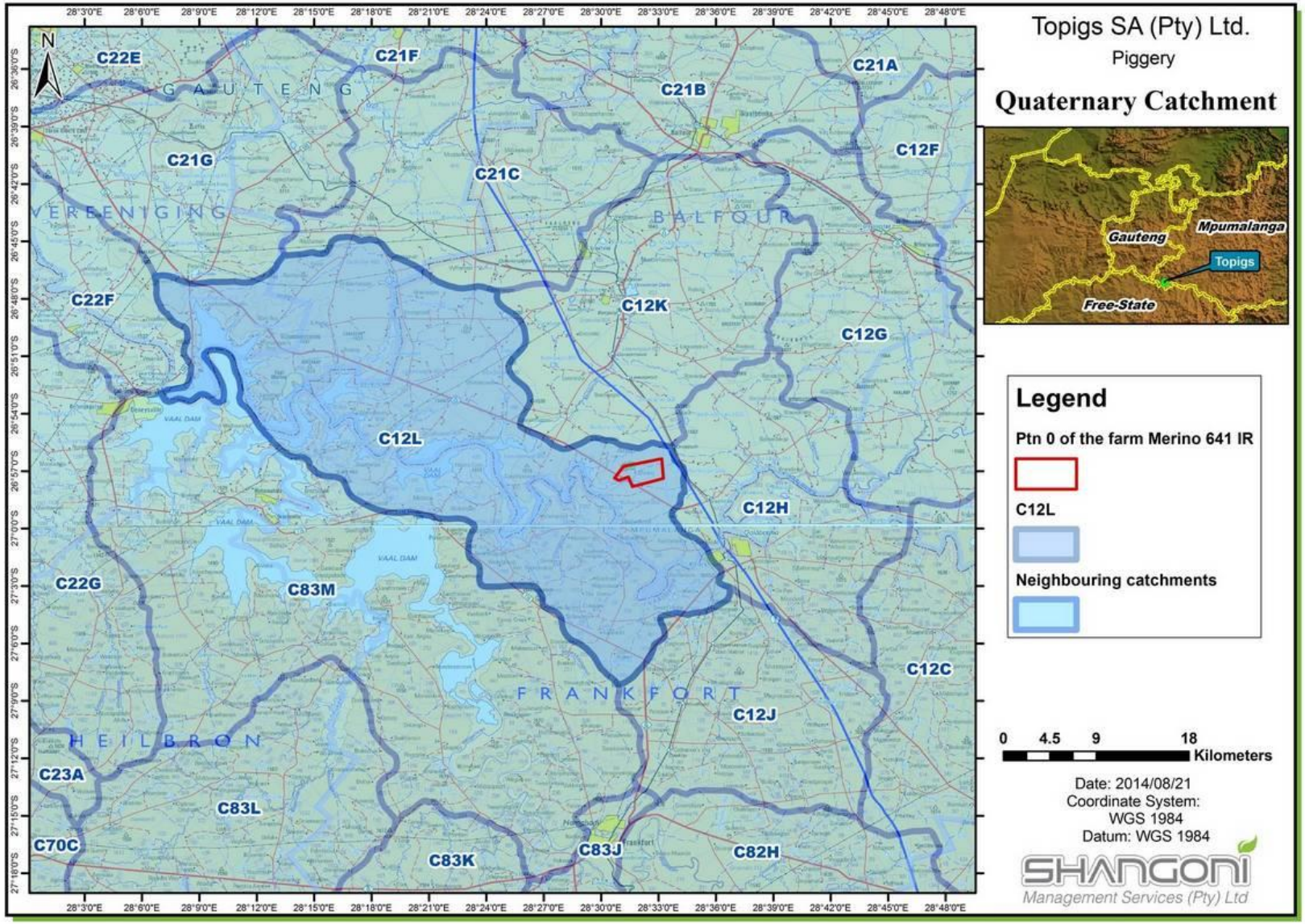


Figure 15: Quaternary Catchment in which the property is located

2.7.2 Mean annual runoff (MAR)

The total Mean Annual Runoff for the Upper Vaal Water Management Area is 2 423 million m^3/annum and the Ecological Reserve is 299 million m^3/annum (DWAF, 2004).

2.7.3 Surface water quality, quantity and use

A non-perennial river flows from east to west through the middle of the project property. The river has historically been dammed in a number of places. No data is available on the quality of the surface water present on the site.

No surface water will be used for the proposed project.

2.7.4 Water authority

The relevant water authority is the Department of Water and Sanitation, Pretoria Regional Office.

2.8 Groundwater

2.8.1 Aquifer type

The groundwater recharge is approximately 5mm per annum and the baseflow is approximately 34mm per annum in the area of the site (DWA, 2010).

2.8.2 Depth of water tables

The depth to the water level is approximately 12.9mbgl (metres below ground level) in the area of the property (DWAF, 2010).

2.8.3 Groundwater Use

Two existing boreholes on the property will be used to supply water to the piggery. In order to determine whether the existing boreholes will be able to supply enough water to the piggery, the two boreholes were subjected to yield testing procedures by Geo-logic Hydrogeological Consultants (2014).

The GPS coordinates for the two boreholes are as follows:
BH01: Lat: -26.955029°; Long: 28.530055°; and
BH02: Lat: -26.955140°; Long: 28.530869°.

The results of the yield testing procedures are shown in the table below.

Table 22: Test pumping results

Borehole	Step Test				Constant Discharge Test			Comment on the Water Level Recovery Rate of the Constant Discharge Test
	Step No.	Rate (l/s)	Duration (min)	D/D (m)	Rate (l/s)	Duration (min)	D/D (m)	
BH01	1	1.02	60	1.41	2.80	1 440	6.22	100% in 840 min
Dept: 16.80m	2	2.00	60	3.06				
Static Water Level: 0.80m	3	4.04	60	12.30				
	4	6.01	7	12.70				
BH02	1	2.50	60	3.21	6.06	1 440	9.16	97.8% in 1 440 min
Depth: 28.5m	2	5.06	60	4.65				
Static Water Level: 1.70m	3	10.09	60	13.06				
	4	15.01	15	19.86				
ST = Step Test					Dur. = Duration			
CDT = Constant Discharge Test					D/D = Draw down			
SWL = Static Water Level in metres below ground level								

The test pumping results were used to calculate the recommended abstraction rates for the two boreholes, as given in the table below.

Table 23: Recommended abstraction rates for production boreholes

Borehole	Recommended Abstraction Rate				Dynamic Water Level (mbgl)	Comments
	For 12h/day	In m^3/day	For 24h/day	In m^3/day		
BH01	1.1	**47.5**	0.8	**69.1**	4	Water level 0.80 mbgl
BH02	0.8	**34.6**	0.6	**51.8**	4	Water level 1.05 mbgl
Total Volume		**82**[#]		**120.9***		
[#] - Total volume of water that can be abstracted from the two existing boreholes if used on a **12** hour duty cycle.						
* - Total volume of water that can be abstracted from the two existing boreholes if used on a **24** hour duty cycle.						

2.8.4 Groundwater quality

The groundwater quality, in terms of mean Total Dissolved Solids (TDS), underlying the area of the property is 291 mg/ℓ (DWA, 2010).

2.9 Water Use Licensing

A detailed legal assessment will be conducted by a Water Use specialist in terms of the requirements for water use registration and licensing for the Merino piggery development. Based on this assessment, the necessary Water Use Registrations and Water Use Licence Applications, together with accompanying Integrated Water and Waste Management Plan (IWWMP) will be submitted to the Department of Water and Sanitation (DWS).

2.10 Sensitive landscapes

2.10.1 Wetlands

A wetland/riparian delineation was conducted by Limosella Consulting in April and May 2015 to provide a preliminary indication of the presence of wetlands and riparian habitat on the property and within its vicinity. A site visit was conducted on the 23rd of April 2015. During this visit, five wetland hydrogeomorphic (HGM) units were identified within the study area and surrounds. The HGM units were classified as a Seepage Wetland, a Floodplain wetland, a Channelled Valley Bottom Wetland and drainage areas. The wetlands are shown in the figure below and ultimately drain into the Vaal River, which is an important source of drinking water in South Africa. Any pollution into the Vaal River should therefore be avoided.

Soil samples were inspected within the two drainage areas linked to the floodplain wetland. The samples showed dense, dark clay soils with no wetland indicators such as mottling, gleying or root oxidation. In these types of soils, the vegetation composition becomes the primary wetland indicator. A follow up study is therefore recommended when the wetland vegetation is in bloom. Historical aerial imagery indicates that the wetlands (drainage areas) have been disturbed since as early as the 1930s. The functionality of the smaller wetlands is likely to be low.

The drainage areas enter into Site Alternative 2. The other delineated wetlands are further than 500m from the preferred site and it is therefore unlikely that the proposed development will affect the wetlands, given that strict mitigation measures are followed to prevent any contaminated water from the piggery from discharging into the wetlands (Limosella Consulting, 2015).

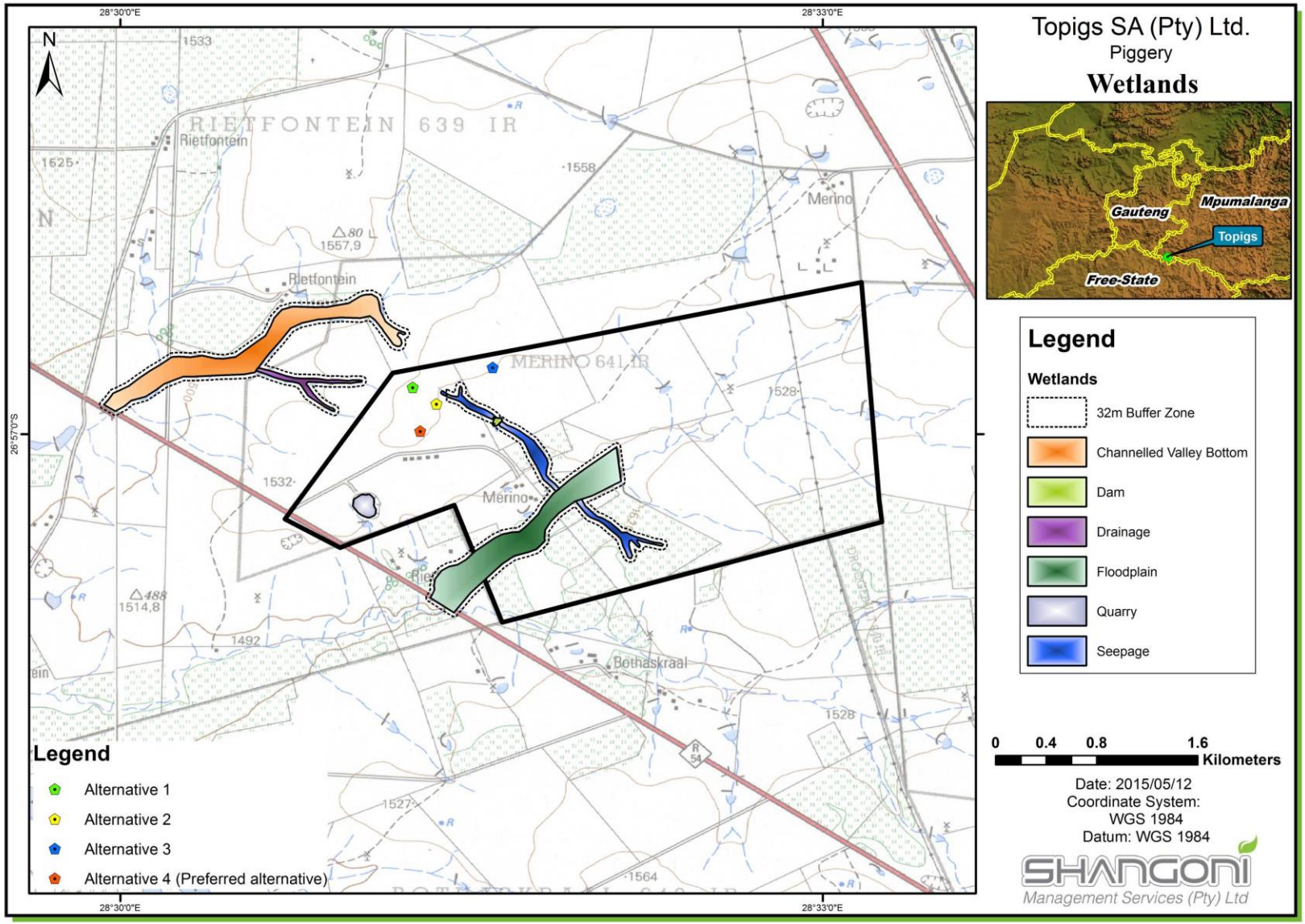


Figure 16: Wetlands in the vicinity of the project sites

2.11 Sites of archaeological and cultural interest

A Phase 1 Heritage Impact Assessment was conducted by A Pelser Archaeological Consulting (APAC) in April and May 2015. The assessment included the identification of objects, sites, occurrences and structures of archaeological or historical nature that may be influenced by the proposed development, assessing the significance of any archaeological or cultural features, describing the possible impact of the development on the features, describing possible mitigation measures as well as reviewing the applicable legislative requirements.

The Phase 1 Heritage Impact Assessment consisted of a literature review and a field survey. Little literature is available on the archaeological or cultural state of the Villiers area. One report (van der Walt, 2008) highlighted the historical timeframe for the larger Villiers area during an Archaeological Impact Assessment.

During the site visit a number of sites, features and objects were identified and recorded, as shown in the figure below. These included a cemetery and two distinct archaeological zones.

Cemetery

A cemetery was found at the following GPS coordinates: S26˚56'43.50", E28˚31'26.60". The cemetery consists of approximately ten unknown graves. The graves were demarcated by cement and brick borders, but no headstones with inscriptions were present. It is believed that the graves are burials of farmworkers in the area. The cemetery is not situated close to any of the Site alternatives for this project.

Archaeological Zones 1 and 2

Two distinct archaeological areas or zones are present on the site, at the following GPS coordinates: S26˚56'41.70", E28˚31'27.50" and S26˚56'48.00", E28˚31'14.90". These sites include stone walled enclosures, the remains of cattle kraals and huts, as well as a number of rock engravings. Decorated pottery, grinding stones as well as faunal remains were also found on the site.

The stone walling consists of circular enclosures (the remains of cattle kraals), surrounded by the remnants of surrounding walls with hut bays. Decorated pottery found on the sites seems to be related to the Ntsuanatstatsi facies of the Urewe pottery tradition, with bands of stamped decoration on the neck of the vessel and stamped arcades on the shoulder. These are sometimes found in combination with red ochre bands. The pottery dates these sites to between AD1450 and AD1650 (Huffman, 2007). Other cultural material found on these sites includes both upper and lower grinding stones, as well as faunal remains (animal bones), while ash midden areas were also identified in some locations.

The rock engravings found in Archaeological Zone 2 are similar to ones found close to Villiers by van der Walt in 2008. The rock engravings are on individual boulders on the site and consist of single or

multiple geometric patterns and possible (unidentified) animal figures. The relationship of these engravings with the stone walled settlements is not known at this stage, but could possibly date to the same period. Some of the geometric patterns seem to be impressions of the settlement features they are located in. According to Dr. Ben Smith, a rock art specialist who looked at photographs of the engravings found by van der Walt, confirmed that they are engravings and that they looked recent, but not new. He thought at the time that they are not related to the San and that the engravings are younger than a hundred years (van der Walt, 2008). This can, however, not be confirmed.

The archaeological sites and features are deemed to be of medium to high significance and should not be disturbed or negatively impacted on by the development. The possibility of unmarked burials located on these sites is also a high likelihood and any development actions on the sites should be avoided. With the archaeological sites situated in relatively close proximity to the development, suitable mitigation measures need to be implemented, including the fencing-in and management of the sites through a Cultural Heritage Resources Management Plan. If there is no way in avoiding the sites then detailed Archaeological Research, including the mapping and excavation of the sites needs to be undertaken.

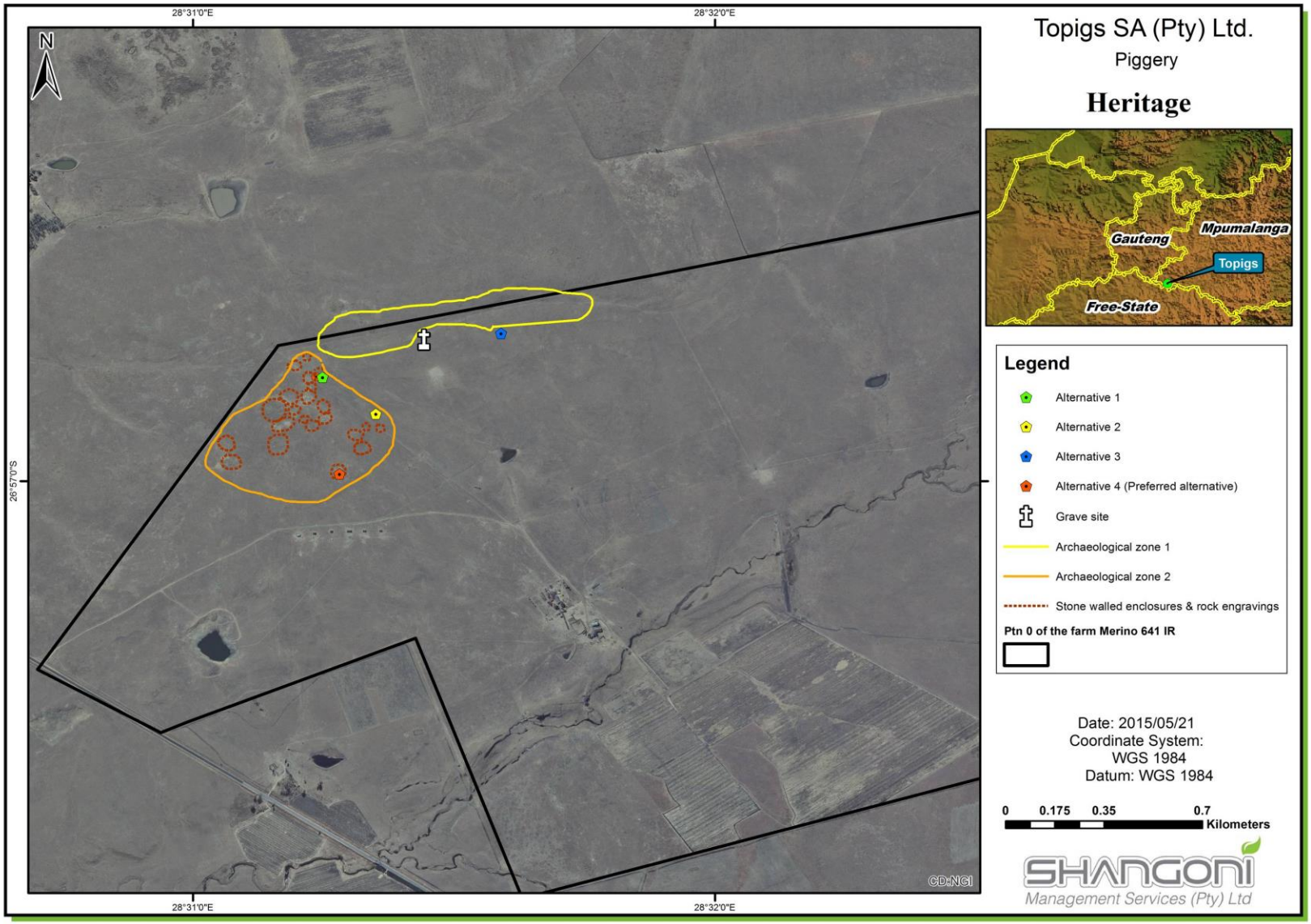


Figure 17: Heritage resources identified on the property

2.12 Air Quality

The site proposed for the establishment of the new piggery is situated within the Highveld region, which was declared as a priority area in terms of Section 18(1) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) on 23 November 2007. It is believed that the ambient air quality in the Highveld Priority Area exceeds or may exceed ambient air quality standards and that significant negative impacts on air quality are present in the area.

According to the Highveld Priority Area Air Quality Management Plan, sources of emissions in the Highveld Priority Area include major industrial sources as well as non-registered sources (sources that are small in comparison to the industrial sources). The release of emissions were determined, using specific methodologies, for residential fuel burning, coal mining, transport, biomass burning, coal mines and smouldering coal dumps. Emission sources that could not be quantified included landfill sites, incinerators, wastewater treatment works, tyre burning, biogenic sources, odour and agricultural dust (DEA, unknown).

As the project property and its surrounding properties are mainly used as agricultural land, the major sources of emissions in the vicinity of the proposed project are from agricultural activities.

2.13 Noise

The sources of noise in the area surrounding the project property are agricultural of nature as the farms adjacent to the property are used for crop production and livestock raising, including cattle and sheep. Vehicles travelling past the project property on the R54 to the South-west of the site and the N3 to the North-east of the site are also sources of noise in the area.

2.14 Visual aspects

All four alternative sites for the proposed development are located in the north-west corner of the project property. The location as well as the slopes of the site may result in a visual impact of the proposed piggery on adjacent landowners, as well as passing motorists on the R54 and N3.

2.15 Socio-economic aspects

2.15.1 Demography

According to the 2011 census, 42 390 people formed part of the 12 637 households in the Dipaleseng Local Municipality. The average household size is 3.4 people per household. The growth rate in the municipality is 0.93% per annum. There are 102.6 men for every 100 women in the municipality (Statistics South Africa, 2011). The table below shows the age structure of the municipality.

