

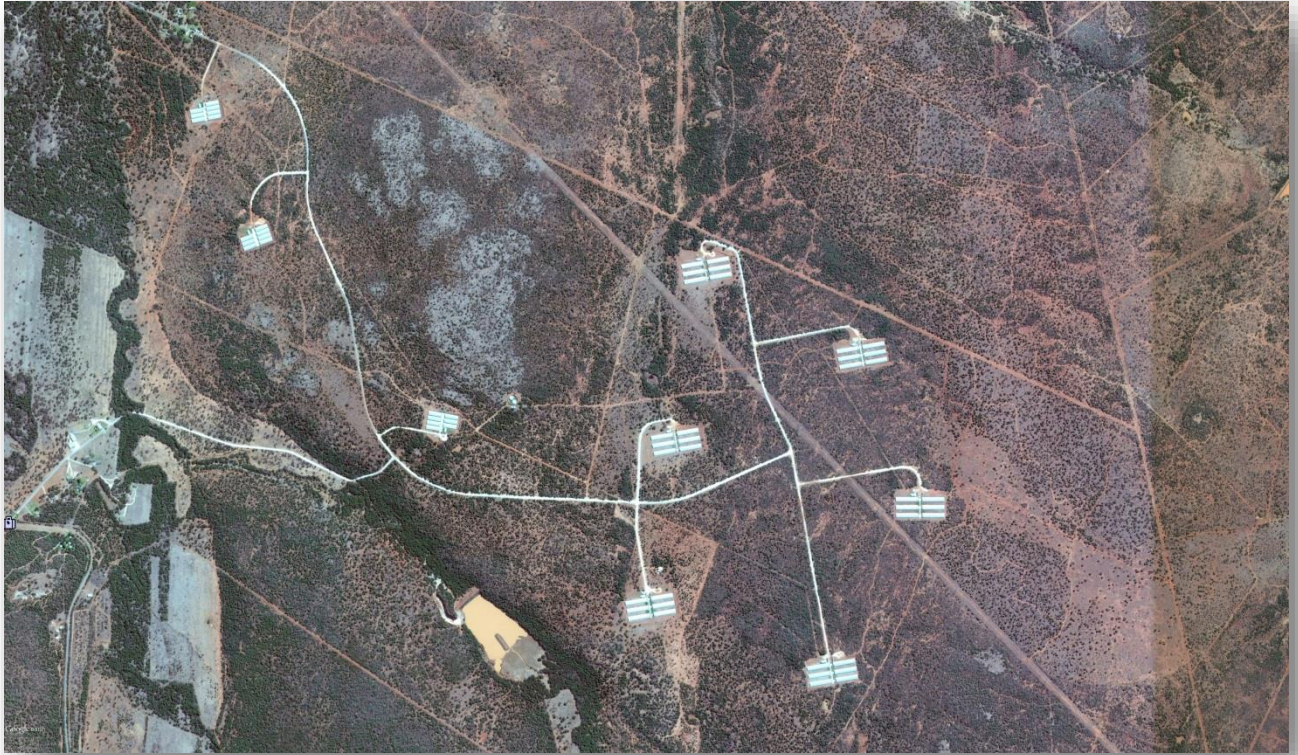


**Client  
Project**

RCL FOODS LIMITED  
ROODEWAL BREEDER FARM  
EXPANSION – DRAFT EIAR  
EIA REF NO.: NWP/EIA/17/2017  
MARCH 2018

**Labesh**

ability to sustain



RCL FOODS LIMITED  
ROODEWAL BREEDER FARM EXPANSION  
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT  
REPORT  
EIA REF NO.: NWP/EIA/17/2017

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## DEFINITIONS

### Alternatives

In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the-

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

### Application

An application for an Environmental Authorisation (EA).

### Biodiversity Plan

A spatial plan that identifies one or more categories of biodiversity priority areas, using the principles and methods of systematic biodiversity planning.

### Biodiversity Sector Plan

A map of Critical Biodiversity Areas and Ecological Support Areas accompanied by contextual information, land and resource-use guidelines and supporting GIS data. The map must be produced using the principles and methods of systematic biodiversity planning. A Biodiversity Sector Plan is the precursor to a Bioregional Plan.

### Biodiversity target (threshold)

The minimum proportion of each ecosystem type that needs to be kept in a natural or near-natural state in the long term in order to maintain viable representative samples of all ecosystem types and the majority of species associated with those ecosystem types.

### Biosphere Reserve

An ecosystem with plants and animals of unusual scientific and natural interest. It is a title given by UNESCO to help protect these ecosystems and associated species etc. The plan is to promote management, research and education in ecosystem conservation. This includes the sustainable use of natural resources.

### Buffer Area

Unless specifically defined, means an area extending 10 kilometres from the proclaimed boundary of a world heritage site or national park and 5 kilometres from the proclaimed boundary of a nature reserve, respectively, or that defined as such for a biosphere.

### Conservation Area

Areas of land not formally protected by law, but informally protected by the current owners and users and managed at least partly for biodiversity conservation. Because there is no long-term security associated with conservation areas, they are not considered a guaranteed form of protection.

### Critical Biodiversity Areas

Terrestrial and aquatic areas required to meet biodiversity targets for ecosystems, species or ecological processes, as identified in a systematic biodiversity plan.

### **Cumulative Impact**

In relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

### **Development**

The building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, including any associated post development monitoring, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.

### **Development footprint**

Any evidence of physical alteration as a result of the undertaking of any activity.

### **EAP**

An environmental assessment practitioner as defined in section 1 of the National Environmental Management Act (NEMA).

### **Ecological corridors**

Ecological corridors, also referred to as biodiversity corridors, can be landscape structures of various size, shape and habitat composition that maintain, establish or re-establish natural landscape connectivity. They can have a continuous or interrupted structure or a structure of stepping stones (Jongman *et. al.*, 2002).

### **Ecological Support Areas**

Terrestrial and aquatic areas that are not essential for meeting biodiversity targets, but play an important role in supporting the ecological functioning of one or more Critical Biodiversity Areas, or in delivering ecosystem services.

### **EMPr**

An Environmental Management Programme contemplated in regulations 19 and 23 of the Environmental Impact Assessment (EIA) Regulations, 2014.

### **Environment**

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

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

### **Environmental Impact Assessment**

A systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes Basic Assessment and Scoping and Environmental Impact Reporting.

### **Environmental Impact Assessment Report**

A report contemplated in regulation 23 of the EIA Regulations, 2014.

### **Independent**

In relation to an EAP, a specialist or the person responsible for the preparation of an environmental audit report, means-

- a) that such EAP, specialist or person has no business, financial, personal or other interest in the activity or application in respect of which that EAP, specialist or person is appointed in terms of the EIA Regulations; or
- b) that there are no circumstances that may compromise the objectivity of that EAP, specialist or person in performing such work;

excluding -

- (i) normal remuneration for a specialist permanently employed by the EAP; or
- (ii) fair remuneration for work performed in connection with that activity, application or environmental audit.

### **Indigenous Vegetation**

Vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

### **Integrated Development Plan (IDP)**

A strategic development plan required by law and developed through participatory processes, to guide and inform all planning, budgeting, management and decision-making in a municipal area in South Africa. [Definition from Biodiversity for Development].

### **Important Bird Areas (IBA)**

The Important Bird and Biodiversity Areas (IBA) Programme is one of BirdLife International's most important conservation initiatives. The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that are globally threatened, have a restricted range, are restricted to specific biomes/vegetation types, and that have significant populations, for example 20 000 water birds ([www.birdlife.org.za](http://www.birdlife.org.za)).

### **Mitigation**

To anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

### **Phased Activities**

An activity that is developed in phases over time on the same or adjacent properties to create a single or linked entity.

### **Plan of Study for Environmental Impact Assessment**

A study contemplated in regulation 22 of the EIA Regulations that forms part of a Scoping Report and sets out how an Environmental Impact Assessment will be conducted.

### **Present Ecological State (PES)**

The PES of a river is expressed in terms of various components. That is, drivers (physico-chemical, geomorphology, hydrology) and biological responses (fish, riparian vegetation and aquatic invertebrates), as well as an integrated state, the EcoStatus.

### **Protected Area**

An area of land or sea that is formally protected by law and managed mainly for biodiversity conservation. This is a narrower definition than the IUCN definition, which includes areas that are not legally protected and that would be defined in South Africa as Conservation Areas rather than Protected Areas.

### **Registered Interested and Affected Party**

In relation to an application, means an Interested and Affected Party whose name is recorded in the register opened for that application in terms of regulation 42 of the EIA Regulations, 2014.

### **Scoping Report**

A report contemplated in regulation 21 of the EIA Regulations, 2014.

### **S&EIR**

The scoping and environmental impact reporting process contemplated in regulation 21 to regulation 24 of the EIA Regulations, 2014.

### **Significant Impact**

An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.

### **Specialist**

A person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies.

### **Systematic Biodiversity Plan**

A plan that identifies important areas for biodiversity conservation, taking into account biodiversity patterns (i.e. the principle of representation) and the ecological and evolutionary processes that sustain them (i.e. the principle of persistence). A Systematic Biodiversity Plan must set quantitative targets/thresholds for aquatic and terrestrial biodiversity features in order to conserve a representative sample of the biodiversity pattern and ecological processes.

### **Watercourse**

- (a) a river or spring;
  - (b) a natural channel in which water flows regularly or intermittently;
  - (c) a wetland, pan, lake or dam into which, or from which, water flows; and
- any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and  
a reference to a watercourse includes, where relevant, its bed and banks.

### **Wetland**

Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

## ABBREVIATIONS

<b>BID</b>	-	Background Information Document
<b>CRR</b>	-	Comments and Response Report
<b>DWS</b>	-	Department of Water and Sanitation
<b>EA</b>	-	Environmental Authorisation
<b>EAP</b>	-	Environmental Assessment Practitioner
<b>EIA</b>	-	Environmental Impact Assessment
<b>EIR</b>	-	Environmental Impact Report
<b>EMF</b>	-	Environmental Management Framework
<b>EMPr</b>	-	Environmental Management Programme
<b>GN</b>	-	Government Notice
<b>I&amp;AP</b>	-	Interested and Affected Party
<b>IWULA</b>	-	Integrated Water Use Licence Application
<b>NEMA</b>	-	National Environmental Management Act, Act No. 107 of 1998, as amended
<b>NEM:WA</b>	-	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended
<b>NHRA</b>	-	National Heritage Resources Act, 1999 (Act No. 25 of 1999), as amended
<b>NWA</b>	-	National Water Act, 1998 (Act No. 36 of 1998), as amended
<b>NWREAD</b>	-	North West Department of Rural, Environment and Agricultural Development
<b>R</b>	-	Regulation
<b>SAHRA</b>	-	South African Heritage Resources Agency
<b>S&amp;EIR</b>	-	Scoping and Environmental Impact Reporting

## 1. PROJECT TITLE

Roodewal Breeder Farm Expansion.

## 2. APPLICANT DETAILS

<b>Applicant Name</b>	RCL Foods Limited
<b>Contact Person</b>	Mr Korf Stoltz
<b>Postal Address</b>	PO Box 2734, Westway Office Park, 3635
<b>Telephone Number</b>	031 242 8531
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## 3. ENVIRONMENTAL ASSESSMENT PRACTITIONER DETAILS

<b>Environmental Assessment Practitioner Company</b>	Labesh (Pty) Ltd
<b>Contact Person</b>	Lourens de Villiers
<b>Postal Address</b>	Postnet Box 469, Private Bag X504, Sinoville, 0129
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<b>Qualifications</b>	B.Sc Earth Science (North West University) Hons B.Sc Geography and Environmental Studies (North West University) M.Sc Water Resource Management (University of Pretoria)
<b>Relevant experience</b>	More than 15 years' experience conducting Environmental Impact Assessment processes

The EAP's Curriculum Vitae is attached to this report under Appendix E.

## 4. LOCATION OF THE DEVELOPMENT FOOTPRINT

The properties for the proposed development and its associated activities are as follows:

Property/Land Parcel	21 digit Surveyor General Code	Property size
The Remaining Extent of Portion 6 of the Farm Roodewal 322 JQ	T0JQ00000000032200006	467.8485ha
Portion 8 of the Farm Roodewal 322 JQ	T0JQ00000000032200008	406.8471ha
Portion 11 of the Farm Roodewal 322 JQ	T0JQ00000000032200011	406.8032ha
Portion 12 of the Farm Roodewal 322 JQ	T0JQ00000000032200012	312.2624ha
Portion 15 of the Farm Roodewal 322 JQ	T0JQ00000000032200015	668.7238ha
Portion 17 of the Farm Roodewal 322 JQ	T0JQ00000000032200017	441.7311ha
Portion 58 of the Farm Elandsfontein 366 JQ	T0JQ00000000036600058	126.0860ha
<b>Total</b>		<b>2 830.3021ha</b>



The project location is ±18km to the south-west of Rustenburg, in the Kgetlengrivier Local Municipality, Bojanala Platinum District Municipality, North West Province. Access to the project properties is from the R52 as well as the gravel road that links the R52 to the R30 (Derby). The GPS coordinates for the project site are as follows:

25°47'5.70"S; 27° 6'3.87"E

A locality map, provided on the next page, shows the location of the seven project properties, at an appropriate scale. The project properties are located within the A22C quaternary catchment.

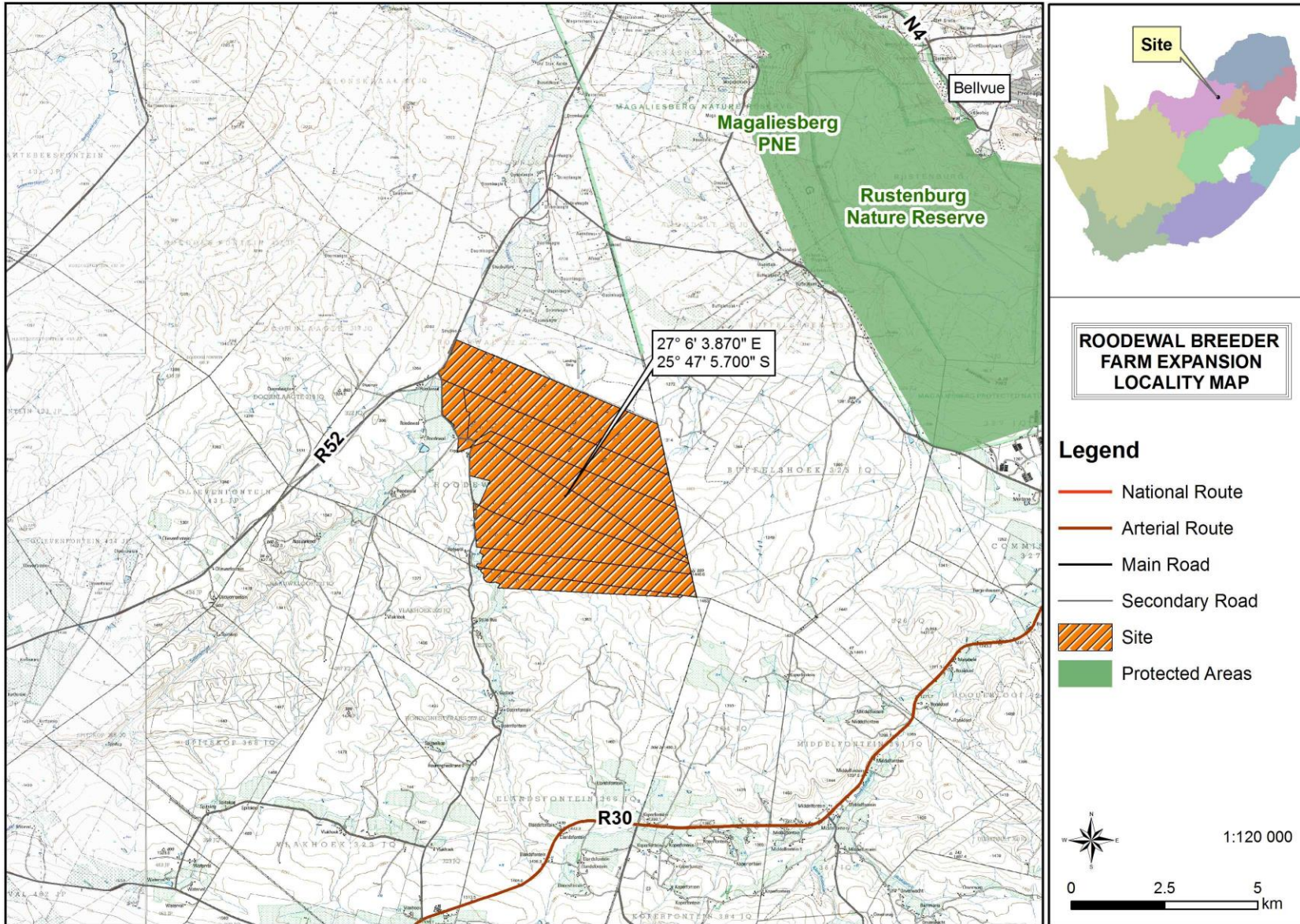


Figure 1: Site locality map

The following photos give an indication of the current status of the project properties. More photographs are given under Appendix B.



Figure 2: Existing laying farm photographs



Figure 3: Existing laying farm photographs



Figure 4: Existing laying farm photographs



Figure 5: Existing rearing farm photographs



Figure 6: Proposed site for the Solar PV Plant



Figure 7: Proposed site for the Egg Bank



*Figure 8: Photographs of the proposed rearing sites (currently mostly undisturbed)*



Figure 9: Photographs of the proposed rearing sites (currently mostly undisturbed)

## 5. SCOPE OF THE PROPOSED DEVELOPMENT AND ACTIVITIES

### 5.1 Description of the activities to be undertaken

RCL Foods Limited own the largest integrated chicken company, namely Rainbow Chicken Farms, in South Africa. This company supplies 4.7 million broiler chickens into the South African consumer market per week. In the Northern region, which includes the Gauteng and North West Provinces, their production is 1.7 million birds per week.

In the Rustenburg area, RCL Foods Limited own the seven below listed project properties (2 830.3021ha in total). Portions 8, 15 and 17 of the farm Roodewal 322 JQ were existing farms belonging to RCL Foods Limited, whereas Portions 6, 11 and 12 of the farm Roodewal 322 JQ and Portion 58 of the farm Elandsfontein 366 JQ (collectively referred to as Kwammatau) were acquired by RCL Foods Limited in January 2016.

- The Remaining Extent of Portion 6 of the farm Roodewal 322 JQ;
- Portion 8 of the farm Roodewal 322 JQ;
- Portion 11 of the farm Roodewal 322 JQ;
- Portion 12 of the farm Roodewal 322 JQ;
- Portion 15 of the farm Roodewal 322 JQ;
- Portion 17 of the farm Roodewal 322 JQ; and
- Portion 58 of the farm Elandsfontein 366 JQ.

#### Current activities on the project site

Currently, RCL Foods Limited operates nine (9) chicken farms on the two northernmost properties (Portions 8 and 15 of the farm Roodewal 322 JQ). The nine farms consist of three rearing farms on the western side of the properties and six laying farms on the eastern side of the properties.

#### Rearing Farms

The three Rearing Farms each consist of seven Rearing houses, with a total of 21 Rearing houses. At each Rearing Farm, there are six female houses and one male house. The house dimensions are 56m x 15m (840m<sup>2</sup>). At each farm, there are 52 920 female birds and 6 350 male birds. In total, there are therefore 177 810 birds between the three Rearing Farms. As there are two production cycles per year, this equates to 355 620 birds per year.

#### Laying Farms

The six Laying Farms each consist of six houses, with a total of 36 Laying houses. The house dimensions are 99m x 16m (1 584m<sup>2</sup>). At each farm, there are 49 745 female birds and 5 271 male birds. In total, there are therefore 330 096 birds (females and males) between the six Laying Farms.

#### Current totals

- 57 poultry houses (21 Rearing houses and 36 Laying houses); and
- 685 716 birds per year.

#### The proposed project

The proposed project will entail the expansion and upgrading of the Roodewal Breeder Farm. The motivation for the expansion stems from the following: due to urbanisation and encroachment of mines close to RCL Foods Limited's chicken farms in the Gauteng region, RCL wishes to relocate some of its breeder farms' production to Rustenburg. As part of the relocation, RCL also wishes to increase the capacity of the existing breeder farm.



