DRAFT BASIC ASSESSMENT REPORT

PROPOSED LISAKHANYA ISRAEL FARMING PIGGERY FARM EIA

Department of Rural Development and Land Reform

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IMPORTANT NOTICE

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has considered any minimum requirements applicable, or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorization for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorization being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

Objective of the basic assessment process

The objective of the basic assessment process is to, through a consultative process–

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context.

(b) identify the alternatives considered, including the activity, location, and technology alternatives.

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:

(i) The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

(ii) The degree to which these impacts—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

(e) Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

(i) Identify and motivate a preferred site, activity and technology alternative;

(ii) Identify suitable measures to manage, avoid or mitigate identified impacts; and

(iii) Identify residual risks that need to be managed and monitored.

TABLE OF CONTENTS

Contents

1 INTRODUCTION 1
1.1 PROJECT BACKGROUND 1
1.2 TERMS OF REFERENCE 4
1.3 PROJECT PROPONENT 4
2 LEGAL FRAMEWORK 4
2.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT 4
2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT: WASTE ACT 5
2.3 NATIONAL WATER ACT 6
2.4 NATIONAL HERITAGE RESOURCES ACT 7
3 PROJECT DESCRIPTION 7
3.1 PROJECT LOCATION 7
3.2 PROPOSED ACTIVITY DESCRIPTION 8
3.3 PIGGERY FACILITY 9
3.3.1 CONSTRUCTION PHASE 10
3.3.2 OPERATIONAL PHASE 10
3.3.3 DECOMMISSIONING PHASE 11
4 SERVICES 11
4.1 WATER SUPPLY 11
4.2 TRANSPORTATION 11
4.3 BIOSECURITY 12
4.4 ELECTRICITY SUPPLY 12
4.5 WASTE MANAGEMENT 12
4.5.1 WASTEWATER 12
4.5.2 SOLID WASTE 12
4.5.3 EFFLUENT WASTE 13
4.5.4 MORTALITY MANAGEMENT 14
5 PROJECT ALTERNATIVES 15
5.1 ACTIVITY ALTERNATIVES 15
5.2 SITE ALTERNATIVES 15
5.3 DESIGN ALTERNATIVE 15
5.4 TECHNOLOGY ALTERNATIVE 16
5.5 NO-GO ALTERNATIVE 16
6 NEEDS AND DESIRABILITY 16
7 BASELINE ENVIRONMENT 17
7.1 Geology 17
7.2 Surface Water 18
7.3 Biodiversity 19

7.4 Land use of the site 20
7.5 Land use character of the surrounding area 21
8 Socio-Economic Aspects 21
9 Historical and Cultural Aspects 22
10 ENVIRONMENTAL IMPACT ASSESSMENT 23
10.1 IMPACT ASSESSMENT METHODOLOGY 23
11 ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS 29
11.1 LOCAL ECONOMY AND EMPLOYMENT OPPORTUNITIES 29
11.1.1 CONSTRUCTION PHASE 29
11.1.2 OPERATIONAL PHASE 29
11.1.3 DECOMMISSIONING PHASE 30
11.2 VISUAL AND AESTHETICS 30
11.2.1 CONSTRUCTION PHASE 30
11.2.2 OPERATIONAL PHASE 30
11.2.3 DECOMMISSIONING PHASE 30
11.3 TRAFFIC IMPACTS 30
11.3.1 CONSTRUCTION PHASE 30
11.3.2 OPERATIONAL PHASE 31
11.3.3 DECOMMISSIONING PHASE 31
11.4 PHYSICAL ENVIRONMENT AMBIENT AIR QUALITY CONSTRUCTION PHASE 31
11.4.1 OPERATIONAL PHASE 32
11.4.2 DECOMMISSIONING PHASE 32
11.5 NOISE 32
11.5.1 CONSTRUCTION PHASE 32
11.5.2 OPERATIONAL PHASE 34
11.5.3 DECOMMISSIONING PHASE 34
11.6 HARZADOUS SUBSTANCES AND WASTE MANAGEMENT 34
11.6.1 CONSTRUCTION PHASE 34
11.6.2 OPERATIONAL PHASE 35
11.6.3 DECOMMISSIONING PHASE 35
11.7 GROUND AND SURFACE WATER QUALITY 36
11.7.1 CONSTRUCTION PHASE 36
11.7.2 OPERATIONAL PHASE 36
11.7.3 DECOMMISSIONING PHASE 37
11.8 GEOLOGY AND SOILS 37
11.8.1 CONSTRUCTION PHASE 37
11.8.2 OPERATIONAL PHASE 37
11.8.3 DECOMMISSIONING PHASE 38
11.9 FAUNA AND FLORA 38

11.9.1 CONSTRUCTION PHASE 38
11.9.2 OPERATIONAL PHASE 39
11.9.3 DECOMMISSIONING PHASE 39
11.10 BIOSECURITY 39
11.10.1 OPERATIONAL PHASE 39
11.10.2 DECOMMISSIONING PHASE 39
11.11 NO- GO ALTERNATIVE 39
12 IMPACT ASSESSMENT MATRIX 40
Table 23: No-go Alternative 48
13 ENVIRONMENTAL IMPACT ASSESSMENT STATEMENT 56
13.1 CONSTRUCTION PHASE IMPACTS 56
13.2 OPERATIONAL PHASE IMPACTS 57
13.3 DECOMMSIONING 57
13.3.1 NO GO 58
14 CONCLUSION 58

ABBREVIATION/ACRONYM	DESCRIPTION
BA	Basic Assessment
BAR	Basic Assessment Report
DAFF	Department of Agriculture and Forestry
DRDLR	Department of Rural Development and Land Reform
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EDTEA	Department of Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GA	General Authorization
GDP	Gross Domestic Product
HIA	Heritage Impact Assessment
KZN	KwaZulu-Natal
WULA	Water Use Licence Application
NEMA	National Environmental Management Act (107 of 1998) as amended
NWA	National Water Act (36 of 1998) as amended
NEM: WA	National Environmental Management: Waste Act (59 of 2008)
SANBI	South African National Biodiversity Institute

1 INTRODUCTION

Lisakhanya Israel Farming Pty Ltd (the applicant referred to as Lisakhanya thereafter) is in a process of acquiring environmental authorization for piggery farming on the following property: Portion 0 (Remaining Extent) of the Farm the Plains No. 3147 in Mpofana Local Municipality and uMgungundlovu District in terms of section 24 of NEMA. Enviso Consulting CC (referred to Enviso here after) has been appointed by Lisakhanya to assist in preparing and submitting environmental reports, EIA process and undertaking a Landowner and Public Consultation Process, in support of Environmental Authorization application. The proposed Lisakhanya Piggery is subject to Environmental Authorization (EA) by the Department of Economic Development, Tourism and Environmental Affairs (EDTEA) in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 as amended, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

1.1 PROJECT BACKGROUND

The project site has historically been used for agricultural activities. The proponent is a new freehold farmer within the uMgungundlovu district and proposes to farm pigs and crops. The farming activity will exclude abattoir which is part of the existing structures. He has signed a lease agreement with the farm owner (The Whisper Trust) who is the legal landowner of the Farm the Plains No. 3147 which was purchased in 2006 for agricultural farming. The farm has a history of piggery production and there are traces of vacant and vandalized buildings on site (Figure 1). The farm is currently neglected and has not been operational for quite some time.

Figure 1: Old existing structures on proposed Piggery Farm site

Figure 1-2: Overview of current infrastructure setting

The proposed site is located in the rural Mooi River around 08 km North of the town of Mooi River, uMgungundlovu District Municipality Mpofana Local Municipality (Figure 2) in the KwaZulu-Natal Province.

Based on the available infrastructure, the design caters for an open-flush system for the handling and treatment of waste, no fundamental upgrades to the waste treatment system have been proposed. Open flush system does not effectively separate waste, nor does it utilize the biodegradable effluent. The setting of available infrastructure is provided as Figure 1-2 above.

In terms of current process flow, the manure (solids and liquids) excreted by the animals shall fall through the partially slatted floor. The manure is temporally stored under the slatted floor in an effluent holding pit until the “flushing plug” is opened daily to release the effluent (manure, urine, and wash water), which flows via a network of concreted effluent channels (gutters) towards the existing purpose-built effluent dams. Thereafter, the treatment will undergo a natural anaerobic reaction at the effluent dams.

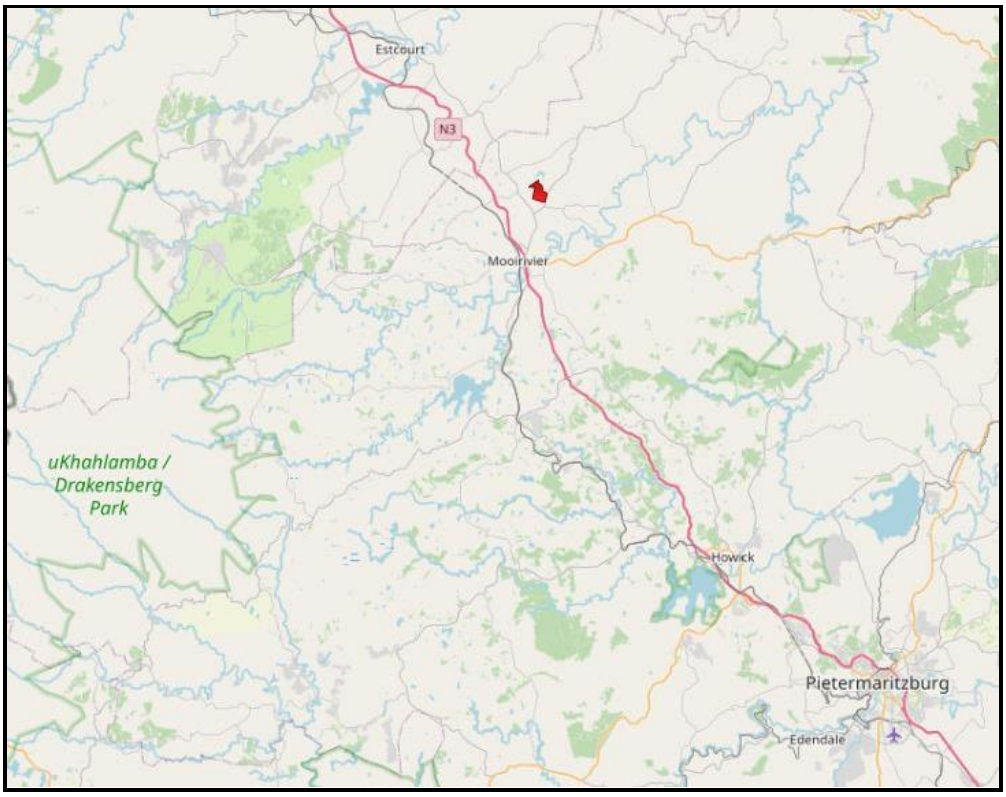

Figure 2: Site Locality Map (BGES GIS, 2022)

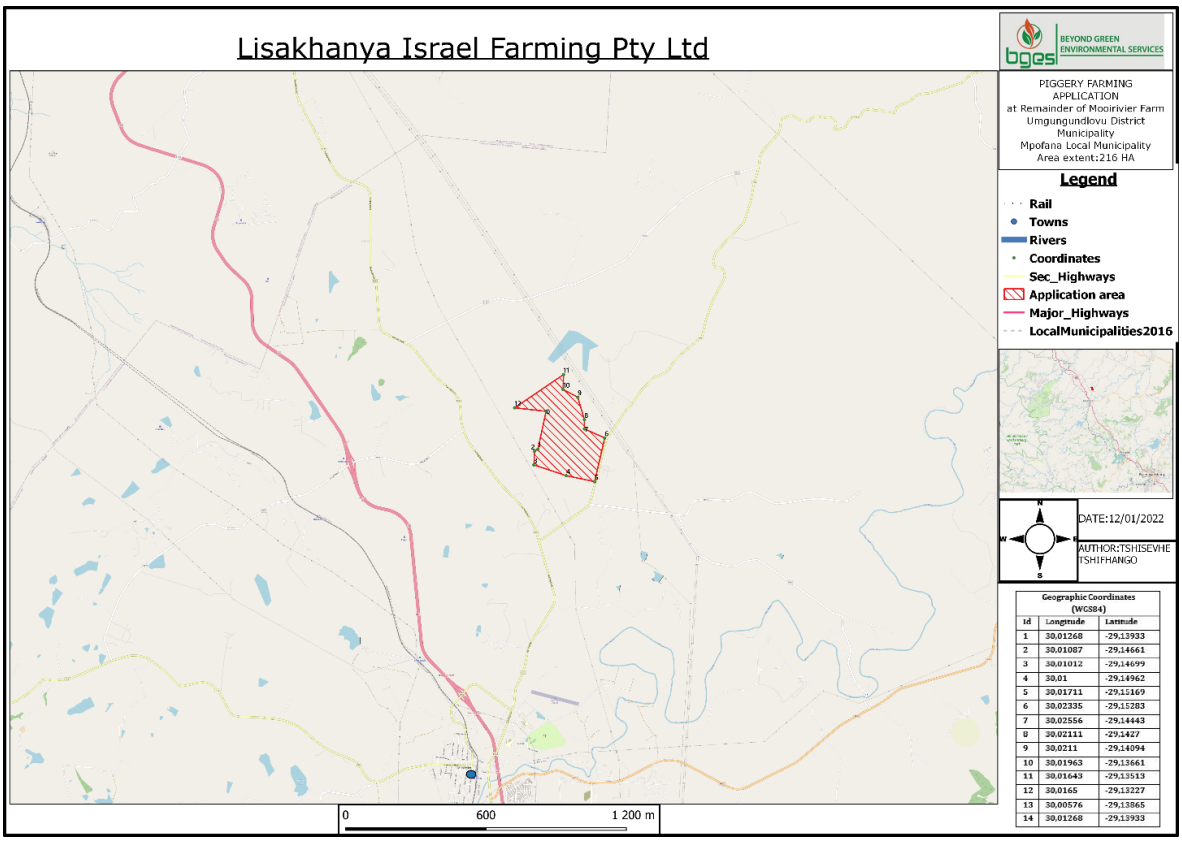

Figure 3: Site Locality Map (BGES GIS, 2022)

1.2 TERMS OF REFERENCE

Enviso Consulting (Pty) Ltd (Enviso) has been appointed by the Department of Rural Development and Land Reform (DRDLR) (on behalf of Lisakhanya Israel Piggery) to undertake the function of independent Environmental Assessment Practitioner (EAP) to facilitate the Basic Assessment (BA) process in accordance with the 2014 EIA Regulations.