Table 24: Demographic Profile of the Dipaleseng Local Municipality (Statistics South Africa, 2011)

Age Group	Percentage of Population (%)
Under 15 years of age	28.2
15 to 64 years of age	66.0
Over 65 years of age	5.8
Total	**100**

2.15.2 Major economic activities

According to the 2011/12 Annual Report of the Dipaleseng Local Municipality, transport, storage and communication contributes to 32.92% of the Gross Geographic Product (GGP) of the municipality, while agriculture, forestry and fishing contributes 26.22%. The table below provides a brief overview of the GGP of the Dipaleseng Local Municipality (Dipaleseng Local Municipality, 2012).

Table 25: Gross Geographic Product Overview - Dipaleseng Local Municipality (Dipaleseng Local Municipality, 2012)

Economic Sector	Contribution percentage (%)
Agriculture / Forestry / Fishing	26.22
Community / Social / Personal	10.51
Construction	8.55
Electricity / Gas / Water	1.36
Financial / Insurance / Real Estate / Business	3.70
Manufacturing	7.31
Mining / Quarrying	0.37
Private Households	14.63
Transport / Storage / Communication	32.92
Undetermined	9.81
Wholesale / Retail	14.61
Other	0.00

2.15.3 Unemployment and employment

The 2011 census found that the official unemployment rate was 37.2% and the youth unemployment rate (15 to 34 years of age) was 45.2%. The dependency ratio was 51.6 per 100 people between the ages of 15 and 64 years (Statistics South Africa, 2011).

3. APPLICABLE LEGISLATION AND GUIDELINES

The table below provides an indication of the main legislation, policies and/or guidelines applicable to the proposed project.

Table 26: Applicable legislation, policies and/or guidelines

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
Laws of General Application		
The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)	-	To establish a Constitution with a Bill of Rights for the RSA.
Environment Conservation Act, 1989 (Act No. 73 of 1989 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To control environmental conservation.
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment, and to regulate the 'Duty of Care' Principle.
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000 as amended)	-	To give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights.
Air Quality and Noise		
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Gert Sibande 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.
Government Notice 1123, dated 2007 under the NEM:AQA, 2004	Gert Sibande Municipality	To declare the Highveld as a priority area in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).
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.
Waste Management		
National Environmental Management: Waste Act (Act No. 59 of 2008)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law regulating waste management in order to protect health and the environment by providing

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
		reasonable measures for the prevention of pollution and ecological degradation.
Biodiversity		
National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	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.
National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law on veldt and forest fires.
Agricultural Pest Act, 1983 (Act No. 36 of 1983 as amended) – GN R276 of 5 March 2004	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To regulate plants, plant products and other regulated articles when imported into South Africa.
Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To consolidate and amend the laws relating to nature conservation within the Province and to provide for matters connected therewith.
Soil and Land Management		
National Environmental Management Act, 1998 (Act No. 107 of 1998). National Environmental Management Amendment Act, 2008 (Act No. 62 of 2008).	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.
Environment Conservation Act, 1989 (Act No. 73 of 1989 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To control environmental conservation.
Heritage and Archaeological Resources		
National Heritage Resources Act, 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

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
		and conserve their heritage resources so that they may be bequeathed to future generations
Protected Areas		
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Mpumalanga Biodiversity Sector Plan	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	
Planning of New Activities		
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.
EIA Regulations R 543, R 544, R 545 and R 546, dated June 2010, under the NEMA, 1998	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To regulate and control the authorisation of certain listed activities.
Dipaleseng Local Municipality – Environmental Management Framework	Dipaleseng Local Municipality	To facilitate appropriate and sustainable development in the

4. PUBLIC PARTICIPATION PROCESS

4.1 Objectives of the Public Participation Process (PPP)

Section 24 of the Constitution of the Republic of South Africa of 1996 guarantees everyone the right to an environment that is not harmful to their health and well-being and to have the environment protected for the benefit of present and future generations. In order to give effect to this right, the National Environmental Management Amendment Act (NEMA), 2008 came into effect.

In terms of Section 24 (4) of the NEMA, 2008, procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must, *inter alia*, ensure, with respect to every application:

- Coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state.
- That the findings and recommendations flowing from an investigation, the general objective of integrated management laid down in NEMA, 2008, and the principles of environmental management set out in Section 2 of NEMA, 2008, are taken into account in any decision made by the organ state in relation to any proposed policy, programme, process, plan or projects, consequences or impacts.
- Public information and participation procedures that provide all integrated and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures.

One of the general objectives of integrated environmental management laid down in Section 23(2) (d) of NEMA, 2008 is to: “ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment.”

The National Environmental Management Principles as stipulated in NEMA, 2008 say that:

- “Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- The participation of all interested and affected parties in environmental governance must be promoted, and all people must have an opportunity to develop the understanding, skills and capacity necessary to achieve equitable and effective participation, and participation by vulnerable and disadvantage persons must be ensured”.

4.2 Legislation and guidelines followed for the PPP

The public participation process for this project was conducted by Shangoni Management Services in terms of:

- The procedures and provisions in terms of the NEMA (as amended), 2008;
- Chapter 6 of the EIA Regulations of 2010;
- GN 807: Public Participation Guideline in the Environmental Impact Assessment Process, dated October 2012; and
- Other relevant legislation such as the Promotion of Access to Information Act (PAIA), 2000.

Refer to Appendix D for an extract regarding the required public participation process to be followed, taken from the relevant legislation and guidelines.

4.3 Public Participation Process followed

4.3.1 Identification and registration of I&APs and key stakeholders

The table below lists adjacent landowners that were identified and notified (by means of e-mail and/or registered post) of the proposed project. Copies of the notifications to the I&APs have been included in Appendix D.

Table 27: List of landowners and adjacent landowners identified and notified

Farm Name	Title deed	Owner
Portion 1 of the farm Merino 641 IR	T10431/2005	Mr Hannes Britz
Portion 2 of the farm Merino 641 IR	T73775/2004	Mr Flip Cronje
Portion 3 of the farm Merino 641 IR, Portion 32 of the farm Rietfontein 639 IR	T96364/1994, T96364/1994	Mr Henru Correia
Portion 1 of the farm Rietfontein 639 IR, Portion 6 of the farm Bothas Kraal 643 IR	T124346/1997, T124346/1997	Mr Gallie Giliomee
Portion 1 of the farm Rietfontein 648 IR	T41428/2007	Mr Stephen Hendrick Mahlangu
Portion 16 of the farm Rietfontein 648 IR, Portion 2 of the farm Leeuwspruit 606 IR	T68661/2003, T68661/2003	Mr Daantjie Jordaan
Portion 1 of the farm Bothas Kraal 643 IR	T14350/1971	Mr Mike Muller
Portion 19 of the farm Leeuwspruit 606 IR	T11686/2014	South African National Roads Agency Soc Ltd

All organs of state that may have jurisdiction in respect of the proposed project are considered to be registered I&APs.

The following organs of state were notified of the proposed project:

- Mpumalanga Department of Community Safety, Security and Liaison;
- Mpumalanga Department of Public Works, Roads and Transport;
- Department of Water and Sanitation;
- Department of Agriculture and Land Administration Impact Management - Gert Sibande District Municipality;
- Mpumalanga Department of Agriculture, Rural Development and Land Administration (now Department of Agriculture, Rural Development, Land and Environmental Affairs);
- Mpumalanga Department of Co-operative Governance and Traditional Affairs;
- Mpumalanga Department of Health and Social Development;
- Mpumalanga Department of Human Settlements;
- Department of Mineral Resources;
- Gert Sibande District Municipality;
- Dipaleseng Local Municipality;
- Mafube Local Municipality;
- Fezile Dabi District Municipality; and
- South African Heritage Resources Agency (SAHRA).

Copies of the notifications to the organs of state have been included in Appendix D and examples are included in the following pages.

SHANGONI
Management Services (Pty) Ltd

Shangoni Management Services Pty (Ltd)
Reg: 2002/000002/07 VAT: 489 019 1069

Tel +27(0)12 807 7036 Fax +27(0)12 807 1014
E-mail info@shangoni.co.za www.shangoni.co.za
Block C8, Block@Nature 472 Botterklapper Street The Willows 0081
PO Box 74726 Lynnwood Ridge 0040

9 January 2015

EIA REF: 17/2/3/GS-281; SMS REF: TOP-VIL-14-04-09

Department of Water Affairs
Private Bag X955
Pretoria
0001

Dear Lorraine Fakuda

NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED TOPIGS SA MERINO PIGGERY PROJECT ON PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641 IR, MPUMALANGA

You are hereby notified that an application for environmental authorisation in terms of the environmental impact assessment (EIA) Regulations of 2010 (regulations in terms of chapter 5 of the National Environmental Management, 1998 (Act No. 107 of 1998), as amended (NEMA), has been lodged with the Mpumalanga Department of Economic Development Environment and Tourism (DEDET).

Applicant: Topigs SA (Pty) Ltd
Project Name: Topigs SA Merino Piggery
Project Location: Portion 0 (remaining extent) of the farm Merino 641 IR, Mpumalanga
Environmental Authorisation Application Process Ref Number: 17/2/3/GS-281

Project Description:
Topigs SA (Pty) Ltd is proposing to establish a new piggery. The proposed project will entail the following:

- The development of a piggery-grower unit where weaner piglets are grown until they are ready for slaughter. These pigs are called baconers.

A Background Information Document (BID) and Interested and Affected Party Registration Form are also attached to this letter in order to provide more detail with regards to the proposed project and so that persons may register as I&APs for the project, should they so wish.

Figure 18: Notification letter - Page 1

Invitation to participate: Should you wish to be registered as an Interested and Affected Party (I&AP) or comment on the above-mentioned project and application process, please submit a completed Registration Form (attached to this letter) or your name, contact information, and interest in the matter, in writing, to the contact person below, by no later than the **17th of February 2015**.

Where to obtain more information: To obtain additional information please contact the Environmental Assessment Practitioner at the details provided below.

Environmental Assessment Practitioner:
Shangoni Management Services (Pty) Ltd
PO Box 74726, Lynnwood Ridge, Pretoria, 0040
Contact Person: **Lizette Crous**
Tel: 012 807 7036, Cell: 071 673 3355, Fax: 012 807 1014/086 643 5360, E-mail: lizette@shangoni.co.za
For online participation go to www.shangoni.co.za and click on the "Public Documents" link.

Regards,

Lizette Crous
Shangoni Management Services

Figure 19: Notification letter - Page 2

4.3.2 Methods of notification

4.3.2.1 Advertisement(s)

The proposed project was advertised in two local newspapers, the Beeld and the Nigel/Heidelberg Rekord, on the 13th of January 2015. The Beeld and Nigel/Heidelberg Rekord were found to be the most appropriate newspapers in terms of their accessibility to the I&APs. Copies of the advertisements and proof of the placement are attached in Appendix D. Refer also to the figures below for proof of the placement of the advertisements and the wording used.

Dinsdag 13 Januarie 2015 Sport24

17

Geklassifiseerd

T: 086 063 8237 I F: 012 485 9067 I E: olx@beeld.com

Eksklusief aanlyn by OLX

Waar kopers en verkopers mekaar ontmoet

www.olx.co.za

Geklassifiseerd

Beeld

INDEKS

FAMILIEKENNISGEWINGS
1001 Geboortes
1005 Sterftes
1006 Sterftes (laat)
1015 Ter nagedagtenis
1020 Dankbetuigings
1025 Begrafnisdienste
1030 Gedenkdienste
1035 Gedenkrings
1040 Verlowings
1045 Huwelike
1050 Huwelike
1055 Algemeen

ALGEMENE KENNISGEWINGS
1201 Diere-aanmerkings
1205 Kerkkennisgewings
1210 Gemeenskapskennisgewings
1215 Gevind
1220 Gratis advertensies
1225 Verlore/weg

PERSOONLIKE DIENSTE
1401 Spyseniering & lokale
1402 Aanmerkings
1405 Kinderverres ak
1410 Dagsorg & crèches
1415 Spoordienste
1420 Finansiële
1425 Funksies & konferensies
1430 Gesondheid & skoonheid
1435 Kru ideleiers
1440 Regsadvies
1441 Saamwerkgeenthede
1445 Leerings
1450 Medies
1455 Verpleging
1460 Persoonlik
1465 Fotografie & video's
1470 Reisinies
1475 Sosiaal & ontspanning
1480 Opleiding & onderrig
1485 Gevra
1490 Huwelike

TE KOOP
1605 Antikwere & kuns
1607 Boeke
1610 Boumateriaal
1615 Klere
1620 Elektriese toebehore
1625 Elektronies & digitaal
1630 Graffels
1635 Meubels
1636 Rommelverkoping
1640 Tuinmaak
1642 Huishoudelik
1645 Juwele & bybehore
1650 Masjinerie & toerusting
1655 Verskeidenheid
1660 Troeteldiere
1665 Fotografie
1670 Rui theekie
1675 Te koop gevra
1677 Wendy-huise

ALGEMENE & HUISDIENSTE
1801 Bouwerk & Konstruksie
1802 Bouplanne
1805 Skoonmaakdienste
1807 DSTV-/TV-/DVD dienste
1810 Elektries
1815 Elektronies & digitale dienste
1820 Te huur
1825 Tuin & besproeiing
1827 Glas / Vensters
1830 Beskuursskole
1835 Huiswerkbetekings binne
1836 Huiswerkbetekings buite

2815 Gauteng
2820 KwaZulu-Natal
2825 Limpopo
2830 Mpumalanga
2835 Noord-Kaap
2840 Noordwes

VOERTUIE
3001 Bybehore & onderdele
3005 Bote & toerusting
3002 Spuitwerk & Paneelklop
3005 Motoraktiwiteite
3010 Rakkiedrys te koop / huur
3015 Bote & toerusting
3020 Woonwaens Te koop / huur
3025 Motors te koop
3030 Eksklusiewe Motors
te koop / huur
3035 4x4's
3040 Sleepwaens
3045 Veldsleepwaens (boswa)
3050 SNY
3055 Motorfietse
3060 Kommersieël
3065 Voertuie te koop onder R30 000
3065 Voertuie te koop onder R50 000
3070 Voertuie te huur
3075 Voertuie te koop gevra
3080 Motorvaartuie/dienste

EIENDOM
3201 Te koop
3205 Te huur
3210 Deeltvereiblyf
3215 Bekoopverele
3220 Landgoedere
3225 Duplekse / simplekse te huur
3230 Duplekse / simplekse te koop
3235 Duette te huur
3240 Duette te koop
3245 Plase te koop / huur
3250 Woonstelle te huur
3255 Woonstelle te koop
3260 Gemeubileerde akkomodasie
3265 Pakkaarers/ berging
3265 Tuinwoonstelle te huur
3270 Huise te huur
3275 Huise te koop
3280 Losies aangebied
3285 Losies gevra
3290 Kantore
3295 Grond / standplase
3301 Eiendomme te koop gevra
3305 Eiendomme te huur gevra
3310 Aftreeoorde te huur
3315 Aftreeoorde te koop
3315 Kamers te huur
3315 Aparte ingang
3320 Koelkeweve / standplase
3325 Meenthuise te huur
3330 Meenthuise te koop
3335 Opelaarhuise
3340 Ontwikkelings
3345 Vakansiehuise te koop
3350 A-Z-eiendomme

WERK
3601 Gevra
3605 Administratief
3610 Landbou
3615 Argitekte
3620 Vakmanne / ambagte
3625 Au Pairs
3630 Bankwese / versekering
3635 Bouwerk

012 004 0125

Is jy moeg om te hoor jy is te jonk of het regstellende aksie sy toll geëis? Ons mpy het 8 suksesvolle takke in Suid-Afrika en ons open 'n nuwe tak in Brooklyn. Ons benodig doelgerigte, hardwerkende individue wat graag 'n sukses van hull lewe wil maak. Die mpy bestaan uit 5 dele:

1) Hernubare energie en energiebesparing vir enige kragverbruikers in Suid-Afrika.
2) Ingenieurs' mpy in die Kaap.
3) Invoere en uitvoere.
4) Eiendomme.
5) Gasvryheidsindustrie. Inkomstepotensiaal tussen R12 000 en R35 000 pm. Ons bied volledige opleiding en baie mpy voordele.

As jy belangstel in een van die industrieë, stuur jou CV na hr@gcarbon.co.za of skakel 086 116 9898

Alle aansoekers sal binne 3 dae geskakel word.

MEDIES

GEREGISTREERDE VERPLEEGSTER

Benodig vir verswakte-sorg in Pretoria, moet skofte werk. Salaris onderhandelbaar.

Faks CV na 086 655 0198

VERKOPE & BEMARKING

DINAMIESE, PRESTASIEGEDREWE VERKOOPS-PERSOON

vir kantoortoerustingmaatskappy. Basies, brandstof en uitstekende kommissiepakket. Eie vervoer 'n vereiste. Net 2 poste beskikbaar. Stuur CV per e-pos na sales@kmcopiers.co.za of faks: 012-803-2029.

012 323 5420 DEAN STARBRIGHT LOANS

KONTANT

in 1 UUR

5% rente

Teen u motor, bakkie, woonwa, sleepwa

- SWARTLYS WELKOM
- VINNIG, VEILIG EN MAKLIK
- MAATSKAPPY GESTIG 1991

Paul Krugerstraat 359, Capitol Park

BRIDGING CASH

While waiting for

PENSION/PACKAGE

Payout

(Lump sum only)

Jhb: 011 394 6937
081 562 0510
Pta: 012 323 4641
072 831 1028
Vaal: 016 933 5451
081 404 0945

OORBRUGGINGS LENING?

Wag u vir pensioen- of pakket-uitbetaling? Stuur "pleasecallme" na 082-301-7856.

Waterfront Terrace, Bellville

IRIS BRIDGE

0860-105-546

PERSOONLIK

★★ MADAM I ★★

Accurate psychic readings. Telephone readings as well. Credit / Debit cards welcome!! IMMA 072-015-0999.

SIENER - 083 261 0354

VERVOER & BERGING

012-379-9559. AUSTEN Meubel-en kantoorvervoer. Verpakking, berging en toesig. AMANDA

071-682-5201/076-729-8369 Rubble Garden Waste Removal: Bakkie R270 4t R378 6ton R690 8ton R890 10ton R980 12ton R1100 FREE quotes on Compost and Treafelling 15 wespanne gereed vir Pinke Diens

073-296-0472. NOEM DIT, EK VERVOER DIT. Van meubels tot rommel, enige tyd en plek. 3-ton-bakkie-en-sleep vu-kombos.. 3-ton-vragmotor.

082 672 6233 / 012-333-2970/ 084 218 7156 - Afro Lindi, Meubel Verhuising!! DEEL-VRAGTE. KAAP, PE & KZN LANDSWYD!! Rootes, spesialiste. 501 afstag

ENYA Meubelvervoer en stoer Elna: 012 525-1343; 083-376-1720 e-pos; info.enyakop@gmail.com

PLAVEISEL

VILLAGE PAVE BK (1982) 012 324 4532/083 334 9798 www.villagepave.co.za 2-lk-waarborg. Spesiale aanbied stene R30 gelê: 6 oldeerde stene R45 gelê.

TUIN & BESPROEIING

012-377-2394. AA-BOOM/SLOPINGS. 24/7. Snv, snu (werk en uitbossing. Gratis lovetasies. 082-573-6582. Met. www.aaboomslopings.co.za

LANDBOU

BOORGATE

HERSTEL VAN BOORGATE Nuwe installasies van boorgate, instandhouding en die VERKOPE VAN BOORGATE. QUENTIN 079-554-4072

VOLWASSENES

MASSERINGS

012 997 1356 VelVetGlow:: Elite venue. Pta East. velvetglow.co.za 072 808 0776. Vacancies for Ladies. 076 388 5620

071 797 1533. Naby EUGENE MARAIS hospitaal. 7 DAE. LENA

072 479 0705. RACE LADY. PRETORIA NORTH.

072-431-5858. CHRISTA. Massering. Centurion. 6 dae/week

A FULL BODY MASSAGE. GLYNIS PTA EAST 074 326 6742

Witbank.060-487-0159 Nicole, slim afrikaan model.

WITBANK: 071 912 1587. new sexy caramel delight bomshell.

WITBANK: 072 893 1226 - Natalie "Afrikaans", Hot & sexy!

Wulpse Aantrekkelike Blondie Erasmusrand 072 643 8570

VAKATURES

AANTREKLIKE DAMES, spontane persoonlikheid vir massering. Gratis verblyf. Wilgers, Pta Dos. 060 756 4028

ELEGANT LADIES (24-40 years) needed for massage studio. NO SEX. Training provided. 130R p.m. ☎076 388 5620.

Opsoek na goedversorgde dames vir upmarket Escort Agency. Uitstekende werks geleentheid. Salaris R40 000-R80 000. Onderhoude in Pta of Fourways. ☎Madzi 082 442 0471

SAKE

GELEENTHEDE

GOED GEVESTIGDE REKENINGKUNDIGE PRAKTYK BENODIG. Tel: 076 939 7303

EIENDOMME

DUPLEKSE/SIMPLEKSE TE HUUR

DASPORT Netjiese groot 3 sk, dubbel gerieve, toeskuit m/huis. Naby winkelsentrums, hospitale en skole. R5 250 pm + deposito 082 933 6390 / 073 561 4864

WOONSTELLE TE HUUR

GARSFONTEIN Netjiese volledig gemeubileerde eenman-woonstel aan huis te huur. Stil omgewing, uitstekende sekuriteit, veilige parkering. Nie-roker, diereliefhebber. Geen troeteldiere. R5 600 p/m, wkl ingeskuit. Beskikbaar 1 Feb 2015. 082 94 22 368 / karlensperber24@gmail.com

TUINWOONSTELLE TE HUUR

QUEENSWOOD

OIS OMGEWINGSIMPAKSTUDIE

NOTICE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS GERRY ROSSOUW ASSESSING A PROPOSED LISTED ACTIVITY OF THE FARM UMBENJO 611 IR, NDUMFALANGA (PTA

The purpose of this notice is to inform interested and affected parties (I&APs) about potential opportunities for influencing these decisions in the Environmental Authorisation and Basic Assessment Process.