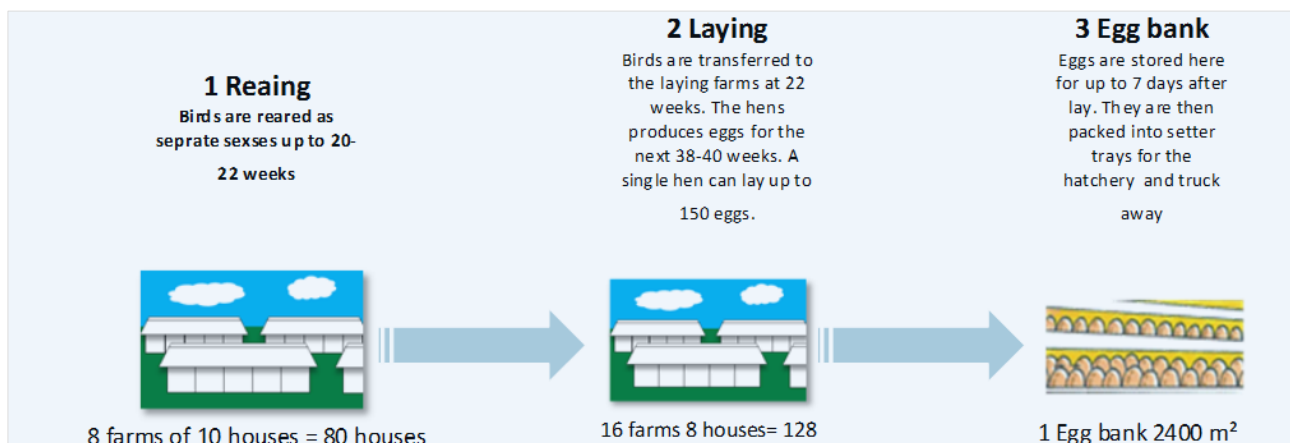
The proposed project will include the changing, upgrading and expansion of the Roodewal Breeder Farm through the following:

- On the northern part of the project site, all of the 21 existing Rearing houses will be upgraded, expanded and converted into Laying houses and the 36 existing Laying houses will be upgraded and expanded. 71 new Laying houses will also be built on the northern part of the site. There will therefore be 128 Laying houses in total (16 farms with eight houses at each farm). The dimensions of the houses will be 114m x 15m (1 710m<sup>2</sup>). Each house will have a capacity for 8 291 female birds and 878 male birds (9 169 birds in total per house). Each farm will therefore house 66 328 female birds and 7 024 male birds. 1 173 632 birds will be kept in Laying houses per year (combined total of the 16 Laying Farms);
- On the southern part of the project site, eight new Rearing farms will be built. Each farm will consist of 8 female houses (64 in total), with dimensions 84m x 15m (1 260m<sup>2</sup>), and 2 male houses (16 male houses in total), with dimensions 75m x 15m (1 125m<sup>2</sup>). Each female house will have a capacity for 8 820 birds and each male house will have a capacity for 4 234 birds. 632 224 birds will be housed per cycle and with two cycles per year, this equates to 1 264 448 birds being kept in Rearing houses per year;
- The construction of an Egg Bank where eggs will be separated into commercial- and production- egg rooms;
- Existing services, including water supply, electricity supply and roads, will be upgraded and expanded upon;
- The construction of a Wastewater Treatment Plant to treat sewage, wastewater and wash water;
- The construction of a new entrance to the Rearing Farm on the southern part of the site;
- The construction of a 10MW Solar PV Plant; and
- The construction of two new Water Reservoirs (±320m<sup>3</sup> each).

#### Proposed totals for the entire site after the expansion

- 208 poultry houses (80 Rearing houses and 128 Laying houses); and
- 2 438 080 birds per year.

Please refer to the figure below for a schematic of the breeder farm processes.



#### Rearing Farms – process description

At the rearing farms, day old chicks are reared (raised) to become laying hens (0-22 weeks). The sexes are split and the males and females are raised separately, with the males in male houses and the females in female houses. Rearing farms are used twice per year (26 week cycles) and the houses are environmentally designed so that the farmer can control all conditions within the houses, including temperature, airflow, humidity, light intensity, water and feed.

Four weeks before placement of the chicks and at the end of the previous production cycle, the houses are prepared. Using a Bobcat front-end loader, the manure from the previous cycle is mechanically pushed to the front of the house and

then loaded onto the manure-buyer's truck. The manure buyer will then remove the manure from the farm. Approximately 60m<sup>3</sup> of manure is generated per house, per cycle (two cycles per year). Once all the manure has been removed, the houses will be dry cleaned, seeped/soaked and wet scrubbed, followed by a steam wash of up to 140°C. This process can take up to six hours per house. A rearing farm with 10 houses will generate 13m<sup>3</sup> of wash water per cycle. As there are eight rearing farms, and two production cycles per year, this equates to 208m<sup>3</sup> of wash water generated at the rearing farms per year (13m<sup>3</sup> x 8 farms x 2 cycles per year). No chemicals are used for the washing process. All wash water will be collected and trucked to the proposed wastewater treatment plant. A sterilisation process is finally also applied to the houses. The cleaning process is conducted according to RCL Foods' Best Operating Practices Manual for the washing of poultry houses.

The rearing farms are heated as they will receive day-old chicks. Two 900 kW hot water boilers will be used to heat water to a temperature of 80°C. The hot water will be transferred with pipes to radiator heaters (called Cubos) that are installed in the rearing houses. Circulation fans will circulate the air inside the house through the heaters until the correct temperature is achieved. A controller will manage the temperature set point and start and stop the heaters as required to maintain the necessary temperature within each house. The water in this heating system is recycled, thereby minimising the usage of water once the system is full and all air has been removed from the system. The water in the system does, however, need to be topped up, but this is not more than approximately 5 litres per day. Two boilers will be used per farm and there will be eight farms at the site. Therefore, there will be 16 boilers in total at the rearing farm, using ±80 litres of top-up water per day (16 boilers x 5 litres of water). 350kg of coal is used per boiler/hour and 10% of this is converted to boiler ash during the combustion process. During summer months, the houses will need to be heated less than in winter months and the coal and water usage will therefore be less in summer than in winter.

As the birds grow feathers, they begin to release heat. The heat released from the flock will eventually necessitate that the houses are cooled. A comprehensive ventilation system will be installed in the houses and will consist of extraction fans, air inlets and a high pressure cooling system. As the heat rises in the house, the controller will open the air inlets and an extraction fan will extract the warm air through the inlets to cool down the house. If this is not sufficient, the high pressure cooling system will be activated to bring the temperature back to set point temperature. The controller will switch between heating and cooling to maintain the desired set point temperature in the houses.

The houses will be equipped with Light Emitting Diode (LED) lighting systems. The lights will also be controlled from the controller to simulate light intensity and day length. No natural day light will be allowed to enter the houses and all air and ventilation entries will be equipped with light excluders to eliminate natural light.

Each farm will be equipped with eight 20ton bulk feed tanks and feed will be delivered into these tanks using trucks. The feed will then be measured and transferred to each poultry house with an auger system. The auger will deliver the feed to the in-house feeding system that will in turn distribute the feed through the houses so that the birds are all fed at the same time.

The houses will have a 2 500kpa water supply to a header tank in order to guarantee water supply to the birds. From this tank the water will flow to the in-house drinking system. The drinker systems are installed throughout the houses to ensure that all the birds have access to water all times.

### **Laying Farms – process description**

Laying farms are the farms where the eggs are produced. At 22 weeks of ages, the male birds are moved from the rearing farms into the layer farm houses. A week later the female birds are moved into the same houses. At this stage, both the male and female birds are maturing. With the addition of light stimulation, mating will start and the first eggs are produced at around 24-25weeks. Layer houses are equipped with nest box systems so there is space for the females to lay their eggs. Layer farms are used once per year (one cycle per year), when the birds are 22-62 weeks of age. The houses are

environmentally designed so that the farmer can control all conditions including temperature, airflow, humidity, light intensity, water/feed supplies and egg collection.

Four weeks before placement of the layer birds, and at the end of the previous production cycle, the houses will be prepared using a similar process as for the rearing farms. Using a Bobcat front-end loader, the manure from the previous cycle is mechanically pushed to the front of the house and then loaded onto the manure-buyer's truck. The manure buyer will then remove the manure from the farm. Approximately 70m<sup>3</sup> of manure is generated per house, per cycle. Once all the manure has been removed, the houses will be dry cleaned, seeped/soaked and wet scrubbed, followed by a steam wash of up to 140°C. This process can take up to six hours per house. A laying farm with eight houses will generate 10.4m<sup>3</sup> of wash water per cycle. As there are 16 rearing farms, and one production cycle per year, this equates to 166.4m<sup>3</sup> of wash water generated at the rearing farms per year (10.4m<sup>3</sup> x 16 farms x 1 cycle per year). No chemicals are used for the washing process. All wash water will be collected and trucked to the proposed wastewater treatment plant. A sterilisation process is finally also applied to the houses. The cleaning process is conducted according to RCL Foods' Best Operating Practices Manual for the washing of poultry houses.

Once the site and houses have been cleaned and sterilised, new wood savings are placed on the floor, the feeding, drinking, heating and nesting equipment is lowered to the floor and operational levels. Controllers are reset and calibrated for the next cycle and all maintenance issues are addressed. This is conducted according to RCL Foods' House Preparation Best Operating Practices Manual. There are no heaters in the layer houses as the birds are mature and fully feathered.

The mature birds will release heat that will necessitate the cooling down of the houses. A comprehensive ventilation system will be installed consisting of extraction fans, air inlets and a high pressure cooling system. As the heat rises in the house, the controller will open air inlets and an extraction fan will extract the warm air through the inlets to cool down the house. If this is not sufficient, the high pressure cooling system will be activated to bring the temperature back to the set point.

Lighting in the layer houses is a more complicated than in the rearing houses since the birds need to be light stimulated to continue to mate. The houses will be equipped with a Light Emitting Diode (LED) lighting system. The lights will also be controlled by the controller to simulate light intensity and day length. There is no restriction to natural daylight.

Each farm will be equipped with eight 20ton bulk feed tanks and feed will be delivered into these tanks using trucks. The male and female birds are fed separately in the layer houses and therefore two different feeding systems will be installed. It will be possible to hoist both systems into the roof after feeding. When the systems are in the roof, they will be refilled with feed. The feed is measured and transferred to each poultry house with an auger system. The auger will deliver the feed to the system in the roof that will in turn distribute the feed through the houses. The following morning, the feeders will be lowered so that the birds have access to the feed at the same time. All of the birds are fed simultaneously.

The houses will have a 2 500kpa water supply to a header tank in order to guarantee water supply to the birds. From this tank the water will flow to the in-house drinking system. The drinker systems are installed throughout the houses to ensure that all the birds have access to water all times. A drinker will also be installed on each nest box to attract the females closer to the nest boxes.

Two lines of automated nest boxes will be installed (refer to *Figure 10* below). The birds will be able to easily access the nests through a lowered, slated floor plate in front of each nest box. A hen will enter the nest box and lay her egg on an astro mat. The egg will then roll to the centre of the nest box and onto the extraction conveyer. The boxes will be connected via the extraction conveyer to the front of the house where a transfer conveyer will collect the egg and transfer them to an on-site grading room. Egg collection will happen twice per day.



Figure 10: An example of an automated nest box system

Once the eggs arrive in the grading room, a grading machine will strip out all the small and oversized eggs. The good eggs will be packed into trays and the trays will be stacked onto a transfer pallet. The farm's information system will record all the eggs according to size and condition (small, oversized, production and damaged). Once the eggs are properly stacked and counted, they will be moved into the fumigation chamber where they will be fumigated with formalin. A fumigation chamber is built onto each grading room and a controller will manage the fumigation process. When the fumigation is completed, the eggs will be stacked in the farm holding room until the eggs are collected with a collection truck.

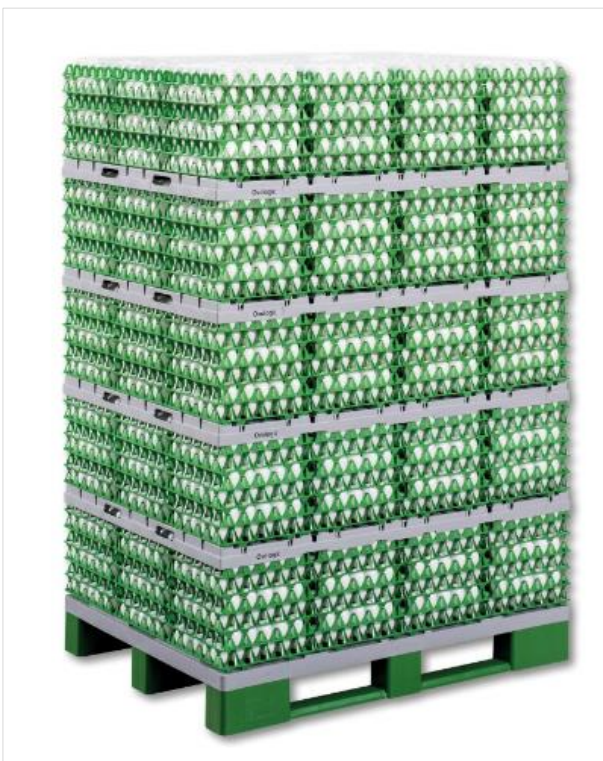


Figure 11: An example of how the eggs will be stacked in trays

### Egg Bank

All the eggs will be collected from the layer farms on a daily basis and transported with a dedicated egg truck to the Egg Bank. At the egg bank, the eggs will be separated between eggs destined for commercial purposes and those destined

for production purposes. The commercial eggs will be packed into a commercial egg room and the production eggs into the Egg Bank holding room. The Egg Bank manager will stack all the eggs according to age, weight and flock. The Egg Bank will be equipped with stacking machines. These machines will de-stack the eggs from the egg trays and pack them into the setter trays according to the setting plan of the hatcheries. Once the setter trollies are packed, the hatchery egg collection truck will collect the loaded setter trollies from the Egg Bank. Eggs can be stored in the Egg Bank for up to 7 days and the Egg Bank will be equipped with a proper ventilation system to keep the temperature of the eggs at 18°C. Once the egg trays, pallets and trollies have been used, they will be washed and sterilised before they are re-used on the farm. The Egg Bank will generate 10 000 litres of wastewater per day. This wastewater will be stored in a wastewater tank and removed to the wastewater treatment plant on a daily basis using a wastewater truck/tanker.



*Figure 12: An example of packing in the Egg Bank*



*Figure 13: An example of the egg tray to egg setter tray packing machine*

### **Biosecurity**

Since the Roodewal Breeder Farm will consist of 24 flocks of high density birds it is critical that the biosecurity on the farm is managed with the necessary attention. It is also for biosecurity reasons that the laying and rearing farms will be split (the first on the northern part of the site and the latter on the southern part of the site with ample open space between the northern and southern farms). The farms will also be managed differently and there will be restrictions in terms of movement between the two farms. No person will be allowed to visit any production farms without the authorisation from the RCL Foods' director. All personnel will shower once upon entering the farm and once upon exiting the farm. Furthermore, all vehicles and equipment will be fumigated (as per RCL Foods' Biosecurity Best Operating Practices Manual).

### **5.1.1 Roads**

#### **Access**

There are currently two existing access gates to the breeder farm. An additional access gate from the secondary dirt road (R30 towards Derby) will be constructed for the southern rearing farm as part of the proposed expansion project. This access point is further south than the two current access points and is an existing access point that requires an upgrade. Permission for this access point will be obtained from the North West Department of Public Works and Roads. Having separate access points for the laying and rearing farms is vital from a biosecurity perspective.

#### **Roads**

On the northern part of the breeder farm (the future laying farm), there are 11.5km of existing gravel roads and storm water infrastructure. An additional 2.26km of roads will need to be built. In-situ material will be used for the road building and where required, G5 material will be obtained from an existing quarry onsite. On the southern part of the breeder farm (the future rearing farm), 8.4km of new roads will need to be built (some existing roads may also be expanded or upgraded as there are existing roads on this part of the farm). In-situ material will be used for the road building and where required, G5 material will be obtained from a new quarry onsite. Please refer to the figure below for the road network layout, the entrances to the farm and the locations of the quarries onsite.

It is proposed for boiler ash generated at the site to be used to fill-in the quarries onsite, as part of the rehabilitation of the quarries. Depending on the classification of the boiler ash, a separate Waste Management Licence may be required. Whether this option will be further explored will be confirmed in due course.

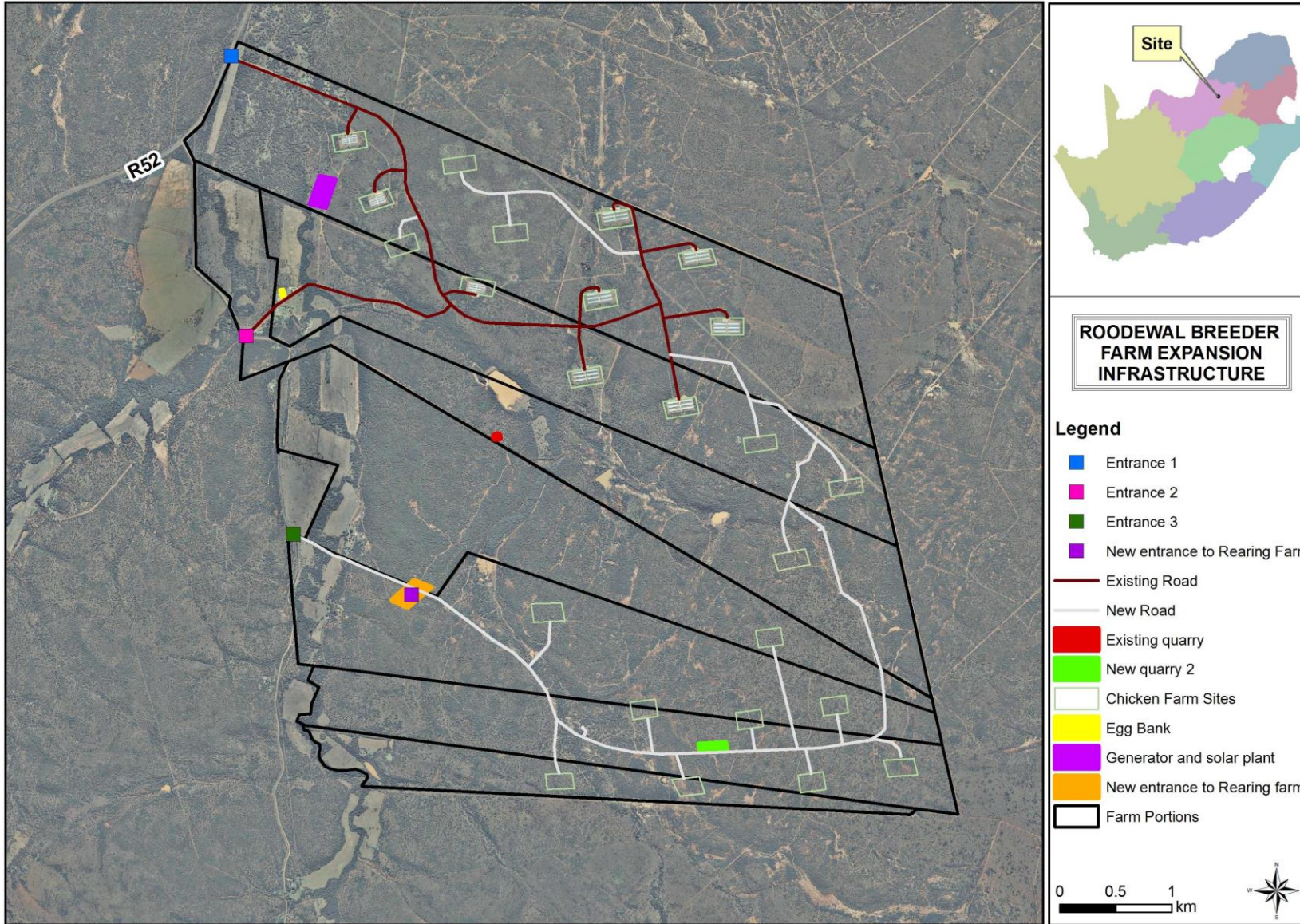


Figure 14: Existing and proposed road infrastructure on the project site

## 5.1.2 Water Services

### Bulk Water Availability

Water for the farm is currently obtained from two onsite boreholes (Boreholes 1 and 2) on the northern part of the site. It is proposed for two other existing boreholes (Boreholes 3 and 4) that are also equipped, to also be used in future. The locations of the boreholes are shown in *Figure 15* below.

A Water Use Registration application was submitted to the then Department of Water Affairs for the abstraction of groundwater from Boreholes 1 and 2, but has not been issued as yet. Labesh will submit a Water Use Licence application to the Department of Water and Sanitation in due course for all water uses on the site, including the abstraction of groundwater from all four boreholes.

There are two existing water reservoirs on the site (Reservoirs 1 and 2 – on the northern part of the farm), one with a capacity of 1 000m<sup>3</sup> and one with a capacity of 4 000m<sup>3</sup>. Two new 320m<sup>3</sup> water reservoirs (Reservoirs 3 and 4) are also proposed on the southern part of the farm, as part of the expansion project. Please refer to the *Figure 15* below for the localities of the four reservoirs (two existing and two proposed).

The boreholes, reservoirs and water pipelines will together form an integrated ring-feed system for the farm. Groundwater is currently pumped from Boreholes 1 and 2 to Reservoir 1. Reservoir 1 has transfer pumps and from here water is pumped to Reservoir 2. Reservoir 3 and 4 will be added to this system, together with Boreholes 3 and 4. As Boreholes 3 and 4 are situated at a low altitude on the farm, it is proposed for the water from these boreholes to be pumped to a transfer tank from where the water will be pumped to Reservoir 4. Reservoir 2 and 3 will be located at a high altitude and gravity flow will therefore be used to feed water to the farms from these two reservoirs.