1.3 PROJECT EAP & PROPONENT

Table 2. The details of the project EAP & proponent

	Environmental Assessment Practitioner (EAP)	**Applicant**
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2 LEGAL FRAMEWORK

The sections below provide a summary of the legislative requirements for the project and as such have been considered in the preparation of this report.

2.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The NEMA provides the environmental legislative framework for South Africa. The EIA Regulations, promulgated under the NEMA, contain Listed Activities that require either a BA or Scoping and EIA procedure to obtain EA from the relevant authority. The listed activities which are applicable to the proposed development for which EA is being applied for is presented in Table 2 below.

Activity number	Listed activity	Description of project activity
GN R327, April 2017		
Activity 4 (ii)(b)	The development and related operation of facilities or infrastructure for the concentration of animals in densities that exceed (ii) 8 square meters per small stock unit and (b) more than 250 pigs per facility excluding piglets that are not yet weaned;	*The proposed project entails the construction of facilities for the operation of a piggery to accommodate more than 250 pigs as well as grazing land to accommodate sheep as small stock units.*
GN R324, April 2017		
Listing notices 3 – Activity 14	Clearance of some vegetation which may be identified as indigenous.	*Clearance of vegetation in the area*
Activity 12 (b)(xii)	The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. (xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.	*Clearance of the site*
Activity 23 (ii) a & c (D for KZN)	Effluent dams to be fixed and restored. They can be found close to sensitive areas as identified by EMF	

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT: WASTE ACT

The National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA) is the principal Act that provides the basis for the regulation of waste management in South Africa. The NEM: WA contains policy elements and gives a mandate for further regulations to be promulgated. Government Notice 921 dated 29 November 2013 lists waste management activities that have, or likely to have a detrimental effect on the environment and require a Waste Management License (WML). There are certain listed activities related to waste storage, treatment and disposal that require a BA or Scoping and EIA Process to be conducted as part of a WML application. The listed activities are divided into two Categories, Category A and Category B. The proposed piggery triggers Category A of the Waste Act activities which would require a Basic Assessment as part of the WML application. Enquiry statement was sent to the Competent Authority (EDTEA), with an intention to have a pre-application meeting aftermath. From the EAP's perspective it is understood that the waste management component for the piggery would be covered under the water use license application (WULA) with the Department of Water and Sanitation (DWS). Therefore, the WML activities applicable to this application have been

excluded. However, all waste generated by the operation of the pig farm must be handled, stored, or disposed of in accordance with the Waste Classification and Management Regulations (WM&CR). A fertilizer registration application must be submitted to the Department of Agriculture, Forestry and Fisheries (DAFF) to obtain authorization for the use of manure on agricultural land.

Category C of GN R921 outlines the requirements and standards for the storage of waste at a facility. The proposed Lisakhanya piggery involves temporary storage of waste at the facility. The storage of general waste must comply with the Norms and Standards for Storage of Waste (2013).

2.3 NATIONAL WATER ACT

The National Water Act (Act No.36, 1998) (NWA) aims to control the use of water, which may affect water resources through the licensing of specific water uses in terms of Section 21 of the act. A water use must be licensed unless it (a) is listed in Schedule 1, (b) is an existing lawful use, (c) is permissible under a general authorization (GA); or (d) if a responsible authority waives the need for a license. If none of these are relevant a Water Use License (WUL) must be applied for and obtained prior to the commencement of such listed activity. The water uses listed below (Table 3) have been identified as potential triggers for a WUL for the proposed piggery.

Figure 4: Section 21 Water Uses

Activity	Water Use Description
21 (a)	taking water from a water resource
21 (b)	storing water
21 (e)	engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1)
21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource

The proposed Lisakhanya Piggery facility proposes to use existing borehole for groundwater abstraction as their water supply. The existing borehole has been used by the previous farmer (landowner); it is assumed that the boreholes is registered with DWS. The EAP did not able to able to ascertain any records to prove registration of the existing water boreholes. It is noted that the WULA process is being undertaken in parallel with the BA process by another EAP.

2.4 NATIONAL HERITAGE RESOURCES ACT

The National Heritage Resources Act (Act No. 25 of 1999) (NHRA) established the South African Heritage Resources Agency (SAHRA) in 1999. SAHRA is tasked with protecting heritage resources of national significance. Under Section 38 of the NHRA, all new developments that will change the character of a site and exceed 5 000 m^2 in extent are subject to a Heritage Impact Assessment (HIA) in support of an application for authorization from SAHRA. A project profile was uploaded on the South African Heritage Resources Information System (SAHRIS) for review and comment by AMAFA who the provincial heritage body is.

The proposed piggery will cover an area of approximately 25 000m^2 but it will not change the nature of the site. The site is currently zoned agricultural and was previously utilized for similar activities. The proposed site has existing buildings, which will be renovated, demolished where necessary to construct new facilities. The buildings are not older than sixty years hence a demolition / alteration permit will not be required. The proposed project, therefore, is not subject to an HIA or permit application.

3 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

Lisakhanya Piggery are proposing to establish a commercial pig facility on the property Frysland Farm Farm the Plains No. 3147 in Mpofana Local (Figure 1). The farm has a total area of 216 hectares (ha) and located at the following geographical co-ordinates 30,01268; -29,13933.

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. A piggery and associated infrastructure are planned to occupy an area of approximately 2.5 ha. The piggery will accommodate approximately 30 sows.

Access to the site is off R103 onto an internal gravel road (D316). The R103 road lies approximately 0.86 km from the western boundary of the site. The site is currently zoned agricultural and will not require a change of land use and was historically utilized as an agricultural farm by the farm owners. The surrounding land use is agricultural (crop and livestock) and comprises of farmsteads (Figure 4). There are four manmade dams and one wetland located on the Frysland Farm property.

3.2 PROPOSED ACTIVITY DESCRIPTION

The proposed development comprises a pig production facility as primary production; and maize and various vegetable farming as secondary production (Table 6). The total farm size is 216 ha with the proposed development occurring in various phases over a five-year timeframe.

Table 5: Proposed project overview

Activity	Infrastructure
Piggery	A piggery and associated infrastructure are planned to occupy an area of approximately 2.5 ha. The piggery will accommodate approximately 30 sows.
Roads	The proposed development entails the upgrading of existing access roads (gravel) within the site that are approximately 0.89 km in length.
Employee Housing	There are existing old housing structures on site which will be renovated. New housing infrastructure will be designed and constructed as the project progresses.
Water Supply	There are three dams on the site which will be utilized as a water supply for the livestock and the farm's agricultural activities. The installation of a borehole will be required. The abstraction and storage of water on site will require a Water Use License (WUL) from the DWS. The client will undertake the WUL application separately from this EA.
Storage facilities	The storage volume per silo will be between 14 and 20 metric tons, depending on the number of pigs. They will be galvanized corrugated steel ones with a funnel and will be placed on concrete footings.
Arable land	Maize farming will be commenced on 15.5 hectares that will be increased to 40ha in the next five years.

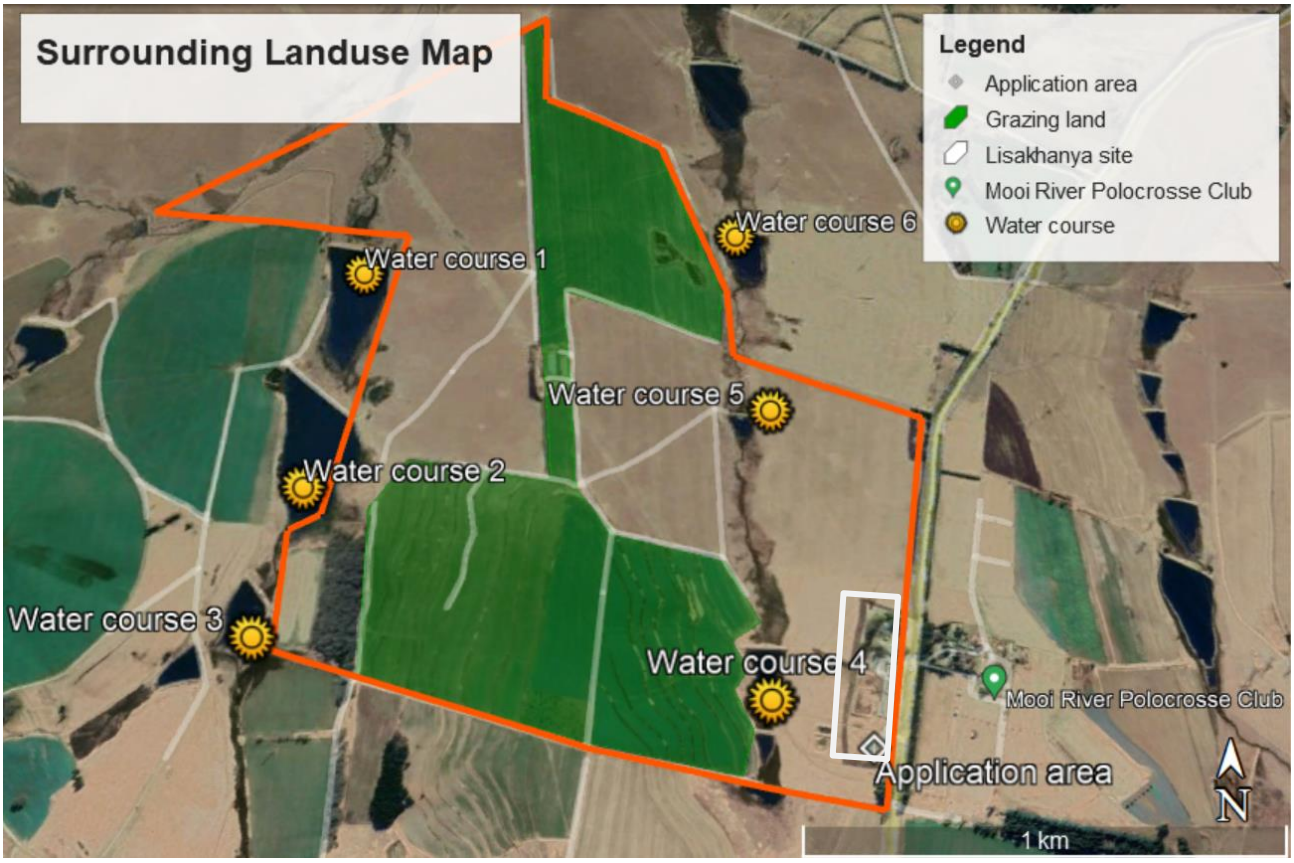

Figure 4: Surrounding Landuse Map

3.3 PIGGERY FACILITY

The proposed Piggery anticipates developing infrastructure that will house more than 30 sows at its completion stage (Table 6). The proposed piggery enterprise is anticipated to occur over five phases and each component will be dependent on market demand and growth. The proposed piggery will result in the housing of >400 pigs in the pig houses.

Table 6: Various phases of the proposed Frysland Piggery

Phase	Number of Pigs
Phase 1A	250 weaners
Phase 1B	500 weaners
Phase 2A	60 sows + followers
Phase 2B	120 sows + followers
Phase 2C	180 sows + followers

3.3.1 CONSTRUCTION PHASE

The proposed development is expected to be completed within a five-year timeframe with completion scheduled for 2022. The construction activities of the proposed Frysland farm and related infrastructure will include:

- Earthworks and excavations for the trenches for foundations, the effluent dam as well as canals to transport wastewater.
- Laying of concrete slabs to support infrastructure.
- Construction of the platform and canals for wastewater transportations.
- Construction of the pig houses on top of the platforms; and
- Installation of supporting infrastructure such as irrigation equipment and boreholes; feed silos and water and feed supply lines to houses.

3.3.2 OPERATIONAL PHASE

The operational phase of the proposed Frysland farm will require equipment and machinery (tractor, trailer and hummer mill). The facility will involve:

- Breeding, feeding and maintenance of pigs for commercial sale.
- Loading and offloading of pigs.
- Maintenance of the piggery and associated infrastructure (access roads);
- Repair work when required.
- Maize and crop farming.
- Separation of wastewater into a solid and liquid fraction.
- Storage of the solid waste for use as fertilizer on farm fields or for purchase by local farmers.
- Storage and treatment of the liquid wastewater fraction; and
- Re-use of the liquid wastewater fraction as a source of plant nutrients (organic fertilizer).

3.3.3 DECOMMISSIONING PHASE

The decommissioning phase aim to rehabilitate the site where the activity was taking place, however the applicant is not intending to decommission this farming activity. Below is a summary of key actions associated with future decommissioning:

- Existing buildings and structures will be demolished, rubble removed from site;
- Removal of concrete surfaces, foundations.
- Exposed excavated areas will be filled and levelled; and Topsoil replaced, and the area revegetated.

4 SERVICES

4.1 WATER SUPPLY

The proposed water supply will use existing borehole on-site. The boreholes are expected to be increased as the piggery farming grows. The existing borehole is proposed to supply water for the piggery activities (washing and drinking) (Table 7). The 24 hours pump test should deliver a 65% yield (approximately 15000 litres) which is an estimated daily requirement for a 100-sow piggery. Water pumped from the borehole will be stored on site in the existing reservoirs. Domestic water will be sourced from the existing Mpofana Local municipal connection. Four existing dams on the site will be utilized as a water supply the farm's agricultural activities.

Table 7: Estimated daily water requirements

Livestock Category	Water Use (L/day)
Weaners (250 - 500)	2750L and 5500L per day
Total Water Requirement	5500L per day

4.2 TRANSPORTATION

The proposed piggery will increase the number of transportation vehicles required to access the farm weekly. Internal access roads will be upgraded to accommodate the increased vehicles travelling to and from the site. At least 2-3 trucks are anticipated to access the site on weekly basis (i.e. increased movement of 12 trucks per month on local roads).

4.3 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.

4.4 ELECTRICITY SUPPLY

The proposed Frysland Piggery will be connected to the existing Eskom Power grid.

4.5 WASTE MANAGEMENT

4.5.1 WASTEWATER

Wastewater will be channeled to a concrete slurry collection pit and will be separated into a solid and liquid waste stream prior to storage. By separating the solids from the liquid, the required volume for storage will be reduced and the nutrient content reduced. This will reduce the effluent stream by 30%.

4.5.2 SOLID WASTE

The construction and operational phase of the proposed activity will result in the generation general and hazardous waste. The construction phase will generate general minimal solid waste (rubble, cement bags, general domestic waste etc.) which will be disposed at a general landfill site (Mpofana Municipality Landfill). Construction phase activities will generate hazardous waste such as empty chemical containers and oil rags. These will be disposed by contractor at the nearest permitted landfill site.