I&APs are opportunity to influence these decisions in the Environmental Authorisation and Basic Assessment Process.

DORPS-BEPLANNING

Robin van Persie (regs), doelskieter van Manchester United, spook om besit teen Morgan Schneiderlin van Southampton in eergister se Premierliga-wedstryd. Foto: JON SUPER | AP

Van Gaal nie beter as Moyes

Figure 20: Advertisement placed in the Beeld Newspaper

13 JANUARY 2015 NIGEL/HEIDELBERG REKORD - ONLINE EDITION www.rekord.org.za PAGE 11

NOTICE

Balfour Hengelklub

29 Hengelaars van Balfour Hengelklub het gedurende Desember by die Oord Bierman Vaaldam 240 visse gevang. Die totale gewig was 130.942kg.

Senior wenner: eerste plek is Dirk Roos met 24 vis teen 14.295kg. Tweede plek Jaco van der Merwe met 25 vis teen 12.796kg. Derde plek Lukas Stoltz met 26 vis teen 9.777kg. **Dames wenners** in die eerste plek is Riette Dercksen met 10 vis teen 3.990kg. Tweede plek Darell Roos met 9 vis teen 2.361kg en derde is Sarita Stoltz met 5 vis teen 2.406kg. **Junior wenners** eerste plek is Sarel Stoltz met 21 vis teen 12.500kg. Tweede Tiaan Roos met 12 vis teen 8.470kg en derde is Juanrich Dercksen met 6 vis teen 9.895kg. **Swaarste Karp** van 2.535kg is deur Dawid Roos gevang. Marie Marais spog met 'n 3.275kg **swaarste Graskarp**. **Swaarste Moddervis** van 0.805kg is deur Dirk Roos gevang. **Swaarste Baber** wenner is Juanrich Dercksen met 7.935kg. **Swaarste Geelvis** van 0.928kg is deur Juan Dercksen gevang. Skakel Lukas by 084 757 6058 of Jaco by 082 323 6284

SA streekspan

Die Suid Afrika Junior Jukskei Kampioenskappe word jaarliks in Desember in Kroostad aangebied.

Ariel Watson en Tiaan Potgieter van Nigel het die Oos Gauteng span verteenwoordig vanaf 13 tot 20 Desember 2014 in Kroonstad. Ariel (kaptein van O/19 span) en Tiaan (deelnemer van die O/16 span) het beide die streekspan gehaal. Ariel het vir sy span twee skofte gegooi wat vir hul 'n oorwinning besorg het en verower 'n goue medalje. Tiaan se streekspan het tweede plek behaal en ontvang 'n silwer medalje.

Tiaan Potgieter

Ariel Watson

Rugbyspelers meld aan!

Heidelberg Rugbyklub nooi alle belangstellende spelers wat hul stempel wil afdruk in die rugby wêreld om saam te kom oefen.

Alle skoolverlaters word aangemoedig om fiks te bly en by die klub aan te sluit. Ons wil graag nuwe talent ontwikkel en jou help om jou toekomsdrome te vervul as speler. Jy kan jou debuut maak deur plaaslik te groei en nasionaal deel te neem. Oefening begin Donderdag, 20 Januarie by die Heidelberg Leergimnasium se Sportgronde vanaf 06h30. Kontak vir Rian 082 5522 671 of Carel 082 4533 794.

NOTICE OF THE ENVIRONMENTAL AUTHORISATION APPLICATION: PROPOSED TOPIGS SA MERINO PIGGERY PROJECT ON PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641 IR, MPUMALANGA (EIA Ref Nr: 17/2/3/GS-281; SMS Ref Nr. TOP-VIL-14-04-09)

The purpose of this notice is to provide information to Interested and Affected Parties (I&APs) about potential decisions that may affect them and to afford I&APs an opportunity to influence those decisions in the Environmental Authorisation application process for the proposed Topigs SA Merino Piggery Project of Topigs SA (Pty) Ltd.

BACKGROUND TO THE PROJECT

Topigs SA (Pty) Ltd is proposing to establish a new piggery. The site is located on Portion 0 (remaining extent) of the farm Merino 641, IR, Mpumalanga, at the following GPS coordinates: 26°56'42.92"S 28°31'35.41"E. The land is currently used for agricultural activities.

The proposed project will entail the following:

· The development of a piggery-grower unit where weaner piglets are grown until they are ready for slaughter. These pigs are called baconers.

· The construction of two (2) Weaner platforms. Each platform will have two (2) houses and each house will have four (4) rooms (therefore a total of 16 rooms). Each room houses 450 piglets. The total capacity within the weaner rooms is therefore 7 200 piglets. The dimensions of one platform is; 75m x 15m (1 125m²) x 2 platforms = 2 250m².

· The construction of seven (7) grower platforms. Each platform will have two (2) houses and each house will have two (2) rooms (therefore a total of 28 rooms). Each room houses 450 baconer/grower pigs. The total capacity within the grower rooms is therefore 12 600 baconers/ growers. The dimensions of one platform: 145m x 15m (2 175m²) x 7 platforms = 15 225m².

· The total footprint size of all the weaner and grower platforms is therefore 17 475m² (1.7475ha).

· The total development footprint, including the platforms and open spaces between and surrounding the platforms is: 285m x 175m = 49 875m² (4.9875ha).

· The construction of an office block that will include a store room and ablution facilities. The office block will have the following dimensions: 6m x 20m (120m²).

LEGISLATIVE REQUIREMENTS

Procedure applied to the application

As the proposed activities entail the development of new infrastructure, a Basic Assessment (BA) will be required in compliance with the National Environmental Management Act, 1998 (Act No.107 of 1998) (NEMA) for the authorisation of listed activities contained in GNR 544 of 18 June 2010 and GNR 546 of 18 June 2010 published in terms of Sections 24(2) and 24D the NEMA.

Application submitted to the competent Authority

An application for Environmental Authorisation in terms of the NEMA, as amended, and the Environmental Impact Assessment Regulations, 2010, was submitted for the proposed activities on the 5th of December 2014 to the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET). The application was accepted by the MDEDET on the 10th of December 2014 and subsequently the reference number 17/2/3/GS-281 was assigned to the application.

Listed activities applicable to the application

The listed activities that have been applied for include Listed activities 4, 20, 23, 37, and 47 of GNR 544 and Listed activities 4, 12, 13 and 19 of GNR 546.

Legislation associated with the application

South African legislation requires that a Basic Assessment Report be compiled in accordance with the National Environmental Management Act (Act No. 107 of 1998) (NEMA), as amended. In order to do so, Topigs SA (Pty) Ltd has appointed Shangoni Management Services (Pty) Ltd (Shangoni), as the independent Environmental Assessment Practitioner (EAP), in terms of Regulation 16 of GNR 543, to undertake and manage the processes of applying for the required environmental authorisations. Furthermore, Shangoni meets the requirements set out in Regulation 17 of GNR 543.

PUBLIC PARTICIPATION

People have a right to be informed about potential decisions that may affect them and to be afforded an opportunity to influence those decisions.

Register as an I&AP

You may be an I&AP for this proposed project. To register as an I&AP of this project, or to obtain more information or submit comments, please request a Registration Form from Shangoni and return it to the details provided below by no later than the **12th of February 2015**.

Availability of the draft Basic Assessment Report

A draft Basic Assessment Report will be made available to the public for review for a period of fourty (40) days at a later stage in this application process. An electronic copy of the draft Basic Assessment Report will also be posted on the Shangoni Management Services (Pty) Ltd website (www.shangoni.co.za) for public comment for the same period of fourty days.

Where to obtain more information

To obtain additional information, please contact the EAP at the details provided below.

Environmental Assessment Practitioner: Shangoni Management Services (Pty) Ltd. Contact person: Lizette Crous. Tel: 012 807 7036; Mobile: 071 673 3355. E-mail: lizette@shangoni.co.za Fax: 012 807 1014/086 643 5360. Postal Address: PO Box 74726, Lynnwood Ridge, 0040.

SHANGONI

Figure 21: Advertisement placed in the Nigel/Heidelberg Rekord Newspaper

NOTICE OF THE ENVIRONMENTAL AUTHORISATION APPLICATION: PROPOSED TOPIGS SA MERINO PIGGERY PROJECT ON PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641 IR, MPUMALANGA

(EIA Ref Nr: 17/2/3/GS-281; SMS Ref Nr. TOP-VIL-14-04-09)

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- The construction of seven (7) grower platforms. Each platform will have two (2) houses and each house will have two (2) rooms (therefore a total of 28 rooms). Each room houses 450 baconer/grower pigs. The total capacity within the grower rooms is therefore 12 600 baconers/growers. The dimensions of one platform: 145m x 15m (2 175m^2) x 7 platforms = 15 225m^2.
- The total footprint size of all the weaner and grower platforms is therefore 17 475m^2 (1.7475ha).
- The total development footprint, including the platforms and open spaces between and surrounding the platforms is: 285m x 175m = 49 875m^2 (4.9875ha).
- The construction of an office block that will include a store room and ablution facilities. The office block will have the following dimensions: 6m x 20m (120m^2).

LEGISLATIVE REQUIREMENTS

Procedure applied to the application

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People have a right to be informed about potential decisions that may affect them and to be afforded an opportunity to influence those decisions.

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A draft Basic Assessment Report will be made available to the public for review for a period of fourty (40) days at a later stage in this application process. An electronic copy of the draft Basic Assessment Report will also be posted on the Shangoni Management Services (Pty) Ltd website (www.shangoni.co.za) for public comment for the same period of fourty days.

Where to obtain more information

To obtain additional information, please contact the EAP at the details provided below.

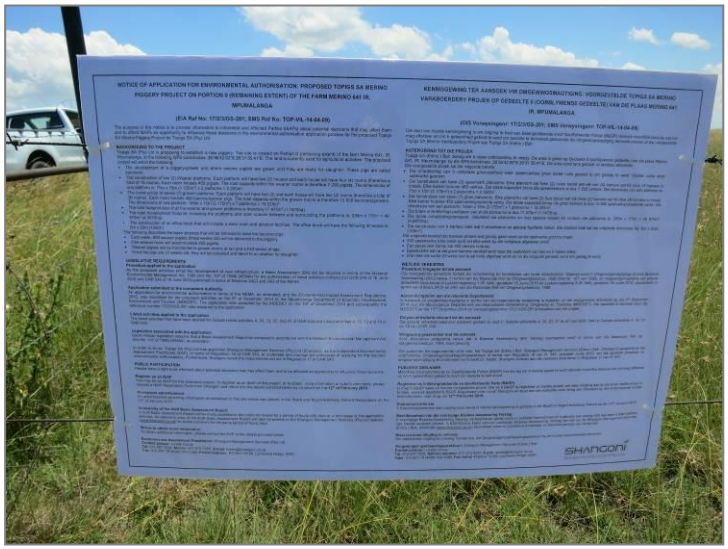
Environmental Assessment Practitioner: Shangoni Management Services (Pty) Ltd
Contact person: Lizette Crous
Tel: 012 807 7036; **Mobile**: 071 673 3355
E-mail: lizette@shangoni.co.za
Fax: 012 807 1014/086 643 5360
Postal Address: PO Box 74726, Lynnwood Ridge, 0040

SHANGONI Management Services (Pty) Ltd

Figure 22: Wording of the newspaper advertisement

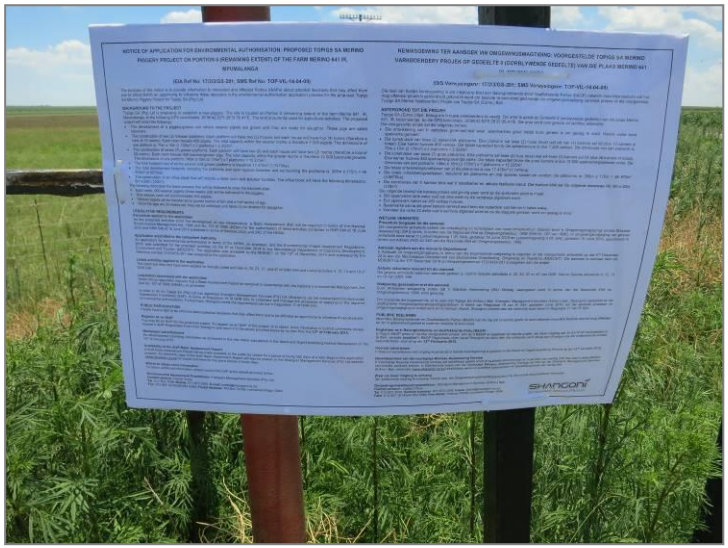
4.3.2.2 Placement of site- and public notices

Notice was also given to Interested and Affected Parties (I&APs) via the placement of site notice boards. Notice boards were placed at four different, noticeable and conspicuous places on the 13th of January 2015. A copy of the site notice and photographs of the site notices are attached in Appendix D. Refer also to the figures below.


NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION: PROPOSED TOPIGS SA MERINO PIGGERY PROJECT ON PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641 IR, MPUMALANGA
KENNISGEWING TER AANSOEK VIR OMGEWINGSMAGTIGING: VOORGESTELDE TOPIGS SA MERINO VARKBOERDERY PROJEK OP GEDEELTE 0 (OORBLYWENDE GEDEELTE) VAN DIE PLAAS MERINO 641 IR, MPUMALANGA
SHANGONI

a

b


NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION: PROPOSED TOPIGS SA MERINO PIGGERY PROJECT ON PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641 IR, MPUMALANGA
KENNISGEWING TER AANSOEK VIR OMGEWINGSMAGTIGING: VOORGESTELDE TOPIGS SA MERINO VARKBOERDERY PROJEK OP GEDEELTE 0 (OORBLYWENDE GEDEELTE) VAN DIE PLAAS MERINO 641 IR, MPUMALANGA
SHANGONI

c


Goeie Hoop Winkel
GV-42-1
GOEIE HOOP WINKEL
CARLING
Black Label
BEER

d

e

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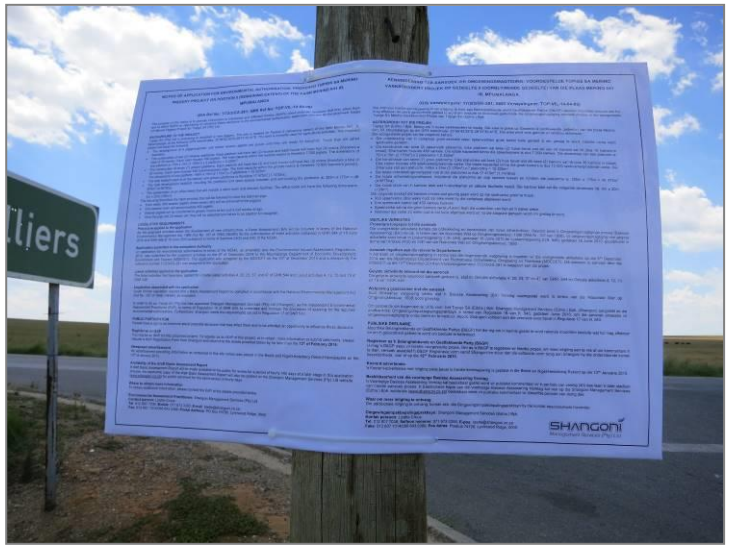
h



i

j

Figure 23: Site notices

4.3.2.3 Background Information Document

Notification letters and the Background Information Document (BID) developed for the proposed project provide information pertaining to the project to I&APs. The BID also includes a registration form that potential I&APs, stakeholders and organs of state are encouraged to complete in order to register as I&APs for the proposed project.

The BID was made available on the 9th of January 2015 to all landowners adjacent to the proposed site, as well as to all organs of state that may have jurisdiction over any aspect of the activity.

Copies of the notification letters and BID, and proof of their distribution to the adjacent landowners and organs of state, are attached under Appendix D.

I&AP register

Once all adjacent landowners, organs of state and the public were notified of the proposed project, an I&AP Register (as also provided in Appendix D) was compiled. The table below provides an extract of the I&AP Register indicating the organs of state and other I&APs that have been registered.

Table 28: Registered I&APs

No.	Name	Department
Organs of State		
1.	Mr Thulani Sibuyi	Mpumalanga Department of Community Safety, Security and Liaison
2.	Mr Kgopana Mathew Mohlasedi	Mpumalanga Department of Public Works, Roads and Transport
3.	Lorraine Fakuda / Florah Mamabolo / Philimon Khwinana / Alexia Hlengani	Department of Water and Sanitation
4.	Violet Siwela	Gert Sibande District Municipality - Department of Agriculture and Land Administration Impact Management
5.	Mr C.H.P. Kleynhans / Mr Jan Venter	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
6.	Mr David Mahlobo	Mpumalanga Department of Co-operative Governance and Traditional Affairs
7.	Mr M.R. Mnisi / Mrs C. Swart / Ms N. Nkosi	Mpumalanga Department of Health and Social Development
8.	Mr David Dube / Mr S. Mstweni	Mpumalanga Department of Human Settlements
9.	Mr A. Tshivhandekano	Department of Mineral Resources
10.	Mr T.D. Hlanyane	Gert Sibande District Municipality
11.	Keitumetse Sejeng	Dipaleseng Local Municipality
12.	Cllr. M. Tsotetsi	Dipaleseng Local Municipality – Ward 5
13.	Mr P.I. Radebe / Londeka Phetha / Isiaac Ngozo / Selena Mtlong	Mafube Local Municipality

No.	Name	Department
14.	Andre van Zyl / Doreen Khoza / Lerato Molaba / Tshepo Makoatle	Fezile Dabi District Municipality
15.	Nokukhanya Khumalo	South African Heritage Resources Agency (SAHRA)
16.	Jabulani Sigasa	Villiers Mayor
17.	Abraham Zemu	Masakeng
No.	**Name**	**Interest**
Registered I&APs		
1.	Mr Gallie Giliomee	Adjacent Landowner
2.	Rudie Lubbe	Adjacent Landowner

Refer also to Appendix D for a detailed I&AP Register including contact information for all registered organs of state and I&APs.

4.3.3 Public meeting(s)

No public meetings have been held nor is one anticipated at this stage.

4.3.4 Access and opportunity to comment on written submissions

4.3.4.1 Basic Assessment Report

The draft Basic Assessment Report will be made available to the public for review for a period of fourty (40) days. An electronic copy of the draft Basic Assessment Report will also be posted on Shangoni Management Services' website (www.shangoni.co.za) for public comment for the same period of fourty days.

4.3.5 Consultation with the relevant Authorities

4.3.5.1 Application form in terms of the NEMA, 1998

The applicable Environmental Authorisation application form under NEMA, 1998, as amended, was submitted to the Mpumalanga Department of Agricultural Development, Land and Environmental Affairs (formerly the Department of Economic Development, Environment and Tourism) on the 9th of December 2015. A reference number (17/2/3/E-281) was issued by the Department on the 10th of December 2015. The letter of acknowledgement indicating the above mentioned reference number is attached under Appendix F.

4.3.5.2 Authorities meeting(s)

No authorities meetings have been held nor is one anticipated at this stage.

4.3.6 Comments and responses

All issues, comments and questions received from the I&APs during the Basic Assessment phase have been summarised in the table below. Copies of the comments received have also been included in Appendix D.