The main water ring-line will be ±18.6km in length, with distribution lines running from the main ring-line to the farms totalling ±21.5km in length. It is estimated that the farm will use 1 078m<sup>3</sup> of water per day. The pipes for the main ring-line will be 200mm in diameter and those for the farm's supply will be 160mm in diameter. The peak throughput will be 299 litres of water per second.

### Storm Water Routing

Storm water will be released into the environment from built-up surfaces as efficiently and with as little erosion as possible. At this stage, attenuation dams/ponds are not deemed necessary.



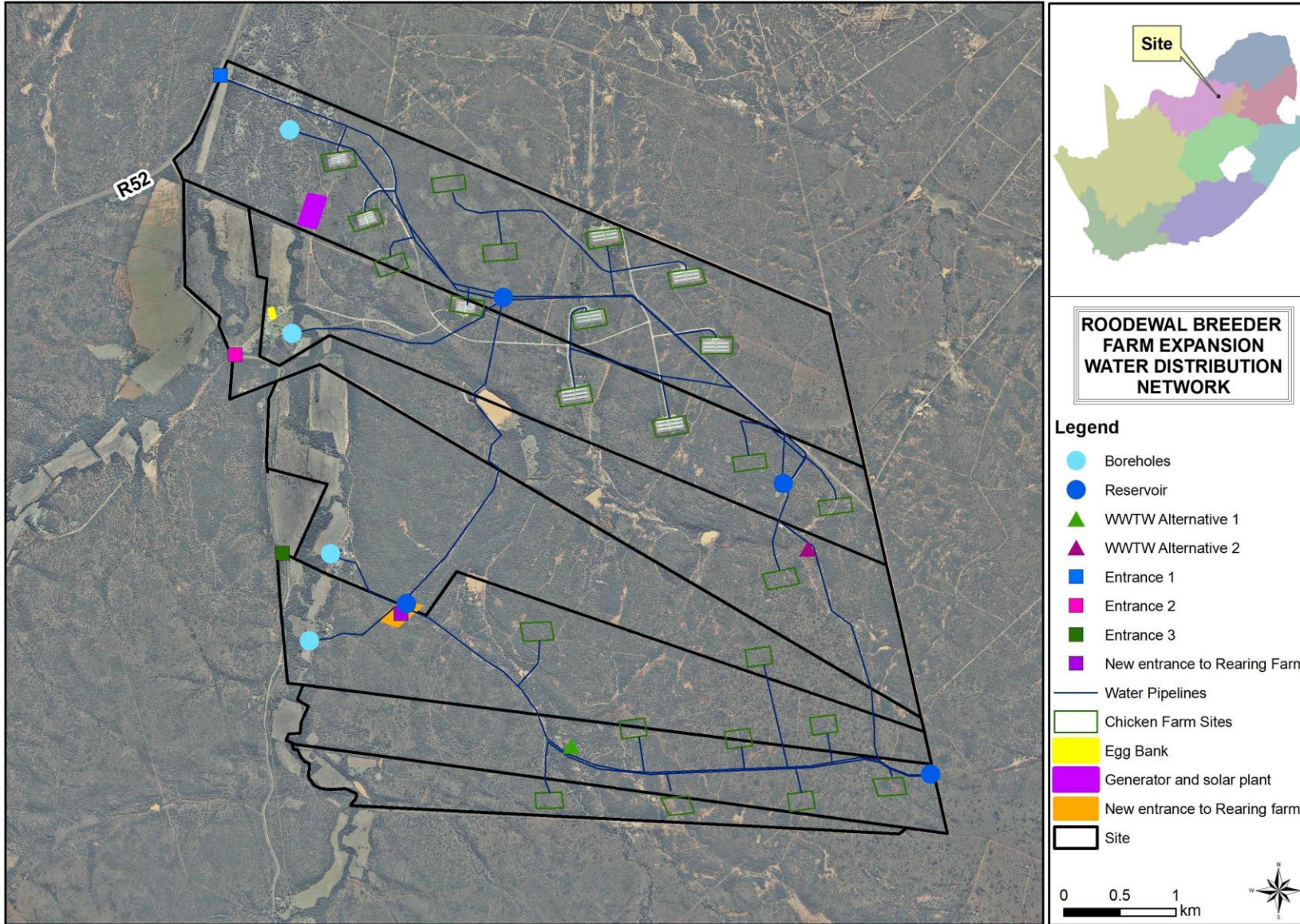


Figure 15: Water distribution network for the project site

### 5.1.3 Sewage and Wastewater

#### Wash water

The rearing farms will be depleted twice a year and the laying farms once per year (after each production cycle). After each depletion/production cycle, the houses will be cleaned and sterilised, as discussed under Section 5.1 of this report. There will be 32 wash cycles per year and a total of 374.4m<sup>3</sup> of wash water will be generated at the breeder farm per year. All wash water will be taken to the proposed wastewater treatment plant for treatment to a quality that complies with the Department of Water and Sanitation's General Limit Standards for discharge into a water resource.

#### Sewage

All sewage from the ablution blocks and residences will pass through septic tanks from where the liquid component is collected together with shower water and fed into a 100m<sup>3</sup> collection tank at each site. From here, a honey-sucker truck will collect the sewage and take it to the holding tank at the proposed wastewater treatment plant, prior to its treatment there. This will be done every day.

#### Wastewater Treatment Plant

The proposed wastewater treatment plant will treat the sewage, wash water and wastewater to a potable quality (and General Limit Standards for discharge into a water resource). The treated water will be passed through an artificial wetland system and from there released into the environment, specifically into a drainage line. The treatment plant will have the capacity to treat 17m<sup>3</sup> of wastewater per day. The previous figure (*Figure 15*) shows the two alternative locations for the proposed wastewater treatment plant. More detail regarding the treatment process and the designs of the artificial wetland will be included in subsequent reports.

### 5.1.4 Electricity

The applicant intends to consolidate the nine electricity delivery points on the breeder farm to a single 3.5 Mva notified load from Eskom. The supply will be delivered at 11kV and the Eskom reference number for the notified load application is 189325644. The motivation for the single supply point is because the applicant wants to generate a base load from renewable energy (from the solar PV plant) during daylight hours, thereby reducing their electricity costs. The solar PV plant is only feasible if all the supply points are consolidated and Eskom has already approved a 3Mva supply to the breeder farm.

#### High tension electrical main ring

Electrical power on the farm will be increased from 400V to 11kVa and distributed through the breeder farm with ±32km of 11kVa main ring. At each farm a step-down transformer (150kVa) will decrease the power from 11kVa to 400V into the low tension distribution boards.

#### Switchgear

The main switchgear to the farm will be installed after the Eskom supply point. This will be 11kV high tension switches that will be managed by a SMEC controller. The controller will manage the load between the main incoming Eskom supply, the solar plant and the generators.

#### Proposed Solar PV Plant

A 10MW solar PV plant will be installed to generate a base load of electricity for the breeder farm. During daylight hours as much of this renewable electricity will be used to power the farm as possible. Please refer to *Figure 16* below for the electricity distribution network, including the location of the solar PV plant.

### **Diesel Generation Plant**

A 3Mva diesel generation plant will be installed to supply power to the farm in case of a power outage or load shedding. The generators will also be required for the pilot supply to the solar plant during power outages. Three synchronised 1.2Mva generators will be installed in a generator room that will also house the switchgear and invertors. All step-down and step-up transformers will be installed in the vicinity of the generator room.

### **Proposed Eskom power line**

Eskom approached the applicant with a request to have a servitude/corridor cross the breeder farm in order for them to construct three 750kV power lines from the Medupi power station to the national grid. The applicant agreed to a sale of the 226ha servitude to Eskom. This proposed activity does not form part of this Environmental Impact Assessment process and will be conducted separately by Eskom. The Eskom servitude is shown in *Figure 16* below.

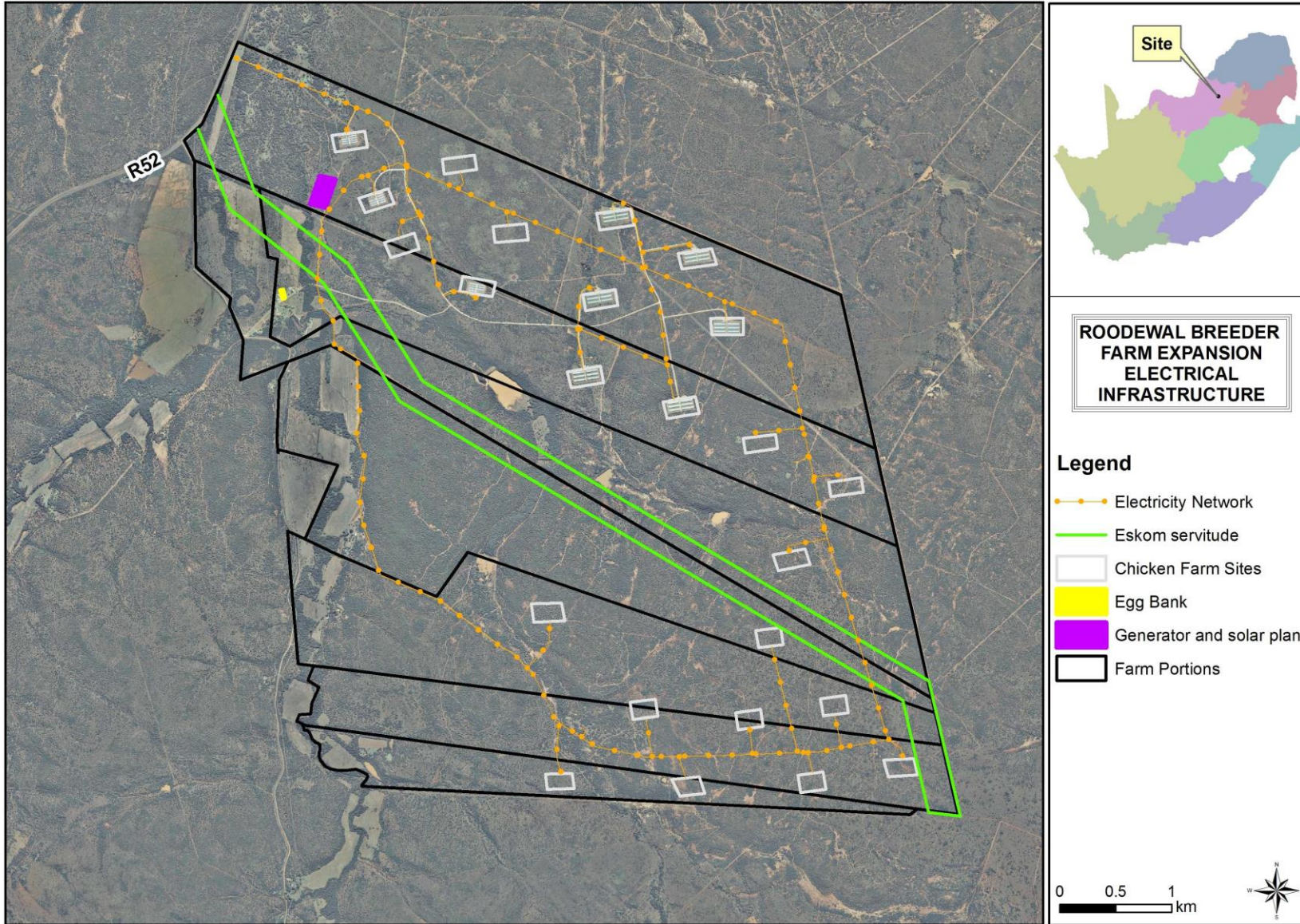


Figure 16: Electricity distribution network for the project site, including the generator and solar PV plant

### **5.1.5 Traffic**

There will be three entrances to the Roodewal Breeder Farm. Entrances 1 and 2 (existing) will service the Laying Farm while Entrance 3 (existing, but requiring an upgrade) will serve the Rearing Farm.

Currently, the farm receives three truckloads of feed per day and the trucks use Entrances 1 and 2. Approximately 15 light motor vehicles visit the farm per day, also using Entrances 1 and 2. Most personnel are transported by bus and there is currently one bus visiting the farm per day.

After the expansion, it is expected that Entrances 1 and 2 will receive seven truckloads of feed per day and Entrance 3 will receive three truckloads per day (10 truckloads per day in total between the three entrances). It is not expected for the number of light motor vehicles to increase. Three busses transporting personnel will be required per day after the expansion.

### **5.1.6 Waste**

#### **Manure**

Manure will be removed from the houses as soon as possible after each cycle. This removal will include the bulk of the manure as well as the fine manure on the floor of the houses. The open area around each house, up until the perimeter fence, will also be raked to gather all the feathers. The manure, fine manure and feathers will be removed by a manure buyer to a farm where it is used as an organic fertilizer.

#### **Mortalities**

Workers remove mortalities from the houses every morning and records are kept of the number of mortalities. The mortalities are taken offsite to accredited crocodile farms.

#### **Domestic waste**

Domestic waste is removed from the farm once a week using a waste contractor and taken to a waste disposal site.

#### **Ash**

Ash bunkers are used to store boiler ash on the farm. The bunkers are cleaned on a weekly basis and the ash will potentially be used to backfill the quarries onsite. The quarries will be fenced and rehabilitated once filled. An Ash Management Plan will also be implemented. The farm will generate ±82 tons of ash per year.

### **5.1.7 Housing**

#### **Farm managers**

There are eight existing manager's houses on the farm and these will continue to be utilised by the production managers, maintenance staff and emergency response staff. No new housing will be built.

#### **Workers**

Workers are brought to the farm every day using busses. Only emergency staff are housed on the farm, in the existing houses.

### **5.1.8 Personnel**

Currently there are 131 personnel working on the farm and 263 jobs will re-assigned from other existing farms to the Roodewal Breeder Farm (as other farms are sold off, the work force will be moved to the Roodewal farm). An additional 22 new, permanent jobs will also be created.

### **5.1.9 Fuel**

There is currently one 4m<sup>3</sup> diesel tank at the breeder farm. The applicant intends to acquire an additional 15m<sup>3</sup> diesel bowser truck for the farm.

### **5.1.10 Game**

The original Roodewal farm has been managed as a conservancy since 1984 and the farm has a number of game species residing on the farm. These include kudu, giraffe, wildebeest, zebra, impala, nyala, bushbuck, eland, waterbuck, red hartebeest and blesbuck. The applicant has installed six drinking and feeding stations for the game so that feed can be provided during times of drought. Tick control measures have also been installed at the feedings stations to control ticks, specifically on the kudus. The applicant intends to install five more feeding stations on the Kwa-mmatau farms (newly-acquired southern properties) in order to increase the conservancy's footprint.

### **5.1.11 Total land disturbance percentage**

The total land area that will be disturbed after the expansion project (this includes the existing and proposed disturbances), should the proposed project be authorised, will be  $\pm 5\%$  of the total land area of the project site (a combination of all the project properties). This is calculated as  $\pm 141.5$ ha out of the total 2 830.3021ha size of the project site.

## **5.2 Listed Activities triggered by the proposed development**

The following listed activities are triggered by the proposed development and therefore require Environmental Authorisation, in terms of the Environmental Impact Assessment Regulations of 4 December 2014:

Table 1: Listed activities triggered by the proposed development

Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
Government Notice R983 (Listing Notice 1) Activity No. 1  Amended by Government Notice 327 (Listing Notice 1) of 7 April 2017	The development of facilities or infrastructure for the generation of electricity from a renewable resource where- (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare; excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs- (a) within an urban area; or (b) on existing infrastructure.	A 10MW solar plant will be installed to generate a base load of electricity to the chicken farms.
Government Notice R983 (Listing Notice 1) Activity No. 5  Amended by Government Notice 327 (Listing Notice 1) of 7 April 2017	The development and related operation of facilities or infrastructure for the concentration of- <del>(i) more than 1 000 poultry per facility situated within an urban area, excluding chicks younger than 20 days;</del> (ii) more than 5 000 poultry per facility situated outside an urban area, excluding chicks younger than 20 days; <del>(iii) more than 5 000 chicks younger than 20 days per facility situated within an urban area; or</del> (iv) more than 25 000 chicks younger than 20 days per facility situated outside an urban area.	Seven (7) new laying poultry farms and eight (8) new rearing poultry farms will be built. Each laying farm will consist of eight (8) houses (8 291 females and 878 males per house) and each rearing farm will consist of two (2) male houses (4 234 chickens per house) and eight (8) female houses (8 820 chickens per house). A total of 632 224 chickens can therefore be housed in new farms on the project site, at any given time. This is more than 5 000 poultry and the site is situated outside of an urban area.
Government Notice R983 (Listing Notice 1) Activity No. 9  Amended by Government Notice 327 (Listing Notice 1) of 7 April 2017	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Main water supply pipelines of 200mm will be installed. From this main ring, 160mm pipelines will be installed to each chicken farm. The peak throughput will be 299litres/second.

Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
<p>Government Notice R983 (Listing Notice 1) Activity No. 24</p> <p>Amended by Government Notice 327 (Listing Notice 1) of 7 April 2017</p>	<p>The development of a road-</p> <p>(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</p> <p>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</p> <p>but excluding a road-</p> <p>(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;</p> <p>(b) where the entire road falls within an urban area; or</p> <p>(c) which is 1 kilometre or shorter.</p>	<p>±17.5km of new gravel roads will need to be constructed onsite. The roads will be 6m wide, but may exceed 8m at turns or turning circles.</p>
<p>Government Notice R983 (Listing Notice 1) Activity No. 40</p> <p>Amended by Government Notice 327 (Listing Notice 1) of 7 April 2017</p>	<p>The expansion and related operation of facilities for the concentration of poultry, excluding chicks younger than 20 days, where the capacity of the facility will be increased by-</p> <p><del>(i) more than 1 000 poultry where the facility is situated within an urban area; or</del></p> <p>(ii) more than 5 000 poultry per facility situated outside an urban area.</p>	<p>The current poultry farms will be expanded. This includes the expansion of the existing laying and rearing houses to increase their capacities. The existing rearing farms (on the northern part of the site) will be converted into laying farms. The existing laying and rearing farms (the rearing farms that will be converted into laying farms) will be increased to eight (8) houses per farm and the house capacities will be increased to 8 291 female chickens and 878 male chickens per house. The expansion of the existing farms will be more than 5 000 poultry and the site is situated outside of an urban area.</p>
<p>Government Notice R983 (Listing Notice 1) Activity No. 45</p> <p>Amended by Government Notice 327 (Listing Notice 1) of 7 April 2017</p>	<p>The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure-</p> <p>(i) has an internal diameter of 0,36 metres or more; or</p> <p>(ii) has a peak throughput of 120 litres per second or more; and</p> <p>(a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or</p> <p>(b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;</p> <p>excluding where such expansion-</p>	<p>The existing infrastructure main water supply pipelines are 200mm and the pipelines connecting the main ring to the farms are 160mm. The peak throughput is 299litres/second.</p>



Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
	<p>(aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area.</p>	
<p>Government Notice R983 (Listing Notice 1) Activity No. 48  Amended by Government Notice 327 (Listing Notice 1) of 7 April 2017</p>	<p>The expansion of-</p> <p>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs-</p> <p>(a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding-</p> <p>(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.</p>	<p>Existing canals, channels, bridges, dams, weirs or bulk stormwater outlet structures may need to be upgraded and/or expanded by 100m<sup>2</sup> or more, within/across a watercourse, in front of a development setback and/or within 32 metres of a watercourse.</p>
<p>Government Notice R983 (Listing Notice 1) Activity No. 67  Amended by</p>	<p>Phased activities for all activities-</p> <p>(i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;</p>	<p>The proposed development will be undertaken in a number of phases over a ±5 year period.</p>

Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
<p>Government Notice 327 (Listing Notice 1) of 7 April 2017</p>	<p>excluding the following activities listed in this Notice-            17(i)(a-d); 17(ii)(a-d); 17(iii)(a-d); 17(iv)(a-d); 17(v)(a-d); 20; 21; 22; 24(i); 29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or            (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;            where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</p>	
<p>Government Notice R984 (Listing Notice 2) Activity No. 6</p> <p>Amended by Government Notice 325 (Listing Notice 2) of 7 April 2017</p>	<p>The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding-</p> <p>(i) activities which are identified and included in Listing Notice 1 of 2014;</p> <p>(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;</p> <p>(iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or</p> <p>(iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.</p>	<p>The proposed development will require a Water Use Licence application, in terms of the National Water Act, 1998, for one or more of the following proposed water use activities:</p> <ul style="list-style-type: none"> <li>• Section 21(a) - abstraction of groundwater from four onsite boreholes;</li> <li>• Section 21(b) - the storage of clean water in a number of dams and reservoirs onsite;</li> <li>• Section 21(c) - development/construction across watercourses and within 500m from the boundary of watercourses onsite;</li> <li>• Section 21(f) - release of treated water from the proposed wastewater treatment plant into the environment;</li> <li>• Section 21(g) - the treatment of sewage, wastewater and wash water in a proposed wastewater treatment plant; and</li> <li>• Section 21(i) - development/construction across watercourses and within 500m from the boundary of watercourses onsite.</li> </ul>

Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
<p>Government Notice R984 (Listing Notice 2) Activity No. 15</p> <p>Amended by Government Notice 325 (Listing Notice 2) of 7 April 2017</p>	<p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>±124ha of vegetation will be cleared for the proposed development. The development will not only consist of linear activities. The total combined size of the project properties is 2 830.3021ha.</p>
<p>Government Notice R985 (Listing Notice 3) Activity No. 2</p> <p>Amended by Government Notice 324 (Listing Notice 3) of 7 April 2017</p>	<p>The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres.</p> <p><b>h. North West</b></p> <p>iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999).</p>	<p>Two new 320m<sup>3</sup> water reservoirs will be constructed. Although the proposed localities for the reservoirs are not currently situated within heritage sites, this activity has been included as there are heritage sites in the wider vicinity and should localities change, these sites may be impacted upon.</p>
<p>Government Notice R985 (Listing Notice 3) Activity No. 4</p> <p>Amended by Government Notice 324 (Listing Notice 3) of 7 April 2017</p>	<p>The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p><b>h. North West</b></p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p> <p>vi. Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve.</p> <p>viii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999).</p>	<p>±17.5km of new gravel roads will need to be constructed onsite. The roads will be 6m wide, but may exceed 8m at turns or turning circles. The project properties are outside of an urban area and some of the roads will be constructed on land that is designated as Critical Biodiversity Area 2 in terms of the North West Biodiversity Assessment.</p> <p>The project site is situated within the Transition Zone of the Magaliesberg Biosphere Reserve (the project site is situated further than 5km from the core area of the Magaliesberg Biosphere Reserve).</p> <p>The proposed gravel roads are in the vicinity of heritage sites and this activity has therefore been included in the event that any heritage sites may be impacted upon.</p>

Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
<p>Government Notice R985 (Listing Notice 3) Activity No. 12</p> <p>Amended by Government Notice 324 (Listing Notice 3) of 7 April 2017</p>	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p><b>h. North West</b></p> <p>iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999);</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p> <p>vi. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.</p>	<p>±124ha of vegetation will be cleared for the proposed development.</p> <p>A number of heritage sites will be impacted upon by the proposed development.</p> <p>Part of this area to be cleared is land which is designated as Critical Biodiversity Area 2 in terms of the North West Biodiversity Assessment. Development footprints, such as roads, may also cross over drainage lines and/or wetlands.</p>
<p>Government Notice R985 (Listing Notice 3) Activity No. 14</p> <p>Amended by Government Notice 324 (Listing Notice 3) of 7 April 2017</p>	<p>The development of-</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs-</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>h. North West</b></p> <p>iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999);</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p>	<p>As part of the proposed development, one or more of the following will be developed within/across a watercourse, in front of a development setback and/or within 32 metres of a watercourse:</p> <ul style="list-style-type: none"> <li>• canals exceeding 100 square metres in size;</li> <li>• channels exceeding 100 square metres in size;</li> <li>• bridges exceeding 100 square metres in size;</li> <li>• dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size;</li> <li>• weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size;</li> <li>• bulk storm water outlet structures exceeding 100 square metres in size;</li> <li>• buildings exceeding 100 square metres in size;</li> <li>• boardwalks exceeding 100 square metres in size; and</li> <li>• infrastructure or structures with a physical footprint of 100 square metres or more.</li> </ul>

Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
		<p>The project properties are outside of an urban area and are mostly situated in an Ecological Support Area 1 in terms of the North West Biodiversity Assessment, with some of the land also being designated as Critical Biodiversity Area 2 in terms of the North West Biodiversity Assessment.</p> <p>A number of heritage sites will be impacted upon by the proposed development.</p>
<p>Government Notice R985 (Listing Notice 3) Activity No. 18</p> <p>Amended by Government Notice 324 (Listing Notice 3) of 7 April 2017</p>	<p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p><b>h. North West</b></p> <p>ii. Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve;</p> <p>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p> <p>viii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999);</p> <p>ix. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.</p>	<p>Existing gravel roads will be widened by more than 4m and/or more than 1km. The project site is situated within the Transition Zone of the Magaliesberg Biosphere Reserve (the project site is situated further than 5km from the core area of the Magaliesberg Biosphere Reserve).</p> <p>The project properties are outside of an urban area and some of the land on which the roads will be expanded is designated as a Critical Biodiversity Area 2 in terms of the North West Biodiversity Assessment.</p> <p>The proposed widening and lengthening of the roads will occur in the vicinity of heritage sites and this activity has therefore been included in the event that any heritage sites may be impacted upon.</p> <p>The widening and lengthening of the roads may occur across watercourses and/or wetlands or within 100 metres from the edge of watercourses and/or wetlands.</p>
<p>Government Notice R985 (Listing Notice 3) Activity No. 23</p> <p>Amended by</p>	<p>The expansion of-</p> <p>(i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or</p> <p>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</p> <p>where such expansion occurs-</p>	<p>As part of the proposed development, one or more of the following may be expanded upon by 10m<sup>2</sup> or more, within/across a watercourse, in front of a development setback and/or within 32 metres of a watercourse:</p> <ul style="list-style-type: none"> <li>• canals;</li> <li>• channels;</li> </ul>

Government Notice and Activity Number	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
<p>Government Notice 324 (Listing Notice 3) of 7 April 2017</p>	<p>(a) within a watercourse; (b) in front of a development setback adopted in the prescribed manner; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>h. North West</b></p> <p>iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999); iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p>	<ul style="list-style-type: none"> <li>• bridges;</li> <li>• dams;</li> <li>• weirs;</li> <li>• bulk storm water outlet structures;</li> <li>• buildings;</li> <li>• boardwalks; and</li> <li>• infrastructure or structures.</li> </ul> <p>A number of heritage sites within a watercourse, in front of a development setback and/or within 32 metres of a watercourse may be impacted upon by the proposed development.</p> <p>The project properties are outside of an urban area and are mostly situated in an Ecological Support Area 1 in terms of the North West Biodiversity Assessment, with some of the land also being designated as Critical Biodiversity Area 2 in terms of the North West Biodiversity Assessment.</p>
<p>Government Notice R985 (Listing Notice 3) Activity No. 26</p> <p>Amended by Government Notice 324 (Listing Notice 3) of 7 April 2017</p>	<p>Phased activities for all activities -</p> <p>i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or</p> <p>ii. similarly listed in any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices- where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold;- excluding the following activities listed in this Notice- 7; 8; 11; 13; 20; 21; and 24.</p>	<p>The proposed development will be undertaken in a number of phases over a ±5 year period.</p>

### 5.3 Water Use Licence Activities

The following proposed water uses require Water Use Registration and/or Licence applications in terms of Chapter 4 of the National Water Act, 1998 (Act No. 36 of 1998):

- Section 21(a): Taking water from a water resource – abstraction of groundwater from four onsite boreholes;
- Section 21(b): Storage of water – the storage of clean water in a number of dams and reservoirs onsite;
- Section 21(c): Impeding or diverting the flow of water in a watercourse – development/construction across watercourses and within 500m from the boundary of watercourses onsite;
- Section 21(f): Discharge of waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit – release of treated water from the proposed wastewater treatment plant into the environment;
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource – the treatment of sewage, wastewater and wash water in a proposed wastewater treatment plant; and
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse - development/construction across watercourses and within 500m from the boundary of watercourses onsite.

The required Water Use Registration and/or Licence application will be submitted to the Department of Water and Sanitation in due course.

## 6. POLICY AND LEGISLATIVE CONTEXT OF THE APPLICATION

The following legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments are applicable to the proposed development and have or will be considered in this full Scoping and Environmental Impact Assessment process.

### Legislation

- The Constitution of South Africa, 1996 (Act No. 108 of 1996), as amended
- The National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
- The Environmental Impact Assessment Regulations of 4 December 2014, as amended
- The National Water Act, 1998 (Act No. 36 of 1998), as amended
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), as amended
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999), as amended
- The National Appeal Regulations – Government Notice No. R.993 of 8 December 2014

### Plans

- North West Biodiversity Sector Plan, 2015
- North West Province Biodiversity Conservation Assessment Technical Report. Version 1.2
- Magaliesberg MPE: Draft Environmental Management Framework and Plan, 2007

### Guidelines

- Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010

### Spatial tools

- SANBI Biodiversity GIS Database

### Municipal development planning frameworks

- Kgetlengrivier Local Municipality – Spatial Development Framework Final Draft – March 2012
- Kgetlengrivier Local Municipality – Integrated Development Plan 2017 (2012-2017)
- Kgetlengrivier Local Municipality – Annual Report June 2013



## **7. MOTIVATION FOR THE NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT**

### **7.1 Need and desirability of the development in the context of the preferred location**

#### **7.1.1 Applicant**

The proposed project will entail the expansion and upgrading of the Roodewal Breeder Farm. The motivation for the expansion stems from the following: due to urbanisation and encroachment of mines close to RCL Foods Limited's chicken farms in the Gauteng region, RCL wishes to relocate some of its breeder farms' production to Rustenburg. As part of the relocation, RCL also wishes to also increase the capacity of the existing breeder farm. The proposed project will generate a source of income for RCL and will also contribute to the sustainability of the company through the relocation of their breeder farms' production to an area that is not under pressure due to urbanisation and the encroachment of mines.

#### **7.1.2 Micro, Local and Regional Economy**

The micro economy of especially the Rustenburg area will benefit significantly from the proposed development. The construction phase will positively affect the micro economy as most of the required building material, labour force, etc. will be obtained from the Rustenburg area and surrounds. The facility itself will provide long-term employment opportunities for the local community. During the construction phase of the proposed project, 250 new job opportunities will be generated. There are currently 131 personnel working on the farm and 263 jobs will re-assigned from other existing farms. An additional 22 new jobs will also be created during the operational phase. Local people will be employed, as far as possible. The additional/new job opportunities will help to alleviate the unemployment rate in the Kgetlengrivier Local Municipality, which was at 20.5% during the 2011 Census (Statistics South Africa, 2011).

The provision of back-up services, such as for maintenance and daily necessities, will ensure that the proposed development has a long term positive effect on the economy of the Rustenburg area. The breeder farm also forms part of a larger, integrated supply chain in the poultry sector. A considerable number of contractors are associated with such a farm, including the following: transporters, bedding/litter suppliers, feed suppliers, mortality collectors and manure collectors. All of these associated services will also benefit from the proposed development.

#### **7.1.3 Provincial and South African context**

The proposed development will contribute to food security in South Africa.

#### **7.1.4 Relationship between the proposed facilities and the natural environment**

The government structures in South Africa are under increasing financial pressure to protect natural areas. It is therefore of utmost importance that developers take initiative to provide and protect such areas. This proposed development will fulfil this task through the maintenance of the Conservancy on the project properties.

### **7.2 Need and Desirability in terms of the Guideline on Need and Desirability**

The Department of Environmental Affairs published a Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010, in Government Notice 891 of 2014 (20 October 2014).

The table below indicates how the guideline requirements have been addressed.

Table 2: Need and desirability of the proposed project, in terms of the Guideline on Need and Desirability

Requirement	Part where requirement is addressed/response
<p>1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?<sup>1</sup></p>	<p>The proposed development of the new chicken farms will take place on natural bushveld that is of good quality. The upgrading and expansion of the existing chicken farms will occur on disturbed areas as well as on natural bushveld areas. The northern part of the project site is currently operated as a Chicken Rearing Farm, whilst the southern part of the project site is mostly undeveloped.</p> <p>The impact of the proposed development on the ecological integrity of the project property has been evaluated in further detail in this report. Please refer to Sections 9.6 and 9.7 of this report.</p>
<p>1.1. How were the following ecological integrity considerations taken into account?</p>	
<p>1.1.1 <i>Threatened Ecosystems.</i><sup>2</sup></p>	<p>To take into consideration any threatened ecosystems that may be present on the project site, the following specialist studies were commissioned as part of this Environmental Impact Assessment process:</p> <ul style="list-style-type: none"> <li>• A Wetland/Riparian Delineation and Functional Assessment;</li> <li>• A Vegetation Assessment; and</li> <li>• A Fauna Assessment.</li> </ul> <p>These studies identified the risks and impacts of the proposed project. These have been evaluated in further detail in this report.</p>
<p>1.1.2 <i>Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and</i></p>	<p>To take into consideration any sensitive, vulnerable, highly dynamic or stressed ecosystems that may be present on the project site, the following specialist studies were commissioned as part of this Environmental Impact Assessment process:</p>

<sup>1</sup> Section 24 of the Constitution and section 2(4)(a)(vi) of NEMA refer.

<sup>2</sup> Must consider the latest information including the notice published on 9 December 2011 (Government Notice No. 1002 in Government Gazette No. 34809 of 9 December 2011 refers) listing threatened ecosystems in terms of Section 52 of National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

Requirement	Part where requirement is addressed/response
<p><i>planning procedures, especially where they are subject to significant human resource usage and development pressure.<sup>3</sup></i></p>	<ul style="list-style-type: none"> <li>• A Wetland/Riparian Delineation and Functional Assessment;</li> <li>• A Vegetation Assessment; and</li> <li>• A Fauna Assessment.</li> </ul> <p>These studies identified the risks and impacts of the proposed project. These have been evaluated in further detail in this report.</p>
<p>1.1.3 <i>Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs").</i></p>	<p>Vegetation and Fauna Assessments were conducted for the project site. According to the reports and the North West Biodiversity Sector Plan, the majority of the project site is listed as an "Ecological Support Area 1". A relatively small north-eastern part of the site is listed as a "Critical Biodiversity Area 2".</p>
<p>1.1.4 <i>Conservation targets.</i></p>	<p>The majority of the site is classified as Moot Plains Bushveld, with a small northern part classified as Zeerust Thornveld.</p> <p>The conservation target is 19% for both the Moot Plains Bushveld and Zeerust Thornveld (Mucina &amp; Rutherford, 2006).</p>
<p>1.1.5 <i>Ecological drivers of the ecosystem.</i></p>	<p>Mitigation measures have been incorporated into the Environmental Impact Assessment Report and Environmental Management Programme for this project. The measures aim to mitigate the influence of ecological drivers such as the influence of uncontrolled fires, human activity and alien invasive plant species.</p>
<p>1.1.6 <i>Environmental Management Framework.</i></p>	<p>The Kgetlengrivier Local Municipality does not yet have an Environmental Management Framework. The North West Biodiversity Sector Plan (NW BSP) will be used to compile the Kgetlengrivier Local Municipality's EMF.</p> <p>The following has been extracted from the NW BSP:</p>

<sup>3</sup> Section 2(4)(r) of NEMA refers.

Requirement	Part where requirement is addressed/response
	<p><b>Critical Biodiversity Area 2 (CBA2)</b>            Maintain these areas in a natural or near-natural state that maximises the retention of biodiversity pattern and ecological process:</p> <ul style="list-style-type: none"> <li>• Ecosystems and species fully or largely intact and undisturbed.</li> <li>• Areas with intermediate irreplaceability or some flexibility in terms of meeting biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising the ability to achieve biodiversity targets, although loss of these sites would require alternative sites to be added to the portfolio of CBAs.</li> <li>• These are biodiversity features that are approaching, but have not passed their limits of acceptable change.</li> </ul> <p><b>Ecological Support Area 1 (ESA1)</b>            Maintain these areas in at least a semi-natural state as ecologically functional landscapes that retain basic natural attributes:</p> <ul style="list-style-type: none"> <li>• Ecosystem still in a natural, near-natural state or semi-natural state, and has not been previously developed.</li> <li>• Ecosystems moderately to significantly disturbed, but still able to maintain basic functionality.</li> <li>• Individual species or other biodiversity indicators may be severely disturbed or reduced.</li> <li>• These are areas with low irreplaceability with respect to biodiversity pattern targets only.</li> </ul> <p>In terms of the recommended land use zones and associated activities in relation to CBA Map Categories (Table 13 of the NWBSP), <i>Agricultural Infrastructure – Intensive Animal Farming</i> (e.g. chicken battery) is stated as “NO”, a not permitted and activity discouraged activity for both CBA2 and ESA1. However, further on in the NWBSP it is stated that agricultural</p>

Requirement	Part where requirement is addressed/response
	<p>infrastructure, and specifically intensive animal production (such as the breeder farm) can be considered in ESAs, with restrictions. Utilities (pipelines, power lines and wastewater treatment works) are stated as “RESTRICTED”, being restricted to compulsory, site-specific conditions and controls when unavoidable and are usually not permitted for both CBA2 and ESA1. Renewable energy (PV plants) and quarrying are both also stated “NO”, not permitted and activity discouraged activities for both CBA2 and ESA1. Extensive game farming is stated as “YES”, a permitted and actively encouraged activity for both CBA2 and ESA1. Environmental conservation, such as the Conservancy at the project site, is stated as “YES”, a permitted and actively encouraged activity for both CBA2 and ESA1.</p> <p>In the North West Province Biodiversity Conservation Assessment Technical Report Version 1.2 – 2009, it was stated in the high-level management objectives that there are options for loss of some components of biodiversity in these landscapes (CBAs and ESAs) without compromising the ability to achieve conservation targets. The Limit of Acceptable Change (LAC), defined as “the permitted amount or degree of change in biodiversity indicator”, was given as “None” for CBA1, “Some” for CBA2 and ESA1. “None” was defined as “A proposed development will not impact more than 10% of the land parcel (development site), i.e. greater than 90% of original natural vegetation of site remaining intact after development”. “Some” was defined as “Between 60% and 90% of original natural vegetation of site remaining intact after development”. The total land area that will be disturbed after the expansion project (including the existing and proposed disturbance), should the proposed project be authorised, will be <math>\pm 5\%</math> of the total land area of the project site (a combination of all the project properties). This is calculated as <math>\pm 141.5\text{ha}</math> out of the total <math>2\,830.3021\text{ha}</math> size of the project site.</p>

Requirement	Part where requirement is addressed/response
	<p>The Magaliesberg Protected Environment Environmental Management Framework is not directly applicable to the proposed project as it is recommended that the EMF's objectives are applied/considered for all applications within a 2.5km buffer around the Magaliesberg Protected Environment. The project site is further than 2.5km from the Magaliesberg Protected Environment (i.e. the core area of the Magaliesberg Biosphere Reserve).</p>
<p>1.1.7 <i>Spatial Development Framework.</i></p>	<p>In terms of rural and agricultural development in the Kgetlengrivier Local Municipality, the following is stated in the municipality's Spatial Development Framework (SDF) (2012):</p> <p><i>In terms of the above factors and in line with the proposals as contained in the "Kgetlengrivier Local Municipality Local Economic Development Strategy 2011" and the Draft Bojanala Platinum District Municipality Rural and Agricultural Master Plan, 2009", the proposals are as follows:</i></p> <p>A) <i>Expanding the Agricultural Base – In view of the extent of the Kgetlengrivier Local Municipality rural area, the diversity of soil types; and good water quality and availability, the following produce can be expanded: - Vegetables, citrus, winter grains, summer grains, animal feed, cattle, goats, sheep, <b>poultry</b> and herbs.</i></p> <p>The proposed development is in line with this statement/goal of the SDF, as poultry produce will be expanded upon.</p> <p>In terms of Agri-processing activities in the Kgetlengrivier Local Municipality, the following is stated in the municipality's SDF:</p> <p><i>Although large volumes of agricultural produce are being produced within the municipal boundary, there are very few forward linkages which support the</i></p>

Requirement	Part where requirement is addressed/response
	<p><i>secondary activities related to the primary activities. Here we refer to processing, packaging, storage and manufacturing.</i></p> <p><i>The agricultural value chain needs to be promoted by providing a conducive environment within the respective urban concentrations for the establishment of these activities.</i></p> <p>The proposed development is in line with this statement/goal of the SDF, as the agricultural value chain will be promoted and packaging of the eggs that are produced at the site is proposed (in the proposed Egg Bank).</p> <p>According to the municipality's SDF, the following are the key environmental issues and principles in the municipal area:</p> <ul style="list-style-type: none"> <li>• The protection of agricultural resources;</li> <li>• The preservation of natural resources; and</li> <li>• The safe utilisation of land by considering biophysical factors.</li> </ul> <p>According to the SDF, the following sensitive areas need to be protected:</p> <ul style="list-style-type: none"> <li>• Critical Biodiversity Areas (CBAs): <ul style="list-style-type: none"> <li>▪ Critical Patches: Critically Endangered Ecosystems</li> <li>▪ Critical Patches: Endangered and Vulnerable Ecosystems</li> <li>▪ Critical Patches: Endemic Vegetation Types</li> <li>▪ Irreplaceable Sites</li> <li>▪ Important Habitats: Hyperdiversity</li> <li>▪ Important Habitats: Features</li> <li>▪ Important Habitats: Hills and Ridges</li> <li>▪ Important Habitats: Expert Areas</li> <li>▪ Existing or Proposed Protected Area Development Corridors</li> <li>▪ Biodiversity Development Nodes</li> </ul> </li> </ul>

Requirement	Part where requirement is addressed/response
	<ul style="list-style-type: none"> <li>▪ Critical Ecological Corridors</li> <li>▪ Ecological Corridors</li> <li>▪ Irreplaceable Sub-Catchments</li> <li>▪ Important Sub-Catchments</li> <li>▪ Irreplaceable wetlands</li> <li>▪ Wetlands and Pans</li> </ul> <p>and</p> <ul style="list-style-type: none"> <li>• Ecological Support Areas (ESAs):               <ul style="list-style-type: none"> <li>▪ Wetland Buffer Areas</li> <li>▪ Groundwater recharge areas: Dolomite Aquifers</li> <li>▪ Protected Area Buffers</li> </ul> </li> </ul>
<p>1.1.8 <i>Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).</i><sup>4</sup></p>	<p>The proposed activities do not have significant contributions towards global and international responsibilities.</p>
<p>1.2 How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?<sup>5</sup></p>	<p>Vegetation and Fauna Assessments were conducted for the proposed project site. The purpose of the studies was to determine the current status of the project site and the impact that the proposed development will have on fauna and flora assemblages. The findings of the assessments are presented under Section 8.3.3 of this report. Developmental footprints for the expansion project have been kept to a minimum and existing gravel roads will be used and expanded, as far as possible. The Egg Bank will also be built on a disturbed area. Refer also to Sections 9.6 and 9.7 of this report.</p> <p>Mitigation measures have been further identified and recommended in the EMP to mitigate negative environmental impacts.</p>

<sup>4</sup> Section 2(4)(n) of NEMA refers.