The operational phase will generate both general and hazardous waste. General waste from various packaging and domestic waste will be collected by the municipality and disposed at general landfill site. The operational phase will result in biohazardous (medical equipment, unused medication) and hazardous waste (cleaning materials, oils and other chemical solvents). All hazardous waste to be handled and disposed of at a permitted landfill site. All bio-hazard waste such as syringes for vaccines will be handled by licensed service provider and disposed of at a permitted landfill site.

The piggery will generate solid waste from waste feed, animal waste and carcasses. Animal feed includes hay, grain which are supplemented with various compounds (protein, amino acids, enzymes,

vitamins, hormones etc.). Waste feed has the potential to contribute to stormwater contamination because of its organic matter content. Animal feed waste will be used as a fertilizer. The piggery will produce animal waste manure which contains nitrogen, phosphorus, and other excreted substances. This will result in air emissions of ammonia and other gases. This has the potential risk of surface and groundwater contamination through leaching and runoff. Manure also contains disease causing agents such as bacteria, pathogens, viruses, and parasites which have the potential to impact soil, surface and groundwater resources. Manure collection system at Frysland Piggery will include slatted floors that will allow manure to drop into the storage area located beneath the floor. The manure will be flushed from the storage area and passed through a filter which separates the solids from the liquids. Waste will be separated by removing solids from the effluent before storage. An analysis of the manure will be conducted to determine the moisture and heavy metal content (e.g., Cadmium, Lead, Mercury, Arsenic, Selenium). The results of this analysis will be submitted as part of the fertilizer registration application process for the use of manure on agricultural fields.

The operational phase will also result in animal carcasses waste which will be disposed in a carcass pit on the property. The carcass pit will be 3metres wide and 3 meters deep. It will narrow to 1,5m width as it goes further down. Animal carcasses should be properly managed and quickly disposed of in order to prevent the spread of disease and odours and avoid the attraction of vectors.
The solid component will be used as compost on the agricultural lands or sold off to local farmers.

4.5.3 EFFLUENT WASTE

The operational phase of the proposed pig farm will generate 11m^3 of effluent waste per day. The effluent comprises of wash water, feaces and urine. The effluent will be handled by deep storage channels under slatted floors and will channeled to the effluent dams on site. An effluent dam which will hold 675m^3, plus covering part of the requirements for an upgrade to a 100-sow piggery. It has been recommended that waste separation and use be incorporated in the farm's waste management procedures to increase storage capacity for up to 1000 sows. The biodegradable effluent from the piggery will be stored in effluent dams, the wastewater is planned for use as irrigation water on the crops.

Wastewater will be generated during the operational phase from daily activities. The wastewater contains disinfectants used to wash the houses, veterinary chemicals, and metals such as copper and zinc. It will also comprise of volatile organic solids, nutrients and possibly salts.

4.5.4 MORTALITY MANAGEMENT

The expected mortality rate at the Frysland Piggery is approximately 10% per week. A carcass pit which is 3m in diameter and 3 meters deep will be constructed on the site next to the effluent dam. It must be designed in line with a liner to minimize seepage.

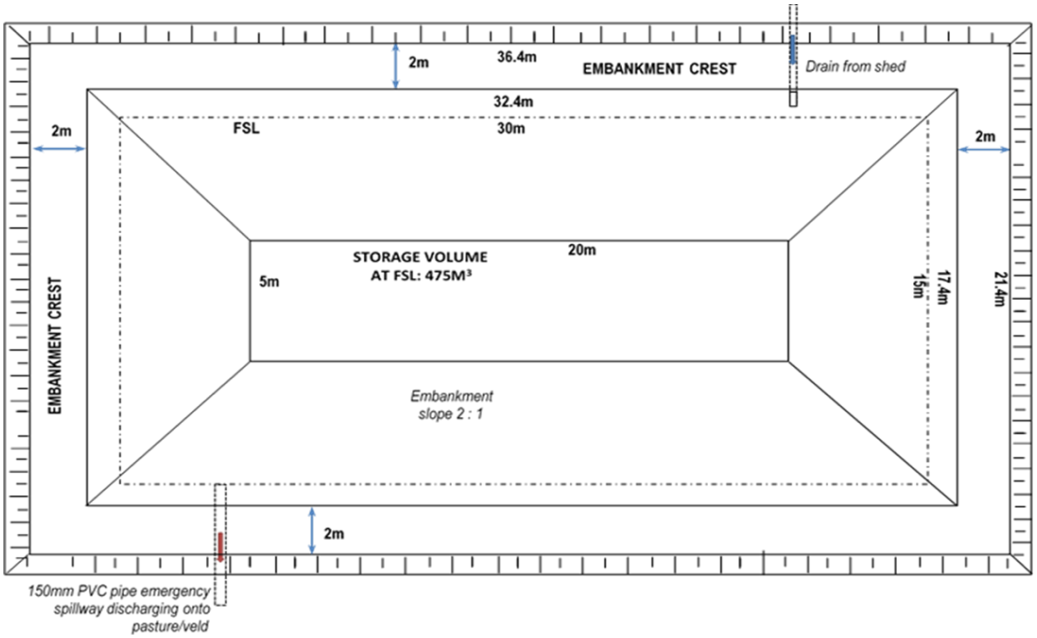

Figure 5: Top view of the effluent dam

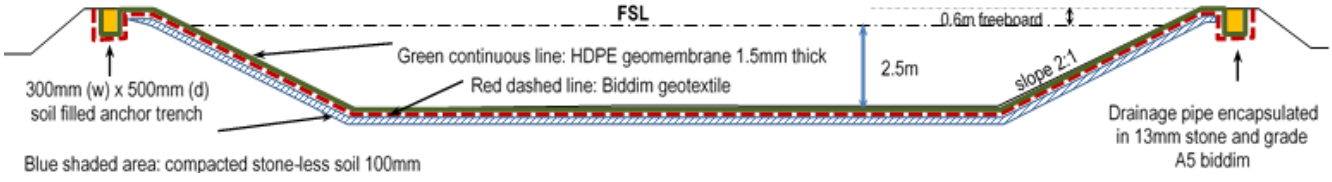

Figure 6: Cross Section of the Effluent Dam

5 PROJECT ALTERNATIVES

The identification of alternatives provides a basis for demonstrating the options considered by the project team and selection of feasible or preferred option available to the decision-making authority. This is a requirement of the 2014 EIA regulations as amended in 2017. The alternatives considered and evaluated in the BA process are outlined below.

5.1 ACTIVITY ALTERNATIVES

The proposed activity is the development of a piggery on the Frysland Farm property. No activity alternatives are considered as this is the type of development that the Applicant has engaged with the DRDLR.

5.2 SITE ALTERNATIVES

Frysland Piggery is a 100% Black owned entity supported by funding from the DRDLR. The site being investigated in this BA is the only site available to this business entity and a lease agreement has been signed. It is zoned agricultural and has previously been utilized for similar activities, piggery farming. There is also existing residential infrastructure on site which will be utilized as part of the new proposed development to house workers. Therefore, no other alternative sites were assessed for this application because the existing site is most feasible both from the planning and financial aspect of the proposed development. Various factors of the site such as the land being relatively flat also make this site the most preferred.

5.3 DESIGN ALTERNATIVE

No design alternatives have been prepared and assessed for the proposed piggery. The preferred layout layout/designs have been compiled according to best practice in the pig industry as well as experience from the appointed Agricultural Engineer. The pig houses are designed to provide the best environment for the pigs and to have the least impact on the environment.

5.4 TECHNOLOGY ALTERNATIVE

Three options of handling waste have been identified.

- No use of effluent, no separation.

This option does not involve waste separation, nor does it utilize effluent. This option requires larger storage capacity and is less sustainable.

- Use of slurry, but no separation of liquids and solids

This option entails the use of slurry (unseparated effluent) for agricultural activities. This option was not selected because it has the potential to leach to groundwater and uncontrolled surface runoff can enter surface water.

- Use of slurry, plus separation of liquids and solids

This option was selected as the most preferred where the solid and liquid fractions of the slurry will be fully separated. Solid wastes will be used for fertilizing the lands or removed off-farm and sold to local farmers. By separating the wastes, the capacity required for storage of effluent decreases.

5.5 NO-GO ALTERNATIVE

The no-go alternative refers to the option of not undertaking the proposed activity. The 'do-nothing' scenario will result in the continuation of the status quo which would retain the existing property in its current neglected state. The site is currently vacant, and all infrastructure has been vandalized. The property was previously utilized for piggery agricultural purposes and is now invaded by alien vegetation. Therefore, the site would continue to deteriorate and there would be a loss of socio-economic opportunities including.

- 60 jobs generated during the construction and 20 jobs during the operational phase
- Growth in local pork industry

6 NEEDS AND DESIRABILITY

The applicant has observed an opportunity in the pork industry in South Africa and have access to suitable land for the activity. Mr Khumalo has applied for funds from the DRDLR, which will enable him to construct the pig production facility, purchase pigs, all the machinery and equipment necessary for an efficient pig production business. In addition, Frysland Piggery will provide full-time

employment to 27 people from the surrounding community. This will improve on skills development because the staff will be required to be competent with the care and health of the pigs. This proposed pig facility will allow Frysland Piggery to achieve socio-economic objectives of poverty alleviation and generation of employment hence contribute positively to the economy of our country.

Animal agriculture contributes to the world economy by providing food, jobs, and financial security for many people. The aim of the Local Economic Development (LED) Strategy is to give direction to the Municipality for the implementation of the economic development sector plan within in Mpofana Local Municipality area through the formulation of key guidelines. Mooi river is an agricultural community and employment, and economic activities are dependent on this activity. Pig farming projects have been identified as a catalyst that will uplift the community. The proposed piggery is thus aligned with the LED and the spatial development framework of in Mpofana Local Municipality and will contribute positively towards the local and regional economy. At least 50% the proposed development income will benefit previously disadvantaged individuals. Frysland piggery is also in line with the surrounding land use as it falls within a predominantly agricultural and rural area.

7 BASELINE ENVIRONMENT

The proposed Frysland Piggery Farming is located within the Mooi River area of Mpofana, which is a rural agricultural area that is inhabited by commercial and emerging farmers. The broader project footprint has been the subject of varying degrees of impact in terms of cultivation, subsistence farming including growing of crops and keeping of livestock. The study site sits in a flat area, sloping gently downwards to the north, with altitude ranging between 1340-1360 masl. The area within the site is classified as consisting of KwaZulu-Natal Highland Thornveld (Gs 6, Least Concern), but is close to the transition to Mooi River Highland Grassland (GS8, Endangered) (Mucina & Rutherford, 2006, 2019).

7.1 Geology

This region is characterized by intergranular and fracture rock aquifers with extremely low to medium development potential. The underlying geology is mostly arenaceous rocks of the Ecca Formation. The site lies over two types of major rock formations, Shale and Mudstone.

7.2 Surface Water

The area is located within few dams and seasonal Wetland. At a broader spatial view, the study site falls within quaternary catchment V20E which is largely drained by the Mooi River. The headwaters of the Mooi River originate from the plateaus of the Drakensberg Mountain, flows north-eastwards towards to join the Tugela River at its middle reaches, near Muden. The catchment size for Mooi River is 2,868 km^2.

At a local drainage setting, the study site is located at the mouth of the Katspruit River, on moderately steep north-east facing slopes. The Katspruit River is a major tributary of the Mooi River. Surface flows (run-off) generated for the surrounding profile drain into minor drainage lines which ultimately recharge the Katspruit River.

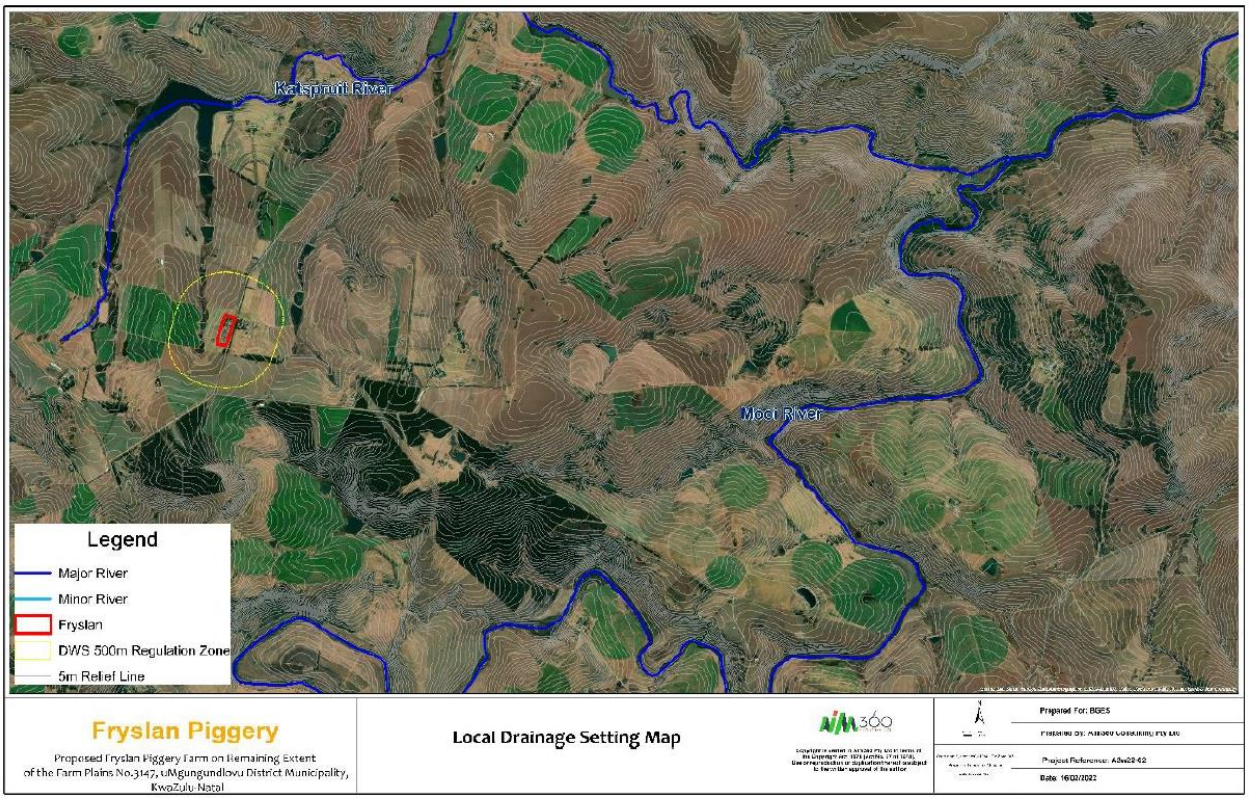

Figure 7: Quaternary catchment and local drainage setting associated with the study site (Aim360, 2022.