Table 29: Comments and responses report

Name of contact person	Company	Date	Method of comment	Issue raised	Response
Mr Gallie Giliomee	Adjacent Landowner	16-01-2015	Email	Hiermee maak ek ten volle beswaar teen die ontwikkeling van Topigs op die plaas Merino 641 IR, Mpumalanga. Ek is die eienaar van die aangrensende plaas, Rietfontein, en dring daarop aan dat die eienaars of gemagtigde persone my persoonlik kom spreek. Die gesprek sal slegs in Afrikaans gevoer word. Skakel asseblief vir 'n afspraak. Translation from Afrikaans: Herewith I make full objection to the development of Topigs on the farm Merino 641 IR, Mpumalanga. I am the owner of the adjacent farm, Rietfontein, and I insist that the owners or designated persons come speak to me personally. The meeting will only be held in Afrikaans. Please phone me for an appointment. **Further comments:** Die enigste probleem wat ek het met die voorgestelde Topigs projek is dat indien daar vloede of oortollige reën kom, is ek bekommerd dat dit die water aan die onderkant van my eiendom gaan affekteer.	**Initial Response** CONFIRMATION OF REGISTRATION AS AN INTERESTED AND AFFECTED PARTY AND ACKNOWLEDGEMENT OF COMMENTS RECEIVED: PROPOSED TOPIGS SA MERINO PIGGERY PROJECT ON PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641 IR, MPUMALANGA Dear Mr Giliomee Your e-mail received on the 16th of January 2015 refers: We hereby confirm receipt of your Interested and Affected Party Registration form and that you have now been registered as an Interested and Affected Party for the Topigs SA Merino Project. You will henceforth receive all correspondence regarding the public participation opportunities as the process unfolds. We also take note of your comments. They will be included and addressed in the

Name of contact person	Company	Date	Method of comment	Issue raised	Response
				Translation from Afrikaans: The only problem that I have with the proposed Topigs project is in case of floods or excessive rain, where I am worried that this will affect the water at the bottom part of my property.	subsequent reports for this project and have also been provided to Topigs SA. **Second response** The wastewater management system for the piggery will be designed and constructed taking a 1:100 year flood into consideration. This will ensure that the system is entirely contained and no overflow into the natural environment will occur, even under reasonably expected flood conditions.
Mr D. Hlanyane	Gert Sibande District Municipality	26-01-2015	Email	PROSPECTING ACTIVITIES – CONSULTATION WITH LANDOWNERS / LAWFUL OCCUPIER AND INTERESTED AND AFFECTED PARTIES IN RESPECT OF PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641, IR. IS SITUATED IN DIPALESENG, MPUMALANGA PROVINCE The District acknowledges receipt of your BID that was emailed for our attention.	ACKNOWLEDGEMENT OF COMMENTS RECEIVED: PROPOSED TOPIGS SA MERINO PIGGERY PROJECT ON PORTION 0 (REMAINING EXTENT) OF THE FARM MERINO 641 IR, MPUMALANGA Dear Mr Hlanyane Your e-mail received on the 26th of January 2015 refers: We hereby acknowledge receipt of your letter dated 26 January 2015.
Nokukhanya	SAHRA	05-02-2015	SAHRIS	**Topigs SA (Pty) Ltd is proposing to**	A Phase 1 Heritage Impact Assessment

Name of contact person	Company	Date	Method of comment	Issue raised	Response
Khumalo				**establish a new piggery. The site is located on Portion 0 (remaining extent) of the farm Merino 641, IR, Mpumalanga, at the following GPS coordinates: 26°56'42.92"S 28°31'35.41"E. The land is currently used for agricultural activities.** Thank you for informing SAHRA of the proposed Merino Piggery Project near the border of the Freestate Province and Mpumalanga Province. The project will be located on the remainder of Portion 0 of the farm Merino 641 IR, Dipaleseng Local Municipality, Mpumalanga Province. The total development footprint is intended to be 4.99ha and the office block comprising of 120m^2. In terms of the National Heritage Resources Act (NHRA), no 25 of 1999m heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer	has been conducted by A Pelser Archaeological Consulting and has been submitted to SAHRA on the SAHRIS website for consideration. A Pelser Archaeological Consulting has also commenced with Phase 2 Mitigation Work, including an application for an Archaeological Permit, mapping, excavation work and an application for a Destruction Permit. The necessary applications and reports will be submitted to SAHRA via SAHRIS as soon as they are finalised.

Name of contact person	Company	Date	Method of comment	Issue raised	Response
				(or mine) to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required. This development footprint is proposed to exceed the 5000m^2, it will consist of construction activities thus SAHRA Archaeology, Palaeontology and Meteorites (AMP) Unit will require a full Heritage Impact Assessment (HIA) to be conducted for this development. The HIA report should be conducted by a suitably qualified archaeologist and the report should follow the SAHRA minimum standards of Heritage reports (http://www.sahra.org.za/about/legislation). If you are not aware of any archaeologists you can refer to (http://www.asapa.org.za/uploads/files/CRM list October 2014 %282%29 %281%29 %283%29.pdf). According to the SAHRA Fossil sensitivity	

Name of contact person	Company	Date	Method of comment	Issue raised	Response
				map, (http://www.sahra.org.za/map/palaeo) the development is situated in an of low/insignificant palaeontological sensitivity. No paleontological assessment is required for this project. SAHRA will await this report before making further comment. It should be noted that we would also require further environmental documents created for this proposed project to be uploaded onto the case.	

4.3.7 Conclusions of the PPP

In conclusion, the Public Participation exercise has provided adequate information to enable an understanding of what the proposed piggery activities would entail and to address the concerns and comments received during the basic assessment process.

5. NEED AND DESIRABILITY FOR THE ACTIVITY

A need and desirability for this project is evident from the following perspectives.

5.1 Developer/Applicant

Current demand for pork in South Africa is not being met. There is therefore an opportunity for the applicant, Topigs SA, to construct a new piggery and take advantage of the existing market demand for pork. The piggery will generate a source of income for the applicant and is therefore desirable from an economic point of view.

5.2 Local community

According to the 2011 census (Statistic South Africa, 2011), the unemployment rate for the Dipaleseng Local Municipality is 37.2%. The establishment of a new piggery will provide employment opportunities to the local community on a temporary and permanent basis. The continued, sustainable operation of the piggery will benefit the local community by ensuring continued employment of local workers. During the construction phase, 48 employment opportunities will be created while 7 employment opportunities will be created during the operational phase of the project.

5.3 District and provincial benefit

The development of a piggery complies with the Environmental Management Framework (BKS (Pty) Ltd, 2011) and Spatial Development Plan (Umsebe Development Planners, 2010) for the Dipaleseng Local Municipality. In these documents the development of sustainable agricultural practices is promoted.

A considerable amount of contract work is also associated with the construction and operation of a piggery, thereby creating secondary employment in the broader economy. Contract work can include:

- Construction companies;
- Feed companies; and
- Transport of piglets to the piggery and the transportation of pigs to the abattoir for slaughter.

The proposed project will also contribute to food security in South Africa.

5.4 Need and Desirability in terms of the Guideline on Need and Desirability dated 20 October 2014

On the 20th of October 2014, the Department of Environmental Affairs published a Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010, in

Government Notice 891 of 2014. The following table indicates how the guideline requirements were addressed in this report.

Table 30: Need and Desirability of the Proposed Project

Requirement	Part where requirement is addressed/response
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?[12]	The development and its associated elements/aspects will take place on land that is currently used for the grazing of livestock. The land was also used for livestock grazing in the past. Table 41, Table 42 and Table 44 in section 7.3 of this report gives a detailed discussion and impact rating of the proposed development on the ecological integrity of the project property.
1.1. How were the following ecological integrity considerations taken into account?	
1.1.1 Threatened Ecosystems.[13]	As drainage lines, a stream and wetland areas are present on the project property, a wetland/riparian delineation was commissioned by the applicant. The wetland zones and their associated buffer zones were presented in the resultant preliminary findings report for the study. This study aided in determining the risks posed by the proposed development (and its four site alternatives) on the wetland system, as rated in section 7.3 of this report. Refer also to section 2.10 of this report.
1.1.2 Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and	As drainage lines, a stream and wetland areas are present on the project property, a wetland/riparian delineation was commissioned by the applicant.

[12] Section 24 of the Constitution and section 2(4)(a)(vi) of NEMA refer.

[13] Must consider the latest information including the notice published on 9 December 2011 (Government Notice No. 1002 in Government Gazette No. 34809 of 9 December 2011 refers) listing threatened ecosystems in terms of Section 52 of National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

Requirement	Part where requirement is addressed/response
planning procedures, especially where they are subject to significant human resource usage and development pressure.[14]	The wetland zones and their associated buffer zones were presented in the resultant preliminary findings report for the study. This study aided in determining the risks posed by the proposed development (and its four site alternatives) on the wetland system, as rated in section 7.3 of this report. Refer also to section 2.10 of this report.
1.1.3 Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs").	A Vegetation Assessment was conducted for the project site. According to the Vegetation Assessment, the four Site Alternatives lies within the following areas in terms of the Mpumalanga Biodiversity Sector Plan: Site Alternative 1: Other Natural Areas Site Alternative 2: Irreplaceable Site Alternative 3: Irreplaceable Site Alternative 4: Irreplaceable Refer also to section 2.5 of this report.
1.1.4 Conservation targets.	The conservation target for the Soweto Highveld Grassland is 24% (Mucina & Rutherford, 2006).
1.1.5 Ecological drivers of the ecosystem.	Mitigation measures were identified and recommended in section 7.3 of this report and the EMP to avoid, minimise and/or remedy the influence of ecological drivers such as the influence of alien invasive plant species, uncontrolled fires and human activity.

[14] Section 2(4)(r) of NEMA refers.

Requirement	Part where requirement is addressed/response
1.1.6 Environmental Management Framework.	The Dipaleseng Local Municipality Environmental Management Framework (EMF) recognises Agriculture as the strongest economic pillar in the Municipality. It is further stated that even though it is a strong pillar, there is still a lot of potential for further development, specifically the making of specialised meat products on farms, amongst others. The development of a new piggery fits into with this development goal.
1.1.7 Spatial Development Framework.	The Dipaleseng Local Municipality Spatial Development Framework (SDF) identified ten development principles in order to facilitate the best possible development scenario for the Municipality. The development of the piggery complies with Development Principles 5 and 6 that promote intensive and extensive commercial farming and the development of industry specific Special Economic Clusters, respectively.
1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).[15]	The activities related to the new piggery will have insignificant contributions towards global and international responsibilities.
1.2 How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[16]	A Vegetation Assessment and a Vertebrate Species Richness and Habitat Assessment were conducted in order to determine the impact of the proposed project on the biological diversity and ecosystems. Refer to section 2 and 7.3.5 of this report for a description of the impact that the proposed development will have on biological diversity, discussed for each site alternative.

[15] Section 2(4)(n) of NEMA refers.

[16] Section 24 of the Constitution and Sections 2(4)(a)(i) and 2(4)(b) of NEMA refer.

Requirement		Part where requirement is addressed/response
		Mitigation measures were identified to minimise the impact of the development on the environment. Refer to section 7.3.5 of this report.
1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[17]	Potential negative environmental impacts associated with the development were identified and evaluated in section 7.3 of this report. Mitigation measures were identified and recommended in section 7.3 and the EMP to avoid, minimise and/or remedy negative environmental impacts.
1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?[18]	Generation waste, such as building rubble and domestic waste, will be generated during the construction phase of the proposed project. Some hazardous waste, such as spilt oil or diesel may also result. Mitigation measures were recommended in section 7.3.5 of this report and the EMP to effectively manage and minimise waste generated by the development.
1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[19]	A Phase 1 Heritage Impact Assessment was conducted during March 2015. A cemetery with 10 unmarked graves as well as two archaeological zones were identified during this assessment. Refer to section 2.10 of this report. Disturbance of the heritage artefacts has been avoided as far as possible. The cemetery and Archaeological zone 1 will not be disturbed at all by the proposed development. Site alternative 3 lies within Archaeological zone 1 and closest to the grave site and has been ruled out as a viable site alternative. Site alternatives 1, 2 and 4 lie within Archaeological zone 2, even

[17] Section 24 of the Constitution and Sections 2(4)(a)(ii) and 2(4)(b) of NEMA refer.

[18] Section 24 of the Constitution and Sections 2(4)(a)(iv) and 2(4)(b) of NEMA refer.

[19] Section 24 of the Constitution and Sections 2(4)(a)(iii) and 2(4)(b) of NEMA refer.

Requirement		Part where requirement is addressed/response
		if just partially. The preferred site alternative is site alternative 4. As development on site alternatives 1, 2 or 4 will result in damage or destruction of the heritage artefacts on site, Phase 2 Heritage Mitigation work has been initiated for the proposed project. This will include detailed mapping as well as excavations, in support of a Destruction Permit application, so as to document the heritage artefacts on site and to obtain approval for their demolition to enable the construction of the proposed piggery.
1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[20]	Operation of the pig farm has a water use requirement of 110 329L/d (40 270m^3 per annum). Mitigation measures were recommended in section 7.3.5 of this report and the EMP to ensure that the non-renewable resources are used efficiently and not waste.
1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to	This development will not use or impact upon any renewable natural resources.

[20] Section 24 of the Constitution and Sections 2(4)(a)(v) and 2(4)(b) of NEMA refer.

Requirement		Part where requirement is addressed/response
	enhance positive impacts?[21]	
1.7.1	*Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)*	The dependency on increased use of resources will not be exacerbated by the proposed development. The intensive nature of the piggery results in less resource usage per pig raised, when compared to less intensive operations.
1.7.2	*Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)*	The resource use is justifiable and will not affect intra- and intergenerational equity. Refer to Section 7.4.5 of this report for the mitigation measures recommended in terms of resource usage.
1.7.3	*Do the proposed location, type and scale of development promote a reduced dependency on resources?*	The proposed development is an intensive animal husbandry operation. Raising a large number of animals in such intensive operations reduces the use of resources per animal raised.
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts?[22]	The preferred site for development was chosen on the principles that it is located as far as possible from sensitive areas such as wetlands, drainage lines or moist vegetation. Refer to sections 2, 6 and 7 of this report.
1.8.1	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?*	It is believed that no knowledge gaps exist in terms of the proposed project, the current state of the environment at both the preferred and alternative sites as well as the potential impacts associated with the proposed project. Also, no uncertainties have been identified.

[21] Section 24 of the Constitution and Sections 2(4)(a)(vi) and 2(4)(b) of NEMA refer.

[22] Section 24 of the Constitution and Section 2(4)(a)(vii) of NEMA refer.

Requirement	Part where requirement is addressed/response
	The following assumptions are made: • That all information provided by the applicant regarding the proposed project is correct. • That the mitigation measures proposed in this report and the EMP are implemented correctly and are effective. • All specialist opinions are accurate. • All research/reference sources are accurate. • That there will be no significant changes to the proposed project that could affect the findings and recommendations of this report and the EMP.
1.8.2 What is the level of risk associated with the limits of current knowledge?	Based on the above described gaps, uncertainties and assumptions, it is our opinion that the level of risk associated with the limits of current knowledge is low.
1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	A risk-averse and cautious approach was applied to this proposed development as the limitations and gaps in knowledge regarding the impacts of the proposed development were taken into account.
1.9 How will the ecological impacts resulting from this development impact on people's environmental right in terms following:[23]	
1.9.1 Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative	Refer to section 7 of this report for all impacts and mitigation measures associated with this project.

[23] Section 24 of the Constitution and Sections 2(4)(a)(viii) and 2(4)(b) of NEMA refer.

Requirement		Part where requirement is addressed/response
	impacts?	
1.9.2	*Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?*	Careful site selection was carried out to ensure minimal impacts on the receiving environment. The proposed development will result in the clearance of vegetation from the approved site alternative. As the keeping of livestock on the project property is not ideal for the piggery from a biosecurity point of view, the grazing of livestock on the remainder of the property will be ceased. The keeping of game may, however, occur. The existing overgrazing and trampling of Themeda grassland on the project property will therefore be reduced and the grassland should rehabilitate over time. This will result in a positive impact in terms of vegetation across the project property, which is 685.23ha in extent.
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Refer to sections 5 and 7 of this report for all impacts associated with this project.
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	Refer to section 7 of this report for all impacts associated with this project.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?[24]	Refer to section 7 of this report for all impacts associated with this project. Section 6 describes the various alternatives considered for this project.

[24] Section 2(4)(b) of NEMA refer.

Requirement		Part where requirement is addressed/response
1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?[25]	Refer to section 7 of this report.
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1	*The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,*	The Integrated Development Plan of the Dipaleseng Local Municipality identifies the need for land availability for agricultural use. The proposed development therefore fits into the needs identified in the local municipality's IDP.
2.1.2	*Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),*	It is not expected that the proposed development will impact upon spatial priorities and patterns.
2.1.3	*Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and*	The existing land use of the area is agriculture and the proposed development therefore fits into the current spatial characteristics of the area.
2.1.4	*Municipal Economic Development Strategy ("LED Strategy").*	The Dipaleseng Local Municipality has a Local Economic Development Strategy and Plan. It is stated in this strategy/plan that agriculture is the prominent economic sector of the area.
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	Refer to section 7 of this report for all impacts associated with this project.
2.2.1	*Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?*	The proposed development will complement the local socio-economic initiatives, including the Dipaleseng Local Municipality's LED Strategy and Plan. In the strategy/plan, one of the six main priority areas is the stimulation

[25] Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

Requirement		Part where requirement is addressed/response
		of the agricultural sector.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?[26]	It is not anticipated that the proposed development will have an impact upon the physical, psychological, developmental, cultural or social needs and interests of the community.
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term?[27] Will the impact be socially and economically sustainable in the short- and long-term?	The proposed development will have an equitable impact distribution over the short (construction phase) and long-term (operational phase). The impacts, as shown in Section 7.3.5 of this report, are mostly low taking mitigatory measures into account, for both the construction and operational phases. The development will be sustainable over the short and long-term as the operation of the piggery is expected to continue for at least the next 30 years.
2.5	In terms of location, describe how the placement of the proposed development will:[28]	
2.5.1	*result in the creation of residential and employment opportunities in close proximity to or integrated with each other,*	Employment opportunities will be created for people in the area during the construction and operational phases of the new piggery.
2.5.2	*reduce the need for transport of people and goods,*	The proposed project will not have an impact on the transportation of people or goods.
2.5.3	*result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),*	The proposed project will not have an impact on access to public transport or non-motorised and pedestrian transport.
2.5.4	*compliment other uses in the area,*	The development will stimulate other industries, such as the transportation of

[26] Section 2(2) of NEMA refers.

[27] Sections 2(2) and 2(4)(c) of NEMA refers.

[28] Section 3 of the Development Facilitation Act, 1995 (Act No. 67 of 1995) ("DFA") and the National Development Plan refer.

Requirement	Part where requirement is addressed/response
	pig food and other associated supply chain functions. As the land in the vicinity of the project property is also used for agricultural activities, the proposed development compliments other uses in the area.
2.5.5 be in line with the planning for the area,	The development is in line with the goals for development of the Dipaleseng Local Municipality.
2.5.6 for urban related development, make use of underutilised land available with the urban edge,	Not applicable as the development is not an urban related development and will take place outside urban edges.
2.5.7 optimise the use of existing resources and infrastructure,	The preferred site alternative for the proposed development is situated next to the existing road infrastructure on the property. This existing access road will therefore be utilised to gain access to the proposed piggery and will minimise the length of new road that will need to be constructed for the proposed project.
2.5.8 opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	This is not applicable as bulk water infrastructure will not be required for the proposed project. Instead, water for the piggery will be obtained from existing boreholes on the project property. The existing electricity supply to the farm will also be utilised.
2.5.9 discourage "urban sprawl" and contribute to compaction/densification,	It is not anticipated that the project will contribute towards “urban sprawl” as the development is not associated with any housing or residential areas.
2.5.10 contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	It is not foreseen that the proposed project will contribute towards the correction of historically distorted settlement spatial patterns or the use of existing infrastructure in excess of current needs.
2.5.11 encourage environmentally sustainable land development practices and processes,	Efficient resource usage, effective waste management and control and mitigation of environmental impacts. Refer to section 7 of this report for all impacts and mitigation measures associated with this project.

Requirement	Part where requirement is addressed/response
2.5.12 take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	The development site was planned in order to avoid sensitive landscapes such as wetlands, drainage lines and moist vegetation. Refer to sections 2 and 7.3.5 of this report.
2.5.13 the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	The proposed piggery will result in high economic returns as a result of job creation, the stimulation of the local economy as well as the stimulation supply chain businesses.
2.5.14 impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	A Phase 1 Heritage Impact Assessment was conducted during March 2015. A cemetery with 10 unmarked graves as well as two archaeological zones were identified during this assessment. Refer to section 2.10 of this report. Disturbance of the heritage artefacts has been avoided as far as possible. The cemetery and Archaeological zone 1 will not be disturbed at all by the proposed development. Site alternative 3 lies within Archaeological zone 1 and closest to the grave site and has been ruled out as a viable site alternative. Site alternatives 1, 2 and 4 lie within Archaeological zone 2, even if just partially. The preferred site alternative is site alternative 4. As development on site alternatives 1, 2 or 4 will result in damage or destruction of the heritage artefacts on site, Phase 2 Heritage Mitigation work has been initiated for the proposed project. This will include detailed mapping as well as excavations, in support of a Destruction Permit application, so as to document the heritage artefacts on site and to obtain approval for their demolition to enable the construction of the proposed piggery.
2.5.15 in terms of the nature, scale and location of the development promote or act as a	It is not foreseen that the proposed project will act as a catalyst to create a

Requirement		Part where requirement is addressed/response
	catalyst to create a more integrated settlement?	more integrated settlement.
2.6	How were a risk-averse and cautious approach applied in terms of socio-economic impacts?:[29]	A risk-averse and cautious approach was applied by taking into account the limitations and gaps in knowledge regarding the impacts of the proposed development.
2.6.1	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?[30]*	It is believed that no knowledge gaps exist in terms of the proposed project, the current state of the environment at both the preferred and alternative sites as well as the potential impacts associated with the proposed project. Also, no uncertainties have been identified. The following assumptions are made: • That all information provided by the applicant regarding the proposed project is correct. • That the mitigation measures proposed in this report and the draft EMP are implemented correctly and are effective. • All specialist opinions are accurate. • All research/reference sources are accurate. • That there will be no significant changes to the proposed project that could affect the findings and recommendations of this report and the draft EMP.
2.6.2	*What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?*	Based on the above described gaps, uncertainties and assumptions, it is our opinion that the level of risk associated with the limits of current knowledge is low.

[29] Section 2(4)(a)(vii) of NEMA refers.

[30] Section 24(4) of NEMA refers.