<sup>5</sup> Section 24 of the Constitution and Sections 2(4)(a)(i) and 2(4)(b) of NEMA refer.



Requirement	Part where requirement is addressed/response
<p>1.3 How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?<sup>6</sup></p>	<p>Negative environmental impacts associated with the proposed development have been identified and assessed in Sections 9.6 and 9.7 of this report. Mitigation measures have also been identified and recommended in the Environmental Impact Assessment Report and EMPr to mitigate negative environmental impacts.</p> <p>The main positive impacts of the proposed development are the generation of job opportunities, the stimulation of the local and regional economy and the contribution towards food security in SA. To enhance the positive impacts, local people will be employed during the construction and operational phases of the development, as far as possible.</p>
<p>1.4 What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?<sup>7</sup></p>	<p>During the construction phase of the proposed development, general waste, such as building rubble and domestic waste will be generated. Some hazardous waste, such as spilt oil or diesel may also be generated. During the operational phase of the development, boiler ash, chicken litter (bedding and manure), general/domestic waste and some hazardous waste, such as spilt oil or diesel may be generated.</p> <p>Mitigation measures to minimise, reuse and/or recycle the waste have been recommended in the Environmental Impact Assessment Report and EMPr for the project.</p>
<p>1.5 How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?<sup>8</sup></p>	<p>A Phase 1 Heritage Impact Assessment was conducted for the project site. The assessment found a number of heritage artefacts or resources at the project properties. Of these, only Sites 13 (possible Stone Age knapping area and open air surface site) and Site 24 (LIA stone-walled settlement site) will be impacted upon directly. Sites 18 and 21 (pottery scatters) are located close</p>

<sup>6</sup> Section 24 of the Constitution and Sections 2(4)(a)(ii) and 2(4)(b) of NEMA refer.

<sup>7</sup> Section 24 of the Constitution and Sections 2(4)(a)(iv) and 2(4)(b) of NEMA refer.

<sup>8</sup> Section 24 of the Constitution and Sections 2(4)(a)(iii) and 2(4)(b) of NEMA refer.

Requirement	Part where requirement is addressed/response
	<p>to chicken house clusters, but are of no significance. Sites 17, 19, 20 and 23 are situated in close proximity to proposed developments, but will not be directly impacted upon. It is recommended that the last mentioned sites are fenced-in or that a buffer zone be applied to avoid any impacts by the planned developments.</p> <p>For Sites 13 and 24 the following is recommended:            Archaeological mitigation measures need to be implemented. This will include mapping the sites in detail, the collection of representative samples of material (for Stone Age Site 13) as well as Archaeological Excavation work on Site 24 after obtaining the required permits from SAHRA. The sites can be demolished once this work has been completed and the go-ahead has been obtained from SAHRA.</p>
<p>1.6 How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?<sup>9</sup></p>	<p>The proposed development will use the following non-renewable natural resources: diesel, petrol, coal and LPG. The proposed development will include a 10MW Solar PV Plant in order to decrease the farms' usage of electricity from the national grid (a non-renewable source of energy).</p> <p>Mitigation measures have been recommended in the Environmental Management Programme for this proposed development, to minimise the usage of non-renewable natural resources.</p>
<p>1.7 How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure</p>	<p>The proposed development will include a 10MW Solar PV Plant in order to decrease the farms' usage of electricity from the national grid (a non-renewable source of energy).</p> <p>It is not expected that the proposed development will jeopardise the integrity of resources.</p>

<sup>9</sup> Section 24 of the Constitution and Sections 2(4)(a)(v) and 2(4)(b) of NEMA refer.

Requirement	Part where requirement is addressed/response
responsible and equitable use of the resources? What measures were explored to enhance positive impacts? <sup>10</sup>	
1.7.1 <i>Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)</i>	As the proposed development entails the expansion of a facility, the resource usage will naturally increase. However, the proposed development will include a 10MW Solar PV Plant in order to decrease the farms' usage of electricity from the national grid (a non-renewable source of energy).
1.7.2 <i>Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)</i>	The resource use is justifiable and should not affect intra- and intergenerational equity. Mitigation measures have been recommended in the Environmental Management Programme for this proposed development to minimise the usage of resources.
1.7.3 <i>Do the proposed location, type and scale of development promote a reduced dependency on resources?</i>	Yes. The proposed development will include a 10MW Solar PV Plant in order to decrease the farms' usage of electricity from the national grid (a non-renewable source of energy).
1.8 How were a risk-averse and cautious approach applied in terms of ecological impacts? <sup>11</sup>	No development will occur within watercourses, wetlands and/or wetland buffer zones. Roads, water pipelines and electricity lines may cross watercourses, wetlands and/or wetland buffer zones, but the necessary Water Use Licences will be obtained in these instances. Refer also to Sections 9.6 and 9.7 of this report.
1.8.1 <i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</i>	It is recommended that a Phase 2 Heritage Impact Assessment be conducted for Stone Age Site 13 and Site 24 (heritage sites). A Destruction Permit will also need to be obtained from SAHRA.  Impacts have been further assessed in this report and further mitigation measures have been provided as part of the EMPr.

<sup>10</sup> Section 24 of the Constitution and Sections 2(4)(a)(vi) and 2(4)(b) of NEMA refer.

<sup>11</sup> Section 24 of the Constitution and Section 2(4)(a)(vii) of NEMA refer.

Requirement	Part where requirement is addressed/response
	<p>The following assumptions have been made:</p> <ul style="list-style-type: none"> <li>• That all research and reference sources or material is accurate and up to date;</li> <li>• That the project information, as provided by the applicant and project manager, is correct; and</li> <li>• That the specialist opinions are scientifically grounded and accurate.</li> </ul>
<p>1.8.2 <i>What is the level of risk associated with the limits of current knowledge?</i></p>	<p>It is Labesh's opinion that the level of risk associated with the limits of current knowledge is <i>low</i>.</p>
<p>1.8.3 <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i></p>	<p>A risk-averse and cautious approach was applied to the Scoping- and Environmental Impact Assessment Phases by keeping in mind the gaps in knowledge and limitations, such as time constraints for the specialist studies that have been conducted.</p>
<p>1.9 How will the ecological impacts resulting from this development impact on people's environmental right in terms following:<sup>12</sup></p>	
<p>1.9.1 <i>Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i></p>	<p>Section 9.6 of this report provides a list of the anticipated impacts from the proposed development. Section 9.10 provides some mitigation measures for these impacts and the Environmental Management Programme for the proposed development has more detailed mitigation measures that should be applied to minimise the impacts on the environment from the development.</p>
<p>1.9.2 <i>Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</i></p>	<p>The main positive impacts of the proposed development are the generation of job opportunities, the stimulation of the economy and agricultural sectors and the contribution towards food security in SA. An artificial wetland will also be created that will enhance the aesthetic and ecological character of the site. To enhance the positive impacts, local people will be employed during the construction and operational phases of the development, as far as possible.</p>
<p>1.10 Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's</p>	<p>Refer to Sections 9.6 and 9.7 of this report.</p>

<sup>12</sup> Section 24 of the Constitution and Sections 2(4)(a)(viii) and 2(4)(b) of NEMA refer.

Requirement	Part where requirement is addressed/response
ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	
1.11 Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	Refer to Sections 9.6 and 9.7 of this report.
1.12 Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations? <sup>13</sup>	Refer to Section 8.1 of this report.
1.13 Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area? <sup>14</sup>	Refer to Sections 9.6 and 9.7 of this report.
2.1 What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1 <i>The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,</i>	<p>The Kgetlengrivier Local Municipality Integrated Development Plan (2012-2017) identifies the need additional jobs due to the low level of individual and household income. Job creation is also a specific community need identified for Ward 6.</p> <p>A development objective of the agricultural sector is to retain and enhance agriculture as an important social and economic area. The intervention that has been identified for this development objective is the promotion of agriculture related industries.</p> <p>The proposed development is in line with these needs, as identified in the IDP.</p>

<sup>13</sup> Section 2(4)(b) of NEMA refer.

<sup>14</sup> Regulations 22(2)(i)(j), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

Requirement	Part where requirement is addressed/response
2.1.2 <i>Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</i>	Not applicable. The proposed project will not have any impact upon spatial patterns in terms of the need for integrated of segregated communities, the need to upgrade informal settlements or the need for densification as no settlements form part of the proposed development.
2.1.3 <i>Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</i>	Please refer to point 1.1.7 above.
2.1.4 <i>Municipal Economic Development Strategy ("LED Strategy").</i>	According to the Kgetlengrivier Local Municipality Integrated Development Plan (2012-2017), the Local Economic Development Strategy of the municipality is under review with the assistance of the Bojanala Platinum District Municipality. While the economic drivers of Kgetlengrivier Local Municipality are agriculture, tourism, small-scale mining, trade and government services, anecdotal evidence suggests that the current economic activities are not maximizing the potential of the area. This could create employment and improve the rate payer base for the municipality. (Kgetlengrivier Local Municipality, 2012). It can be inferred that the proposed development will be in line with the Local Economic Development Strategy for the Kgetlengrivier Local Municipality as agriculture is one of the main economic drivers and the proposed development will maximise the production potential of the project site and create jobs for people from the local communities.
2.2 Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	<p>The following socio-economic impacts of the proposed development have been identified at this stage:</p> <ul style="list-style-type: none"> <li>• Generation of a large number of job opportunities; and</li> <li>• Potential increase in crime due to the influx of workers, especially during the construction phase.</li> </ul> <p>Job creation is a socio-economic objective of the area. The proposed project will contribute towards job creation.</p>

Requirement	Part where requirement is addressed/response
<p>2.2.1 <i>Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?</i></p>	<p>According to the Kgetlengrivier Local Municipality Integrated Development Plan (2012-2017), the Local Economic Development Strategy of the municipality is under review with the assistance of the Bojanala Platinum District Municipality. While the economic drivers of Kgetlengrivier Local Municipality are agriculture, tourism, small-scale mining, trade and government services, anecdotal evidence suggests that the current economic activities are not maximizing the potential of the area. This could create employment and improve the rate payer base for the municipality. (Kgetlengrivier Local Municipality, 2012). It can be inferred that the proposed development will be in line with the Local Economic Development Strategy for the Kgetlengrivier Local Municipality as agriculture is one of the main economic drivers and the proposed development will maximise the production potential of the project site and create jobs for people from the local communities.</p>
<p>2.3 How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?<sup>15</sup></p>	<p>The proposed development will address the following specific need of the community, namely the provision of:</p> <ul style="list-style-type: none"> <li>• Job opportunities.</li> </ul>
<p>2.4 Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term?<sup>16</sup> Will the impact be socially and economically sustainable in the short- and long-term?</p>	<p>It is expected for the proposed development to result in equitable impact distributions in the short- and long-term as well as to be socially and economically sustainable in the short- and long-term.</p>
<p>2.5 In terms of location, describe how the placement of the proposed development will:<sup>17</sup></p>	
<p>2.5.1 <i>result in the creation of residential and employment opportunities in close proximity to or integrated with each other,</i></p>	<p>It is estimated that the proposed development will generate a total of 250 job opportunities during the construction phase and 22 new, permanent job opportunities during the operational phase. This will include job opportunities for local labourers.</p>

<sup>15</sup> Section 2(2) of NEMA refers.

<sup>16</sup> Sections 2(2) and 2(4)(c) of NEMA refers.

<sup>17</sup> Section 3 of the Development Facilitation Act, 1995 (Act No. 67 of 1995) ("DFA") and the National Development Plan refer.

Requirement	Part where requirement is addressed/response
2.5.2 <i>reduce the need for transport of people and goods,</i>	The project site is situated in close proximity to Rustenburg and the N4 highway. This reduces the distances that workers will need to travel from Rustenburg to the site. Workers will also be transported by RCL Foods to work and back.
2.5.3 <i>result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</i>	It is not expected for the proposed development to have any impact upon or result in any change in public transport.
2.5.4 <i>compliment other uses in the area,</i>	The predominant land uses in the area are agricultural land uses (crop production, livestock grazing, game farming and intensive animal husbandry). The proposed development will therefore compliment other land uses in the area.
2.5.5 <i>be in line with the planning for the area,</i>	The proposed development is in line with the planning for the area, as identified in the Kgetlengrivier Local Municipality Integrated Development Plan (2012-2017).
2.5.6 <i>for urban related development, make use of underutilised land available with the urban edge,</i>	The proposed development is not situated within the urban edge.
2.5.7 <i>optimise the use of existing resources and infrastructure,</i>	The proposed development will make use of existing gravel road infrastructure on the project site, as far as possible. The roads will, however, need to be upgraded. Existing electricity and water distribution infrastructure will also be used and upgraded and existing boreholes will also be used.
2.5.8 <i>opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</i>	The project site is not a settlement, not will a settlement be constructed.  The proposed development will make use of existing gravel road infrastructure on the project site, as far as possible. The roads will, however, need to be upgraded. Existing electricity and water distribution infrastructure will also be used and upgraded.
2.5.9 <i>discourage "urban sprawl" and contribute to compaction/densification,</i>	As the proposed development is not residential in nature, it is not expected to have any impact on "urban sprawl" or compaction/densification.



Requirement	Part where requirement is addressed/response
<p>2.5.10 contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</p>	<p>It is not expected for the proposed development to have any impact upon historically distorted spatial patterns of settlements.</p>
<p>2.5.11 encourage environmentally sustainable land development practices and processes,</p>	<p>Environmentally sustainable land development practices and processes will be encouraged through specific mitigation measures that have been included in the Environmental Management Programme for this project. The original Roodewal farm has been managed as a conservancy since 1984 and the applicant intends to install five more feeding stations on the Kwa-mmatau farms (the newly-acquired southern properties) in order to increase the conservancy's footprint. The undeveloped parts of the project site will be managed as a Conservancy area. The proposed development will include a 10MW Solar PV Plant in order to decrease the farms' usage of electricity from the national grid (a non-renewable source of energy). Wastewater generated on the farm will be treated to a quality that complies with the Department of Water and Sanitation's General Limit Standards for discharge into a water resource and an artificial wetland will be constructed to enhance the aesthetic and ecological functioning of the site. The treated water (also at livestock watering quality) will also be provided to the game on the site as an additional water source.</p>
<p>2.5.12 take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</p>	<p>The location for the proposed development is strategically ideal for the following reasons:</p> <ul style="list-style-type: none"> <li>• The site is situated close to Rustenburg and the N4 highway that makes travelling to markets convenient;</li> <li>• The project site is a vegetation dense site that makes biosecurity easier to implement as there will be dense vegetation between each chicken farm. This reduces the risk of diseases spreading between farms or from the farm to adjacent properties;</li> <li>• The site is not situated in an urban are nor are there mines in the vicinity that would place developmental pressure on the breeder farm; and</li> </ul>

Requirement	Part where requirement is addressed/response
<p>2.5.13 <i>the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),</i></p>	<ul style="list-style-type: none"> <li>The applicant has other existing chicken farms in the area, making the project site ideal from a logistic point of view.</li> </ul> <p>Investment in the proposed development will result in high socio-economic returns for the area. It is estimated that the proposed development will generate a total of 250 job opportunities during the construction phase and 22 new, permanent job opportunities during the operational phase. The capital investment of the project will be in the order of R800 000 000-00.</p>
<p>2.5.14 <i>impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</i></p>	<p>A Phase 1 Heritage Impact Assessment was conducted for the project site. The assessment found a number of heritage artefacts or resources at the project properties. Of these, only Site 13 (possible Stone Age knapping area and open air surface site) and Site 24 (LIA stone-walled settlement site) will be impacted upon directly. Sites 18 and 21 (pottery scatters) are located close to chicken house clusters, but are of no significance. Sites 17, 19, 20 and 23 are situated in close proximity to developments, but will not be directly impacted upon. It is recommended that the last mentioned sites are fenced-in or that a buffer zone be applied to avoid any impacts by the planned developments.</p> <p>For Sites 13 and 24 the following is recommended: Archaeological mitigation measures need to be implemented. This will include mapping the sites in detail, the collection of representative samples of material (for Stone Age Site 13) as well as Archaeological Excavation work on Site 24 after obtaining the required permits from SAHRA. The sites can be demolished once this work has been completed and the go-ahead has been obtained from SAHRA.</p>
<p>2.5.15 <i>in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</i></p>	<p>It is not expected for the proposed development to have any impact upon settlement patterns.</p>

Requirement	Part where requirement is addressed/response
2.6 How were a risk-averse and cautious approach applied in terms of socio-economic impacts?: <sup>18</sup>	A risk-averse and cautious approach was applied to the Scoping- and Environmental Impact Assessment Phases by keeping in mind the gaps in knowledge and limitations, such as time constraints for the specialist studies that have been conducted.
2.6.1 <i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</i> <sup>19</sup>	<p>It is recommended that a Phase 2 Heritage Impact Assessment be conducted for Stone Age Site 13 and Site 24 (heritage sites). A Destruction Permit will also need to be obtained from SAHRA.</p> <p>Impacts have been further assessed in this report and further mitigation measures have been provided as part of the EMP.</p> <p>The following assumptions have been made:</p> <ul style="list-style-type: none"> <li>• That all research and reference sources or material is accurate and up to date;</li> <li>• That the project information, as provided by the applicant and project manager, is correct; and</li> <li>• That the specialist opinions are scientifically grounded and accurate.</li> </ul>
2.6.2 <i>What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</i>	It is Labesh's opinion that the level of risk associated with the limits of current knowledge is <i>low</i> .
2.6.3 <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i>	A risk-averse and cautious approach was applied to the Scoping- and Environmental Impact Assessment Phases by keeping in mind the gaps in knowledge and limitations, such as time constraints for the specialist studies that have been conducted.

2.7 How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:

<sup>18</sup> Section 2(4)(a)(vii) of NEMA refers.

<sup>19</sup> Section 24(4) of NEMA refers.

Requirement	Part where requirement is addressed/response
2.7.1 <i>Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i>	It is not expected for the proposed development to impact significantly on people's health, safety and social ills.
2.7.2 <i>Positive impacts. What measures were taken to enhance positive impacts?</i>	The main positive impacts of the proposed development are the generation of job opportunities, the stimulation of the local and regional economy and the contribution towards food security in SA. To enhance the positive impacts, local people will be employed during the construction and operational phases of the development, as far as possible.
2.8 Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	The development will result in the consumption of natural resources, such as ground water and coal. However, the usage of the resources is not considered to be an over-utilisation and some resources would have been utilised in any event, albeit at a different locality (the breeder farm production that is being relocated from other existing farms to the project site).
2.9 What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations? <sup>20</sup>	Refer to Section 8.1 of this report.
2.10 What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? <sup>21</sup> Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	Refer to Section 8.1 of this report.
2.11 What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and	Local labourers will be employed, as far as possible and up to certain skill levels, depending on the work involved.

<sup>20</sup> Section 2(4)(b) of NEMA refers.

<sup>21</sup> Section 2(4)(c) of NEMA refers.