7.3 Biodiversity

Evaluation of the site determined that no pristine or near- pristine natural vegetation is present, and the site has been virtually completely transformed in the past and currently. At present, it consists of the following landcovers.

❖ Kikuyu grassland – dense Kikuyu Pennisetum clandestinum covers much of the southern half upper-slope of the property

❖ Mixed weedy secondary vegetation, including a variety of alien, annual weedy species, such as Tagetes minuta, Bidens pilosa, Cyrsium vulgare and others, cover large areas in the central and northern portions

❖ Ploughed land – a large area in the central section had recently been ploughed

❖ Some areas of secondary grassland, dominated by *Eragrostis curvula* grass, occurred in the northern and western portion.

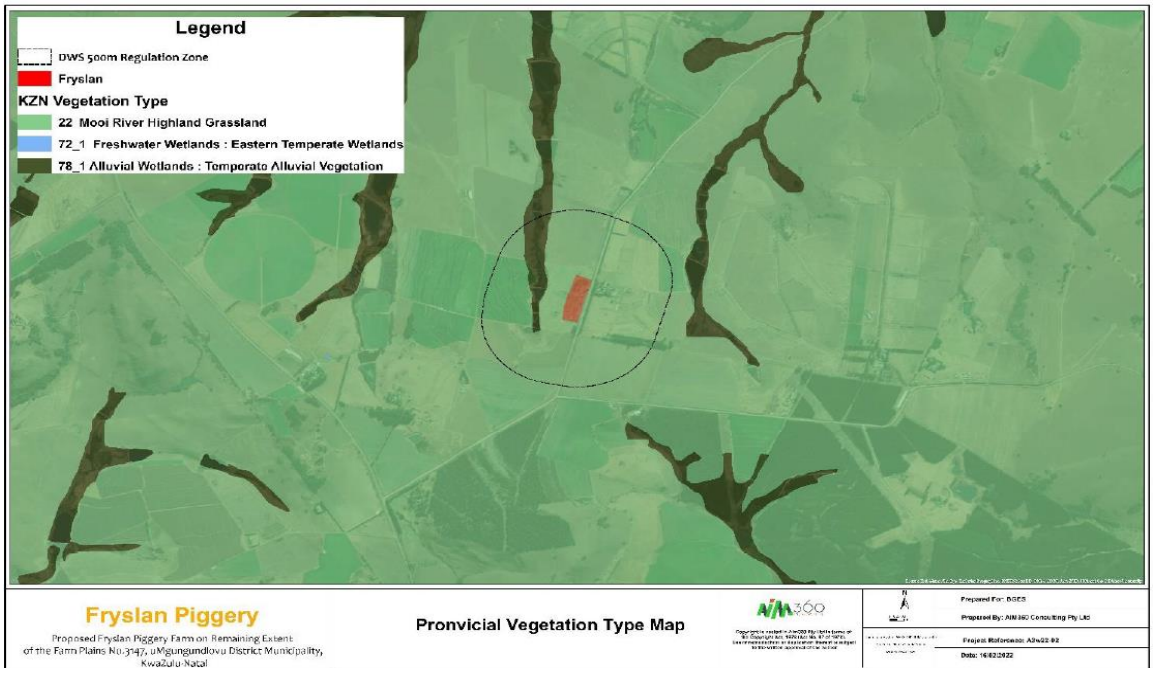

Figure 8: Provincial Vegetation Type Map

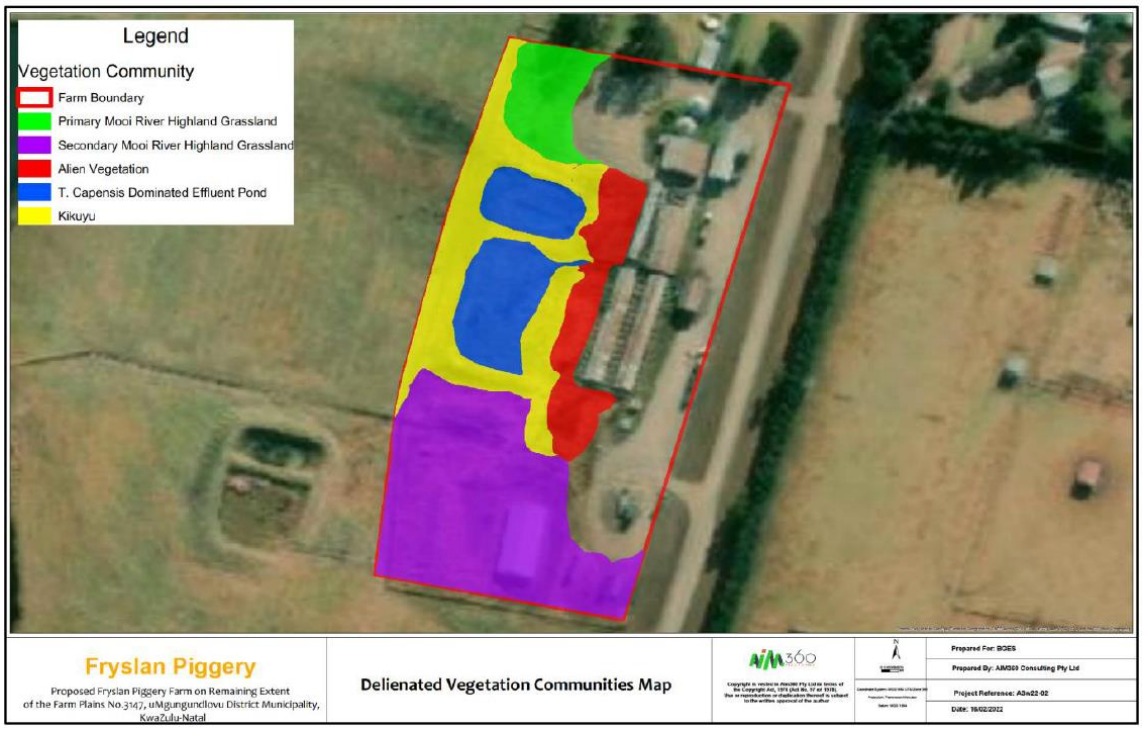

Figure 9: Delineated vegetation communities

No aquatic habitats or any rocky areas are present on or close to the site.

The adjacent landcover within 100m of the site is also virtually entirely transformed or disturbed. In the south and east, the site is bordered by buildings and secondary vegetation, in the north by actively managed agricultural cropland, and in the west by secondary vegetation.

7.4 Land use of the site

The predominant land use in the Mooi catchment is commercial; large-scale dryland agriculture (DWS, 2013); wetland is open space/wilderness and cultivated agriculture. Water quality is largely impacted by return-flows laden with agro-chemicals. Due to urbanization, total dissolves solutes have been recorded in addition to organic pollution, especially in rivers situated downstream of the catchment (Wade, 2019).

It should be noted both historic and ongoing agricultural activities have impacted this wetland area to some degree. Ultimately the functionality of the wetland has been degraded to some degree. Some areas within the delineated wetland which have been significantly impacted by agricultural activities, were considered as relic wetland area, as those areas no longer function as wetland.

7.5 Land use character of the surrounding area

The presence of a seep, channeled valley bottom and relic wetland have been noted near the site.

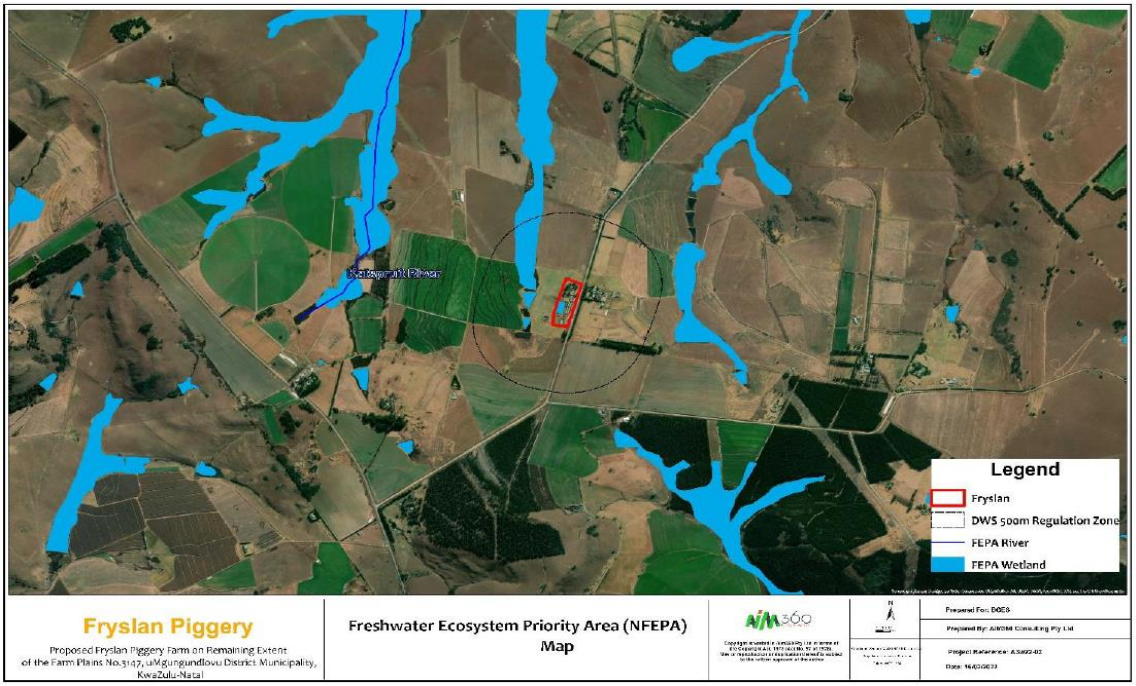

Figure 10: Water courses within the application area.

8 Socio-Economic Aspects

Describe the existing social and economic characteristics of the community in the vicinity of the proposed site, to provide baseline information (for example, population characteristics/demographics, level of education, the level of employment and unemployment in the area, available work force, seasonal migration patterns, major economic activities in the local municipality, gender aspects that might be of relevance to this project, etc).

The municipality has a total population of approximately 38 301 according to the 2011 Population Census. A large portion of the population is still dependent on a relatively small portion of the population earning an income. This, combined with the high unemployment rate, the situation becomes dire.

Economic aspects

Mooi River is the only primary node within Mpofana Local Municipality. Mooi River Town is the primary node and the most densely populated area within the municipality. It serves as the main commercial and administrative center and is a priority focus area. With a large concentration of people,

development efforts are focused on economic development& service provision, job creation, government services and ensuring basic services. The Node and a conceptual boundary are illustrated below. The Mooi river area is in Ward 1 of the Municipality has been identified as the most densely populated Ward.

9 Historical and Cultural Aspects

(a) Please be advised that if Section 38 of the NHRA is applicable to your proposed development, you are requested to furnish this Department with written comment from Amafa KwaZulu-Natal as part of your public participation process. Amafa KwaZulu-Natal must be given an opportunity, together with the rest of the I&APs, to comment on any Pre-application, a Draft BAR, and Revised BAR.

(b) Section 38 of the NHRA states the following:

"38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as-

(a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site-

(i) exceeding 5 000m2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000m2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development".

(a) The impact on any national estate referred to in section 3(2), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii), of the NHRA, must also be investigated, assessed and evaluated. Section 3(2) states the following:

"3(2) Without limiting the generality of subsection (1), the national estate may include—

(a) places, buildings, structures and equipment of cultural significance;

(b) places to which oral traditions are attached or which are associated with living heritage;

(c) historical settlements and townscapes;

(d) landscapes and natural features of cultural significance;

(e) geological sites of scientific or cultural importance;

(f) archaeological and paleontological sites;

(g) graves and burial grounds, including—

(i) ancestral graves;

(ii) royal graves and graves of traditional leaders;

(iii) graves of victims of conflict; (iv) graves of individuals designated by the Minister by notice in the Gazette;

(v) historical graves and cemeteries; and

(vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);

(h) sites of significance relating to the history of slavery in South Africa;

(i) movable objects, including—

(i) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects and material, meteorites and rare geological specimens;

(ii) objects to which oral traditions are attached or which are associated with living heritage;

(iii) ethnographic art and objects;

(iv) military objects;

(v) objects of decorative or fine art;

(vi) objects of scientific or technological interest; and

10 ENVIRONMENTAL IMPACT ASSESSMENT

10.1 IMPACT ASSESSMENT METHODOLOGY

The key objectives of the risk assessment methodology will be to validate impacts identified through a matrix, identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and

ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts.

The Hackings risk assessment methodology has been used for the ranking of the identified environmental impacts (Hacking, 2001b). The significance of environmental aspects can be determined and ranked by considering the criteria presented in Table 11.

Table 8: Criteria Used to Determine the Significance of Environmental Aspects

Significance Ranking	Negative Aspects	Positive Aspects
H (High)	Will always/often exceed legislation or standards. Has characteristics that could cause significant negative impacts.	Compliance with all legislation and standards. Has characteristics that could cause significant positive impacts.
M (Moderate)	Has characteristics that could cause negative impacts.	Has characteristics that could cause positive impacts.
L (Low)	Will never exceed legislation or standards. Unlikely to cause significant negative impacts.	Will always comply with all legislation and standards. Unlikely to cause significant positive impacts.

Where significant environmental aspects are present ("high" or "moderate"), significant environmental impacts may result. The significance of the impacts associated with the significant aspects can be determined by considering the risk:

Significance of Environmental Impact (Risk) = Probability x Consequence

The consequence of impacts can be described by considering the severity, spatial extent, and duration of the impact.

10.16 SEVERITY OF IMPACTS

Table 8 presents the ranking criteria that can be used to determine the severity of impacts on the bio-physical and socio-economic environment. **Table 9** provides additional ranking criteria for determining the severity of negative impacts on the bio-physical environment.