Requirement		Part where requirement is addressed/response
2.6.3	*Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?*	A risk-averse and cautious approach was applied to this proposed development as the limitations and gaps in knowledge regarding the impacts of the proposed development were taken into account.
2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1	*Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?*	It is not anticipated that the proposed project will impact significantly on people's health, safety and social ills.
2.7.2	*Positive impacts. What measures were taken to enhance positive impacts?*	Careful site selection was carried out to ensure minimal impacts on the receiving environment. The proposed development will result in the clearance of vegetation from the approved site alternative. As the keeping of livestock on the project property is not ideal for the piggery from a biosecurity point of view, the grazing of livestock on the remainder of the property will be ceased. The keeping of game may, however, occur. The existing overgrazing and trampling of Themeda grassland on the project property will therefore be reduced and the grassland should rehabilitate over time. This will result in a positive impact in terms of vegetation across the project property, which is 685.23ha in extent.
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	It is not anticipated that the development's socioeconomic impacts will result in new, direct ecological impacts.

Requirement	Part where requirement is addressed/response
2.9 What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?[31]	Refer to section 6 of this report.
2.10 What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?[32] Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	Refer to section 6 of this report. The alternatives identified allow for the “best practicable environmental option” to be selected.
2.11 What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?[33]	Local labourers up to a certain skills level will be employed during the construction phase of the piggery.
2.12 What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?[34]	Mitigation measures were recommended to ensure that the environmental consequences of the proposed development were addressed. Refer to section 7 for all environmental impacts identified and mitigation measures proposed for the development.
2.13 What measures were taken to:	
2.13.1 ensure the participation of all interested and affected parties,	The public participation process for this project was conducted by Shangoni

[31] Section 2(4)(b) of NEMA refers.
[32] Section 2(4)(c) of NEMA refers.
[33] Section 2(4)(d) of NEMA refers.
[34] Section 2(4)(e) of NEMA refers.

Requirement	Part where requirement is addressed/response
	Management Services in terms of: •The procedures and provisions in terms of the NEMA (as amended), 2008; •Chapter 6 of the EIA Regulations of 2010; •GN 807: Public Participation Guideline in the Environmental Impact Assessment Process, dated October 2012; and •Other relevant legislation such as the Promotion of Access to Information Act (PAIA), 2000. Also refer to section 4 of this report.
2.13.2 provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,[35]	The public participation process is open to all parties. Public notices and a newspaper advertisement were distributed to encourage participation.
2.13.3 ensure participation by vulnerable and disadvantaged persons,[36]	The public participation process is open to all parties, including vulnerable and disadvantaged persons.
2.13.4 promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,[37]	All employees will undergo environmental awareness/training.
2.13.5 ensure openness and transparency, and access to information in terms of the process,[38]	The public participation process for this project was conducted by Shangoni Management Services in terms of: •The procedures and provisions in terms of the NEMA (as amended), 2008; •Chapter 6 of the EIA Regulations of 2010; •GN 807: Public Participation in the Environmental Impact Assessment

[35] Section 2(4)(f) of NEMA refers.

[36] Section 2(4)(f) of NEMA refers.

[37] Section 2(4)(h) of NEMA refers.

[38] Section 2(4)(k) of NEMA refers.

Requirement	Part where requirement is addressed/response
	Process, dated October 2012; and •Other relevant legislation such as the Promotion of Access to Information Act (PAIA), 2000. Refer to section 4 of this report. Therefore, the process was open and transparent and the public had access to all documents. All public comments have been included in this document and were adequately addressed.
2.13.6 ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge[39], and	The public participation process for this project was conducted by Shangoni Management Services in terms of: •The procedures and provisions in terms of the NEMA (as amended), 2008; •Chapter 6 of the EIA Regulations of 2010; •GN 807: Public Participation Guideline in the Environmental Impact Assessment Process, dated October 2012; and •Other relevant legislation such as the Promotion of Access to Information Act (PAIA), 2000. Also refer to section 4 of this report.
2.13.7 ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?[40]	The public participation process for this project was conducted by Shangoni Management Services in terms of: •The procedures and provisions in terms of the NEMA (as amended), 2008; •Chapter 6 of the EIA Regulations of 2010; •GN 807: Public Participation Guideline in the Environmental Impact Assessment Process, dated October 2012; and

[39] Section 2(4)(g) of NEMA refers.

[40] Section 2(4)(q) of NEMA refers.

Requirement	Part where requirement is addressed/response
	•Other relevant legislation such as the Promotion of Access to Information Act (PAIA), 2000. Also refer to section 4 of this report.
2.14 Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?[41]	Local labourers up to a certain skills level will be employed during the construction phase of the piggery.
2.15 What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?[42]	All contractors, sub-contractors and workers will attend compulsory environmental awareness training and inductions. This training will highlight the dangers associated with the workplace. Procedures relating to environmental risks will also be put in place and will be regularly updated.
2.16 Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1 the number of temporary versus permanent jobs that will be created,	48 temporary jobs will be created during the construction phase and 7 permanent jobs will be created during the operational phase of the proposed project.
2.16.2 whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	Local labourers up to a certain skills level will be employed during the construction phase of the piggery.
2.16.3 the distance from where labourers will have to travel,	Labourers will be transported to and from the construction site and their current homes.
2.16.4 the location of jobs opportunities versus the location of impacts (i.e. equitable	The location of the job opportunities will be in close proximity to the proposed

[41] x

[42] Section 2(4)(j) of NEMA refers.

Requirement	Part where requirement is addressed/response
distribution of costs and benefits), and	development.
2.16.5 the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	The development will create job opportunities without impacting on employment opportunities in other sectors.
2.17 What measures were taken to ensure:	
2.17.1 that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and	All applicable environmental legislation was considered and adhered to during the Basic Assessment process. Refer to section 3 of this report.
2.17.2 that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	A public participation process for this project was conducted by Shangoni Management Services in terms of: •The procedures and provisions in terms of the NEMA (as amended), 2008; •Chapter 6 of the EIA Regulations of 2010; •GN 807: Public Participation Guideline in the Environmental Impact Assessment Process, dated October 2012; and •Other relevant legislation such as the Promotion of Access to Information Act (PAIA), 2000. Also refer to section 4 of this report.
2.18 What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?[43]	All mitigation measures proposed as part of this Environmental Impact Assessment process have been focussed on minimising the potential impacts associated with the proposed development. The focus is on the protection of the environment through various measures, including pollution minimisation. The piggery has also been designed with the environment in mind by, for example, including the effective management of slurry, wastewater and manure collection into the designs for the piggery.

[43] Section 2(4)(o) of NEMA refers.

Requirement	Part where requirement is addressed/response
2.19 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?[44]	The mitigation measures are realistic, as also described in item 2.18 above. Also refer to sections 7 and 8 of this report.
2.20 What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?[45]	The applicant will be responsible for the costs of any remediation of pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects.
2.21 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?[46]	Refer to sections 6 and 8.2 of this report.
2.22 Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?[47]	Cumulative impacts are described in section 7.3.6 of this report.

[44] Section 240(1)(b)(iii) of NEMA and the National Development Plan refer.

[45] Section 2(4)(p) of NEMA refers.

[46] Section 2(4)(b) of NEMA refers.

[47] Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

6. CONSIDERATION OF ALTERNATIVES

The following definition of "alternatives" is given in the EIA Regulations of 18 June 2010: "alternatives", in relation to the proposed activity, *means different means of meeting the general purpose and requirements of the activity, which may include alternatives to-*

a) the property on which or location where it is proposed to undertake the activity;
b) the type of activity to be undertaken;
c) the design or layout of the activity;
d) the technology to be used in the activity;
e) the operational aspects of the activity; and
f) the option of not implementing the activity".

Typically, alternative assessments are conducted to assist in comparing various projects or attributes of projects that will occur. The most critical comparison is evaluating any proposed project against the No-Go option. The alternatives assessment then considers alternatives to project site selection for the proposed development; alternatives to layout of the development; and alternatives to construction methodologies and/or materials used for the development.

6.1 No-Go Option

This alternatives assessment was conducted using a simple cost-benefit analysis, through assessing various environmental attributes. These attributes can include physical (geology and soils, surface water quality and quantity, groundwater quality and quantity); biophysical (flora and fauna, sensitive environments); and social attributes (site of archaeological or cultural importance, land use issues, social health and welfare).

The impact of the each alternative was then evaluated in terms of whether it has a positive, negative, or no impact. In this instance, the impact is not evaluated in terms of significance but rather whether or not it will arise. Positive impacts are assigned a value of 1; no impact a value of 0; and a negative impact a value of -1.

By adding all of the attribute scores for each alternative, a suitability score is derived that indicates the preferred alternative. A total positive score indicates that the project benefits outweigh the potential negative impacts, while a total negative score indicates the project environmental costs outweigh the potential benefits. Essentially, the highest scoring alternative is then carried forward for full impact evaluation.

The potential impact of the preferred project option on environmental and socio-economic attributes identified during the assessment phase is evaluated against the potential impact of the No-Go option on the same attributes. The summary of this assessment is provided in the table below.

Table 31: Development vs. No-Go option

Attribute	Development Option	No-go Option
Physical environment		
Air Pollution	0	0
Noise Pollution	-1	0
Water Quality	0	0
Water Quantity	-1	0
Visual Aesthetics	0	0
Biophysical environment		
Flora	-1	-1
Fauna	0	0
Sensitive Environments	0	0
Social environment		
Traffic	-1	0
Impact on property values	1	0
Food safety and security	1	0
Local and regional economy	1	0
Infrastructure development	1	0
Total	**0**	**-1**

As can be seen in the table above, the development option (piggery establishment) is preferred to the No-Go option (only the current crop production and livestock grazing practices), as derived from comparative analysis. The No-Go option (current situation) results in negative impacts on flora as the grazing of livestock has led to overgrazing and trampling of vegetation, especially in areas preferred by the livestock. This includes areas that are designated as “irreplaceable” according to the Mpumalanga Biodiversity Sector Plan.

The development option has an overall score of zero. This is as a result of the negative impacts of the piggery, including potential impacts on flora, traffic, noise and water quantities being balanced by its positive impacts, including a positive impact on property values, food safety, the local and regional economy and the development of infrastructure.

6.2 Alternatives considered

The following alternatives were compared using a qualitative assessment.

6.2.1 Activity alternatives

The activity is the development (construction and operation) of a piggery. As this is the type of development that the applicant wishes to establish, no activity alternatives could be considered.

6.2.2 Location alternatives

As the applicant only has the proposed property available for the proposed development, no location alternatives could be considered for the piggery project.

6.2.3 Site layout alternatives

The ideal location for the construction of a piggery is on land which is relatively flat. This minimises the earthworks required for platform preparation. It is also beneficial for the piggery houses to be higher than the wastewater collection system. In this manner, the wastewater can be conveyed by way of gravity flow. Electricity costs and investment in pumps can be minimised by relying mostly on gravity flow.

Four potential site alternatives have been identified for the establishment of the new piggery. The alternative locations are shown in Figure 1. The remainder of the property could not be considered as the maize fields are still used for crop production and the wastewater sludge from the piggery will be irrigated onto the crops. Also, as shown in Figure 16, a large portion of the property is covered by streams, drainage areas and wetlands.

Site Alternative 1

Site alternative 1 is located in the most north-western corner of the project property and is close to the property boundary. According to the Vegetation Assessment and the Vertebrate Species Richness and Habitat Assessment, this site is the most suitable for the piggery from a fauna and flora perspective. The site is located in overgrazed and trampled grassland and in an “Other Natural Area” in terms of the Mpumalanga Biodiversity Sector Plan. From a Heritage perspective, this site lies within an Archaeological Zone where remnants of Late Iron Age stone walled enclosures and rock engravings were identified. The archaeological sites and features are deemed to be of medium to high significance. Whilst it would be preferable to avoid disturbance of the archaeological sites and features, it is possible to conduct Archaeological Mapping and Excavations of the sites prior to applying for a destruction permit to allow construction of the piggery. This route is being followed by Topigs and the application for an Excavation Permit is in process. This site lies approximately 128m from the seepage wetland present on the project property.

Site Alternative 2

Site alternative 2 is located south-east of Site alternative 1 and lies more towards the centre of the property. The site is situated within an “Irreplaceable” Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Sector Plan. The site has, however, been trampled and overgrazed. In terms of heritage resources, the site lies within an Archaeological Zone where remnants of Late Iron Age stone walled enclosures and rock engravings were identified. The archaeological sites and features are deemed to be of medium to high significance. Whilst it would be preferable to avoid disturbance of the archaeological sites and features, it is possible to conduct Archaeological Mapping and Excavations of the sites prior to applying for a destruction permit to allow construction of the

piggery. This route is being followed by Topigs and the application for an Excavation Permit is in process. This site lies the closest to the seepage wetland that is present on the project property. It extends into the wetland and is therefore not preferable, as all wetlands are deemed to be sensitive areas and should not be disturbed or damaged.

Site Alternative 3

Site alternative 3 is located to the east of the other alternative sites. This site is considered unsuitable for development as a result of the following:

- The fauna and flora assessments conducted for the project determined that this site is situated within rocky *Themeda* grassland. The rocky ridges of the site are most likely to house high species richness of plants and animals. Two plants of conservation concern are also located in close proximity to the site.
- From an archaeological perspective, this site lies within an archaeological zone/area where stone walling and rock engravings have been found. The significance of these sites are deemed to be medium to high and the possibility of unmarked burials is also highly likely. Any development on this site should therefore be avoided.
- The site lies close to the boundary of the property, which is not ideal from a biosecurity point of view.

Site Alternative 4 (Preferred Alternative)

Site alternative 4 is situated adjacent to the existing access road on the property and is further south than the other alternative sites. It is therefore the furthest from the boundary of the property. This site lies within natural grassland, dominated by *Themeda triandra* (red grass). In terms of the Mpumalanga Biodiversity Sector Plan, the site is within a Critical Biodiversity area that is deemed to be “irreplaceable”. From a Heritage perspective, this site lies within an Archaeological Zone where remnants of Late Iron Age stone walled enclosures and rock engravings were identified. The archaeological sites and features are deemed to be of medium to high significance. Whilst it would be preferable to avoid disturbance of the archaeological sites and features, it is possible to conduct Archaeological Mapping and Excavations of the sites prior to applying for a destruction permit to allow construction of the piggery. This route is being followed by Topigs and the application for an Excavation Permit is in process. This site is the furthest from the wetlands on the property, when compare to the other site alternatives. It is approximately 170m from the seepage wetland present on the project property.

This site alternative is the preferred alternative for this project for the following reasons:

- Even though the site is situated within an area that is deemed to be “irreplaceable” according to the Mpumalanga Biodiversity Sector Plan, this site will result in the smallest development footprint being disturbed for this construction of the piggery. This is because the site is adjacent to the existing access road on the property. A new access road will therefore not need to be constructed to this site, as would be the case for all the other site alternatives, and less vegetation would

therefore be disturbed should the development take place on this site. Furthermore, existing workers' houses on the opposite side of the existing road will be demolished (they are younger than 60 years old), and this disturbed area will be used for the construction camp. No vegetation will therefore need to be disturbed for the establishment of the construction camp, as would be necessary on any of the other site alternatives.

- This site is situated the furthest from the seepage wetland on the property.
- This site is the closest to the access gate into the property. Vehicles travelling to and from the site will therefore travel shorter distances than they would to any of the other site alternatives. This minimises the potential amount of dust and noise that will be generated by vehicles on site.
- The site is relatively flat, with a gentle slope. This is ideal from a construction point of view, as this minimises the amount of excavation work that needs to be done and subsequently the construction costs are also minimised. This will also minimise the indirect impact on the environment as a result of the excavation activities.
- The soil underlying this site has a shallow clay layer, followed by suitable, stable foundation material. Deep excavations to move past the clay layer will therefore not be required. This will minimise the impact of the excavation activities on the soil and geology underlying the site.

6.2.4 Design alternatives

There are no design alternatives that can be considered for the proposed piggery. The layouts and designs have been compiled according to best practice in the pig industry as well as experience from other operational piggeries that have been established by the applicant. The pig houses are designed to provide the best environment for the pigs and also to have the least impact on the environment.

6.2.5 Comparative assessment

An evaluation of the advantages and disadvantages of the different options are given in the table below.

Table 32: Advantages and disadvantages of the site alternatives of the new piggery

	Site Alternative 1	Site Alternative 2	Site Alternative 3	Site Alternative 4 (preferred alternative)
Advantages	• Located in an "Other Natural Area" in terms of the MBSP. • Vegetation at this site is overgrazed and trampled grassland. • Located relatively far away from the drainage lines and wetlands on the property (128m from the seepage wetland). • The site lies within a Low-medium vegetation sensitivity area according to the fauna assessment.	• This site is further away from the property boundary. This is positive from a biosecurity point of view. • Vegetation at this site is overgrazed and trampled grassland. • The site lies partly within a Low-medium vegetation sensitivity area according to the fauna assessment.	• Located relatively far away from the drainage lines and wetlands on the property (133m from the seepage wetland).	• This site is situated the furthest from the property boundary. This is positive from a biosecurity point of view. • This site is the furthest from the wetlands on the property. • Located next to the existing access road into the property. • This site will result in the smallest development footprint of all the site alternatives. • This site is the closest to the access gate to the property (shortest distance for vehicles to travel to and from the piggery). • The site is relatively flat, with a gentle slope, minimising the excavation work necessary and subsequently the cost of construction. • The soil underlying this site has a shallow clay layer, followed by suitable, stable foundation material. • Existing transformed area

	Site Alternative 1	Site Alternative 2	Site Alternative 3	Site Alternative 4 (preferred alternative)
				(worker's houses) can be demolished and used for the construction camp, instead of having to disturb untransformed vegetation for this purpose.
Disadvantages	• Located close to the border of the property, which poses a higher biosecurity risk. • Situated far from the existing access road into the property. • The site lies within an Archaeological Zone where remnants of Late Iron Age stone walled enclosures and rock engravings were identified. • A destruction permit will need to be obtained from SAHRA to construct the piggery at this site. • Will have a larger development footprint than Site alternative 4. • An access road to the site will need to be built. • The construction camp will need to be established on an untransformed piece of land.	• The site is situated within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP. • The site lies within an Archaeological Zone where remnants of Late Iron Age stone walled enclosures and rock engravings were identified. • A destruction permit will need to be obtained from SAHRA to construct the piggery at this site. • This site lies the closest to the seepage wetland that is present on the project property. Its footprint extends into the wetland. • Situated far from the existing access road into the property. • Will have a larger development footprint than Site alternative 4. • An access road to the site will	• Located close to the border of the property, which poses a higher biosecurity risk. • The site is situated within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP. • The site is situated within rocky *Themeda* grassland. The rocky ridges of the site are most likely to house high species richness of plants and animals. • The site would likely extend into an area of land which has a high vegetation sensitivity according to the fauna assessment. • Two plants of conservation concern are also located in close proximity to the site. • The site lies within an Archaeological Zone where stone walling and rock engravings have	• The site lies within natural grassland, dominated by *Themeda triandra* (red grass). • The site is situated within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP. • The site lies within a Medium-high vegetation sensitivity area, according to the fauna assessment. • Likely occurrence of the protected *Gladiolus ellioti*. • The site lies within an Archaeological Zone where remnants of Late Iron Age stone walled enclosures and rock engravings were identified. • A destruction permit will need to be obtained from SAHRA to construct the piggery at this site.

	Site Alternative 1	Site Alternative 2	Site Alternative 3	Site Alternative 4 (preferred alternative)
		need to be built. • The construction camp will need to be established on an untransformed piece of land.	been found. The significance of these sites are deemed to be medium to high and the possibility of unmarked burials is also highly likely. • A destruction permit will need to be obtained from SAHRA to construct the piggery at this site. • Will have a larger development footprint than Site alternative 4. • An access road to the site will need to be built. • The construction camp will need to be established on an untransformed piece of land.	

7. ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Aims of Environmental Impact Assessment

Potential environmental impacts (biophysical) associated with the proposed establishment of the new piggery have been identified.

The Environmental Impact Assessment (EIA) phase aims to adequately investigate and address all potentially significant environmental issues in order to provide the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs with sufficient information to make an informed decision regarding the proposed project.

This part of the document focuses on the identification of the major potential impacts that the activities, processes and actions may have on the surrounding environment. It indicates the major impacts that these activities may have on the environmental components associated with the site, as required in terms of R.543 of the EIA Regulations, 2010.

The EIA aims to achieve the following:

- To provide a detailed assessment of the biophysical environments affected by the proposed project;
- To assess impacts on the study area in terms of environmental criteria; and
- To identify and recommend appropriate mitigation measures for potentially significant environmental impacts.

This BAR addresses the following:

- A detailed description of the proposed project;
- Detailed assessment of the impacts identified that were determined to be potentially significant;
- Recommendations regarding the mitigation of significant impacts; and
- To meet the requirements and to comply with the necessary legislation and Acts.

Any specialist studies are combined into this consolidated report to allow for easy assessment of the potential aspects with associated impacts.

7.2 Environmental Impact Assessment Procedure

The environmental risk of any aspect is determined by a combination of parameters associated with the impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk.

Impact assessments should be conducted based on a methodology that includes the following:

- Clear processes for impact identification, predication and evaluation;
- Specification of the impact identification techniques;
- Criteria to evaluate the significance of impacts;
- Design of mitigation measures to lessen impacts;
- Definition of the different types of impacts (indirect, direct or cumulative); and
- Specification of uncertainties.

After all impacts have been identified, the nature of each impact can be predicted. The impact prediction will take into account physical, biological, socio-economic and cultural information and will then estimate the likely parameters and characteristics of the impacts. The impact prediction will aim to provide a basis from which the significance of each impact can be determined and appropriate mitigation measures can be developed.

The risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk, the pathway and the target that experiences the risk (receptor). Refer to the figure below for a model representing the above principle (as contained in the DWA's Best Practice Guideline: G4 – Impact Prediction).

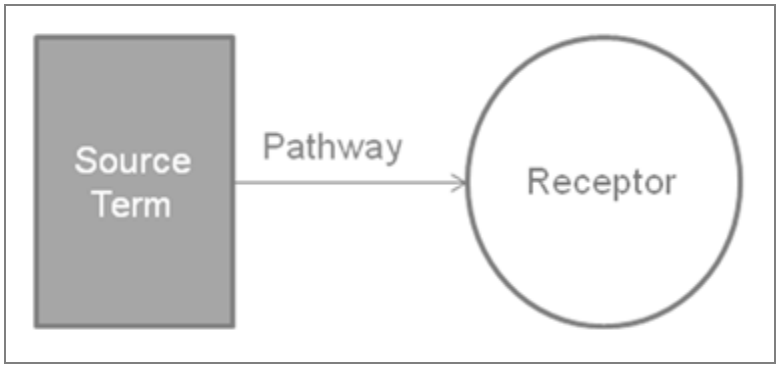


Figure 24: DWA's model for impact prediction (risk assessments)

Table 33 and Table 34 below indicate the methodology to be used in order to assess the Probability and Magnitude of the impact, respectively, and Table 35 provides the Risk Matrix that will be used to plot the Probability against the Magnitude in order to determine the Severity of the impact.

Table 33: Determination of Probability of impact

Frequency of Aspect / Unwanted Event	Score	Availability of pathway from the source to the receptor	Score	Availability of receptor	Score
Never known to have happened, but may happen	1	A pathway to allow for the impact to occur is never available	1	The receptor is never available	1
Known to happen in industry	2	A pathway to allow for the impact to occur is almost never available	2	The receptor is almost never available	2
< once a year	3	A pathway to allow for the impact to occur is sometimes available	3	The receptor is sometimes available	3
Once per year to up to once per month	4	A pathway to allow for the impact to occur is almost always available	4	The receptor is almost always available	4
Once a month - Continuous	5	A pathway to allow for the impact to occur is always available	5	The receptor is always available	5

*Step 1: Determine the **PROBABILITY** of the impact by calculating the average between the Frequency of the Aspect, the Availability of a pathway to the receptor and the availability of the receptor.*

Table 34: Determination of Magnitude of impact

Source								Receptor			
Duration of impact	**Score**	**Extent**	**Score**	**Volume / Quantity / Intensity**	**Score**	**Toxicity / Destruction Effect**	**Score**	**Reversibility**	**Score**	**Sensitivity of environmental component**	**Score**
Lasting days to a month	1	Effect limited to the site. (metres);	1	Very small quantities / volumes / intensity (e.g. < 50L or < 1Ha)	1	Nontoxic (e.g. water) / Very low potential to create damage or destruction to the environment	1	Bio-physical and/or social functions and/or processes will remain unaltered.	1	Current environmental component(s) are largely disturbed from the natural state. Receptor of low significance / sensitivity	1
Lasting 1 month to 1 year	2	Effect limited to the activity and its immediate surroundings. (tens of metres)	2	Small quantities / volumes / intensity (e.g. 50L to 210L or 1Ha to 5Ha)	2	Slightly toxic / Harmful (e.g. diluted brine) / Low potential to create damage or destruction to the environment	2	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced / Still reversible	2	Current environmental component(s) are moderately disturbed from the natural state. No environmentally sensitive components.	2
Lasting 1 – 5 years	3	Impacts on extended area beyond site boundary (hundreds of metres)	3	Moderate quantities / volumes / intensity (e.g. > 210 L < 5000L or 5 – 8Ha)	3	Moderately toxic (e.g. slimes) Potential to create damage or destruction to the environment	3	Bio-physical and/or social functions and/or processes might be notably altered or enhanced / Partially reversible	3	Current environmental component(s) are a mix of disturbed and undisturbed areas. Area with some environmental sensitivity (scarce / valuable environment etc.).	3
Lasting 5 years to Life of Organisation	4	Impact on local scale / adjacent sites (km's)	4	Very large quantities / volumes / intensity (e.g. 5000 L – 10 000L or 8Ha– 12Ha)	4	Toxic (e.g. diesel & Sodium Hydroxide)	4	Bio-physical and/or social functions and/or processes might be considerably altered or enhanced / potentially irreversible	4	Current environmental component(s) are in a natural state. Environmentally sensitive environment / receptor (endangered species / habitats etc.).	4
Beyond life of Organization / Permanent impacts	5	Extends widely (nationally or globally)	5	Very large quantities / volumes / intensity (e.g. > 10 000 L or > 12Ha)	5	Highly toxic (e.g. arsenic or TCE)	5	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced / Irreversible	5	Current environmental component(s) are in a pristine natural state. Highly Sensitive area (endangered species, wetlands, protected habitats etc.)	5

*Step 2: Determine the **MAGNITUDE** of the impact by calculating the average of the factors above.*

Table 35: Determination of Severity of impact

ENVIRONMENTAL IMPACT RATING / PRIORITY					
MAGNITUDE					
PROBABILITY	**1 Minor**	**2 Low**	**3 Medium**	**4 High**	**5 Major**
5 Almost Certain	Low	Medium	High	High	High
4 Likely	Low	Medium	High	High	High
3 Possible	Low	Medium	Medium	High	High
2 Unlikely	Low	Low	Medium	Medium	High
1 Rare	Low	Low	Low	Medium	Medium

Step 3: Determine the SEVERITY of the impact by plotting the averages that were obtained above for Probability and Magnitude in the table below.

7.3 Description of Environmental Impacts

The aim of this section of this EIA report is to provide information regarding the potential environmental impacts associated with the proposed activities. In order to provide background information and a framework for the environmental risk assessment, a description of the different phases of the project is provided below. Refer to the tables below for the impacts associated with the piggery project.

7.3.1 Design and Planning Phase

- Designing and planning of the new piggery; and
- Planning for construction of the new piggery.

7.3.2 Construction Phase

- Laydown of material within the construction footprint area;
- Excavation of trenches for the foundations of the platforms for the pig-raising houses as well as the canals for the transportation of wastewater;
- Construction of the foundations of the platforms and canals for wastewater transportation;
- Construction of the houses on top of each platform;
- Installation of infrastructure, such as the water reservoir, backup generator, diesel tank, feed silos and water and feed supply lines to each house; and

- Rehabilitation of the construction site.

7.3.3 Operational Phase

- Operational activities of the piggery including loading and offloading of pigs;
- Routine maintenance of the piggery;
- Repair work when required;
- Canalisation of wastewater and separation into a solid and liquid fraction;
- Storage of the solid fraction of the wastewater;
- Storage of the liquid wastewater fraction; and
- Re-use of the liquid wastewater fraction as a source of plant nutrients (organic fertiliser).

7.3.4 Decommissioning Phase

Decommissioning of the piggery is not anticipated for the foreseeable future. Should the piggery be decommissioned, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs prior to decommissioning.

7.3.5 Impacts associated with the proposed establishment of a new piggery (GN. No. 544, Listing Notice 1 of 18 June 2010: Activity Numbers 4, 23, 37 and 47, GN. No. 546, Listing Notice 3 of 18 June 2010: Activity Numbers 4, 12, 13 and 19)

As Site Alternative 3 has been eliminated as a viable alternative, due to its high sensitivity in terms of the nature of the vegetation at this site together with the heritage artefacts present at the site, this alternative has not been included nor rated in the following tables.

7.3.5.1 Planning and Design

Table 36: Environmental Impact Assessment: Planning and Design

Activity:
- Design and planning of the proposed piggery.
- Design and planning of the wastewater management system.

Aspect:
- Inadequate planning and design of the piggery.
- Inadequate design and planning of the wastewater management system.

Nature and significance of environmental impact

Project Phase Applicability: Design and Planning

Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Magnitude	Severity					Probability	Magnitude	Severity	
Harm to moist grassland and watercourses due to inadequate planning and design.				To prevent harm to moist grassland and watercourses 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 moist grassland or watercourses. • Project engineers should compile a method statement, outlining the construction methodologies. Mitigation measures should be included in this method statement that must be approved by the ECO and be available on site.	During the Planning of the Merino piggery.	• Facility manager. • Designing engineer.				• NEMA, 1998 • NWA, 1998
Site Alternative 1	3	3	M					2	2	L	
Site Alternative 2	4	3	H					3	2	M	
Site Alternative 4 (preferred alternative site)	2	3	M					2	2	L	
Soil, surface water and groundwater pollution from the ineffective containment of the piggery wastewater and the irresponsible application of wastewater sludge to land. All Site Alternatives	3	4	H	To ensure effective design of the wastewater management system, so that no environmental harm results when the system becomes operational.	• The wastewater management system should be property designed and installed to that the piggery waste is effectively removed from the houses. • Plastic lined holding dams/lagoon for wastewater (liquid fraction) should be designed to contain the maximum amount of wastewater that could be stored at any given time. Any eventualities resulting in land application not being possible should be taken into account when designing the storage facilities. • The holding dam/lagoon must be lined with a 1.5mm HDPE liner or impermeable concrete floor. • The wastewater management system must positioned so that it is not subject to flooding and must be situated	During the design and planning of the wastewater management system.	• Facility manager. • Designing engineer.	1	3	L	• NEMA, 1998 • NWA, 1998

					above the 1:100 year floodline. • Overflow of the wastewater management system must be prevented. Ensure sufficient freeboard to guarantee facility integrity during heavy rainfall events. • The solid fraction of the wastewater must be stored on an impermeable surface that is properly drained, with drains leading back to the separator. • Determining the amount of land required for the effective and responsible application of the wastewater sludge must take the following into consideration: ▪ Susceptibility to waterlogging, erosion and surface water runoff; ▪ Climatic conditions (evapotranspiration, wind speed and rainfall); ▪ The potential effect on surface and groundwater resources; ▪ The nature of the crop or pasture to be irrigated; ▪ Agricultural practices on the farm; ▪ Soil properties, such as infiltration rate; ▪ The quantity and quality of the wastewater; ▪ Trace element loading (Cu, Zn and Cd); and ▪ The maximum operational life of the application sites in terms of phosphorous sorption capacity and predicted salt accumulation (ARMCANZ/ANZECC, 1999). • It must be ensured that the soils where the wastewater will be irrigated have the following characteristics, or as many of them as possible: ▪ A structure that permits water penetration and air movement; ▪ Adequate drainage; ▪ Sufficient depth for crop root development; ▪ Sufficient capacity to hold water for plant use between irrigations; ▪ A moderate pH; ▪ Nutrients in sufficient quantities to promote plant growth; and ▪ Ease of cultivation. ▪ Suitable soils are generally deep, well drained, well-structured soils with loam to clay loam textures (ARMCANZ/ANZECC, 1999). • Land application rates must take into consideration the following: ▪ Wastewater salinity; ▪ Wastewater nutrient content; ▪ Wastewater pH; ▪ Wastewater BOD; ▪ Hydraulic loading; ▪ Salt loading; and ▪ Nutrient loading (P, N and K) (ARMCANZ/ANZECC,					

					1999). • Land application of wastewater should not occur on land which is: ▪ Waterlogged or saline; ▪ Subject to flooding; ▪ Sloping with inadequate groundcover; ▪ A highly impermeable soil type; and ▪ Rocky or highly erodible (ARMCANZ/ANZECC, 1999). • The following groundwater factors must be considered when designing the wastewater irrigation system: ▪ Groundwater quality; ▪ Depth to the groundwater; and ▪ The current and potential future uses of the groundwater (ARMCANZ/ANZECC, 1999). • The following surface water factors must be considered when designing the wastewater irrigation system: ▪ The distance to watercourses; and ▪ Hydrological features such as drainage patters and catchment areas (ARMCANZ/ANZECC, 1999).						

7.3.5.2 Environment in General

Table 37: Environmental Impact Assessment: 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

Project Phase Applicability		
	Construction	**X**
	Operation	**X**
	Decommissioning	

Impact Description	**Risk rating (before mitigation)**			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Timeframe**	**Responsibility**	**Risk rating (after mitigation)**			**Applicable legislation / other documents**
	Probability	**Magnitude**	**Severity**					**Probability**	**Magnitude**	**Severity**	
Harm to the environment in general (including pollution of soil and water resources, as well as harm to employees). All Site Alternatives	3	3	M	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 sub-contractors and their employees, attend onsite Environmental Awareness Training prior to commencing	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998

					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.						

7.3.5.3 Geology and Soil

Table 38: Environmental impact assessment: Geology and Soil

Activity:
- Construction and operation of the new piggery.
- Stockpiling of topsoil and cleared vegetation.
- Site clearance.
- Replacement of topsoil and re-vegetation.
- 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

Project Phase Applicability		
	Construction	X
	Operation	X
	Decommissioning	

Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Magnitude	Severity					Probability	Magnitude	Severity	
Exposure of soil to erosion. Erosion can lead to destruction of natural habitats and sedimentation of the proximate watercourses. All Site Alternatives	3	3	M	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.	During the construction phase.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998 • DWAF, 2005

					• 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.						
Degradation and loss of valuable resource (topsoil) due to exposure of topsoil to the elements. All Site Alternatives	3	2	M	To reduce the duration and extent of exposure of topsoil in order to preserve and protect it as a resource.	• 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. • The length and steepness of the slopes should be minimised. • If sterilisation of the topsoil has occurred during stockpiling, inorganic fertilisers can be used to supplement the soils before seeding of the areas takes place. • Replace topsoil concurrent with construction, whenever possible. • Cordon off areas under rehabilitation using danger tape or similar demarcation to prevent vehicular, pedestrian and livestock access. • Aim to replace topsoil to its original depth. • 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 and approved by the ECO. • Compacted soil should be ripped to ensure effective re-vegetation. • Work necessary additives, as indicated by the soil analysis, into the soil. • Re-vegetation by indigenous grass species. • If areas show no specific vegetation growth within three months, the areas shall receive additional topsoil, ripped to a depth of 100mm and re-planted. • Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/20m²), 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.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998

					• 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.						
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. All Site Alternatives	2	3	M	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, ripped to a depth of 100mm and re-planted. • Fertilisers can also be used to promote growth of vegetation.	During the operational phase.	• Facility Manager • ECO	2	2	L	• NEMA, 1998

7.3.5.4 Atmosphere and Noise

Table 39: Environmental Impact Assessment: Atmosphere and Noise

Activity:											
• Construction activities of the piggery • Excavation activities, loading and offloading activities and vehicles travelling to and from the site. • Increased traffic to and from the site. • Operational activities on the piggery • Waste management on site											
Aspect:											
• Release of emissions and odours from the piggery, mortalities and wastewater management system, and subsequent nuisance. • Dust generation • Generation of noise and nuisance											
Nature and significance of environmental impact											
Project Phase Applicability	**Construction**	**X**									
	Operation	**X**									
	Decommissioning										
Impact Description	**Risk rating (before mitigation)**			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Timeframe**	**Responsibility**	**Risk rating (after mitigation)**			**Applicable legislation / other documents**
	Probability	**Magnitude**	**Severity**					**Probability**	**Magnitude**	**Severity**	
Degradation of ambient air quality and nuisance due to odour generation from the piggery, ammonia emissions, its wastewater management practices and mortality management. **The generation of odours depends on the design of the piggery, the wastewater collection and disposal system as well as how the piggery is managed. The impact of any odours that are generated depends upon the topography**	4	3	H	To minimise atmospheric emissions, odour generation and the subsequent nuisance it causes.	• Ventilation points on the piggery houses must be as high as possible so that the exiting gases enter the air column as high as possible. • Covering the wastewater collection pond/lagoon can reduce odorous emissions. The released gas can also be captured as part of a bio-gas plant. • Spillages must be prevented. • Effective housekeeping and best management	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	3	3	M	• NEMA, 1998 • NWA, 1998

and climate 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 treatment systems, storage of wastewater and land application of wastewater and solids (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 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 include a deep pit flush system as described under Section 1.5 of this report. Should any pipes within the system burst, the wastewater will enter into the main channel and from there into the collection sump. The entire system is a closed system and no wastewater can be released into the environment.** **The introduction of a separator stage will have the following benefits:** • **The N utilisation (% of total N) by crops of the liquid fraction is higher compared to application of raw, unseparated pig slurry (Birkmose, 2009). More of the liquid fraction is therefore considered to enter the soil, resulting in the generation of less odours following land application.** • **The storage of the separated liquid fraction in**					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. • Disposal of the liquid fraction on agricultural land should be avoided in adverse weather conditions (windy days). • Low trajectory slurry application techniques, where the slurry is directed towards the soil, should be used. • Wind rows for drying the solid fraction should be located as far as possible from sensitive receptors. • Disposal of wastewater on agricultural land should be avoided on weekends and public holidays, as far as possible. • The following buffer zone is required to protect the public from possible vectors and odours: ▪ Application to land: >500m away from dwellings. • The production of biogas from the wastewater slurry and its use in generating heat and/or electricity can reduce the greenhouse gas emissions per kg pig raised at the piggery (www.thepigsite.com/swinenews/18012/environmental-impact-assessment-in-pig-production/). • Ensure adequate ventilation of houses. • Keep wastewater drains clean. • Avoid ponding and irrigation with wastewater slurry during wet conditions. • Avoid excessive build-up of manure within the houses and below the floor area. • Regularly flush wastewater from the houses. • Plant trees around the piggery to act as buffers (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/odour). • A biodigester is proposed for the disposal of mortalities on the farm. Alternatively a mortality/compost pit can also be used. • Mortalities must be stored in enclosed areas prior to being taken to the biodigester or mortality/compost pit. • The biodigester or mortality/compost pit must be adequately designed and regularly maintained. • It must be ensured that the capacity of the biodigester or mortality/compost pit is not exceeded. • The biodigester or mortality/compost pit must be well managed and monitored. • The biodigester or mortality/compost pit must be located away from sensitive environmental receptors, including wetlands, rivers, streams and drainage lines.					

dams/lagoons should also have a lower potential to produce persistent odours as the solid fraction has been removed. Also, as the liquid fraction should contain no solids/fibres, less crust should form in the dams/lagoons. Crust formation contributes to anaerobic conditions and further putrification of the liquid and greater odour problems. Soil infiltration following land application is also facilitated, thereby reducing ammonia losses due to volatilisation. **The application of the sludge to land is a recognised practice for piggeries across the world. Its application must, however, be controlled and managed effectively to prevent negative effects on environmental resources.** All Site Alternatives					• The design of the mortality/compost pit must ensure that water does not enter upstream of the pit. This can be achieved by locating the pit at or near the crest of a hill. • The addition of Carbon to the mortality/compost pit is necessary to ensure that the required Carbon-Nitrogen ratio is present, allowing for optimal composting. Sawdust is the preferable source of Carbon. Straw can also be used. • The composting process will be more efficient if the correct ingredients are placed in composting "bins" in the correct proportions, allowed to compost for a period of time (a minimum of three months from when the last mortality is placed in the bin) and then moved to a second bin for a secondary composting phase of at least three months. The composting bins can be constructed using large round or square bales of hay. The bales are placed end-to-end to create three-sided enclosures (bins). Two adjacent bins are required as a minimum. The bins must be constructed on top of a layer of at least 300mm of sawdust. • Each mortality must be placed in the pit and covered with at least 300mm of sawdust or straw. • Mortalities must be inspected daily and re-covered where necessary. • Any runoff from the pits should be contained and taken to the wastewater management 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 may lead to odour nuisance. • The biodigester or mortality/compost pit must be monitored for abnormal fly populations and odours. • A complaints register should be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how the concern was addressed.					
Degradation of ambient air quality due to dust and exhaust emissions generation. All Site Alternatives	3	2	M	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 dust cart should be onsite to water down dusty roads. • Speed bumps and traffic signs should be erected to reduce speeding onsite. • A complaints register should be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how the concern was addressed. • Open areas should be re-vegetated. If the soil is compacted, it should be ripped, and fertilised.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998

					• Regular maintenance of vehicles and equipment should be undertaken. Optimal engine combustion will allow for 'cleaner' exhaust emissions.						
Noise 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.** All Site Alternatives	3	3	M	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. This will ensure that the pigs are not excessively noisy. • Vehicles travelling to and from the site during night time hours must be kept to a minimum. • A complaints register should be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how the concern was addressed.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998 • OHSA, 1993

7.3.5.5 Soil, surface water, stormwater and groundwater

Table 40: Environmental Impact Assessment: Soil, surface water, stormwater and groundwater pollution

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 fuelling.
- Construction and operation of the piggery, its wastewater management system and mortality management system.
- Stormwater runoff on site.
- Management of the solid wastewater fraction.

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 management system and mortality management system.
- Contamination of clean runoff water.
- Poor containment and management of the solid wastewater fraction.