Requirement	Part where requirement is addressed/response
<p>what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?<sup>22</sup></p>	
<p>2.12 What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?<sup>23</sup></p>	<p>To ensure that responsibility for the environmental health and safety consequences of the development has been addressed, mitigation measures have been identified in this report and the EMPr. The responsibility for implementing the mitigation measures lies with the applicant.</p>
<p>2.13 What measures were taken to:</p>	
<p>2.13.1 <i>ensure the participation of all interested and affected parties,</i></p>	<p>A public participation process was conducted, in accordance with the EIA Regulations, 2014, and also taking the following into consideration</p> <ul style="list-style-type: none"> <li>• GN 807 - Public Participation Guideline in the Environmental Impact Assessment Process, 2012; and</li> <li>• The Promotion of Access to Information Act (PAIA), 2000.</li> </ul>
<p>2.13.2 <i>provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</i><sup>24</sup></p>	<p>The public participation process for this project is open to all parties. Site notices and a newspaper advertisement were placed to encourage participation from a wider audience than simply the adjacent land owners.</p>
<p>2.13.3 <i>ensure participation by vulnerable and disadvantaged persons,</i><sup>25</sup></p>	<p>The public participation processes were open to all individuals, also to vulnerable and disadvantaged persons.</p>
<p>2.13.4 <i>promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,</i><sup>26</sup></p>	<p>All employees, contractors and sub-contractors will be required to attend environmental awareness inductions (training).</p>

<sup>22</sup> Section 2(4)(d) of NEMA refers.

<sup>23</sup> Section 2(4)(e) of NEMA refers.

<sup>24</sup> Section 2(4)(f) of NEMA refers.

<sup>25</sup> Section 2(4)(f) of NEMA refers.

<sup>26</sup> Section 2(4)(h) of NEMA refers.

Requirement	Part where requirement is addressed/response
<p>2.13.5 ensure openness and transparency, and access to information in terms of the process,<sup>27</sup></p>	<p>A public participation process was conducted, in accordance with the EIA Regulations, 2014, and also taking the following into consideration</p> <ul style="list-style-type: none"> <li>• GN 807 - Public Participation Guideline in the Environmental Impact Assessment Process, 2012; and</li> <li>• The Promotion of Access to Information Act (PAIA), 2000.</li> </ul> <p>The public participation process was open to participation from any members of the public and was a fully transparent process. All comments received from Interested and Affected Parties have been included in the reports for this project and have also been responded to/addressed. The reports will be available to any person wishing to review and comment upon the reports.</p>
<p>2.13.6 ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge<sup>28</sup>, and</p>	<p>A public participation process was conducted, in accordance with the EIA Regulations, 2014, and also taking the following into consideration</p> <ul style="list-style-type: none"> <li>• GN 807 - Public Participation Guideline in the Environmental Impact Assessment Process, 2012; and</li> <li>• The Promotion of Access to Information Act (PAIA), 2000.</li> </ul>
<p>2.13.7 ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?<sup>29</sup></p>	<p>A public participation process was conducted, in accordance with the EIA Regulations, 2014, and also taking the following into consideration</p> <ul style="list-style-type: none"> <li>• GN 807 - Public Participation Guideline in the Environmental Impact Assessment Process, 2012; and</li> <li>• The Promotion of Access to Information Act (PAIA), 2000.</li> </ul>
<p>2.14 Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the</p>	<p>Local labourers will be employed, as far as possible and up to certain skill levels, depending on the work involved.</p>

<sup>27</sup> Section 2(4)(k) of NEMA refers.

<sup>28</sup> Section 2(4)(g) of NEMA refers.

<sup>29</sup> Section 2(4)(q) of NEMA refers.

Requirement	Part where requirement is addressed/response
community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)? <sup>30</sup>	
2.15 What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected? <sup>31</sup>	All employees, contractors and sub-contractors will be required to attend environmental awareness inductions (training). This will include informing workers that they have the right to refuse work should the work be harmful to human health or the environment.
2.16 Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1 <i>the number of temporary versus permanent jobs that will be created,</i>	It is estimated that the proposed development will generate a total of 250 job opportunities during the construction phase and 22 new, permanent job opportunities during the operational phase.
2.16.2 <i>whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),</i>	Local labourers will be employed, as far as possible and up to certain skill levels, depending on the work involved.
2.16.3 <i>the distance from where labourers will have to travel,</i>	Labourers will be transported to and from the site. Using local labourers (as far as possible) will decrease travel distances.
2.16.4 <i>the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and</i>	Job opportunities will be created at the proposed development site, which is reasonably close to Rustenburg, Derby and Koster.
2.16.5 <i>the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</i>	The proposed development will create job opportunities and should not impact upon employment opportunities in other sectors.
2.17 What measures were taken to ensure:	
2.17.1 <i>that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</i>	Relevant environmental and town planning legislation was considered and adhered to during the Environmental Impact Assessment and Land Use Rights processes. Also refer to Chapter 6 of this report.

<sup>30</sup> x

<sup>31</sup> Section 2(4)(j) of NEMA refers.

Requirement	Part where requirement is addressed/response
<p>2.17.2 that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</p>	<p>A public participation process was conducted, in accordance with the EIA Regulations, 2014, and also taking the following into consideration</p> <ul style="list-style-type: none"> <li>• GN 807 - Public Participation Guideline in the Environmental Impact Assessment Process, 2012; and</li> <li>• The Promotion of Access to Information Act (PAIA), 2000.</li> </ul>
<p>2.18 What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?<sup>32</sup></p>	<p>The original Roodewal farm has been managed as a conservancy since 1984 and the applicant intends to install five more feeding stations on the Kwammatau farms (the newly-acquired southern properties) in order to increase the conservancy's footprint. The undeveloped parts of the project site will be managed as a Conservancy area.</p> <p>Mitigation measures have been in the Environmental Management Programme for this development to minimise the impacts of the proposed development on the environment.</p>
<p>2.19 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?<sup>33</sup></p>	<p>The mitigation measures have been elaborated in the EMPr for this project. Any long-term environmental legacy or burden will also be discussed in the Environmental Impact Assessment Report.</p>
<p>2.20 What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?<sup>34</sup></p>	<p>The applicant will be responsible for any costs associated with the remediation of pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects.</p>
<p>2.21 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in</p>	<p>Refer to Section 8.1 of this report.</p>

<sup>32</sup> Section 2(4)(o) of NEMA refers.

<sup>33</sup> Section 240(1)(b)(iii) of NEMA and the National Development Plan refer.

<sup>34</sup> Section 2(4)(p) of NEMA refers.



Requirement	Part where requirement is addressed/response
the selection of the best practicable environmental option in terms of socio-economic considerations? <sup>35</sup>	
2.22 Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area? <sup>36</sup>	Cumulative impacts have been described in Sections 9.6 and 9.7 of this report.

<sup>35</sup> Section 2(4)(b) of NEMA refers.

<sup>36</sup> Regulations 22(2)(i)(j), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

### 7.3 Need and Desirability: Motivation for the preferred development footprint within the approved site as contemplated in the accepted Scoping Report

Please refer to Section 8 below for the motivation for the preferred development footprints within the approved site (as contemplated in the accepted Scoping Report).

## 8. PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE

### 8.1 Alternatives considered

According to the Western Cape Department of Environmental Affairs and Development Planning's Guideline on Alternatives (2010), the following alternatives can be assessed:

Table 3: Alternative Types

Alternative Type	Explanation/Examples
Location	Refers to both alternative properties as well as alternative sites on the same property.
Activity	Incineration of waste rather than disposal at a landfill site/Provision of public transport rather than increasing the capacity of roads.
Design or Layout	Design: e.g. Different architectural and or engineering designs Site Layout: Consideration of different spatial configurations of an activity on a particular site (e.g. siting of a noisy plant away from residences).
Technological	Consideration of such alternatives is to include the option of achieving the same goal by using a different method or process (e.g. 1 000 megawatt of energy could be generated using a coal-fired power station or wind turbines).
Demand	Arises when a demand for a certain product or service can be met by some alternative means (e.g. the demand for electricity could be met by supplying more energy or using energy more efficiently by managing demand).
Input	Input alternatives are applicable to applications that may use different raw materials or energy sources in their process (e.g. industry may consider using either high sulphur coal or natural gas as a fuel source).
Routing	Consideration of alternative routes generally applies to linear developments such as power line servitudes, transportation and pipeline routes.
Scheduling and Timing	Where a number of measures might play a part in an overall programme, but the order in which they are scheduled will contribute to the overall effectiveness of the end result.
Scale and Magnitude	Activities that can be broken down into smaller units and can be undertaken on different scales (e.g. for a housing development there could be the option of 10, 15 or 20 housing units. Each of these alternatives may have different impacts).
"No-Go Option"	This is the option of not implementing the proposed activity.

Alternative Assessments must always include the "No-Go Option" as the baseline against which all other alternatives must be measured. The following alternatives could be considered for the proposed project:

- Location – alternative properties and alternative sites on the same property;
- Design/Layout;
- Technological;
- Routing;

- Scale and Magnitude; and
- “No-Go Option”.

Alternatives were considered in a qualitative manner.

### **8.1.1 Location**

#### **Alternative properties**

As mentioned elsewhere, the applicant wishes to relocate and expand its breeder operations as a result of pressure at some of their existing farms due to urbanisation and the encroachment of mines. In order to find a suitable site for the proposed relocation and expansion project, the applicant went through a lengthy process in order to identify suitable sites. Two alternatives were considered in this process. The first was an entirely undeveloped property/properties in the vicinity of Rustenburg, and the second was an existing breeder farm. The applicant determined that expanding an existing breeder farm would be the preferred as the property would already be in a disturbed state, to a certain degree, and it would logistically and financially be more viable to expand an existing farm than it would be to establish an entirely new farm on an undeveloped site. An undeveloped site would potentially also be less disturbed than an existing farm. The Roodewal breeder farm (the northern properties of the project site, as discussed in this report) was identified as a suitable, existing farm for the proposed expansion. However, the existing farm did not have enough open land/space to accommodate the number of additional chicken farms that the applicant wishes to construct as part of the expansion project. The applicant therefore investigated the purchasing of land in the vicinity of the existing farm and identified the four properties to the south of the existing farm as potential properties to purchase in order to enlarge the land available for the expansion project. A Preliminary Environmental Sensitivity Assessment was commissioned by the applicant before the purchasing of the four properties. Based on the findings of this assessment, the applicant decided to purchase said properties and initiated this Environmental Authorisation application and its associated Environmental Impact Assessment process. Henceforth, the project properties, as described in this report, are the preferred property alternatives for the proposed project.

The suitability and feasibility of the project properties for the proposed project are demonstrated by the following:

- The properties are situated in close proximity to Rustenburg;
- The properties are situated in an area with agricultural land-uses;
- The properties are large in extent; and
- The properties are not situated close to any mines or urban and residential areas/settlements.

#### **Alternative sites on the same property**

A Site Sensitivity Mapping Exercise was used to identify suitable site(s) on the project properties for the proposed development. This also identified unsuitable sites where environmental constraints prohibit development activities. Sensitivity maps were developed from the following specialist studies: Fauna Assessment, Flora Assessment, Wetland/Riparian Delineation and Functional Assessment, Phase 1 Heritage Impact Assessment and a Palaeontological Desktop Assessment. The maps were then integrated into two combined sensitivity maps, as given in the figures below. The maps were used to identify the most sensitive areas that should be avoided and protected as part of the proposed development, or where further mitigation measures would be required to address specific impacts that could not be avoided. This is further discussed under the following section (8.1.2 Design/Layout).

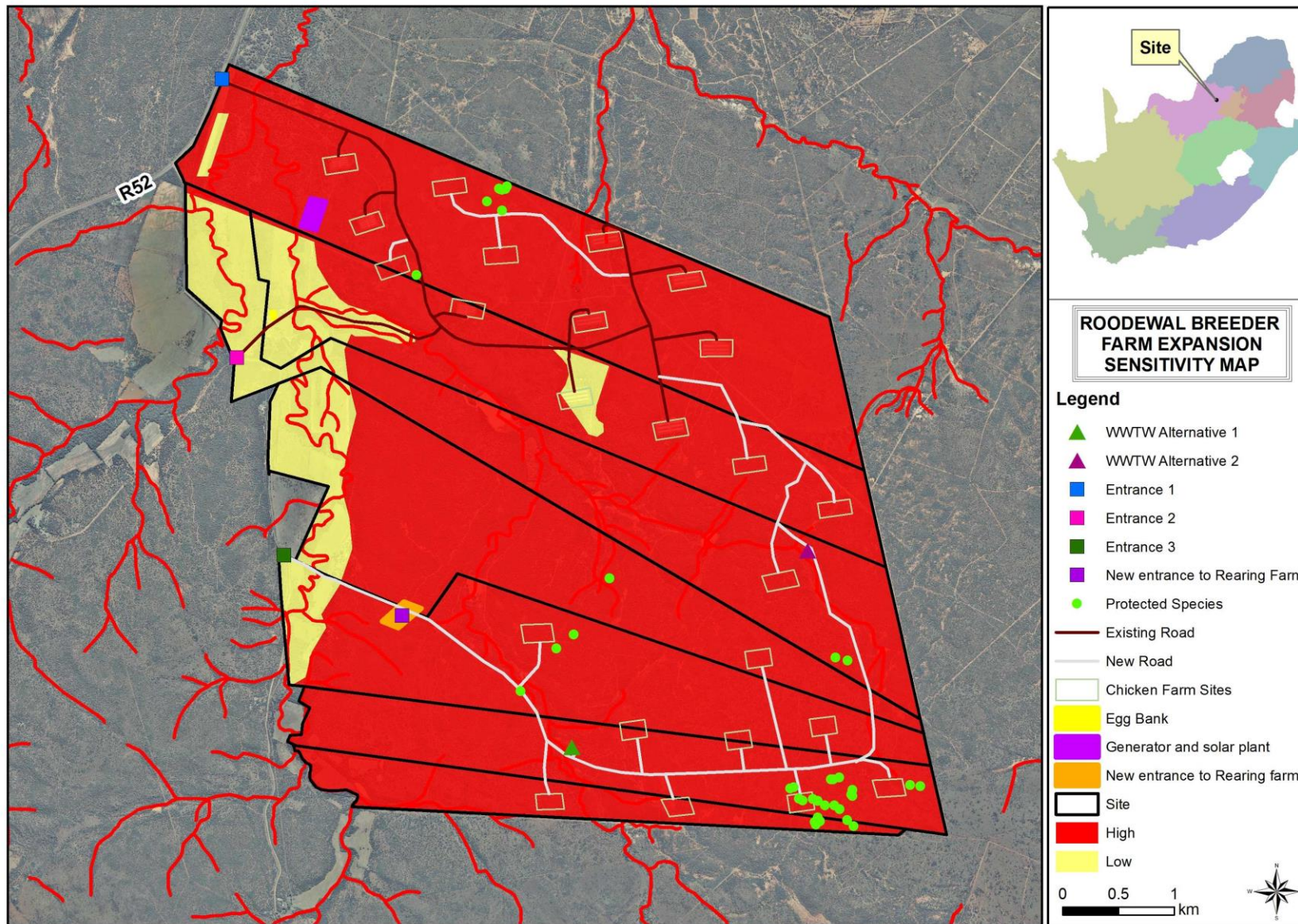


Figure 17: Ecological sensitivity map

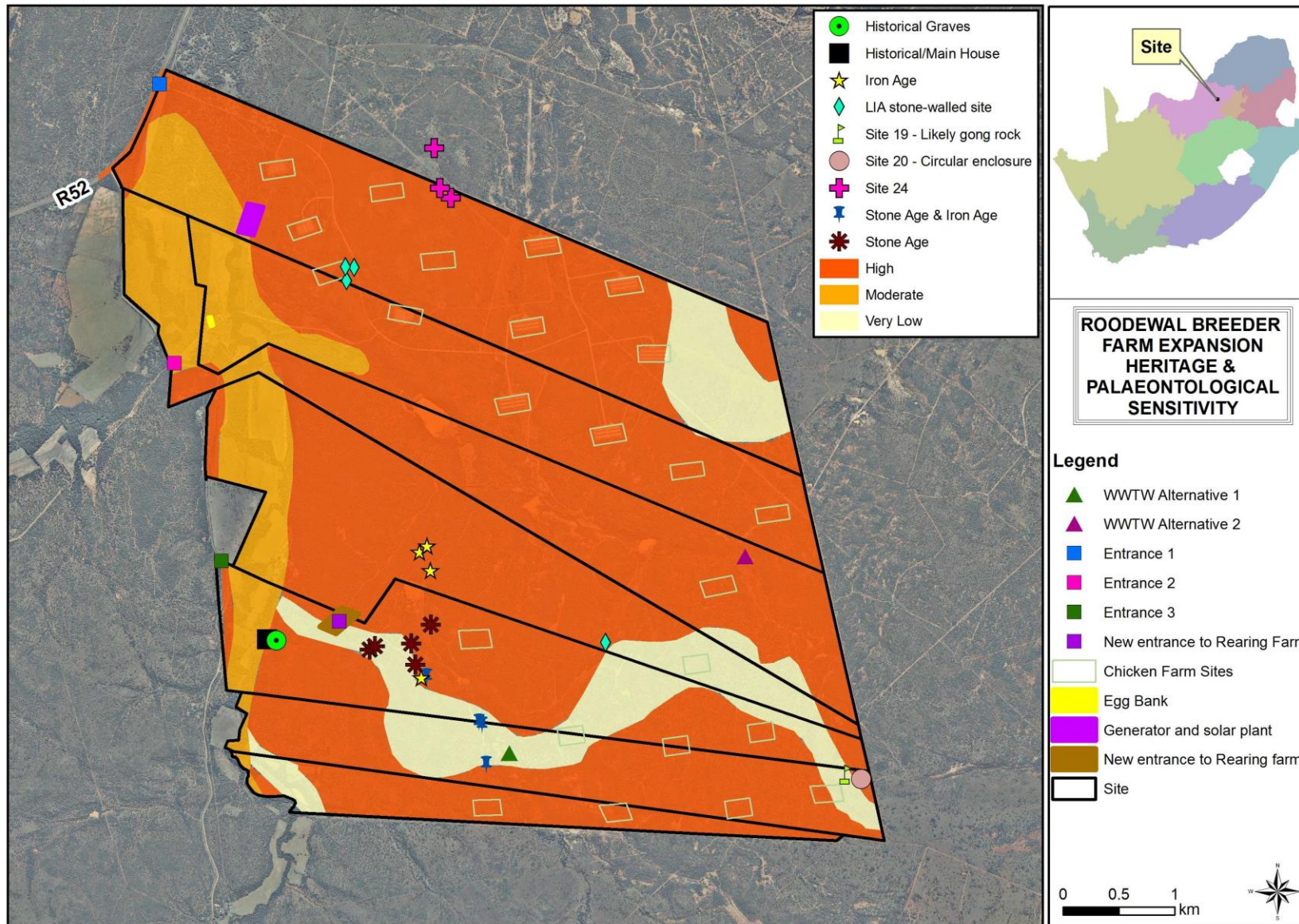


Figure 18: Heritage and Palaeontological sensitivity map

### 8.1.2 Design/Layout

The layout plan for the proposed development was influenced by the following factors:

- There is a 226ha servitude/corridor over the breeder farm, as shown in *Figure 16*. This was requested by Eskom in order for them to construct three 750kV power lines from the Medupi power station to the national grid;
- Ensuring there is enough space between the chicken farms (at least 500m) in order to comply with biosecurity requirements;
- Ensuring there is enough space between the laying and rearing farms (at least 1km) in order to comply with biosecurity requirements;
- Ensuring adequate surface storm water drainage;
- Ensuring that level areas are chosen for the chicken farms as construction on moderate to steep slopes would be too costly;
- Ensuring that the proposed Wastewater Treatment Plant is situated relatively close to a drainage line, but outside of the 15m buffer, so that treated wastewater (of the required quality) can be discharged into the drainage line in order to supplement the water available to game on the site;
- Ensuring the Solar PV plant is situated in an open area where the panels will have unobstructed exposure to the sun; and
- Ensuring that the Egg Bank is situated close to existing offices on the laying farm (northern part of the site) so that vehicles collecting the eggs can have easy access to the facility.

In the Vegetation Assessment it was recommended that the chicken farm sites be moved into the more disturbed vegetation units, such as the transformed and derelict agricultural fields. In addition, the development footprint should be concentrated on the western portion of the site, in close proximity to already disturbed areas (Dimela Eco Consulting, 2016). Furthermore, from an ecological perspective, almost the entire site is classified as having a high sensitivity (refer to *Figure 17* above).