Table 8: Criteria for Ranking the Severity of Environmental Impacts

	Negative			Positive		
Criteria	**High-**	**Medium-**	**Low-**	**Low+**	**Medium+**	**High+**
Qualitative	Substantial deterioration. Death, illness or injury.	Moderate deterioration. Discomfort.	Minor deterioration. Nuisance or minor irritation.	Minor improvement.	Moderate improvement.	Substantial improvement.
Quantitative	Measurable deterioration.		Change not measurable i.e. will remain within current range.		Measurable improvement.	
	Recommended level will often be violated.	Recommended level will occasionally be violated.	Recommended level will never be violated.		Will be within or better than recommended level.	
Community Response	Vigorous community action.	Widespread complaints.	Sporadic complaints.		No observed reaction.	Favorable publicity

Table 9: Criteria for Ranking the Severity of Negative Impacts on the Bio-physical Environment

Ranking Criteria

Ranking Criteria			
	Low (L-)	Medium (M-)	High (H-)
Soils and land capability	Minor deterioration in land capability. Soil alteration resulting in a low negative impact on one of the other environments (e.g. ecology).	Partial loss of land capability. Soil alteration resulting in a moderate negative impact on one of the other environments (e.g. ecology).	Complete loss of land capability. Soil alteration resulting in a high negative impact on one of the other environments (e.g. ecology).
Ecology (Flora and Fauna)	Disturbance of areas that are degraded, have little conservation value or are unimportant to humans as a resource. Minor change in species variety or prevalence.	Disturbance of areas that have some conservation value or are of some potential use to humans. Complete change in species variety or prevalence.	Disturbance of areas that are pristine, have conservation value or are an important resource to humans. Destruction of rare or endangered species.
Surface and Groundwater	Quality deterioration resulting in a low negative impact on one of the other environments (ecology, community health etc.)	Quality deterioration resulting in a moderate negative impact on one of the other environments (ecology, community health etc.).	Quality deterioration resulting in a high negative impact on one of the other environments (ecology, community health etc.).

SPATIAL EXTENT AND DURATION OF IMPACTS

The duration and spatial scale of impacts can be ranked using the criteria in **Table 10.**

Table 10: Ranking the Duration and Spatial Scale of Impacts

Ranking Criteria			
	Low (L-)	Medium (M-)	High (H-)
Duration	Quickly reversible. Less than the project life. Short-term	Reversible over time. Life of the project. Medium-term	Permanent. Beyond closure Long-term
Spatial Scale	Localized. Within site boundary	Fairly widespread. Beyond site boundary Local	Widespread. Far beyond site boundary. Regional/national

Where the severity of an impact varies with distance, the severity should be determined at the point of compliance or the point at which sensitive receptors will be encountered. This position corresponds to the spatial extent of the impact.

CONSEQUENCE OF IMPACTS

Having ranked the severity, duration and spatial extent, the overall consequence of impacts can be determined using the qualitative guidelines in **Table 11.**

Table 11: Ranking the Consequence of an Impact

Severity = Low (L)

Spatial Scale			Localised - within site boundary	Beyond site boundary	Far beyond site boundary
			Low	Medium	High
DURATION	Long Term	High	Medium	Medium	Medium
	Medium Term	Medium	Low	Low	Medium
	Short Term	Low	Low	Low	Medium

Severity = Medium (M)

Spatial Scale			Localised - within site boundary	Beyond site boundary	Far beyond site boundary
			Low	Medium	High
DURATION	Long Term	High	Medium	High	High
	Medium Term	Medium	Medium	Medium	High
	Short Term	Low	Low	Medium	Medium

Severity = High (H)

Spatial Scale			Localised - within site boundary	Beyond site boundary	Far beyond site boundary
			Low	Medium	High
DURATION	Long Term	High	High	High	High
	Medium Term	Medium	Medium	Medium	High
	Short Term	Low	Medium	Medium	High

To use **Table 12,** firstly go to one of the three "layers" based on the severity ranking obtained from **Table 09** and/ or **Table 10.** Thereafter determine the consequence ranking by locating the intersection of the appropriate duration and spatial scale rankings.

OVERALL SIGNIFICANCE OF IMPACTS

Combining the consequence of the impact and the probability of occurrence, as shown by **Table 14** provides the overall significance (risk) of impacts.

Table 14: Ranking the Overall Significance of Impacts

Consequence (from Table 14-15)			Low	Medium	High
PROBABILITY	Definite Continuous	High	Medium	Medium	High
	Possible Frequent	Medium	Medium	Medium	High
	Unlikely Seldom	Low	Low	Low	Medium

The overall significance ranking of the negative environmental impacts provides the following guidelines for decision making **(Table 15):**

Table 15: Guidelines for decision-making

Significance of Impact	Nature of Impact	Decision Guideline
High	Unacceptable impacts.	Likely to be a fatal flaw.
Moderate	Noticeable impact.	These are unavoidable consequence, which will need to be accepted if the project is allowed to proceed.
Low	Minor impacts.	These impacts are not likely to affect the project decision.

11 ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS SOCIAL ENVIRONMENT

11.1 LOCAL ECONOMY AND EMPLOYMENT OPPORTUNITIES

11.1.1 CONSTRUCTION PHASE

There is the potential for short term employment to be created during the construction phase. Potential jobs include site engineers, building contractors, laborer's, livestock handlers, cleaners, tractor drivers and truck drivers, i.e., skilled, semi-skilled and un-skilled workers. The construction phase will provide a positive impact by providing temporary employment opportunities to contract workers over this period (proposed 60 job opportunities). The overall local, regional, and national impact is likely to be of medium post mitigation significance due to the temporary nature of this phase.

Indirect socio-economic benefits for local suppliers are anticipated during the construction phase. Impact significance is anticipated to be of low with mitigation / management measures outlined in Draft EMPr **(Appendix A).** The use of local suppliers during the construction phase is encouraged.

11.1.2 OPERATIONAL PHASE

The operational phase of the proposed Frysland Piggery will contribute to the generation of employment for people from the surrounding area. It is anticipated that a number of employment opportunities will be created for un-skilled, semi-skilled and skilled workers. The number of skilled opportunities during the operational phase are estimated to be between 8 and 12, and 20 unskilled jobs. This is positive impact however the significance will be medium due to the limited number of opportunities. There is also the opportunity for skills development during the operational phase of the piggery which is positive impact.

The proposed Frysland Piggery will have indirect impacts on secondary industries. It will contribute towards economic growth of their suppliers (animal feed and operational stock suppliers). It will also impact on the economy of the distributers of pork products by ensuring the availability of pork. This is a positive impact which will be of medium significance.

11.1.3 DECOMMISSIONING PHASE

The decommissioning phase impacts will be like that of the construction phase; however, the applicant is not intending to decommission this farming activity.

11.2 VISUAL AND AESTHETICS

11.2.1 CONSTRUCTION PHASE

There is a possibility of change in the nature of the area during the construction period. Factors contributing to this will include a change in aesthetics, construction noise and an increase in traffic associated with the construction activities. Visual impacts associated the clearing of vegetation will be of low significance due to the agricultural nature of the surrounding land use. The vegetation will be cleared for the first phase of the development and majority of the vegetation are invasive species which need to be removed. Very small area will be exposed to vegetation removal.

11.2.2 OPERATIONAL PHASE

The proposed piggery may result in tall buildings (silos) that may be visually intrusive for the neighbors adjacent to the site. The night lighting of the proposed piggery has the potential to impact on the nightscape to surrounding receptors as a nuisance factor. This may impact on the aesthetics of the area however this impact is anticipated to be of low significance with the implementation of mitigation measures outlined in Draft EMPr (Appendix A).

11.2.3 DECOMMISSIONING PHASE

Should the decommissioning occur, it will result in a temporary negative impact of low significance (post mitigation) associated with the dismantling and removal of structures associated with the project.

11.3 TRAFFIC IMPACTS

11.3.1 CONSTRUCTION PHASE

An increase in traffic associated with the construction phase activities (delivery of construction materials and equipment) is anticipated. This may include large equipment such as excavators, dozers, tip, or waste removal trucks. An increased traffic volume has the potential to result in

increased congestion and community safety risks. The traffic volumes are expected to be relatively low. Congestion is not anticipated as the existing roads are not frequently used (agricultural area). Traffic impacts are anticipated to be negative and of low significance during the construction and decommissioning phases. The implementation of the traffic management measures outlined in the Draft EMPr (Appendix A) will result in the overall significance being negligible.

11.3.2 OPERATIONAL PHASE

The operational phase of the proposed piggery will result in an increased traffic frequency (12 trucks per month) to and from the site due to the delivery of animal feed, transportation of pigs to slaughter, removal of waste etc. This has the potential to increase safety risks for the local community. Traffic impacts related to congestion are anticipated to be of low significance due to the surrounding agricultural land use which does not generate a large number of vehicles on the road at set peak periods. The applicant has also made provision for the upgrading and maintenance of internal access roads which will minimize traffic volumes hence minimizing community risks. Risks caused by traffic are anticipated to be low post mitigation.

11.3.3 DECOMMISSIONING PHASE

The decommissioning phase impacts will be like that of the construction phase; however, the applicant is not intending to decommission this farming activity.

11.4 PHYSICAL ENVIRONMENT AMBIENT AIR QUALITY CONSTRUCTION PHASE

During the construction phase there is likely to be an increase in dust (particulate matter) related to the following activities: excavations, transport on unpaved roads and mixing of construction materials (wind-blown materials). The deterioration of local air quality associated with increased dust emissions has the potential to result in a nuisance factor to the nearest residential receptors (<50m away). Dust can be relatively easily prevented through the implementation of mitigation measures contained in the Draft EMPr (Appendix A).

The impacts are anticipated to be of low significance provided that dust control measures are implemented. Emissions from vehicles transporting materials and labour may have an impact on local air quality potentially negatively affecting close receptors (residential house of the adjacent

landowner). Impact significance is anticipated to be low post mitigation with strict adherence to mitigation measures outlined in the Draft EMPr (Appendix A).

11.4.1 OPERATIONAL PHASE

The operational phase of the piggery will decrease the ambient air quality of the site thereby potentially affecting the surrounding landowners located between 40-120m away from the site. Air emissions from the piggery will include ammonia, methane, nitrous oxide, odours, bioaerosols and dust. The main sources of odour at intensive piggery operations are poorly maintained pig houses, inadequate housekeeping, and poor management and storage of wastewater (effluent). Impacts are anticipated to be of medium significance post mitigation with the implementation of mitigation measures outlined in the approved Draft EMPr (Appendix A).

Loading and offloading activities and increased traffic has the potential to reduce ambient air quality because of increased dust and vehicular emissions. The impact will be of low significance post mitigation with the implementation of mitigation measures outlined in the Draft EMPr (Appendix A).

11.4.2 DECOMMISSIONING PHASE

The decommissioning phase is likely to result in an increase in dust (particulate matter) related to demolishing, removal of rubble and vehicles moving in and out of the site. The decommissioning phase impacts will be similar to that of the construction phase; however, the applicant is not intending to decommission this farming activity.

11.5 NOISE

11.5.1 CONSTRUCTION PHASE

The proposed construction phases of the piggery will result in elevated noise levels which have the potential to cause disruption to sensitive receptors. This nuisance factor will likely be related to the use of machinery, vehicles and contractors on site. Since the surrounding area is predominantly agricultural land there are very few sensitive receptors. However, the nearest receptor is <50 away from the proposed site. Recommendations made in the Draft EMPr (Appendix A) must be implemented in order to ensure minimal disturbance. Provided that construction activities occur

within normal working hours (i.e., Monday to Friday 7:00am to 5pm), disturbance by elevated noise levels are likely to result in an impact of low significance.

Acceptable levels are prescribed by SANS 10103:2008 (The Measurement and Rating of Environmental Noise with Respect to Annoyance and to Speech Communication). It is the most relevant code of practice for environmental noise impact assessment in South Africa. Typical rating levels for noise in different types of districts are presented in Table 16 below. Rating levels for rural areas are applicable to this project. These values should be viewed as guidelines of typical noise levels that should not be exceeded outdoors in the various district levels. Construction activities will need to comply with noise guidelines and mitigation measures outlined in the Draft EMPr (Appendix A).

Table 16: Typical rating levels for noise in districts (adapted from SANS 10103:2008)

Type of District	**1. Equivalent Continuous Rating Level for Noise ($L_{Req,T}$) (dBA)** **2. Outdoors**		
	Day-Night ($L_{R,dn}$)	**Daytime ($L_{req,d}$)**	**Night-time ($L_{req,n}$)**
a) Rural	45	45	35
b) Suburban (with little road traffic)	50	50	40
c) Urban	55	55	45
d) Urban (with one or more of the following: workshops; business premises; and main roads)	60	60	50
e) Central Business Districts	65	65	55
f) Industrial District	70	70	60

Table 17: Categories of community/ group response (adapted from SANS 10103:2008)

Excess ($\Delta L_{Req,T}$)[a] dBA	**Estimated Community Group Response**	
	Category	**Description**
0 – 10	Little	Sporadic Complaints
5 – 15	Medium	Widespread Complaints
10 – 20	Strong	Threats of community or group action
>15	Very	Vigorous community or group action
	Strong	

11.5.2 OPERATIONAL PHASE

During the operational phase, noise will be generated by pigs, equipment, and transport vehicles. Increased noise levels during the operational phase will potentially result from disturbed or excited animals (e.g., pigs that are fed at designated times during the day become exciting when the feed wagon approaches). The noise levels at the piggery should not exceed 45dB during daytime hours and 35dB at nighttime. The piggery houses will be solidly constructed and will largely contain noise generated by the pigs. This impact is anticipated to be of medium significance post mitigation. Strict adherence to the EMPr (Appendix A) is emphasized to minimize the noise impacts to the surrounding land users.

11.5.3 DECOMMISSIONING PHASE

The decommissioning phase is also likely to have a negative impact on local noise levels, resulting from the use of machinery, vehicles, and contractors on site. To date, the applicant is not intending to decommission the activities.

11.6 HARZADOUS SUBSTANCES AND WASTE MANAGEMENT

11.6.1 CONSTRUCTION PHASE

The construction phase has the potential to generate both general waste (building rubble, domestic waste etc.) and potentially small amounts of hazardous waste (oils, spent solvents etc.). The mixing of cement and improper handling of waste/wash water and negligent small-scale spills can lead to soil, surface and groundwater contamination and secondary impact to human health and ecosystems. The presence of laborers on site requires ablution facilities which have the potential to increase soils and water pollution. Adherence to measures and spill management procedures outlined within the EMPr (Appendix A) will ensure that the impacts associated with generation, storage, use and disposal of hazardous substances, and general and hazardous waste will be appropriately mitigated. The significance of this potential impact is anticipated to be of low significance post-mitigation.