Nature and significance of environmental impact

Project Phase Applicability		
	Construction	X
	Operation	X
	Decommissioning	

Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Magnitude	Severity					Probability	Magnitude	Severity	
Soil and surface water pollution as a result of spillage, improper handling, storage, mixing or disposal of cement and concrete. All Site Alternatives	3	3	M	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 spill 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 bangs are to be stored in	During the construction phase.	• Construction contractor • Facility Manager • ECO	2	3	M	• NEMA, 1998

					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. • Should a concrete batching plant be required, the following measures should be implemented: ▪ Concrete may only be mixed in designated and demarcated areas. ▪ The batching plant must be erected on a compacted earth platform. ▪ The batching plant must be sited within a bund wall. ▪ Stormwater must be diverted around the batching plant. ▪ Any concrete spillages must be removed by the contractor and disposed of at a licensed disposal site. ▪ After use, all waste remaining at the batching plant must be removed and disposed of at a licensed disposal site.						
Soil and surface water pollution through contaminated wash water. All Site Alternatives	3	3	M	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 form the washing activities is to be contained against the building by excavations of berms around the foundations.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998
Soil, surface water and groundwater pollution due to poor waste management (including biological waste generated on site). All Site Alternatives	3	3	M	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.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998

					• Skips or bulk containers should be removed to a licensed landfill site on a weekly basis or more often if required. 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 measure 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 slurry store facility of 50 – 60cm deep with a storage capacity of at least 28 days. • All slurry receiving and conducting canals should be concrete canals with flow regulators. • The concrete slurry collection pit to which slurry is fed should have an additional 10 days collection capacity. • The liquid fraction that will be applied to agricultural land should be handled in accordance with DWS and WRC recommended guidelines.						
Soil, surface water and groundwater pollution due to unsanitary conditions onsite. All Site Alternatives	2	3	M	To prevent soil, surface water and groundwater pollution.	• Sufficient ablution facilities shall be provided – minimum of 1 toilet per 15 workers. • Ablution facilities must 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.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	1	3	L	• NEMA, 1998

					• The contractor shall ensure that no chemicals and/or waste form the ablution facilities are spilled on the ground at any time. • Ablution facilities are to 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.						
Soil, surface water and groundwater pollution due to poor management and accidental spills of hazardous chemical substances including fuel, greases and oils used onsite. **A diesel tank will be installed on site to provide diesel to the backup generator and the heaters within the houses.** All Site Alternatives	2	3	M	To present 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	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	1	3	L	• NEMA, 1998

					capacity of holding 110% of the total storage volume. • The removal of only the daily-required amount of chemicals to be used from the shed. • 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. • Ensure that any spilled chemical cannot exit the designated storage area by constructing a berm or bump at the exit, or store chemicals in a spill tray. • 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 removed from site.						
Hydrocarbon pollution of soil, surface water and groundwater due to spilling of fuel, grease or oil or leaking equipment and vehicles. All Site Alternatives	2	3	M	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.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	1	3	L	• NEMA, 1998

					• 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.						
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 include a deep pit, flush system as described under Section 1.5 of this report. Should any pipes within the system burst, the wastewater will enter into the main channel and from there into the collection sump. The entire system is a closed system and no wastewater can be released into the environment.** **The introduction of a separator stage will have the following benefits:** • **The N utilisation (% of total N) by crops of the liquid fraction is higher compared to application of raw pig slurry (Birkmose, 2009). More of the liquid fraction is therefore considered to enter the soil, resulting in the generation of less odours following land application.** • **The storage of the separated liquid fraction in dams/lagoons should also have a lower potential to produce persistent odours as the solid fraction has been removed. Also, as the liquid fraction should contain no solids/fibres, less crust should form in the dams/lagoons. Crust formation contributes to anaerobic conditions and further putrification of the liquid and greater odour problems. Soil infiltration following land**	2	3	M	To ensure responsible management of the piggery wastewater and to prevent the pollution of soil, surface water and groundwater.	• The wastewater sludge must be classified in terms of the South African Wastewater Sludge Classification System. • The Pollutant, Microbial and Stability Classes of the wastewater sludge must be established. • The wastewater management system must regularly be maintained and inspected to ensure that it is in working condition. This will prevent the development of leaks. • All land application of wastewater must be in accordance with the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). • Application of wastewater may only be during conditions that will minimise surface run-off, surface ponding and groundwater contamination (ARMCANZ/ANZECC, 1999). • The restrictions (wetland buffer zones) and soil quality monitoring requirements regarding land application of wastewater, as stipulated in the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06) must be adhered to. • Sludge may only be stored in suitable facilities that are designed to ensure minimal impact on the environment. • The sludge should be applied as soon as possible. • Action must be taken to reduce odours and vector attraction. • Storage ponds must be desludged once the sludge takes up one third of the total volume (or half of the depth) of the pond (ARMCANZ/ANZECC, 1999). • The application rate must not exceed plant nutrient requirements (agronomic rates) and should be less than 10 tons dry mass/ha/year (WRC TT 262/06). • The nutrient content of the wastewater sludge must be confirmed before each major planting season by determining the phosphorous, nitrogen and potassium concentration on at least four composite samples. • Slope and land preparation must not result in soil erosion or potential surface runoff. • The following buffer zones are required to protect	During the operational phase.	• Construction contractor • Facility Manager • ECO	1	3	L	• NEMA, 1998 • NWA, 1998

application is also facilitated, thereby reducing ammonia losses due to volatilisation. **According to the Water Resources Commission (WRC) Guidelines for the utilisation and disposal of wastewater sludge, Volume 2, Requirements for the agricultural use of wastewater sludge, wastewater sludge, such as that from the proposed piggery, has beneficial fertilising and soil conditioning properties. A variety of elements in the sludge are essential for plant growth and it has been suggested that sludge is a more complete fertiliser than organic fertilisers. The major benefits of sludge application to land are:** • **A supply of plant nutrients, namely magnesium, calcium, potassium, nitrogen and phosphorous;** • **A supply of micronutrients, namely copper, zinc, manganese and molybdenum; and** • **An improvement in the soil's physical properties, including improved soil water transmission, increased water holding capacity and improved soil structure.** **Sludge can be beneficially recycled to agricultural land provided that the processing and application of the sludge is effectively managed and controlled and that the application rate doesn't exceed the nitrogen needs of the crops (this would result in nutrient leaching). The agricultural use of sludge is viewed as a cost effective management option. The sludge increases the organic content of the soils, which is especially beneficial in South Africa where cultivated soils are low in organic matter due to its rapid decomposition in the SA climate. The use of wastewater sludge for fertiliser also results in savings on commercial, inorganic fertilisers (WRC, 2006).** **The application of the sludge to land is a recognised practice for piggeries across the world. Its application must, however, be controlled and managed effectively to prevent negative effects on environmental resources.** All Site Alternatives					groundwater and surface water from pollution: ▪ Depth to aquifer: >5m. ▪ Distance from surface water/borehole: >200m. • Relaxation of buffer zones may only be applied for on condition that proof is provided that the water resource or odour control or vector attraction are adequately protected or implemented. • Monitoring of the sludge and soil must be performed according to the WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). • Record keeping must be in place for the aspects listed above, as well as application volumes and areas, as specified in the WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). • Re-use of the liquid and solid fractions of the wastewater must take cognisance of the Precautionary Practices applicable. • Spillages must be prevented. • Low trajectory slurry application techniques, where the slurry is directed towards the soil, should be used. • Avoid ponding and irrigation with wastewater slurry during wet conditions. • 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 biodigester or mortality/compost pit. • The biodigester must be adequately designed and regularly maintained. • It must be ensured that the capacity of the biodigester is not exceeded. • The biodigester or mortality/compost pit must be well managed and monitored. • The biodigester or mortality/compost pit must be located away from sensitive environmental receptors, including wetlands, rivers, streams and drainage lines. • The design of the mortality/compost pit must ensure that water does not enter upstream of the pit. This can be achieved by locating the pit at or near the crest of a hill. • The addition of Carbon to the mortality/compost pit is necessary to ensure that the required Carbon-Nitrogen ratio is present, allowing for optimal composting. Sawdust is the preferable source of Carbon. Straw can also be used. • The composting process will be more efficient if the correct ingredients are placed in composting "bins" in the correct proportions, allowed to compost for a period of time (a minimum of three months from when the last mortality is placed in the bin) and then moved to a				

					second bin for a secondary composting phase of at least three months. The composting bins can be constructed using large round or square bales of hay. The bales are placed end-to-end to create three-sided enclosures (bins). Two adjacent bins are required as a minimum. The bins must be constructed on top of a layer of at least 300mm of sawdust. • Each mortality must be placed in the pit and covered with at least 300mm of sawdust or straw. • Mortalities must be inspected daily and re-covered where necessary. • Any runoff from the mortality/compost pit should be contained and taken to the wastewater management system (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/pig-carcass-composting).						
Soil, surface water and groundwater pollution due to the contamination of clean stormwater runoff. All Site Alternatives	2	2	L	To ensure effective management of stormwater and the prevention of contamination of stormwater runoff.	• It is the responsibility of the applicant to ensure that storm water control measures are designed and constructed to be capable of withstanding the maximum design flood. It should be taken into consideration that the potential for erosion increases where the surface runoff is concentrated and must be addressed within the designs. Designs should incorporate gradual drainage to avoid siltation of storm water infrastructure. • The composting area must be bunded and a collection pit/sump must be installed to contain any runoff from the composting area.	During the operational phase.	• Site Manager	1	2	L	• NEMA, 1998 • NWA, 1998
Soil, surface water and groundwater pollution due to the incorrect management of the solid fraction of wastewater on site. Nuisance due to management of the solid fraction. All Site Alternatives	3	3	M	To prevent soil, surface and groundwater pollution and nuisance as a result of poor management of the solid wastewater fraction.	• The solid fraction of the piggery wastewater may only be temporarily stored in designated areas, on impermeable surfaces. • The temporary storage must occur in such a manner as to prevent the harbouring of pests. • The composting process must occur on a bunded area of land that is impermeable. • No wastewater from the composting area may be discharged or allowed to run into the environment or into any drainage lines or other water systems. • A collection pit/sump must be installed to contain any runoff from the composting area. The captured water can be re-used to moisten the compost piles. • Manage every active compost pile such that the initial carbon to nitrogen ratio is at least 25:1. The ideal C:N ratio is between 25:1 and 30:1. • Any solid or liquid waste generated at the facility, including contaminated products and process residuals that cannot be processed at the facility must be stored in such a manner as to prevent water pollution and amenity impacts. • The quantities of incoming and processed organics	During the operational phase.	• Site Manager	2	2	L	• NEMA, 1998 • OHSA, 1993

					must not exceed the design requirements of the storage and processing areas. • All organic compost intended for use as fertilisers must be registered with the DAFF and meet all the necessary requirements as per the Regulations Regarding Fertilisers (GNR 732 of 10 September 2012) issued in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947), including any other amended version(s) thereof. • No incineration of any kind of waste will be permitted onsite. • Implement a surface- and groundwater monitoring programme.						

7.3.5.6 Vegetation:

The assessment found that proposed site 1 is the most suitable for development in terms of the vegetation on the site. Site 1 is situated within overgrazed and trampled grassland as well as Other Natural Areas of the Mpumalanga Biodiversity Sector Plan (MBSP).

Table 41: Environmental impact assessment: Vegetation

Activity: • Construction of the proposed piggery. • Operational activities of the piggery.											
Aspect: • Site clearance • Establishment of the construction camp • Storage of construction equipment and building material. • Movement of construction, maintenance and delivery vehicles and machinery.											
Nature and significance of environmental impact											
Project Phase Applicability	**Construction**	**X**									
	Operation	**X**									
	Decommissioning										
Impact Description	**Risk rating (before mitigation)**			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Timeframe**	**Responsibility**	**Risk rating (after mitigation)**			**Applicable legislation / other documents**
	Probability	**Magnitude**	**Severity**					**Probability**	**Magnitude**	**Severity**	
Destruction of natural vegetation due to construction, access to the site and operational activities.				To minimise the destruction of natural vegetation.	• Development should, as far as possible, occur on already transformed areas. • Development should occur as far as possible from moist grassland. • Before construction takes place the proposed development area will be pegged out and demarcated.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	4	3	**H**					4	2	M	
Site Alternative 2	4	3	**H**					4	2	M	

Site Alternative 4 (preferred alternative site)	4	4	H		Construction activities will be limited to these areas. • The construction camp should be restricted to already disturbed areas, such as where the existing worker's housing will be demolished next to the access road into the farm. • All construction equipment and building material must be stored within the already disturbed area of the construction camp when not in use. • Vegetation should only be removed where absolutely necessary. • The development footprint should be kept to a minimum. • Existing access roads should be used as far as possible. New road should be planned within vegetation of low-medium sensitivity. • Access roads should not be wider than 3m in sensitive areas. Roads should include stormwater management to prevent water runoff from the roads impacting on the surrounding vegetation. • The construction site should be demarcated to prevent access to sensitive areas. The demarcation should be maintained for the duration of the construction phase. • An area/corridor of disturbance should be marked out by the ECO and construction contractor. No disturbance is permitted outside of this disturbance area/corridor. • Vehicle and pedestrian access to natural areas beyond the development footprint should be prohibited. • Trenching required for the installation of engineering services, such as water, sewerage and underground electricity lines, should be done by hand as far as possible to limit the impact of excavation equipment on site. • Excavated material may not be placed in the veld, outside of the disturbance area/corridor. The material must be placed within the development footprint, on road surfaces or within the future road surface area. • Trenches must only be as deep as necessary. • Trenches must be backfilled as soon as possible. • Open trenches must be demarcated with danger tape. • No open fires or harvesting of trees for firewood are permitted. • Enough fire extinguishers and hydrants must be placed on site. The hydrants must also have a high enough water pressure for use as fire extinguishers. • Site workers and contractors may not remove vegetation or collect seed form plants without permission from the local authority. • Overburden material must be stored in designated areas, within the disturbance zone, and re-used later for filling and/or sloping and landscaping.			4	3	H	

					• Clay removed from foundations may not be discarded into the adjacent vegetation. • No edge effects from construction may be allowed into the adjacent *Themeda*-grassland and proximate moist grassland. • After construction, the land must be cleared of waste, surplus materials and equipment. Conditions should be left as close as possible to the conditions prior to construction. • Soil stockpiles must be cleared of alien vegetation before being re-used/reintroduced. • Maintenance should take place according to a fixed plan. • Rehabilitating areas should be demarcated as no-go areas. • Maintenance work should be restricted to previously disturbed areas. • Natural fires should be allowed to burn across the vegetation, except if infrastructure and lives are threatened. • Firebreaks must be managed as stipulated in the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998). • Re-introduction of livestock to all rehabilitation areas should be delayed until an acceptable level of re-vegetation has been reached. **Specific mitigation measures applicable to Site Alternative 4** • The construction on site alternative 4 must be discussed with the Mpumalanga Tourism and Parks Agency (MTPA). An offset can be considered to allow construction on site alternative 4. The offset will entail setting aside part of the property to be managed for conservation through the Mpumalanga Biodiversity Stewardship Programme. Through this programme, landowners become the stewards of biodiversity conservation, through formal declaration of the land as protected areas and by applying specific management measures that ensure that the land is well managed and that biodiversity persists. • The disturbance footprint must be kept as small as possible. As much use must be made of the trampled and grazed grassland to the east of site alternative 4. • The footprint of the development and related infrastructure must be walked by a vegetation specialist after good summer rains to ascertain whether any threatened plants may be present.					

Exposure of the soil to erosion and subsequent sedimentation of wetlands. **Indigenous vegetation is not likely to colonise eroded soils successfully. This may cause spread of alien invasive species.** All Site Alternatives	3	3	M	To prevent soil erosion, subsequent sedimentation of wetlands and the spread of alien invasive species.	• Areas susceptible to erosion, such as stockpiles, should be protected. • Erosion should not be allowed to develop to a large scale before taking action. • The extent of wetland and riparian conditions should be verified by a wetland specialist. No activities should take place within the wetland zones onsite without a Water Use License. • Existing roads should be used. • Runoff form roads should be managed to avoid erosion. • Vegetation and soil should be retained in position for as long as possible (DWAF, 2005). • Remove only vegetation where essential for construction, taking precaution not to disturb adjoining natural vegetation. • Areas that were used for the stockpiling of soil must be ripped and re-vegetated as soon as the stockpiles have been removed. • Colonisation of disturbed areas by species from surrounding natural vegetation should be monitored to ensure that vegetation cover is sufficient within one growing season. If not, areas should be rehabilitated with species naturally occurring in the area.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998 • DWAF, 2005
Modification of habitats and destruction of vegetation due to soil compaction by the movement of heavy machinery. Soil compaction will also inhibit re-vegetation and increase runoff. This could result in erosion of proximate watercourses and moist grassland.				To minimise soil compaction and the subsequent modification and destruction of vegetation.	• Vehicles should only make use of dedicated roads. • Once construction is complete, obsolete roads should be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion. Natural species composition should also be re-established. • Independent Environmental Auditing should be conducted during the construction phase.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	3	3	M					2	2	L	
Site Alternative 2	3	3	M					2	2	L	
Site Alternative 4 (preferred alternative site)	3	2	M					2	1	L	
Possible destruction of plants of conservation concern				Protection of plants of conservation concern.	• Construction activities should be restricted to already disturbed or transformed areas as far as possible. • Project engineers should compile a method statement, outlining the construction methodologies. Mitigation measures should be included in this method statement that must be approved by the ECO and be available on site. • Final development footprints must be investigated during the growing/flowering period of plant species of conservation concern to assess the presence of any such species. • If any plants of conservation concern are present within the development footprint, a Plant Rescue and Rehabilitation Plan should be implemented. Any such species that are under threat form construction activities	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	2	4	M					1	3	L	
Site Alternative 2	2	4	M					1	3	L	
Site Alternative 4 (preferred alternative site)	4	4	H					4	2	M	

					should be removed by a suitably qualified specialist and relocated as part of vegetation rehabilitation. Any plants of conservation concern may only be removed with the permission of the provincial authority.						
Spread of alien invasive species from current infestation to disturbed soils or by means of contaminated vehicles and tools All Site Alternatives	3	3	M	To prevent the spreading and increase of alien invasive vegetation.	• Ensure that all alien invasive species are identified on site. • Alien invasive species identified on the site should be removed prior to construction. • All alien seedlings and saplings should be removed as they are identified during the construction and operation of the piggery. • Manual/mechanical removal should be used rather than chemical control. • All vehicles, equipment and material should be thoroughly cleaned prior to access on to the site in order to assure that all vehicles, equipment and material are free of soil and plant material.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998
Negative impacts on moist grassland and watercourse as well as loss of stabilising vegetation. **Destruction of vegetation will impact on the hydrological function of the moist grassland and can cause edge effects in the moist grassland and vegetation.** **Polluted water and sediment reaching the moist grassland or watercourse will have detrimental effects on the vegetation and hydrology of the wetland system.**				To minimise negative impacts on moist grassland and watercourses.	• A wetland assessment should be undertaken to delineate the wetlands and watercourses in the area and recommend an appropriate, protective buffer zone. • 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. • Permeable paving should be used for the development in order to maintain catchment areas to the moist grassland. • Existing roads and tracks must be used. • Runoff from roads should be managed to avoid erosion and pollutions problems. • Vegetation should only be removed if it is essential for construction. No disturbance should be allowed to the adjoining vegetation. • Areas susceptible to erosion should be protected. Erosion control barriers should be placed and maintained to prevent sedimentation of watercourses and moist grasslands. • Polluted water should be prevented from reaching the watercourse and surrounding moist grassland. • An ecologically sound stormwater management plan must be implemented during construction. Stormwater management of the completed development must be adequate to prevent negative impacts on the moist grasslands and watercourses. • Stormwater should not be allowed to be canalised. • Contamination of rainwater should be prevented on the site. • Vehicles and equipment should only be washed in	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	4	4	**H**					3	3	M	
Site Alternative 2	4	4	**H**					3	3	M	
Site Alternative 4 (preferred alternative site)	3	4	**H**					2	3	M	

					dedicated areas. Dirty water should not be discharged into the watercourse or surrounding vegetation.						
Loss of ecological function of moist grassland and deterioration of watercourses. **Loss of natural vegetation in and around the wetland (due to polluted water and sedimentation) could drastically reduce the wetland's water holding capacity and could subsequently lead to loss of ecological function of the vegetation as catchment to the watercourse.**				To prevent loss of ecological function of moist grassland and watercourses.	• A method to contain, divert and treat accidental release of effluent should be implemented. • Routes through drainage lines, moist grassland and watercourses should be avoided. Stormwater management should be implemented for the construction of the access roads. • Leaks should be repaired and issues of water wastage should be addressed as soon as identified. • Erosion control barriers should be placed and maintained to prevent sedimentation. • Vegetation disturbed during construction should be rehabilitated. Rehabilitation should be monitored for at least three years after construction has been completed. If rehabilitation failed, corrective action should be taken immediately. • Maintenance should be done according to a fixed plan. After maintenance, the area must be cleared of waste, surplus material and equipment. The area should be left in a condition as natural as possible.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	3	4	**H**					2	3	M	
Site Alternative 2	3	4	**H**					2	3	M	
Site Alternative 4 (preferred alternative site)	2	4	**H**					2	3	M	

7.3.5.7 Fauna

Due to the size of the development, the construction and operation of the new piggery is expected to have minimal influence on the faunal species in the area. Displacement of animals will most likely only be applicable to individual animals rather than populations and therefore irreplaceable loss of species will not occur. Site 1 would be the preferred site for development as it will have the smallest effect on vertebrate habitat. Site 1 is located in 'Other Natural Area' in terms of the Mpumalanga Biodiversity Sector Plan (MBSP) while the other alternative sites are located in 'Irreplaceable Area'.