The proposed sites for the chicken farms, the Egg Bank, Solar PV plant and new entrance to the rearing farm have been positioned to be outside of the drainage lines onsite, as well as their 15m buffer zones. The development sites have been placed as close as possible to each other, taking the mandatory 500m between chicken farms into consideration, together with conditions pertaining to the gradient of the slopes onsite. At first, the chicken farms on the southern part of the project site (the future rearing farm) were spread out much more, as shown in *Figure 19* below. This layout was rejected and reconsidered in order to concentrate the proposed chicken farms as much as possible, in favour of decreasing the impacts on the environment in terms of edge effects. The proposed chicken farms were therefore placed as close as possible to each other, on the southernmost part of the site. The Flora specialists for this project recommended that the chicken farms be located on the western parts of the site, which are already disturbed. This alternative was, however, not a viable one as siting the chicken farms close to the road that passes the site on its western boundary poses a high risk in terms of biosecurity, due to vehicles carrying chickens from other farms also making use of this road. Diseases could therefore spread to the Roodewal farm from passing vehicles, or vice versa. Secondly, the westernmost parts of the site are criss-crossed by drainage lines and their short tributaries. This area is therefore more sensitivity from a watercourse and wetland point of view and the presence of these drainage lines also severely limits the space that is available in these disturbed areas for the placement of chicken farm sites (exacerbated by the required 500m distance between the farms for biosecurity reasons). The grasslands on the disturbed areas of the site (the westernmost parts of the site) are necessary for the provision of sufficient grazing land for the antelope onsite (zebra, impala and so forth). Without the grasslands, there would not be sufficient vegetation on the site to maintain the grass-eating antelope populations. Protected plant species have been avoided as far as possible during the placement of the proposed chicken farm sites. Unfortunately, one site on the southernmost part of the project site (the site where a number of bright green circles are visible within the farms' proposed construction footprint on *Figure 17*) will impact upon a number of protected plants and the required permits will

need to be obtained in order to relocate or remove these plants. Lastly, construction is also very difficult on areas with steep/steeper slopes (hills and ridges). The chicken farm sites have therefore been placed on areas of flatter land and hills and ridges have been avoided. This is also desirable from an ecological perspective as hills and ridges are unique and sensitive habitats. Please refer to *Figure 20* in this regard.

After reviewing the Draft Scoping Report, Biodiversity Unit of the North West Department of Rural, Environmental and Agricultural Development requested that the layout of the farm be changed to remove the two north-eastern laying farms (indicated in the red circle on *Figure 21* below), as they are situated within the CBA 2 (Critical Biodiversity Area 2) of the North West Biodiversity Sector Plan, 2015. The two laying farms have therefore been moved. One farm has been moved further south (shown in the blue circle on *Figure 22* below) and one farm has been moved to the southern part of the site (shown in the yellow circle on *Figure 22* below). The road-, electricity- and water infrastructure plans have also been amended to accommodate the new farm layouts.

Two alternative sites were considered for the placement of the Wastewater Treatment Plant, as shown in *Figure 17* and *Figure 18* above. The one alternative site, the northernmost site, was subsequently rejected as a viable alternative due to erosion at this site. The southernmost site has therefore been identified as the preferred alternative for the Wastewater Treatment Plant and a wetland specialist has confirmed that the locality is suitable for the placement of the plant and the construction of the artificial wetland. The applicant has commissioned designs for the artificial wetland that will form part of the proposed Wastewater Treatment Plant.



*Figure 19: Originally proposed layout for the chicken farm sites*

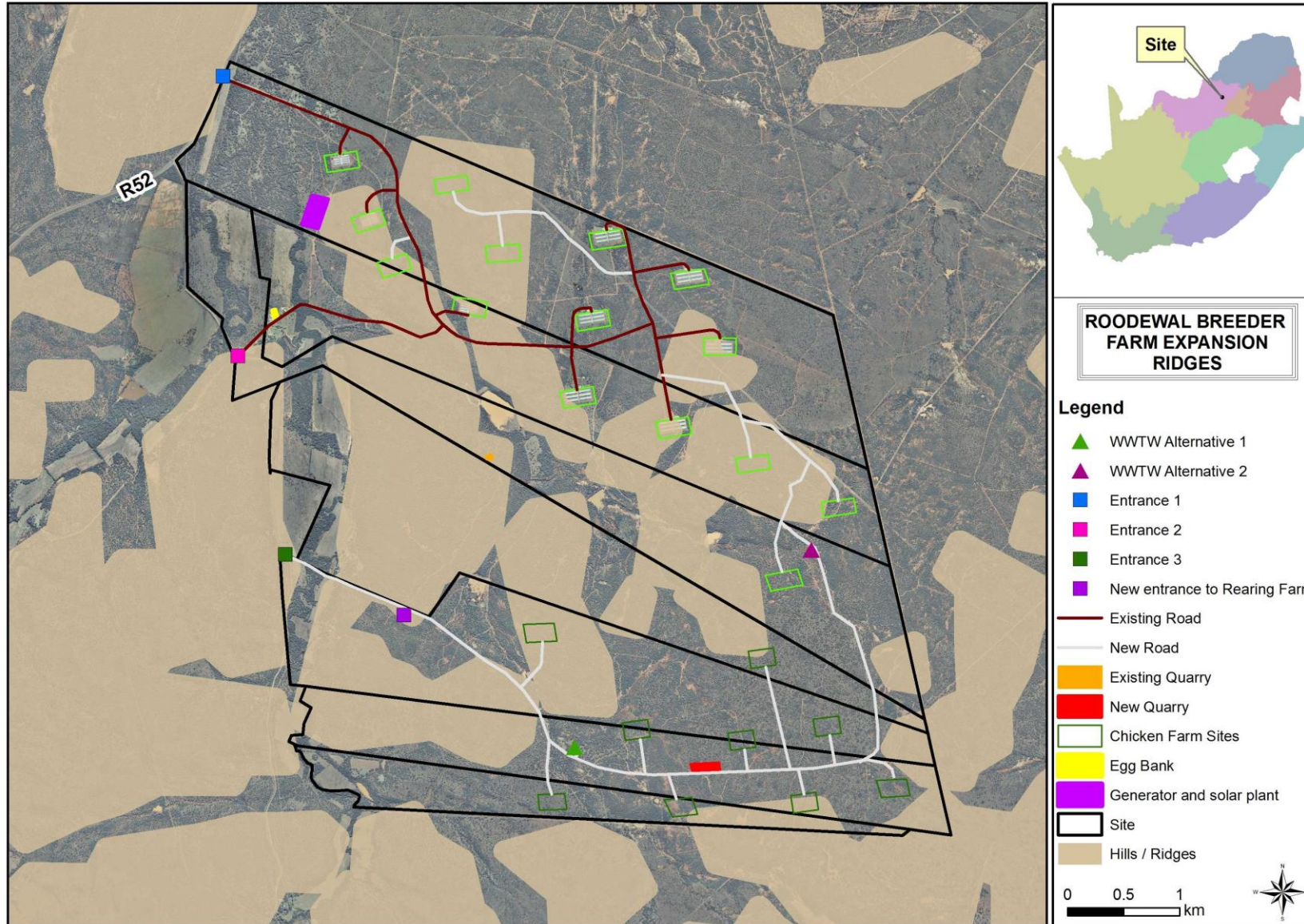


Figure 20: Hills and ridges of the project site



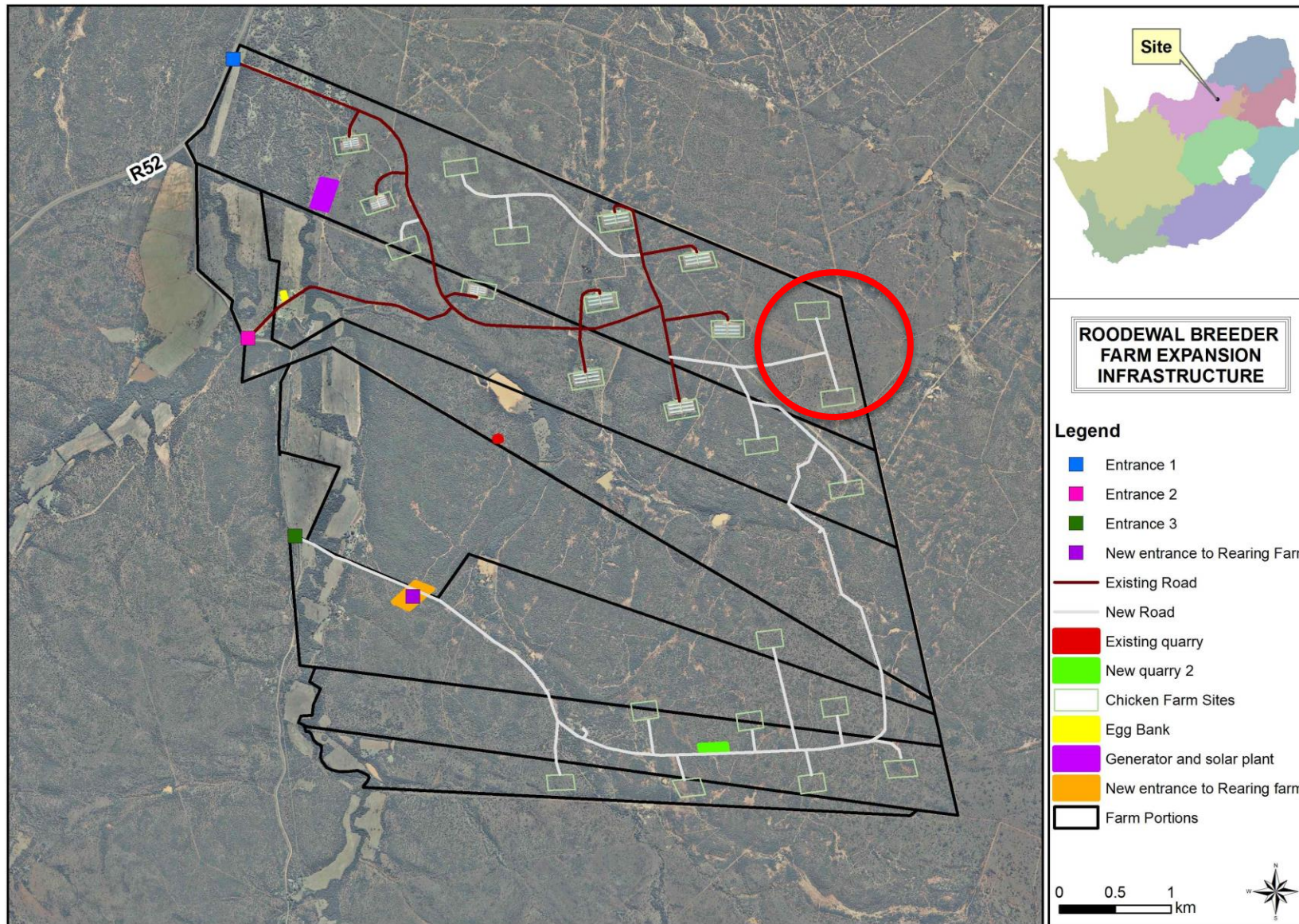


Figure 21: Layout proposed in the Scoping Report

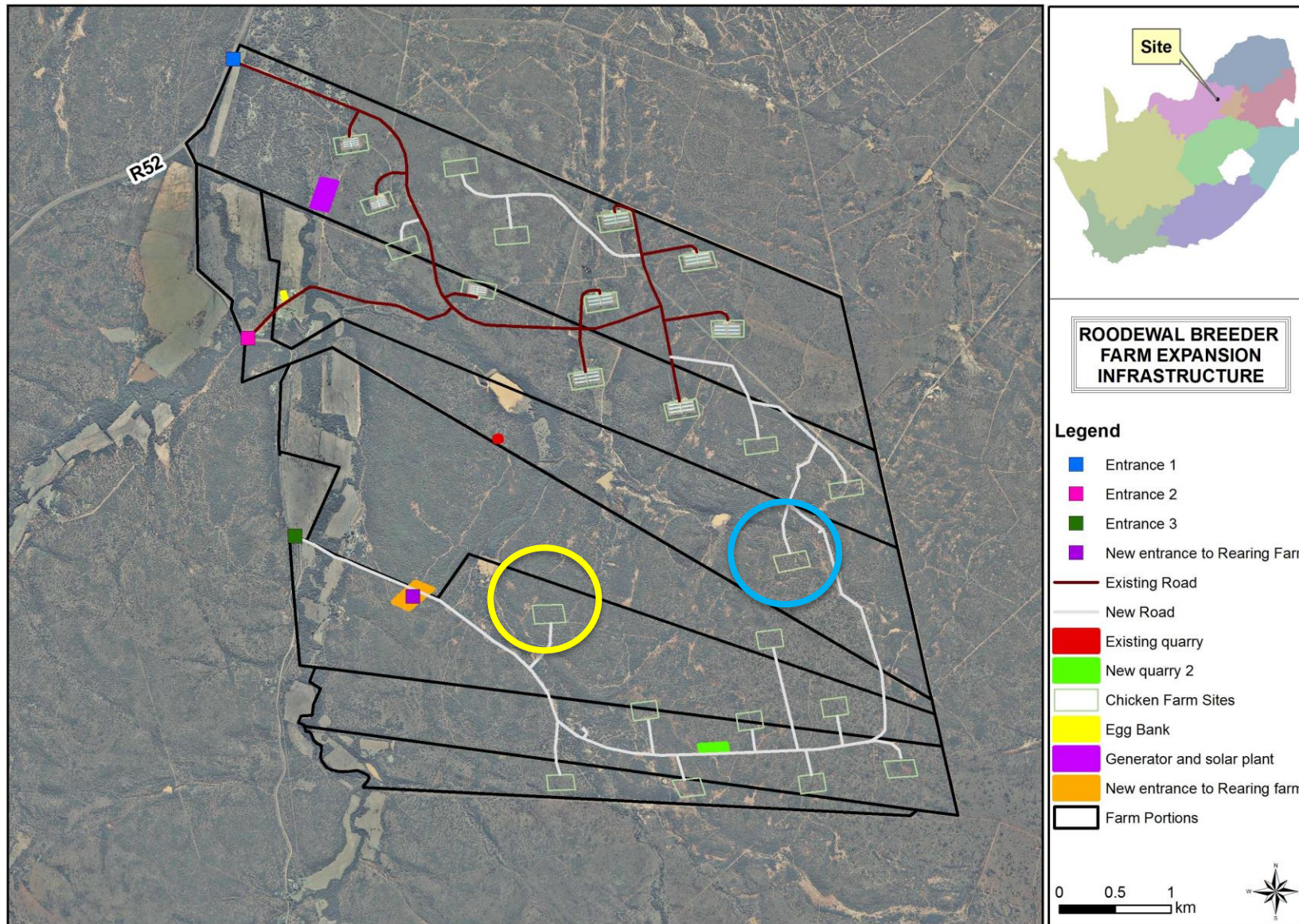


Figure 22: Final Infrastructure/Development Plan

The high palaeontological sensitivity of the majority of the site cannot be avoided (refer to *Figure 18*), but specific mitigation measures have been recommended by the palaeontologist in this regard. From a heritage point of view, a number of sites have been identified (refer to *Figure 18*) and a Phase 2 Heritage Impact Assessment and Mitigation Measures (mapping and excavation work), as well as an application for a Destruction Permit from SAHRA, are required for Sites 13 and 24. This is, however, not considered to be a fatal flaw and the heritage specialist has indicated that the proposed development should be allowed to continue. The layout has ensured that all other sites will not be affected by the proposed development.

### **8.1.3 Technological**

The applicant has determined the technology that will be used for the proposed chicken farms, based on the most advanced technologies available globally and which will also be suitable to conditions in South Africa. No technology alternatives have therefore been considered as part of this EIA process. The applicant has also determined the most suitable technology for the Solar PV plant and wastewater treatment plant and no alternatives have therefore been considered in this regard either.

### **8.1.4 Routing**

Routing for the proposed development includes the routing of the following linear infrastructure: power lines, the water distribution network and roads. A ring road approach has been chosen to limit the distance of roads that need to be constructed. Existing roads will be used as far as possible and upgraded and expanded where required. The water and electricity distribution networks will follow the roads (on either side of the road) in order to decrease the footprint area that needs to be disturbed.

### **8.1.5 Scale and Magnitude**

The applicant determined the number and size of the chicken farms that are desired for the proposed development. This is based on economies of scale and their production requirements, as well as the production capacity that needs to be relocated to the Roodewal Breeder Farm from existing farms elsewhere. No scale and magnitude alternatives could therefore be considered as part of the EIA process.

### **8.1.6 “No-Go Option”**

The No-Go Option would be where the project site is not developed any further. The existing laying and rearing farms will continue to operate and the southern properties of the site will remain undeveloped. Without the applicant's use of the southern properties, it is likely that they will again be used for commercial cattle farming, as was the case in the past. In this scenario, no areas of this land will be set aside for conservation purposes. In the Vegetation Assessment it is stated that extensive livestock production, such as cattle farming, and which is allowed in an ESA1 area, could lead to an undesirable change in flora species composition. The contributions to the local and regional economy and the provision of many new job opportunities will also not be fulfilled.

## **8.2 Public Participation Process undertaken in terms of Section 41 of the EIA Regulations, 2014**

The following potentially Interested and Affected Parties were identified as part of the proposed development's Environmental Impact Assessment process (please also refer to the next figure that shows the adjacent land owners of the project properties):

- Kgetlengrivier Local Municipality
- Kgetlengrivier Local Municipality – Ward 6
- Bojanala Platinum District Municipality
- North West Department of Rural, Environment and Agricultural Development

- North West Department of Finance
- North West Department of Local Government and Human Settlement
- North West Department of Community Safety and Transport Management
- North West Department of Public Works and Roads
- North West Department of Economy and Enterprise Development
- North West Department of Social Development - Bojanala District
- North West Department of Health
- Department of Water and Sanitation
- South African Heritage Resources Agency (SAHRA)
- Department of Mineral Resources
- Kgaswane Mountain Reserve
- Magaliesberg Biosphere
- Adjacent land owner: Portion 62 of the Farm Elandsfontein 366 JQ
- Adjacent land owner: Portion 66 of the Farm Elandsfontein 366 JQ
- Adjacent land owner: Portion 61 of the Farm Elandsfontein 366 JQ
- Adjacent land owner: Portion 65 of the Farm Elandsfontein 366 JQ
- Adjacent land owner: Remaining extent of Portion 3 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 11 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 12 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 19 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Remaining extent of Portion 28 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 24 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 27 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 40 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 20 of the Farm Buffelshoek 325 JQ
- Adjacent land owner: Portion 27 of the Farm Roodewal 322 JQ
- Adjacent land owner: Portion 32 of the Farm Roodewal 322 JQ
- Adjacent land owner: Portion 33 of the Farm Roodewal 322 JQ
- Adjacent land owner: Remaining extent of Portion 10 of the Farm Roodewal 322 JQ
- Adjacent land owner: Portion 3 of the Farm Roodewal 322 JQ
- Adjacent land owner: Portion 31 of the Farm Roodewal 322 JQ
- Adjacent land owner: Remaining extent of Portion 1 of the Farm Roodewal 322 JQ

For the initial Public Participation Process (notification of potentially Interested and Affected Parties), written notifications and Background Information Documents were distributed to the above mentioned list of identified Interested and Affected Parties. The notifications were sent via email, fax, registered post or hand delivered. Site notices were placed on the boundary of the project properties, specifically at entrance gates to the properties. A newspaper advertisement was placed in the Rustenburg Herald on the 18<sup>th</sup> of November 2016.

Proof of the above mentioned initial Public Participation Process is attached under Appendix C.

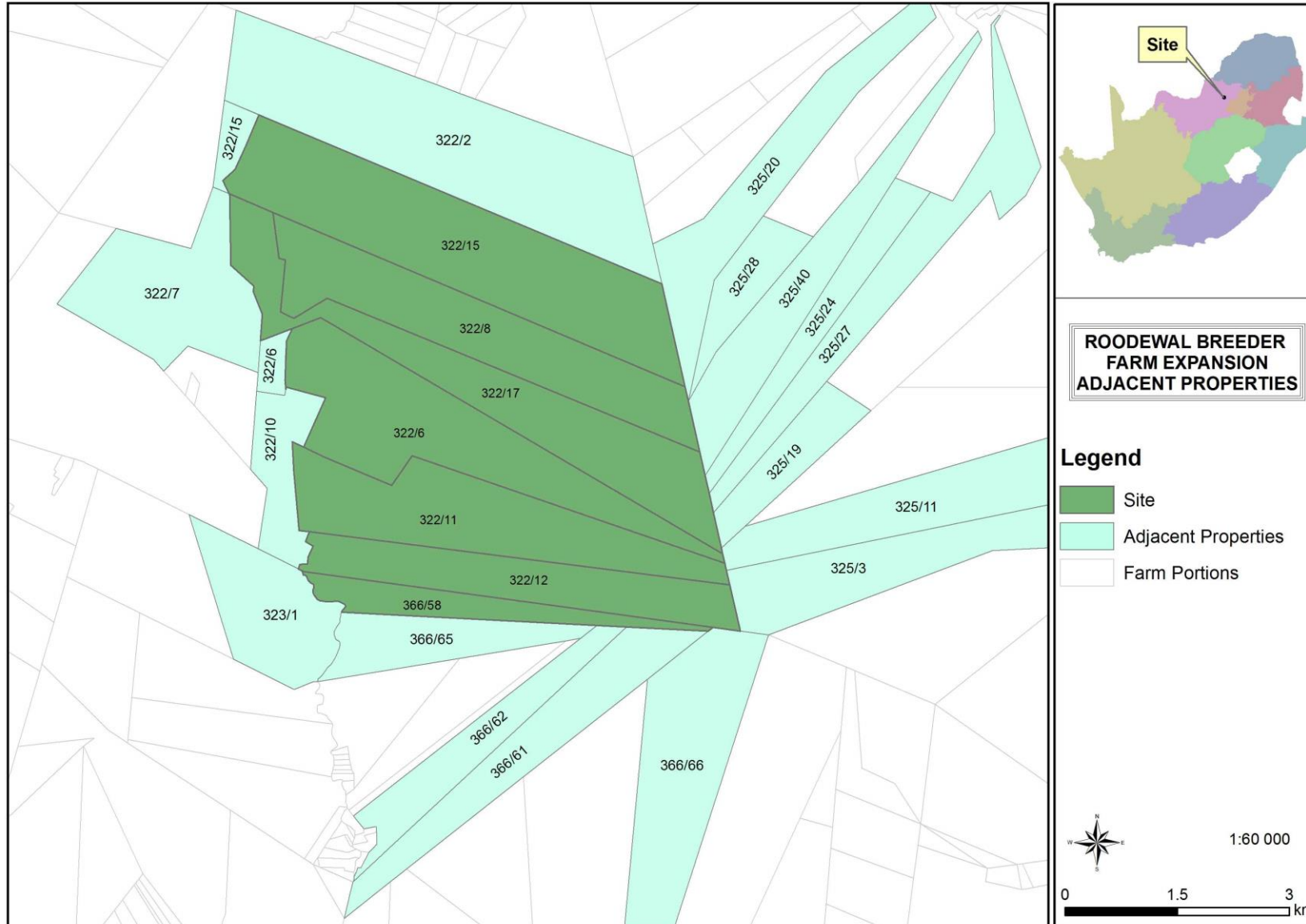


Figure 23: Properties adjacent to the project properties (the site)

### **8.2.1 Public Review of the Draft Scoping Report**

As required by the Environmental Impact Assessment Regulations, 2014, the Scoping Report (draft) was circulated for public review and commenting, for a period of at least 30 days. The review period was from the 23<sup>rd</sup> of May 2017 to the 3<sup>rd</sup> of July 2017. Interested and Affected Parties were notified of the availability of the Scoping Report and the review period via email and registered post. Proof hereof is attached under Appendix C. Comments received from Interested and Affected Parties during this review period have been included in *Table 4* below.