11.6.2 OPERATIONAL PHASE

Improper handling and storage of hazardous waste (rags and empty containers of fuel and oil) during the operational phase has the potential to lead to soil, surface and groundwater contamination (and secondary impact to human health and done stream ecosystems) if not managed properly. The operation of the piggery will produce animal waste (manure) which contains nitrogen, phosphorus, and other excreted substances. This will result in air emissions of ammonia and other gases including methane. Manure also contains disease causing agents such as bacteria, pathogens, viruses, and parasites. Poor handling of biological waste has the potential risk of surface and groundwater contamination through leaching and runoff resulting in an impact of high significance prior to mitigation. Wastewater from the piggery will stored in an effluent dam. Failure to contain effluents has the potential to lead to contamination of soils, surface water and groundwater with nutrients, ammonia, sediment, pesticides, pathogens, and feed additives (heavy metals, hormones) – leading to secondary impacts to water quality, human health, and ecosystems. Surface water diversions need to be installed to direct clean runoff around areas containing waste. The implementation of surface and groundwater monitoring will be required. The effluent storage dam will need to be designed with an HDPE liner in accordance with the requirements of the DWS to prevent leakage and contamination of the environment. The significance of this potential impact is anticipated to be of high significance pre-mitigation and medium with implementation of best practice waste management controls and EMPr (Appendix A).

Animal carcasses waste will be generated which will be disposed in a carcass pit on the property. The carcass pit will result in leachate which has the potential to impact on soils and water resources. Animal carcasses will be properly managed and quickly disposed of in order to prevent the spread of disease, odours and the attraction of vectors. This impact is anticipated to be of medium significance with the implementation of the EMPr mitigation measures and best management practices.

11.6.3 DECOMMISSIONING PHASE

The decommissioning phase has the potential to generate both general wastes and hazardous waste, and to result in accidental spillage of small quantities of hazardous substances, which could result in contamination of soil, surface and groundwater. The applicant is not intending to decommission this farming activity.

11.7 GROUND AND SURFACE WATER QUALITY

11.7.1 CONSTRUCTION PHASE

Improper handling, storage and mixing of concrete during the construction phase has the potential to contaminate surface and ground water resources. The chemicals and waste from the ablution facilities has the potential to pollute surface and groundwater resources. The cleaning of equipment in the construction areas has the potential to impact on water quality (surface and ground). Implementation of soil erosion and sediment control measures and spoil management contained in the EMPr (Appendix A) will minimize the negative impacts to of a low significance post mitigation.

11.7.2 OPERATIONAL PHASE

The operational phase of the Frysland Piggery will result in increased hardened surfaces such as roofs and walkways. Increased runoff from impermeable surfaces which will result in increased erosion and sedimentation on site and nearby drainage lines. Increased runoff from impermeable surfaces associated with the proposed piggery infrastructure and the waste management site has the potential to impact on the ground water and surface water quality by transporting leachate and toxins into the system in the event of containment loss or accidental spillage. This is a negative impact of medium significance post mitigation. Implementation of stormwater control measures outlined the EMPr is emphasized to minimize the negative impacts on water quality which will reduce impact probability.

Poor slurry management on the site will impact on the surface ground water resources. During the operational phase the potential exists for the pig effluent to pollute surface and groundwater resources on the site if the effluent dam is positioned, designed, and maintained irresponsibly. The effluent dam needs to be positioned as per engineer’s specifications to eliminate any negative impacts on surface and groundwater quality. Suitable management of the piggery, its wastewater management system and mortality management system is required (Appendix A) to minimize the potential negative impacts on surface and groundwater quality. The effluent dam must have a high-density polyethylene (HDPE) membrane as per the DWS requirements to contain or prevent waste constituents and leachate from escaping the proposed waste management site.

The operational phase of the piggery will result in depletion of groundwater resources in the event of over usage or exceedances. Water is a scarce resource, and all employees must be informed of the

importance of natural resources. This impact is of high significance without the implementation of mitigation measures. The quantity of groundwater abstracted daily must be metered or gauged and all records of abstractions to be recorded as per the requirements of the DWS. Regular inspection and maintenance of the boreholes, reservoirs, water pipes, valves and should be conducted to improve significance to medium. Implementation of the mitigation measures outlined in the EMPr (Appendix A) will reduce potential impact significance to medium.

11.7.3 DECOMMISSIONING PHASE

The decommissioning phase could result in contamination of surface and groundwater as a result of improper handling and storage of hazardous goods. The decommissioning of the wastewater management facility has the potential to result in contamination of soils, surface and ground water resources if not handled appropriately. The implementation of management and mitigation measures (as outlined for the construction phase) is recommended to reduce the potential impact from medium significance to low.

11.8 GEOLOGY AND SOILS

11.8.1 CONSTRUCTION PHASE

Construction activities, including excavation and stockpiling of materials, and clearing of vegetation has the potential to increase localized soil erosion. Potential indirect impacts relate to the contribution of dust as a nuisance factor from increased traffic on the unpaved road. In addition, sediment laden surface water / stormwater contamination has the potential to lead to the deterioration of receiving water bodies associated with increased turbidity. All excavated material must be adequately managed and only remove the vegetation essential for construction phase. The magnitude and extent of soil erosion will be minimized through the implementation of stringent soil erosion and sediment control measures stipulated in the EMPr (Appendix A) resulting in a medium impact significance post mitigation.

11.8.2 OPERATIONAL PHASE

The operational phase of the proposed piggery will increase the degradation and loss of topsoil resource (topsoil) due to exposure of topsoil to various elements (vehicular, pedestrians and

livestock). The use of manure on agricultural lands has both positive and negative impacts on soils. A positive impact is that it will increase the organic content of the soils which would be beneficial to site as soils are likely to have a low in organic matter. The use of manure has the potential to result in the contamination of soils which can have indirect impacts on water quality. This impact will be of high significance without the implementation of mitigation measures. The manure needs to be analyzed (heavy metal and moisture content) to test suitability before being applied onto soils. A fertilizer registration needs to be submitted DAFF before the manure is applied onto the fields.

11.8.3 DECOMMISSIONING PHASE

The decommissioning phase activities could have the potential to result in localized soil erosion. The magnitude and extent of soil erosion should be minimized through the implementation of soil erosion measures. The applicant is not intending to decommission this farming activity.

11.9 FAUNA AND FLORA

11.9.1 CONSTRUCTION PHASE

Clearing of vegetation and increase in vehicle and human activity has the potential to impact on vegetation communities. The natural state of vegetation has however been previously transformed as the site was utilized for agricultural purposes and this impact is anticipated to be of low significance post-mitigation.

The site consists of a number of alien vegetation such as Wattle and eucalyptus (SANBI, 2012) which will be removed during the construction phase. This will be a positive impact on flora because the removal of alien species gives an opportunity for natural vegetation to recover in areas where possible. Removal and disposal of Category 1b alien species from the site will be a positive impact of medium significance post mitigation.

The clearing of vegetation will result in the destruction of habitat thus resulting in the displacement of faunal species. Due to the transformed nature of the site, displacement of animals will most likely only be applicable to individual animals rather than populations and therefore irreplaceable loss of species will not occur. This impact is anticipated to be of low significance post mitigation.

11.9.2 OPERATIONAL PHASE

The operational phase has the potential to impact on vegetation by increasing proliferation of alien species from operational activities (influx of vehicles, people and materials, site disturbance). This impact is of low significance with the implementation of alien invasive removal mitigation measures contained in the EMPr (Appendix A). During the operational phase, natural vegetation must be allowed to recover in areas of disturbance.

11.9.3 DECOMMISSIONING PHASE

The decommissioning phase has the potential to improve the natural state of the site should rehabilitation occur after decommissioning. The applicant is not intending to decommission this farming activity. This is a positive impact because the site would return to its natural state.

11.10 BIOSECURITY

11.10.1 OPERATIONAL PHASE

The operational phase of the proposed piggery has the potential to increase pests such as flies, weevils, ants, termites, cockroaches, fleas, lice, mites, ticks, etc. These can be a serious problem as pest carry infectious vectors which can be detrimental to the health of the pigs. An increase in the death of pigs at the piggery has the potential to spread diseases to other nearby farms. Poor pest control will increase their infestations which is a negative impact of medium significance prior to mitigation. Regular and careful monitoring is required. Failure to do so will often result in increased cost of control, less effective or ineffective control measures and significant damage or loss.

There is also the potential for employees working with biological waste to injure themselves during the operation of the facility (syringes for animal vaccines). Unauthorized access to the site via foot or vehicle can increase biosecurity risks. Controlled access (fence) is required and the implementation of the EMPr will reduce the negative impact to a low significance.

11.10.2 DECOMMISSIONING PHASE

No impacts are anticipated during the construction and decommissioning phase of the proposed project.

11.11 NO- GO ALTERNATIVE

The no-go alternative will not result in the impacts assessed above. The status quo of the Frysland Farm property will remain with continued degradation of existing infrastructure. The alien invasive

vegetation will remain. The no go alterative will result in a loss of local and regional economic opportunities. These opportunities are anticipated during the construction and operational phases of the development. The piggery is also associated with indirect socio-economic activities which will not be realized with the no-go option. Therefore, the no-go alternative will impact on the demand and supply of pork products industries and has the potential to hinder economic growth potential.

12 IMPACT ASSESSMENT MATRIX

The risk assessment methodology (as described in Section 10) was used to assess the potential environmental impacts of the proposed Frysland Piggery development on the receiving environment. The results are provided in Table 20 (construction phases), Table 21 (Operational phase), Table 22 (decommissioning phase) and Table 23 (No-go alternative).

Table 20: Construction Phase Impacts

PRIOR TO MITIGATION											POST MITIGATION							
Aspect	Impact Description	Intensity	Extent	Duration	Consequence of Impact	Probability	Confidence	Status	Significance of Impact	Mitigation Measures	Intensity	Extent	Duration	Consequence of Impact	Probability	Confidence	Status	Significance of Impact
Social Environment																		
Local Economy & Employment opportunities	Generation of employment opportunities	Low	Low	Medium	Low	Low	Medium	**Positive**	**Low**	a) Local contractors must be used to further maximize the local opportunities. b) Tender processes must include the prioritization of local businesses contractors and labor.	Low	Medium	Low	Low	Medium	Medium	**Positive**	**Medium**
Visual and Aesthetics	Visual disturbances to surrounding land users	Medium	Medium	Low	Medium	High	Medium	Negative	Medium	a) Minimize clearing and grading where possible. b) Litter and rubble should be timeously removed c) The construction site boundary must be demarcated d) Construction at night not permitted in order to avoid lighting impacts.	Low	Low	Low	Low	Medium	Medium	Negative	Low
Traffic	Increase in traffic flow and congestion due to increased vehicular movement (construction vehicles and delivery of materials)	Medium	Medium	Low	Medium	Medium	High	Negative	Medium	a) Compliance with applicable road regulations and any permit issued in terms of the National Road Traffic Regulations (2000). b) Signage must be placed at relevant points along the access road to caution pedestrians of the movement of construction vehicles and machinery c) Site Manager to notify surrounding landowners of project and associated increased vehicular activity. d) Vehicle drivers must be aware of the local residents using the existing road.	Low	Low	Low	Low	Low	Medium	Negative	**Low**
Traffic	Increase in vehicular traffic will increase community safety risks.	High	Medium	Low	Medium	Medium	High	Negative	Medium		Low	Low	Low	Low	Low	Medium	Negative	**Low**
Physical Environment																		
Air Quality	Increase in dust (earthworks) and vehicles emission which has the potential to deteriorate local air quality and result in a nuisance factor to sensitive receptors	Medium	Medium	Medium	Medium	Medium	High	Negative	**Medium**	a) Dust suppression measures on active and stockpile, excavated, and cleared areas. b) Reduction of unnecessary traffic and vehicles travelling on unpaved roads; and strict adherence to speed limits to ensure minimal dust entrainment. d) Wherever possible, avoid dust-generating activities (i.e. excavations, grading and moving of soil) during windy periods. e) Store topsoil from construction area in stockpiles not more than 3m in height f) Cover and / or maintain appropriate freeboard on trucks hauling any loose material that could produce dust when travelling.	Low	Low	Low	Low	Low	High	Negative	Low
Noise	Elevated noise levels have the potential to cause disruption to sensitive receptors (residents) where an increase in ambient noise is discernible	Medium	Low	Medium	Medium	High	High	Negative	Medium	a) Maintain vehicles and machinery in good working order. b) Equipment with a lower noise output should be selected where practical c) No sound amplification equipment such as sirens, loud halers or hooters are to be used on site except in emergencies. d) Undertake all noisy construction activities during normal working hours i.e. 08h00 – 17h00 during weekdays.	Low	Low	Medium	Low	Low	Medium	Negative	Low
Hazardous Substances and Waste Management	Improper handling, storage and disposal of general (building rubble), domestic and hazardous waste (fuels grease and oils) leading to secondary impacts to downstream ecosystem and receptors"	medium	Medium	Medium	Medium	Medium	High	Negative	Medium	a) Waste should be separated and stored in separate skips for appropriate re-use, recycle, or disposal options. b) Hazardous waste storage (including used oils and material containing oils, solvents etc.) should be within impermeable bunded, ventilated and covered storage areas, capable of containing 110% of total volume. All storage containers are to be labelled, sealed and stored in accordance with MSDS requirements. c) Waste receptacles should be located with consideration to stormwater management and covered to prevent windblown waste. d) Working areas are to be cleared of litter daily. No litter / waste may be burnt on-site. e) Building waste must be disposed of at a landfill site.	Low	Low	Medium	Low	Low	Medium	Negative	Low