Table 42: Environmental impact assessment: Fauna

Activity: • Construction and operation of the new piggery.											
Aspect: • Movement of construction, maintenance and delivery vehicles. • Increased human activity on the site.											
Nature and significance of environmental impact											
Project Phase Applicability	**Construction**	**X**									
	Operation	**X**									
	Decommissioning										
Impact Description	**Risk rating (before mitigation)**			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Timeframe**	**Responsibility**	**Risk rating (after mitigation)**			**Applicable legislation / other documents**
	Probability	**Magnitude**	**Severity**					**Probability**	**Magnitude**	**Severity**	

Destruction of natural habitat due to construction activities and consequential displacement of vertebrates.				To minimise the effect of construction activities on the natural habitat.	• Construction activities should be restricted to the development footprint. • The site should be cordoned off in order to restrict the movement of construction vehicles and personnel. • Safety and warning signs should be erected along the construction site. • No development should occur within any sensitive natural open spaces.	During the construction phase.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	4	3	H					4	2	M	
Site Alternative 2	4	3	H					4	2	M	
Site Alternative 4 (preferred alternative site)	4	3	H					4	2	M	
Destruction of sensitive vertebrate habitat which can lead to the relocation of certain species.				To prevent the destruction of sensitive habitat.	• No construction should be allowed within sensitive vegetation (wetlands). • Sensitive vegetation should be cordoned off to prevent access. • A monitoring programme should be implemented to assess the presence of faunal species within sensitive vegetation.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	4	3	H					4	2	M	
Site Alternative 2	4	3	H					4	2	M	
Site Alternative 4 (preferred alternative site)	4	4	H					4	3	H	
Loss of ecosystem function such as reduction in water quality, soil pollution and underground water contamination and the consequent negative impacts on vertebrate species richness and population numbers.				To prevent the loss of ecosystem function on the site.	• Restrict construction activities to the development site. • The site should be cordoned off in order to restrict the movement of construction vehicles and site workers and contractors. • No development should occur within any sensitive natural open spaces.	During the construction phase.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	4	3	H					4	2	M	
Site Alternative 2	4	3	H					4	2	M	
Site Alternative 4 (preferred alternative site)	4	3	H					4	2	M	
Loss of ecological function of the wetland due to alteration of the landscape by the development. This may place faunal species under pressure.				To prevent loss of ecological function of the wetland.	• No development should take place near any wetland zones or drainage lines. • Any spillages should be contained.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	4	3	H					3	2	M	
Site Alternative 2	4	3	H					3	2	M	
Site Alternative 4 (preferred alternative site)	4	3	H					3	2	M	
Exposure of soil to erosion may lead to damage to the basal cover which may influence species richness and population numbers.				To minimise erosion and the subsequent impacts on faunal species in the area.	• A construction strategy should be implemented to ensure rehabilitation of the construction area immediately after construction has been completed. • Bare soil should be protected from erosion. • Stormwater Management Measures should be implemented.	During the construction phase.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998
Site Alternative 1	4	3	H					3	2	M	
Site Alternative 2	4	3	H					3	2	M	
Site Alternative 4 (preferred alternative site)	4	3	H					3	2	M	
Poaching of wildlife in the area of the development. Increased human activity in the area may lead to more animals being killed.	3	3	M	To prevent harm to animals.	• Education of site workers and contractors about the value of wildlife and environmental sensitivity. • Access to suitable and sensitive habitats of faunal	During the construction and operational phases.	• Construction contractor • Facility Manager	2	2	L	• NEMA, 1998

All Site Alternatives					species should be restricted. • Site workers and contractors should ensure that no animals are disturbed, trapped, hunted or killed during the construction phase. Conservation–orientated clauses should be included into contracts for construction personnel, complete with penalty clauses for non-compliance.		• ECO				
Disturbance of faunal species due to light pollution. All Site Alternatives	4	3	H	To minimise the effect of light pollution on fauna.	• Outside lighting should be designed to minimise impacts on fauna. • All outside lighting should be directed away from sensitive areas. • Fluorescent and mercury vapour lighting should be avoided. Sodium vapour lights should rather be used as far as possible.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	3	M	• NEMA, 1998
Displacement of indigenous fauna species All Site Alternatives	3	2	M	To minimise the displacement of indigenous fauna species.	• The site is so small and treeless that no mitigation measures are required.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	1	L	• NEMA, 1998
Increased amounts of surface water runoff from hard surfaces can increase the chance of flash floods. This may cause fatalities of terrestrial vertebrates as refuges such as burrows are inundated. All Site Alternatives	3	3	M	To minimise the extent of hard surfaces and subsequently the probability of flash floods.	• Create open, natural space within the development and reduce the amount of hard paved surfaces. • Implement an ecologically sound storm water management plan such as retention ponds and artificial water sponges (wetlands).	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998
Human activities could disturb fauna species that depend on the natural, sensitive vegetation present on site. All Site Alternatives	3	2	M	To minimise the disturbance of fauna species on site.	• A management plan should be implemented to prevent the workers from disturbing or harassing any animals. • Implement a monitoring programme to regularly assess the presence of faunal species within the sensitive vegetation on site.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	1	L	• NEMA, 1998
Construction activities may impact upon the drainage and status of wetland areas and connectivity along the watercourses. This will in turn have a negative impact upon the vertebrate species richness. All Site Alternatives	1	3	L	To prevent negative impacts upon the vertebrate species richness on site.	• No development may occur within or close to any wetland zones or drainage lines. • Any spillages during the construction phase must be contained so that it cannot impact on the wetlands on site.	During the construction phase.	• Construction contractor • Facility Manager • ECO	1	1	L	• NEMA, 1998

7.3.5.8 Heritage

The archaeological or culturally significant features that were found on the property are of medium to high and high significance.

Table 43: Environmental Impact Assessment: Heritage

Activity: • Construction and operational activities of the new piggery.			
Aspect: • Disturbance of artefacts or sites of cultural heritage (archaeological and historical) significance.			
Nature and significance of environmental impact			
Project Phase Applicability	**Construction**	**X**	
	Operation	**X**	

Decommissioning												
Impact Description	**Risk rating (before mitigation)**			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Timeframe**	**Responsibility**	**Risk rating (after mitigation)**			**Applicable legislation / other documents**
	Probability	**Magnitude**	**Severity**					**Probability**	**Magnitude**	**Severity**	
Construction activities may disturb or destroy sites, features or artefacts of archaeological and/or historical importance. The graves (not within the development footprint of any of the Site alternative) carry a high significance rating and are worthy of conservation. Archaeological Zone 1 will not be impacted by the proposed development. Archaeological Zone 2 will be impacted, by all of the Site alternatives (1, 2 and 4). Archaeological mitigation measures need to be implemented as construction on either of these sites will have an impact on a section of the Iron Age settlement features. From a heritage point of view, the development should be allowed to continue, taking the necessary mitigation measures into account.				To protect artefacts or sites of cultural heritage (archaeological and historical) significance.	• The grave site should be included in the heritage register and not be disturbed. • The grave site should be fenced in to protect it. Access to the site for potential visitors (descendants/living relatives) should be provided. • Workers should be informed of the importance of cultural and/or archaeological features. • A Cultural Heritage Resources Management Plan should be compiled and implemented. • Mitigation measures need to be implemented to allow construction of the piggery on either of Site alternatives 1, 2 or 4. This should include detailed mapping of all sites and features, as well as archaeological excavations in Archaeological Zone 2. • A Destruction Permit must be obtained before the piggery can be constructed. • Archaeological Zone 1 must be protected. • 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 suitable mitigation measures must be implemented. All activities in the area should be halted until the situation has been resolved.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998 • NHRA, 1999
Site Alternative 1	5	4	H					5	3	H	
Site Alternative 2	5	4	H					5	3	H	
Site Alternative 4 (preferred alternative site)	5	4	H					5	3	H	

7.3.5.9 Sensitive landscapes – Wetlands

Table 44: Environmental Impact Assessment: Sensitive landscapes – Wetlands

Activity: • Construction activities for the establishment of new piggery. • Operational activities of the piggery. • Wastewater management at the piggery.
Aspect: • Site clearance influencing wetland zones. • Increased human activity in the vicinity of the wetland zones. • Alteration of the landscape in the vicinity of the wetland zones. • Inefficient management of piggery wastewater.
Nature and significance of environmental impact

Project Phase Applicability		
	Construction	X
	Operation	X
	Decommissioning	

Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Magnitude	Severity					Probability	Magnitude	Severity	
Disturbance or degradation of the wetland due to site clearance, consequential sedimentation of the wetland, increased human activity, alternation of the landscape and the loss of natural vegetation.				To minimise the impact of the construction and operation of the proposed piggery on the wetlands on site.	• Construction should take place as far from the wetland as possible. • Before any construction takes place, the proposed area for construction will be pegged out. All construction activities will be limited within these areas in order to avoid impact on the wetland zones. • Site clearance is to be limited to only the area necessary for construction of the piggery. • The contractor is to draw up a plan for submission to the ECO and the facility manager indicating the locations of construction infrastructure including the site-camp, paint or cement cleaning pits, toilets, stores, stockpiles (topsoil and building rubble), site office and wetland zones. • No entry, stockpiling, dumping or storage of equipment is allowed within any of the wetland zones. • All construction activities are to be restricted within the site boundary and may not extend into any wetland zones. • Operational activities must occur outside of the wetland zones. No entry, stockpiling, dumping or storage of equipment or other material is allowed within any of the wetland zones. • A habitat assessment study must be conducted annually for a period of three years. • Existing roads and tracks should be used. • Maintenance should be done according to a fixed plan. After maintenance, the area must be cleared of waste, surplus material and equipment. The area should be left in a condition as natural as possible.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO				• NEMA, 1998 • NWA, 1998
Site Alternative 1	3	4	H					2	3	M	
Site Alternative 2	3	4	H					2	3	M	
Site Alternative 4 (preferred alternative site)	3	3	M					2	2	L	
Eutrophication of wetlands due to the potential release of piggery wastewater into the environment and the subsequent accumulation of nutrient rich material within the wetland zones. All Site Alternatives	3	3	M	To prevent the accumulation of nutrients within the wetland zones.	• The piggery wastewater management system must contain all wastewater (solid and liquid fractions) and must ensure that no wastewater is released or overflows into the environment, where it can end up in watercourses or wetland zones. • The wastewater management system must regularly be maintained and inspected to ensure that it is in working	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	1	3	L	• NEMA, 1998 • NWA, 1998

					condition. This will prevent the development of leaks. • All land application of wastewater must be in accordance with the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). • The restrictions (wetland buffer zones) and soil quality monitoring requirements regarding land application of wastewater, as stipulated in the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06) must be adhered to.						

7.3.5.10 Biosecurity

Table 45: Environmental Impact Assessment: 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											
Project Phase Applicability	**Construction**										
	Operational	**X**									
	Decommissioning										
Impact Description	**Risk rating (before mitigation)**			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Timeframe**	**Responsibility**	**Risk rating (after mitigation)**			**Applicable legislation / other documents**
	Probability	**Magnitude**	**Severity**					**Probability**	**Magnitude**	**Severity**	
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.** All Site Alternatives	3	3	M	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.	During the operational phase.	• Facility Manager	2	2	L	• NEMA, 1998
Potential injury to employees working with biological waste. Biological or bio-hazard waste includes syringes for	3	2	M	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	During the operational phase.	• Facility Manager	1	2	L	• NEMA, 1998 • OHSA, 1993

vaccines. All Site Alternatives					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.						
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. All Site Alternatives	3	2	M	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.	During the operational phase.	• Facility Manager	1	2	L	• NEMA, 1998
Death of pigs at the piggery, including mass mortalities and the potential spread of the disease to other farms. All Site Alternatives	3	4	H	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). • Sealable containers must be used for mortalities. • Inform the relevant state department of the outbreak. • 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. • 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.	During the operational phase.	• Facility Manager	2	2	L	• NEMA, 1998

7.3.5.11 Resource Usage

Table 46: Environmental Impact Assessment: Resource Usage

Activity: • Usage of resources, such as electricity and water (groundwater).			
Aspect: • **Ine**fficient and redundant use of valuable resources (electricity and groundwater).			
Nature and significance of environmental impact			
Project Phase Applicability	**Construction**	**X**	
	Operation	**X**	
	Decommissioning		

Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Magnitude	Severity					Probability	Magnitude	Severity	
Wastage or depletion of valuable resources (electricity and groundwater) due to inefficient or redundant usage. All Site Alternatives	3	3	M	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.	During the construction and operational phases.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998

					Electricity • Houses should face north for optimal temperature control within the houses. • 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 management system should be by gravity flow, rather than pumps, as far as possible.						

7.3.5.12 Infrastructure

Table 47: Environmental Impact Assessment: 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 N4 and R54.											
Nature and significance of environmental impact											
Project Phase Applicability	**Construction**	**X**									
	Operational	**X**									
	Decommissioning										
Impact Description	**Risk rating (before mitigation)**			**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Timeframe**	**Responsibility**	**Risk rating (after mitigation)**			**Applicable legislation / other documents**
	Probability	**Magnitude**	**Severity**					**Probability**	**Magnitude**	**Severity**	
Wear of access roads, accidents on access roads, unpermitted transport of pigs and loss of pigs being transported on access roads. All Site Alternatives	3	2	M	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.	During the construction and operational phase.	• Construction contractor • Facility Manager • ECO	2	2	L	• NEMA, 1998
Visual impact upon receptors surrounding the piggery, including adjacent land owners and passing motorists on the N4 and R54. **The preferred site (Alternative 4) is the closest to the R54 (approximately 950m from the R54), but is also the furthest from the N4. Site Alternative 3 is the closest to the N4 at**	4	3	H	To minimise the visual impact of the piggery on receptors in the vicinity of the site.	• 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	During the construction and operational phase.	• Construction contractor • Facility Manager • ECO	3	2	M	• NEMA, 1998

approximately 3km. The residential dwellings of all adjacent properties are further than 1km from the four alternative sites. All Site Alternatives					nearby N4 and R54. • No high floodlights may be erected at the piggery.						

Refer to Part 8 below for a summary on the key findings related to the new piggery and associated infrastructure.

7.3.6 Cumulative Impacts

Cumulative impacts refer to the situation where an activity may in itself not have a significant impact, but may become significant when added to the existing and potential impacts from similar or different activities in the area.

The following potential cumulative impacts have been identified:

Table 48: Cumulative impacts

Activity	Aspect	Cumulative Aspect
Operational activities at the piggery	Generation of noise and dust due to general operational activities at the piggery as well as an increase in vehicles travelling to and from the facility	Noise and dust generated at the piggery will combine with existing sources of noise and dust in the area, such as vehicles travelling on the nearby R54 and N3 and the agricultural activities on the property and in its vicinity.
	Abstraction of groundwater for domestic use, drinking water, cooling water, to pre-charge the cement wastewater canals (fill them with water) and to clean the houses.	The abstraction of groundwater will add to existing groundwater abstraction on the property for domestic use, livestock watering and irrigation of crops.

8. ENVIRONMENTAL IMPACT STATEMENT

8.1 Summary of key findings

This application for Environmental Authorisation in terms of the National Environmental Management Act, 1998, as amended, has been initiated to allow development of the Topigs SA Merino piggery.

The above mentioned authorisation will ensure legally compliant operation of the piggery in terms of the relevant environmental legislation in South Africa.

The following main negative impacts may arise from the proposed activity:

- Disturbance, degradation or pollution of the wetland and riparian habitats present on the project property;
- Loss of grassland that is classified as “Irreplaceable” in terms of the Mpumalanga Biodiversity Sector Plan;
- Disturbance or destruction of sites, features or artefacts of archaeological and/or historical importance;
- Loss of fauna species and/or their habitats;
- Generation of odourous emissions and nuisance conditions;
- Soil, surface water and groundwater pollution;
- Soil erosion;
- Visual impact on receptors such as neighbours and motorists using the N4 or R54;
- Infestation of alien invasive plant species;
- Loss of a valuable resource (topsoil);
- Generation of noise and nuisance conditions;
- Breach in biosecurity at the piggery; and
- Inefficient or redundant use of resources (water and electricity).

8.2 Comparative assessment of positive and negative implications of the proposed activity and alternatives

Part 6 of this BAR contains a detailed investigation and assessment of the alternative options for the establishment of the new piggery. The positive and negative implications of each alternative are also described in the table below. A comparison is done below to assess the positive and negative implications of the proposed activities compared with the no-go alternative. This should provide a fundamental consideration of the feasibility of the project.

Table 49: Comparison of the proposed preferred activities and the no-go option

	Piggery Development – Site Alternatives 1 and 2	Piggery Development – Site Alternative 4	No-go option
Positive impacts	• Creation of permanent and temporary jobs during the construction and operational phases of the proposed development. • Stimulation of the local and regional economy. • The remainder of the property (apart from the piggery) will be undisturbed, except during irrigation practices. No more grazing of grassland by livestock on the property. This will allow the grassland (lying within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP) to rehabilitate over time. The keeping of game may, however, occur on the property. • Related industries, such as those that will form part of the supply chain for the piggery, will be stimulated from an economic point of view. • Positive contribution towards food safety and security in South Africa. • Development of infrastructure in the area. • The piggery is in line with the local socio-economic initiatives, including the Dipaleseng Local Municipality's LED Strategy and Plan, where the stimulation of the agricultural sector is one of the six main priority areas	• Creation of permanent and temporary jobs during the construction and operational phases of the proposed development. • Stimulation of the local and regional economy. • The remainder of the property (apart from the piggery) will be undisturbed, except during irrigation practices. No more grazing of grassland by livestock on the property. This will allow the grassland (lying within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP) to rehabilitate over time. The keeping of game may, however, occur on the property. Related industries, such as those that will form part of the supply chain for the piggery, will be stimulated from an economic point of view. • Positive contribution towards food safety and security in South Africa. • Development of infrastructure in the area. • The piggery is in line with the local socio-economic initiatives, including the Dipaleseng Local Municipality's LED Strategy and Plan, where the stimulation of the agricultural sector is one of the six main priority areas identified within the LED	• No disturbance of grassland, whether natural or degraded. • No destruction of Late Iron Age stone walled enclosures and rock engravings within Archaeological Zone 2.

	Piggery Development – Site Alternatives 1 and 2	Piggery Development – Site Alternative 4	No-go option
	identified within the LED Strategy and Plan. • The piggery is in line with the Integrated Development Plan of the Dipaleseng Local Municipality, where the need for land availability for agricultural use is identified.	Strategy and Plan. • The piggery is in line with the Integrated Development Plan of the Dipaleseng Local Municipality, where the need for land availability for agricultural use is identified.	
Negative impacts	• Disturbance/destruction of a small portion (<5ha) of degraded (trampled and overgrazed) grassland within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP. • Destruction of Late Iron Age stone walled enclosures and rock engravings within Archaeological Zone 2.	• Disturbance/destruction of a small portion (<5ha) of natural grassland, dominated by *Themeda triandra* (red grass) within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP. • Destruction of Late Iron Age stone walled enclosures and rock engravings within Archaeological Zone 2.	• Continued overgrazing of areas of grassland by livestock within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP. • No creation of new job opportunities. • No stimulation of the local and regional economy. • No new contribution towards food safety and security in South Africa. • No new development of infrastructure in the area. • No contribution towards fulfilling the objectives of the Dipaleseng Local Municipality's LED Strategy and Plan. • No contribution towards fulfilling the objectives of the Dipaleseng Local Municipality IDP.

As can be seen in the table above, the No-go option has a number of positive impacts on the environment, but has a greater number of negative impacts, especially pertaining to the socio-economic sector. The Development Option (for all the site alternatives) has many positive economic impacts, but a number of negative impacts. The positive impacts are the same for Site alternatives 1, 2 and 4, but the negative impacts are more severe as natural grassland, dominated by *Themeda triandra* (red grass) within an "Irreplaceable" Critical Biodiversity Area in terms of the MBSP, is present at Site alternative 4.

9 CONCLUSION

Information has been provided to Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs and interested and affected parties during the Basic Assessment process. Comments and concerns were received and integrated into the Basic Assessment Report. This document serves as the draft report to be considered by the registered I&APs and state departments. Should there be any comments received on this report within the notice period provided, these comments will be address in the final report that will be submitted to the competent authority, the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs, for final perusal.

This Basic Assessment process has been carried out in accordance with the NEMA, 1998, as amended, and the Regulations there under.

The positive and negative impacts of all the alternatives have been identified and assessed in Chapter 6. The identified impacts/environmental risks to the environment as a result of the proposed piggery are mostly **Medium-High**. The impacts can, however, be mitigated to mostly **Low**, provided that the draft Environmental Management Programme, containing all proposed mitigation measures, is implemented. It is further important that the EMP must be viewed as a dynamic, working document that will be improved upon as and when required.

Positive impacts from the proposed project include the creation of new employment opportunities as well as the stimulation of local, district and provincial economies.

Based on the outcomes of the Environmental Impact Assessment, conducted as part of this Basic Assessment process, as well as the alternatives assessment, the following recommendations are made:

1. The proposed project (the construction and operation of the Topigs Merino piggery) should be authorised and allowed to proceed on the preferred site (26°56'59.18"S; 28°31'16.85"E).
2. Alternatively, the development should be authorised and allowed to proceed on Site Alternative 1 (26°56'48.00"S; 28°31'14.90"E).
3. The mitigation measures proposed in this report and the draft Environmental Management Programme must be implemented during all phases of the proposed project.
4. It is assumed that the mitigation measures proposed in this report and the draft Environmental Management Programme will be correctly implemented by the applicant and that they will be effective.
5. A communications pathway must be established that would allow the designated ECO to accept and deal with stakeholder complaints.

6. Proposed mitigation measures should be incorporated as far as possible into the operational plan for the piggery.
7. Strict monitoring and enforcement of requirements of the EMP must be undertaken to ensure that contractors and operators adhere to these requirements.