Hazardous Substances and Waste Management	Accidental spillage of hazardous substances and waste (outside of contained area and loss of primary containment) resulting in contamination of surface water, groundwater.	High	Medium	Medium	Medium	Medium	High	Negative	Medium	a) Use drip trays on vehicles and machinery. b) Contaminated soil removed as soon as possible and deposited in a designated area for disposal. c) Spill and response equipment must be accessible on-site. d) Method statements and contingency / emergency response plans should be prepared for management of hazardous materials on-site. e) Adequate spill response training	Medium	Low	Medium	Medium	Low	Medium	Negative	Low
Soils, Surface water quality	Earth moving activities and vehicles on unpaved roads will increase soil erosion and sedimentation of stormwater	Medium	Medium	Medium	Medium	Medium	Medium	Negative	Medium	a) Measures must be implemented to control soil erosion including limiting the extent of work areas, management of stormwater runoff, and sediment containment structures. b) Excavated areas to be rehabilitated as much as possible. c) Store topsoil from construction area in stockpiles not more than 1.5 - 2m in height to avoid compaction.	Low	Low	Medium	Low	Low	Medium	Negative	Low
Biotic Environment																		
Fauna and Flora	Excavations have the potential to result in loss of flora, fauna, and their habitats.	Medium	Medium	Medium	Medium	Medium	High	Negative	**Medium**	a) Vegetation should only be removed where necessary. b) The development footprint (including construction camp) should be kept to a minimum and occur on already transformed areas. c) Cleared vegetation must be disposed of appropriately and not burned. d) Temporarily disturbed areas (e.g. for support activities such as moving machinery) should be graded as soon as practical to encourage re-vegetation of indigenous vegetation. e) Alien Invasive Removal P l a n g) Vehicular access may only take place along the designated access road. f) Access to suitable and sensitive habitats for fauna should be restricted, however there are none on site. Contractors should ensure that no animals are disturbed, trapped, hunted or killed during the construction phase.	Low	Low	Low	Low	Low	High	Negative	**Low**
Fauna and Flora	Excavations and clearing of vegetation will remove alien vegetation present on site	Medium	Medium	Medium	Medium	Medium	High	Positive	Medium	a) An Alien Invasive Removal Plan must be implemented. b) 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.	Medium	Medium	Medium	High	Medium	High	Positive	Medium

Table 21: Operational Phase Impacts

PRIOR TO MITIGATION											POST MITIGATION							
Aspect	Impact Description	Intensity	Extent	Duration	Consequence of Impact	Probability	Confidence	Status	Significance of Impact	Mitigation Measures	Intensity	Extent	Duration	Consequence of Impact	Probability	Confidence	Status	Significance of Impact
Social Environment																		
Local Economy and Employment Opportunities	Generation of local employment opportunities and skills transfer	Low	Low	Medium	Low	High	High	**Positive**	**Medium**	a) Give priority to the local communities if and when employment opportunities arise, provided applicants have the necessary skills. Notify the local community of employment opportunities prior to broader (public) advertisement.	Medium	Medium	Medium	Medium	High	High	**Positive**	**Medium**
Visual and Aesthetics	Visual impacts associated with the piggery infrastructure and night lighting	Medium	Medium	Medium	**Medium**	High	High	Negative	**Medium**	a) Lighting must be carefully planned and kept to a minimum to enable work to continue. Consideration is to be given to the fact that light at night travels great distances. b) Good housekeeping and management of the piggery will be critical to prevent waste being strewn across the site and entering adjacent land. b) Planting of communities of indigenous plants will enhance biodiversity and improve aesthetics.	Low	Low	Medium	Low	Low	High	Negative	**Low**
Traffic	Increase in traffic on road network due to additional operational vehicles (operational delivery vehicles) will increase congestion.	High	Medium	Medium	Medium	High	High	Negative	**Medium**	a) Compliance with applicable road regulations and any permit issued in terms of the National Road Traffic Regulations (2000). b) The movement of vehicles into and out of the site must be managed to ensure the impact on port roads is minimized. Undertake re-calibration of existing traffic signals if required.	Low	Low	Medium	Low	Low	High	Negative	**Low**
Traffic	Increase in traffic on road network due to additional operational vehicles will increase risks to pedestrian safety.	Medium	Medium	Medium	Medium	High	High	Negative	**Medium**	a) The movement of vehicles into and out of the site must be managed to ensure the impact on port roads is minimized. Undertake re-calibration of existing traffic signals if required.	Low	Low	Medium	Low	Low	High	Negative	**Low**
Physical Environment																		
Air Quality	Increase in dust and vehicles emission which has the potential to deteriorate local air quality and result in a nuisance factor to sensitive receptors	Low	Medium	Low	Low	Low	High	Negative	**Low**	a) Reduction of unnecessary traffic and vehicles travelling on unpaved roads; and strict adherence to speed limits to ensure minimal dust entrainment. Re-vegetate or hard surface disturbed areas as soon as possible to prevent excessive dust.	Low	Low	Low	Low	Low	High	Negative	**Low**
Air Quality	Degradation of ambient air quality and nuisance due to odour generation	**High**	**Medium**	**Medium**	**High**	**High**	**High**	**Negative**	**Medium**	a) Effective housekeeping and best management practices must be implemented. Houses should be cleaned and maintained on a regular basis. b) Ventilation points on the piggery houses must be as high as possible to ensure exiting gases enter the air column as high as possible. c) Covering the wastewater collection pond can reduce odorous emissions. d) Waste spillages should be prevented at all times. e) Drains and treatment systems should be well maintained. f) Disposal of wastewater should be done in accordance with DWS and WRC guidelines.	**Medium**	**Low**	**Medium**	**Medium**	**Medium**	**High**	**Negative**	**Medium**
Noise	Increase in ambient noise caused by the livestock, machinery and increased vehicular movements	**Medium**	**Medium**	**Medium**	**Medium**	**High**	**High**	**Negative**	**Medium**	a) Maintain vehicles and machinery in good working order b) Unnecessary disturbance of the pigs should be avoided. d) Vehicles travelling to and from the site during night-time hours must be kept to a minimum. e) A complaints register should be kept onsite.	**Low**	**Low**	**Medium**	**Low**	**Low**	**High**	**Negative**	**Low**
										a) Wastewater sludge must be classified in terms of the South African Wastewater Sludge Classification System. b) The Pollutant, Microbial and Stability Classes of the wastewater sludge must be								

Hazardous Substances and Waste Management	Poor waste management (including biological waste has the potential to contaminate soils, surface and groundwater pollution	High	Medium	Medium	Medium	Medium	High	Negative	**Medium**	established. c) 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. d) All land application of wastewater must be in accordance with the DWS and Water Research Commission Guidelines for the Utilization and Disposal of Wastewater Sludge. e) 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. f) Slope and land preparation must not result in soil erosion or potential surface runoff. g) Each mortality must be placed in the pit and covered with sawdust or straw. h) Solid animal waste may only be temporarily stored in designated areas, on impermeable surfaces. b) I) Preparation and Implementation of Waste Management Plan	Low	Low	Medium	Low	Low	Medium	Negative	**Low**
Geology and Soils	Unregistered fertilizer use of organic wastes on agricultural land can result in contamination build up within soils and water resources.	High	Medium	Medium	Medium	High	High	Negative	Medium	a) Re-use of the liquid and solid fractions of the wastewater must take cognizance of Precautionary Practices b) Monitoring of the sludge and soil must be performed according to the WRC Guidelines for the Utilization and Disposal of c) Wastewater Sludge c) Sludge may only be stored in suitable facilities that are designed to ensure minimal impact on the environment. e) All organic compost must be registered with the DAFF and meet all the necessary requirements as per the Regulations.	High	Medium	Medium	Medium	Low	High	Negative	**Low**
Surface and Groundwater	Poor slurry and effluent management leading to potential soil, surface water and groundwater contamination	High	High	High	High	High	High	Negative	**High**	a) Contaminated runoff must be contained and managed in accordance with the Stormwater Management Plan (SWMP) b) The SWMP must be designed to ensure that run-off arising from operational actions, for example, the washing of vehicles and containers must be regarded as contaminated run-off and shall be treated according to wastewater management requirements. c) Runoff and stormwater must be diverted using berms and trenches. d) Surface water quality monitoring network must include monitoring for the quality of uncontaminated run-off water in stormwater drains on and adjacent to the Site. e) Surface water and groundwater monitoring must be undertaken throughout the piggery f) operations.	High	Medium	Medium	Medium	Low	High	Negative	**Low**
Soils, Surface, and Groundwater	Increased risk of erosion and sedimentation as a result of disturbances to soils during operations									a) Vehicles should only make use of dedicated roads b) Stormwater Management Plan c) Minimize clearing and grading - where possible, the time that areas are left exposed								

	(livestock and vehicular movements) leading to increased turbidity in downstream water resources	Medium	Meduim	Medium	Medium	Medium	High	Negative	**Medium**	must be minimal. g) Routine inspection of stormwater mitigation measures	Mediu m	Low	Low	Low	Low	High	Negative	Low
Biotic Environment																		
Fauna and Flora	Increased proliferation of invasive species	**Low**	**Low**	**Low**	**Low**	**Medium**	**High**	**Negative**	**Medium**	a) Alien seedlings and saplings should be frequently removed. b) Manual/mechanical removal should be used rather than chemical control. c) 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.	**Low**	**Low**	**Low**	**Low**	**Low**	**High**	**Negative**	**Low**
Biosecurity	Increased pests and spread of vectors associated with poor mortality management has the potential to spread disease leading to secondary impact on adjacent farms	**High**	**High**	**Medium**	**Medium**	**Medium**	**High**	**Negative**	**High**	a) Mortalities must be inspected on a daily and re-covered where necessary. b) Mortalities must be removed from the pig houses on a daily basis. c) Mortalities must be stored in enclosed areas prior to being taken to the carcass pit. d) Each mortality must be placed in the pit and covered with sawdust or straw.	**Low**	**Low**	**Low**	**Low**	**Low**	**High**	**Negative**	**Low**
Biosecurity	Operation of a piggery has the potential to increase pests, and vectors which may lead to health impacts on the pigs	**High**	**Medium**	**High**	**High**	**Medium**	**High**	**Negative**	**High**	a) The feed storage and distribution systems must be designed and maintained in a manner that prevents the presence and breeding of pests. b) Effective sanitation and housekeeping at the piggery will minimize the area where flies can rest and breed. c) Regular flushing of the wastewater from the houses will minimise fly breeding. d) Regularly clean the feeding areas and collect wasted feed. This will prevent the attraction of flies to the piggery. e) Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.	**High**	**Mediu m**	**Mediu m**	**Mediu m**	**Medium**	**High**	**Negative**	**Mediu m**
Biosecurity	Unauthorised access to the site (via foot or vehicles) as well as the entry of other animals increases Biosecurity risk	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**High**	**Negative**	**Medium**	a) A security fence must be erected around the piggery with controlled access point. b) Access to the property itself must also be controlled during operational hours c) The condition of the fence around the piggery must be inspected every six months.	**Mediu m**	**Low**	**Mediu m**	**Low**	**Low**	**High**	**Negative**	**Low**
Biosecurity	Potential injury of employees working with biological wastes such as syringes for vaccines	**High**	**Low**	**Medium**	**Medium**	**Medium**	**High**	**Negative**	**Medium**	a) The handling and disposal of biological waste must be conducted in a responsible manner with the assistance of a specialist. b) Appropriate storage equipment/containers must be utilised for the collection of this waste. c) Training of employees on the handling and storage of biohazard waste into the designated containers.	**High**	**Low**	**Mediu m**	**Mediu m**	**Low**	**High**	**Negative**	**Low**

Table 22: Decommissioning Phase Impact

PRIOR TO MITIGATION										POST MITIGATION								
Aspect	Impact Description	Intensity	Extent	Duration	Consequence of Impact	Probability	Confidence	Status	Significance of Impact	Mitigation Measures	Intensity	Extent	Duration	Consequence of Impact	Probability	Confidence	Status	Significance of Impact
Social Environment																		
Local Economy and Employment Opportunities	Generation of employment opportunities	Low	Low	Medium	Low	Low	Medium	**Positive**	**Low**	a) Local contractors must be used to further maximise the local opportunities.	Low	Low	Low	Low	Low	Medium	**Positive**	**Low**
Visual and Aesthetics	Visual disturbances to surrounding land users	High	Medium	Medium	Medium	High	Medium	Negative	**Medium**	a) Minimise clearing and grading where possible. b) Good housekeeping on c) Litter and rubble should be timeously removed d) The decommissioning site boundary must be demarcated.	Medium	Low	Low	Low	Medium	Medium	Negative	Low
Traffic	Increase in traffic flow and congestion due to increased vehicular movement (waste vehicles and trucks)	Medium	Low	Medium	Medium	Medium	High	Negative	**Medium**	a) Compliance with applicable road regulations and any permit issued in terms of the National Road Traffic Regulations (2000). b) Signage must be placed at relevant points along the access road to caution pedestrians of the movement of decommissioning vehicles and machinery c) Site Manager to notify surrounding landowners of activities and associated increased vehicular activity. d) Vehicle drivers must be aware of the local residents using the existing road.	Low	Low	Low	Low	Low	Medium	Negative	**Low**
Traffic	Increase in traffic on road network due to additional operational vehicles will increase risks to pedestrian safety.	Medium	Low	Medium	Medium	Medium	High	Negative	**Medium**		Low	Low	Low	Low	Low	Medium	Negative	**Low**
Physical Environment																		
Air quality	Increase in dust and vehicles emission which has the potential to deteriorate local air quality and result in a nuisance factor to sensitive receptors	High	Medium	Medium	Medium	Medium	High	Negative	**Medium**	a) Dust suppression measures on active and stockpile, excavated, and cleared areas. b) Reduction of unnecessary traffic and vehicles travelling on unpaved roads; and strict adherence to speed limits to ensure minimal dust entrainment. d) Wherever possible, avoid dust- generating activities (i.e. excavations, grading and moving of soil) during windy periods. e) Cover and / or maintain appropriate freeboard on trucks hauling any loose material that could produce dust when travelling.	Low	Low	Low	Low	Low	High	Negative	Low

Noise	Elevated noise levels have the potential to cause disruption to sensitive receptors (residents) where an increase in ambient noise is discernible	Medium	Medium	Medium	Medium	High	High	Negative	**Medium**	a) Maintain vehicles and machinery in good working order. b) Equipment with a lower noise output should be selected where practical c) Undertake all noisy construction activities during normal working hours i.e. 08h00 – 17h00 during weekdays.	Low	Low	Medium	Low	Low	Medium	Negative	**Low**
Hazardous Substances and Waste Management	Improper handling, storage and disposal of general (building rubble), domestic waste	High	Medium	Medium	Medium	Medium	High	Negative	**Medium**	a) Waste should be separated and stored in separate skips for appropriate re-use, recycle, or disposal options. b) Hazardous waste storage (including used oils and material containing oils, solvents etc.) should be within impermeable bunded, ventilated and covered storage areas, capable of containing 110% of total volume. All storage containers are to be labelled, sealed and stored in accordance with MSDS requirements. c) Waste receptacles should be located with consideration to stormwater management and covered to prevent windblown waste. d) Working areas are to be cleared of litter on a daily basis. No litter / waste may be burnt on- site. e) Building waste (rubble) must be disposed of at a landfill site. Metal and steel to be recycled.	Low	Low	Medium	Low	Low	Medium	Negative	**Low**
Hazardous Substances and Waste Management	Accidental spillage of hazardous effluent and wastewater and waste (outside of contained area and loss of primary containment) resulting in contamination of soils, surface water, groundwater.	High	Medium	Medium	Medium	High	High	Negative	**Medium**	a) Use drip trays on vehicles and machinery. b) Contaminated soil removed as soon as possible and deposited in a designated area for disposal. c) Spill and response equipment must be accessible on-site. d) Method statements and contingency / emergency response plans should be prepared for management of hazardous materials on-site. e) Adequate spill response training.	Low	Low	Low	Low	Low	High	Negative	**Low**
Soils, Surface and Groundwater	Earth moving activities will increase the potential for localised soil erosion to occur and indirect impacts related to sedimentation and increased turbidity	**High**	**Medium**	**Medium**	**Medium**	**High**	**High**	**Negative**	**Medium**	a) Measures must be implemented to control soil erosion including limiting the extent of work areas, management of stormwater runoff, and sediment containment structures. b) Excavated areas to be rehabilitated as much as possible.	**Medium**	**Low**	**Low**	**Low**	**Medium**	**High**	**Negative**	**Low**
Biotic Environment																		
Fauna and Flora	Dismantling of infrastructure has the potential to impact on vegetation on site.	Low	Low	Low	Low	Low	High	Positive	**Low**		Low	Low	Low	Low	Low	High	Negative	**Low**

Table 23: No-go Alternative

Aspect	Impact Description	Intensity	Extent	Duration	Consequence of Impact	Probability	Confidence	Status	Significance of Impact
Local Economy and Employment Opportunities	Loss of generation of employment opportunities	Medium	Medium	Medium	Medium	High	High	Negative	Medium
Local Economy and Employment Opportunities	Hindrance of growth of secondary industries and regional economy due to lack of provision of produce and pork products.	Medium	Medium	Medium	Medium	High	High	Negative	Medium
Fauna and Flora	Continued invasion of alien species on vacant site.	Medium	Medium	Medium	Medium	High	High	Negative	Medium

13 WASTE AND EFFLUENT RISK ASSESSMENT

Effluent characteristics are often grouped into physical, microbiological and chemical.

A pig voids approximately 6% of its body weight every day. Piggery waste typically has 20 to 50 times more degradable organic matter per unit of volume than municipal sewage waste.

Nutrients contained in pig effluent include nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, sodium, chloride, iron, manganese, boron, molybdenum, zinc, copper, cadmium, and lead. Pig effluent also includes waste water and feed waste feed, animal waste, and carcasses. Other wastes include various kinds of packaging, used ventilation filters, unused/spoilt medications, used cleaning materials, and sludges from wastewater treatment if present (which may contain residual amounts of growth enhancers and antibiotics, among other hazardous constituents).

Pigs like all animals (including humans) expel microorganisms with faecal matter. These organisms will include their gut microbiota, parasite eggs, and any disease organisms present in their system. The exact types of organisms will vary between farms and will be influenced by the health status of the pigs on that farm.

What is the biosecurity risk of pond effluent?

Environmental concerns about piggery effluent have tended to be focused on the potential for pollution from nutrients such as nitrogen and phosphorus, or odour problems and air quality. There is however growing community concern about all animal effluent treatment and disposal systems based on the potential for pathogenic organism contamination of human food and water systems.

Waste feed

Livestock feed includes hay, grain (sometimes supplemented with protein, amino acids, enzymes, vitamins, mineral supplements, hormones, heavy metals, and antibiotics) and silage. Waste feed, including additives, may contribute to the contamination of stormwater runoff, primarily because of its organic matter content.

Animal waste

The piggery produces animal waste, mainly in the form of un-metabolised nutrients excreted as manure. Manure contains nitrogen, phosphorus, and other excreted substances which may result in air emissions of ammonia and other gases and may pose a potential risk of contamination to surface and groundwater resources through leaching and runoff. Manure also contains disease-causing agents such as bacteria, pathogens, viruses, parasites, and prions which may potentially affect soil, water and plant resources. Animal wastes can either be liquid, slurry or solid.

The manure collection system at Endwell Farm includes slatted floors that allow manure to drop into the storage area located beneath the floor. Manure is flushed from the storage area and passed through a filter, which separates the solids from the liquids. The solids are composted and the liquids are stored in an effluent holding pond.

Manure may be used as a fertiliser on agricultural land after careful assessment of potential impacts due to the presence of hazardous chemical and biological constituents.

Carcasses

Animal carcasses should be properly managed and quickly disposed of in order to prevent the spread of disease and odours, and avoid the attraction of vectors.

Mitigation and management

Measures suggested to minimise the wastage of feed:

• Promote efficient storage, handling and use of feed by maintaining records of feed purchases and livestock feed use;

• Use covered and protected feeders to prevent feed from exposure to rain and wind;

• Maintain feeding systems in good working condition to prevent spills and feed contact with the ground;

• Consider mixing of waste feed with other recyclable materials destined for use as fertilizer.

Measures suggested with regard to the handling of manure

• Match feed content to the specific nutritional requirements of the animals in their different production and growth stages;

• Use low-protein, amino acid-supplemented diets;

• Grind feed to increase utilisation efficiency by the animals, allowing the use of less feed and thereby reducing the amount of manure generated (as well as increasing production efficiency);

• Use low-phosphorus diets with highly digestible inorganic phosphates;

• Use quality, uncontaminated feed materials;

• Ensure production and manure storage facilities are constructed to prevent urine and manure contamination of surface water and groundwater (e.g. use concrete floors, collect liquid effluent from pens, and use roof gutters in buildings to collect and divert clean stormwater);

• Keep waste as dry as possible by scraping wastes instead of, or in addition, to flushing with water to remove waste;

• Reduce the amount of water used during cleaning (e.g. by using high-pressure, low-flow nozzles);

• Minimise the surface area of manure in storage;

• Locate manure stacks way from water bodies, floodplains, or other sensitive habitats;

• Check for storage system leakage regularly e.g. inspect tanks for corrosion of seams, especially those near ground level, annually empty and inspect tanks;

• Use double valves on outlets from liquid tanks to reduce the probability of release;

• Conduct manure spread only as part of a well-planned strategy that considers potential risks to health and the environment due to the presence of chemical and biological agents as well as nutrient balance in an agricultural setting. Ensure that manure is applied to agricultural land only during periods that are appropriate for its use as fertiliser (generally just before the start of the growing season);

• Manure storage facilities should have capacity for 3- 6 months of manure production to avoid over application;

• Remove liquids and sludge from lagoons as necessary to prevent overtopping;

• Build a reserve slurry storage lagoon.

Measures suggested with regard to the handling of carcasses

• Place the on-site burial pit on stable, low-permeability soils with sufficient physical separation from houses and water resources to avoid contamination by vapours and leachate from buried, decaying materials.

Wastewater

Livestock operations most commonly generate non-point source effluents due to runoff from feed (including silage) storage, loading, and unloading, livestock housing, feeding, and watering, waste management facilities, and areas of land application of manure.

Effluents have the potential to contaminate surface water and groundwater with nutrients, ammonia, sediment, pesticides, pathogens and feed additives, such as heavy metals, hormones and antibiotics. Effluents from livestock operations typically have a high content of organic material and consequently a high biochemical oxygen demand (BOD) and chemical oxygen demand (COD), as well as nutrients and suspended solids (TSS).

Mitigation and management

Measures suggested to reduce the impact of environmental pollution by wastewater:

• Install vegetative filters to trap sediment;

• Install surface water diversions to direct clean runoff around areas containing waste;

• Implement buffer zones to surface water bodies, avoiding the application of manure within these areas.

• Implement a surface water and groundwater quality monitoring program.

Air emissions

Air emissions from the piggery include ammonia, methane, nitrous oxide, odours, bioaerosols and dust. Effective waste management, as discussed in Impact 1, is the first step towards reducing air emissions.

Ammonia and odours

Ammonia gas and other sources of odour are generated primarily during denitrification of manure and can be released directly into the atmosphere at any stage of the manure handling process, including through ventilation of buildings and manure storage areas. Ammonia gas levels are also affected by the ambient temperature, ventilation rate, humidity, stocking rate, litter quality and feed composition (crude protein). Ammonia gas has a sharp and pungent odour and can act as an irritant when present in high enough concentrations. Ammonia gas deposition into surface waters may contribute to their eutrophication. Release of ammonia gas also reduces the nitrogen content and therefore the fertiliser value of the manure.

Dust

Dust can reduce visibility, cause respiratory problems, and facilitate the transport of odours and diseases.

Mitigation and management

Measures suggested to reduce the impact of ammonia, odours and greenhouse gases

• Control the temperature, humidity, and other environmental factors of manure storage to reduce emissions;

• Consider composting of manure to reduce odour emissions;

• Reduce emissions and odours during land application activities by applying a few centimeters below the soil surface and selecting favourable weather conditions.

• Increase the carbon to nitrogen ratio in feeds to reduce methane and nitrous oxide production;

Measures suggested to reduce the generation of dust

• Install dust collection systems at dusty operations, such as feed grinding;

• Prevent overgrazing of pastureland;

• Implement fugitive-dust-control measures, such as wetting frequently travelled dirt roads, as necessary.

14 HEALTH RISK ASSESSMENT

The air within swine confinement buildings contains many contaminants that are hazardous to human health. These hazards include gases, swine confinement dusts and microorganisms or their components. The dust generated within indoor swine buildings may contain many types of particles including: animal dander; faecal material and urine of both pigs and rodents; feed components; bedding materials; absorbed gases and chemicals. Importantly, this dust also contains microorganisms such as viruses, bacteria, yeasts, moulds and their by-products. Some 70%-90% of swine dust is thought to be biologically active in its effects.

These include, amongst others:

• Manual handling issues

• Noise

• Animal handling

• Lone working

• Hazardous chemicals

• Confined spaces

• Farm equipment

13.1 Important Measures to Reduce Risk to Swine Workers

1. Dust Control

- All housing units should be regularly and thoroughly cleaned, e.g. farrowing units every 4 weeks, fattening units every 8 to 10 weeks.
- Reduce dust from feed by adding oil to the dry rations.
- Mix gestation rations with water.
- Undertake appropriate and regular maintenance of feeding equipment.
- Ensure work in swine houses is done at a calm pace to avoid exciting the pigs and reduce dust concentrations.
- Air filtration: A well designed and managed ventilation system will control the level of gases, dusts and vapours in swine confinement buildings.
    - Mechanical exhaust ventilation is the most common type of system used and consists of three basic components - properly sized fans, properly sized and distributed fresh air inlets and controls.

13.2 Personal Protective Equipment

- Appropriate disposable filtering facepiece respirators or orinasal masks will significantly reduce the risk of respiratory illness occurring were airborne contaminants cannot be reduced to safe levels by other means, e.g. ventilation. Appropriate training is critical to their effective use.
- Disposable and orinasal masks must be of correct fit. It is also imperative that reusable masks are maintained and stored correctly.
- Appropriate use of personal protective equipment (PPE) includes following appropriate donning, removal and disposal procedures.
- Overalls should be cleaned after use and stored separately from regular clothing.
- Workers should be provided with and advised to use handwashing facilities after leaving the swine housing area and must be encouraged to not touch their nose/face until after their hands have been thoroughly cleaned.

15 ENVIRONMENTAL IMPACT ASSESSMENT STATEMENT

This assessment has found that both the construction and operational phases of the proposed Frysland Piggery facility have the potential to have direct and indirect impacts on the environment of variable character (i.e. positive and negative), magnitude and overall significance.

Mitigation measures to improve and mitigate negative impacts have been proposed and included in the Draft EMPr **(Appendix A).** Both the initial and residual (post-mitigation) significance of impacts have been presented throughout, so as to obtain an indication of the effectiveness of the mitigation measures. Potential impacts associated with the proposed project have been assessed and the significance of these evaluated with consideration of proposed mitigation measures (i.e. post-mitigation):

13.1 CONSTRUCTION PHASE IMPACTS

Employment opportunities which is a positive impact was identified as being of medium post- mitigation because of the duration of the proposed project. Traffic impacts decreased air quality, visual impacts, increased soil erosion, accidental spillage of hazardous substances were considered to be of medium significance pre-mitigation. However, with the implementation of proposed mitigation measures, impacts can be reduced to low significance, post-mitigation. The removal of alien invasive species on site will be a positive impact of medium significance.

13.2 OPERATIONAL PHASE IMPACTS

The majority of the potential impacts are negative in nature (social, physical and biotic) but are expected to be of low significance post-mitigation. Potential negative impacts associated with the piggery is a decrease in ambient air and noise quality. These are deemed to be of low significance post-mitigation. The extent of these impacts is reduced by the nature of the area. Contamination of soils, surface water, and groundwater and due to improper handling of waste management and mortality management facilities will be of high significance pre mitigation. Adequate management of the piggery, its wastewater management system and mortality management system is emphasized in order to minims impacts to medium significance. The operation of the piggery will contribute to local and regional economic growth, which is of medium significance. The extent of this positive impact is significant to the region's economy.

13.3 DECOMMISIONING

Potential negative impacts associated with the decommissioning phase piggery is a decrease in ambient air and noise quality, which are of low significance. Increase in traffic congestion and community risks will be impacts of medium significance. There is the potential for contamination of soils, surface water, and groundwater and due to accidental spillages and improper handling of wastes. The extent if this impact is of medium significance prior to mitigation. A positive impact associated with the decommissioning phase is the improvement of vegetation on site, which will be of low significance if not mitigated. Lisakhanya Piggery is not intending to decommission this farming activity.

13.3.1 NO GO

The no-go option will result in a loss of generation of employment opportunities and hindrance in growth of secondary industries. These impacts are negative and are of a medium significance.

14 CONCLUSION

The overall objective of the BA process is to provide sufficient transparent and technically robust information to enable informed decision-making by the authorities. This has been undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures. The impacts assessed by the EAP have allowed for the development of the Draft EMPr **(Appendix A).** The proposed Frysland Piggery facility will have positive and negative impacts on the biophysical and social environment as the site. The identified negative impacts/environmental risks are mostly low-medium post mitigation. All mitigation measures proposed in this report and the draft EMPr must be implemented during all phases of the proposed project. It is further noted that the Draft EMPr must be viewed as a dynamic, working document that will be improved upon as and when required.

It is the opinion of ENVISO that the information contained in this document is sufficient for EDTEA to make an informed decision for the EA being applied for in respect of this project. It is further recommended that the EA should be issued in accordance with the current legal requirements under the NEMA and subject to adherence to mitigation measures outlined in this report and the accompanying Draft EMPr **(Appendix A).**