### **8.2.2 Summary of the issues raised by the Interested and Affected Parties and how the issues were addressed or incorporated into the Environmental Impact Assessment process**

Comments received from Interested and Affected Parties are summarised in the following table:

Table 4: Comments and Responses Report

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
Adjacent Land Owner	Mr. Roelf Odendaal	7-12-2016	Verbal (telephonic conversation)	<ol style="list-style-type: none"> <li>1. The gravel road to the farm must be tarred and maintained by RCL Foods (gravel road between the R52 and the R30 – Derby).</li> <li>2. I will have to see a map of where the chicken houses will be placed.</li> </ol>	<p><b>Response from the applicant</b></p> <p>The R30 gravel road is a road that belongs to the Roads Department and we (RCL) do not have any jurisdiction to upgrade or alter the road. With the building of the new farm and the increase of operations we are of the opinion that our impact of the road will be very limited and therefore the tarring of the road is not necessary. We might need to upgrade the entrance to the farm to comply to subsidiary road standards.</p> <p><b>EAP's response</b></p> <p>There will be three entrances to the Roodewal Breeder Farm. Entrances 1 and 2 (existing) will service the Laying Farm while Entrance 3 (existing, but requiring upgrading) will serve the Rearing Farm.</p> <p>Currently, the farm receives three truckloads of feed per day and the trucks use Entrances 1 and 2. Approximately 15 light motor vehicles visit the farm per day, also using Entrances 1 and 2. Most personnel are transported by bus and there is currently one bus visiting the farm per day.</p> <p>After the expansion, it is expected that Entrances 1 and 2 will receive seven truckloads of feed per day and Entrance 3 will receive three truckloads</p>

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
					per day (10 truckloads per day in total between the three entrances). It is not expected for the number of light motor vehicles to increase. Three busses transporting personnel will be required per day after the expansion.
Adjacent Land Owner Portion 15 of the farm Roodewal 322 JQ	Adv. Jurie Wessels	9-12-2016	Email	I don't have enough details to comment as yet.	Noted.
Adjacent Land Owner Portion 1 of the farm Vlakhoek 323 JQ Portion 65 of the farm Elandsfontein 366 JQ	Mr. G.M. Mostert	13-12-2016	Fax	<ol style="list-style-type: none"> <li>Chickens bring a lot of flies (sickness) and how will it effect me long term.</li> <li>What effect will the disposing of waste have on the long term.</li> </ol>	<p><b>Response from the applicant</b></p> <p>1. Usually commercial layer eggs do have a big build-up of manure and this attracts flies and creates problems, but this is a broiler breeder farm with only hatchable eggs. This farm does already have 57 houses with no fly problems. Our houses will all be closed, environmentally controlled houses that will dry all the manure and limit fly infestation. Due the biosecurity risk we also remove any waste that can attract flies on a daily basis to limit risk.</p> <p>2. Domestic waste: All domestic waste is collected on a weekly basis and a contractor removes it to an accredited waste site. Manure removal: Manure from the previous production cycle will be mechanically removed with a bobcat and pushed to the front of the house (<math>\pm 70m^3</math>). A front-end</p>



Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
					<p>loader will load the manure onto a manure buyer's truck and the manure will be removed from the farm.</p> <p>Mortalities: Every morning the production team will remove all the mortalities from the poultry houses and record the number in the record books. All mortalities will be sold to accredited crocodile farms.</p> <p>Waste water: The waste water will be collected and processed through a waste water treatment plant. The plant will recycle all effluent as well as wash water and clean it to discharge standards. Once the water has been cleaned, it will proceed through an artificial wetland and be re-introduced into the Kwa-mmatau catchment system. The waste water treatment plant will manage 16.5m<sup>3</sup> of effluent per day.</p> <p>Storm water: Storm water will be released into the environment as soon as possible. At this stage, attenuation dams will not be required.</p> <p>Boiler ash: The ash bunkers at the rearing farms will be cleaned on a weekly basis the ash will be used as a backfill material in our quarries since the ash is a low risk material (refer to EAP's response below). The quarries will be fenced off</p>

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
					<p>and the area rehabilitated. An Ash Management Plan will be implemented.</p> <p><b>EAP's response</b></p> <p>1. Refer to applicant's response above. The breeder farm will be operated with strict biosecurity measures and according to formal/documented Best Operating Practice Manuals.</p> <p>2. All waste generated at the breeder farm will be managed according to the Waste Management Hierarchy as well as the classification of the waste. Should the ash be used as backfill material, the necessary permits will first be obtained, where necessary. Measures have been included in the Environmental Management Programme for the development to ensure that all waste is managed in an environmentally responsible manner and any waste that is disposal of offsite will need to be disposed of at appropriately licensed facilities and Safe Disposal Certificates obtained.</p>
Natasha Higgitt	South African Heritage Resources Agency (SAHRA)	09-01-2017	SAHRIS website	<p><b>Response to NID (Notification of Intent to Develop) In terms of Section 38(2) of the National Heritage Resources Act (Act 25 of 1999)</b></p> <p>Attention: RCL Foods Limited</p>	A Phase 1 Heritage Impact Assessment and a Desktop Palaeontological Impact Assessment, together with a Protocol of chance find of fossils, has been conducted/compiled for the proposed project. These reports have been uploaded onto

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<p><b>Roodewal Breeder Farm Expansion • The Remaining Extent of Portion 6 of the Farm Roodewal 322 JQ; • Portion 8 of the Farm Roodewal 322 JQ; • Portion 11 of the Farm Roodewal 322 JQ; • Portion 12 of the Farm Roodewal 322 JQ; • Portion 15 of the Farm Roodewal 322 JQ; • Portion 17 of the Farm Roodewal 322 JQ; and • Portion 58 of the Farm Elandsfontein 366 JQ Kgetlengrivier Local Municipality, Bojanala Platinum District Municipality, North West Province</b></p> <p>Thank you for notifying SAHRA of the proposed Roodewal Breeder Farm Expansion on the several farms in the Kgetlengrivier Local Municipality, Bojanala Platinum District Municipality, North West Province.</p> <p>In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer to ensure that a <b>Heritage Impact Assessment (HIA)</b> is done as per Section 38(8) of the NHRA. This must include the archaeological component (Phase 1) any other applicable heritage components. The HIA must be conducted as part of the Environmental Impact Assessment (EIA) phase of the Environmental</p>	<p>SAHRIS and the Draft Scoping Report was also uploaded onto SAHRIS.</p>

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<p>Authorisation Application in terms of the National Environmental Management Act, No 107 of 1998 (NEMA) and the NEMA EIA Regulations 2014.</p> <p>The quickest process to follow for the archaeological component would be to contract a specialist (see <a href="http://www.asapa.org.za">www.asapa.org.za</a>) to provide a Phase 1 Archaeological Impact Assessment Report. The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites. If the property is very small or disturbed and there is no significant site the specialist may choose to send a letter to the heritage authority to indicate that there is no necessity for any further assessment.</p> <p>Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study must be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive,</p>	

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<p>a full Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary (see <a href="http://www.palaeontologicalsociety.co.za">www.palaeontologicalsociety.co.za</a> for qualified paleontologists).</p> <p>Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed.</p> <p>Please note that all Environmental Reports (Scoping Report and EIA) with all appendices must be submitted to the SAHRIS Case file in order for an informed comment to be issued.</p> <p>Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p>	
Comments received during the public review of the Draft Scoping Report					
Ms C. Theunissen	Department of Water and Sanitation	30-05-2017	Email	<p><b>RCL Foods Limited - Roodewal Breeder Farm Expansion - re ext of ptn 6, 8, 11, 12, 15, 17, Roodewal 322 JQ, ptn 58, Elandsfontein 366 JQ – Deaft Scoping Rpeort for Public Review, Env Auth and WULA (RCL Foods Limited owns Rainbow Chicken Farms)</b></p> <p>This office acknowledges the receipt of your application documents regards to the above-mentioned on 25 May</p>	The Department's letter is acknowledged.

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<p>2017 (Task T213/2017). The office responsible for this area is: Ms Lethabo Ramashala and can be contacted at (012) 207-9911.</p> <p>Comments would be forwarded in due time.</p>	
Natasha Higgitt	South African Heritage Resources Agency (SAHRA)	13-06-2017	SAHRIS website	<p><b>Interim Comment</b>  <b>In terms of Section 38(4) of the National Heritage Resources Act (Act 25 of 1999)</b></p> <p><b>Roodewal Breeder Farm Expansion • The Remaining Extent of Portion 6 of the Farm Roodewal 322 JQ; • Portion 8 of the Farm Roodewal 322 JQ; • Portion 11 of the Farm Roodewal 322 JQ; • Portion 12 of the Farm Roodewal 322 JQ; • Portion 15 of the Farm Roodewal 322 JQ; • Portion 17 of the Farm Roodewal 322 JQ; and • Portion 58 of the Farm Elandsfontein 366 JQ Kgetlengrivier Local Municipality, Bojanala Platinum District Municipality, North West Province</b></p> <p>Labesh (Pty) Ltd was appointed by RCL Foods Limited to conduct a Scoping and Environmental Impact Assessment (EIA) Process in support of an Environmental Authorisation (EA) Application for the proposed Roodewal Breeder Farm Expansion on the remaining extent of portion 6, portion 8, 11, 12, 15 and 17 of the farm Roodewal 322JQ, and portion 58 of the farm Elandsfontein 366JQ, Kgetlengrivier Local Municipality, Bojanala Platinum District Municipality, North West Province. A draft Scoping Report has been</p>	<p>These comments are noted. The recommendations contained in the heritage specialist reports have been incorporated into the Scoping Report, Environmental Impact Assessment Report and Environmental Management Programme for this proposed development.</p> <p>A permit application in terms of Section 35 of the National Heritage Resources Act, Act No. 25 of 1999 (NHRA) and Chapter IV of the NHRA Regulations (No. R548 of 2000) will be applied for in order to mitigate Sites 13 and 24.</p> <p>The requirements for no-go buffers to sites 17, 19, 20 and 23; the Heritage Management Plan (HMP); and the Change Finds Protocol are noted and will be attended to.</p> <p>The draft Environmental Impact Assessment Report and Environmental Management Programme, together with all other appendices, will be submitted to SAHRA once these documents have been finalised.</p>

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<p>submitted in term of the National Environmental Management Act, 1998 (NEMA) and the NEMA EIA Regulations 2014. The proposed development will comprise the upgrading and expansion of the existing 21 rearing houses and 36 laying houses. New infrastructure will include 71 new laying houses measuring 114 m x 15 m, eight (8) new rearing farms, an egg bank, Waste Water Treatment Plant, new entrance, 10MW solar PV plant, and two water reservoirs. Existing services including water supply, electrical supply and roads will be upgraded and expanded. APelser Archaeological Consulting and Gideon Groenewald were appointed to complete the Archaeological Impact Assessment (AIA) and the Palaeontological Desktop Assessment respectively.</p> <p><i>Pelser, A. 2017. Final Report on a Heritage Impact Assessment for the Proposed establishment of a new poultry facility located on portions of the farm Roodewal 322JQ and Elandsfontein 366JQ, near Derby in the Rustenburg District of North West.</i></p> <p>A total of 24 heritage resources were identified within the proposed development area. These resources include Stone Age lithic scatters, Late Iron Age (LIA) ceramic scatters and stone-walled complexes, historical farmsteads and burial grounds. A total of two sites will be directly impacted on by the proposed development (Stone Age knapping area - Site 13 and LIA stone-walled</p>	

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<p>settlement - 24). Sites 17-20, 21 and 23 are located in close proximity to development however will not be directly impacted.</p> <p>Recommendations provided in the report include the following:</p> <ul style="list-style-type: none"> <li>• Archaeological mitigation must be implemented. This will include mapping the sites in detail, the collection of representative samples of material (for Stone Age site 13) as well as Archaeological excavation work on site 24 after obtaining permits from SAHRA;</li> <li>• The sites can be demolished once the work has been completed and the go-ahead has been obtained by SAHRA;</li> <li>• Sites 17-21 and 23 must be fenced-in or a buffer zone be applied to avoid any impacts by the planned developments;</li> <li>• Furthermore, the subterranean presence of archaeological or historical sites, features or objects should always be kept in mind. Should any be uncovered during the development process, an archaeologist should be called in to investigate and recommend on the best way forward. The presence of other low stone packed or unmarked graves should also be kept in mind.</li> </ul>	



Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<p><i>Groenewald, G. 2017. Palaeontological Desktop Assessment for the Proposed Roodewal Poultry Facility on the Farms Roodewal 322 (Re/6/322; 8/322; 11/322; 12/322; 15/322; 17/322) and Elandsfontein 366 (58/366) near Derby, Kgetlengrivier local Municipality, Bojanala district Municipality, North West Province.</i></p> <p>The proposed development is underlain by Vaalian sedimentary and igneous rocks of the Silverton Formation, as well as diabase and alluvial material. The Silverton Formation contains micro -fossils and stromatolitic limestones and is rated as moderate to highly sensitive. No significant fossil finds are therefore expected in this study area before excavations deeper than 1.5 m where bedrock will be exposed.</p> <p>Recommendations provided in the report include the following:</p> <ul style="list-style-type: none"> <li>• The EAP as well as the ECO for this project must be made aware of the fact that the Silverton Formation sediments is Highly significant for fossil remains of micro-organisms and the alluvium might contain significant fossils not yet recorded for this area;</li> <li>• If bedrock is exposed during excavation for foundations, the ECO must report exposure of possible stromatolitic structures. The likely hood of these structures is however small; and</li> </ul>	

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
<b>Initial Public Participation Process</b>					
				<ul style="list-style-type: none"> <li>• A suitably qualified palaeontologist must be appointed to do a Phase 1 PIA investigation at the onset of excavations and follow, as well as upgrade, the basic recommendations made in the “Chance Find Protocol”, which must be included in the EMPr of the project.</li> </ul> <p>The Chance Find Protocol has been provided as a separate document with specific mitigation measures and protocols for palaeontological chance finds.</p> <p><b>Interim Comment</b>            The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit accepts the submitted heritage specialist reports and the recommendations contained therein. The recommendations provided by the heritage specialists and the following conditions must be included into the EIA and Environmental Management Programme (EMPr):</p> <ul style="list-style-type: none"> <li>• A permit application in terms of section 35 of the National Heritage Resources Act, Act No 107 of 1998 (NHRA) and Chapter IV of the NHRA Regulations (No. R548 of 2000) must be applied for in order to mitigate sites 13 and 24;</li> <li>• A no-go buffer zone of 30 m must be put in place around sites 17, 19, 20 and 23;</li> </ul>	

Entity represented	Name and Surname	Comment received on	Comment submitted via	Comment(s) raised	Response to comment(s) raised
Initial Public Participation Process					
				<ul style="list-style-type: none"> <li>• A Heritage Management Plan (HMP) must be developed for <i>in situ</i> conservation and management of heritage resources located within the development footprint. The HMP must be submitted to SAHRA for approval;</li> <li>• The Chance Finds Protocols must be implemented as part of the EMP; and</li> <li>• The draft EIA and all appendices must be submitted to SAHRA before further comments can be provided.</li> </ul> <p>Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p>	

## 8.3 Environmental attributes associated with the alternatives considered – Environmental attributes of the proposed, project properties (the preferred alternative)

### 8.3.1 Geographical

#### Geology

The geology of the area is dominated by the Transvaal, Rooiberg, Griqualand-West groups (Council of Geoscience, 1997). According to the North-West layers of the Environmental Potential Atlas of South Africa (ENPAT), the area is dominated by shale (Limosella, 2016).

#### Soil

The soils include Glenrosa and/or Mispah forms, although other soils may also occur. Lime is rare or absent in upland soils, but generally present in low-lying soils. A small section on the northern border includes the following soils: vertic, melanic, red structured diagnostic horizons, undifferentiated soils (ENPAT). The soil type mostly associated with wetlands/riparian areas in the study area is Glenrosa, which presents signs of wetness incorporated at the family level. Mispah and Glenrosa soils have generally high erosion risk mainly due to their (often) upslope landscape position (Fey, 2005) (Limosella, 2016).

#### Agricultural Potential

According to the AGIS Comprehensive Atlas, the land capability of the project site is mostly listed as “non-arable, low to moderate potential grazing land”. A portion of the northern part of the project site is listed as “moderate potential grazing land”. The project site is listed as having a grazing capacity potential (1993 data) of 4-7ha being required per large stock unit (AGIS, 2007).

### 8.3.2 Physical

#### Rainfall

The project site lies within a summer rainfall area and experiences very dry winters. The mean annual rainfall for the area is 601 - 800mm/annum. The Mean Annual Evaporation (MAE) rate for the area is 1 801 – 2 200mm/annum (AGIS, 2007).

#### Temperature

The mean maximum annual temperature for the project area is 29.1°C - 31°C and the mean minimum annual temperature is 0.1°C to 4°C (AGIS, 2007).

#### Wind

The Rustenburg weather station is approximately 20km to the north-east of the project site. According to [www.metroblue.com](http://www.metroblue.com), the prevailing wind direction for Rustenburg is East-northeast, as indicated by the figure below. The prevailing wind direction has been determined from 30 years' hourly weather model simulations (from 1985 onwards) and the data have a spatial resolution of approximately 30km ([www.meteoblue.com/en/weather/forecast/modelclimate/rustenburg\\_south-africa\\_958724](http://www.meteoblue.com/en/weather/forecast/modelclimate/rustenburg_south-africa_958724)).

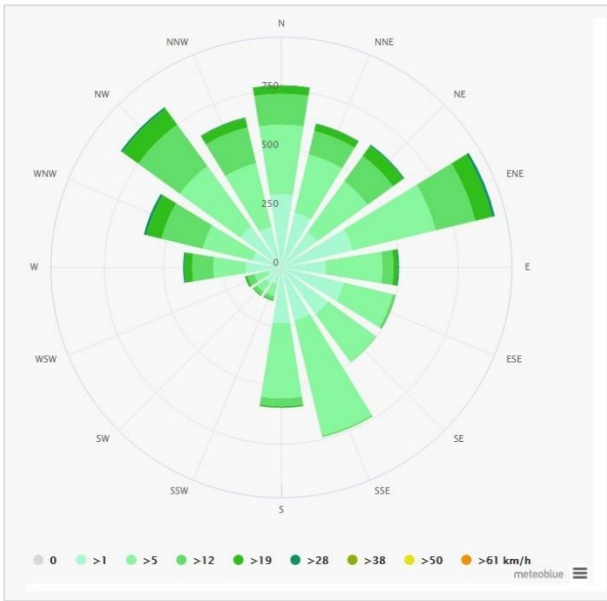


Figure 24: Prevailing wind direction for Rustenburg  
 ([www.meteoblue.com/en/weather/forecast/modelclimate/rustenburg\\_south-africa\\_958724](http://www.meteoblue.com/en/weather/forecast/modelclimate/rustenburg_south-africa_958724))

### Topography

The project site slopes downwards from south-east to north-west, with the elevation for the south-eastern part of the site lying at elevations of between 1 425.32 and 1 479.39masl (metres above sea level) and the north-western part of the site lying at elevations of between 1 154.95 and 1 209.03masl. This is also shown in the figure below.

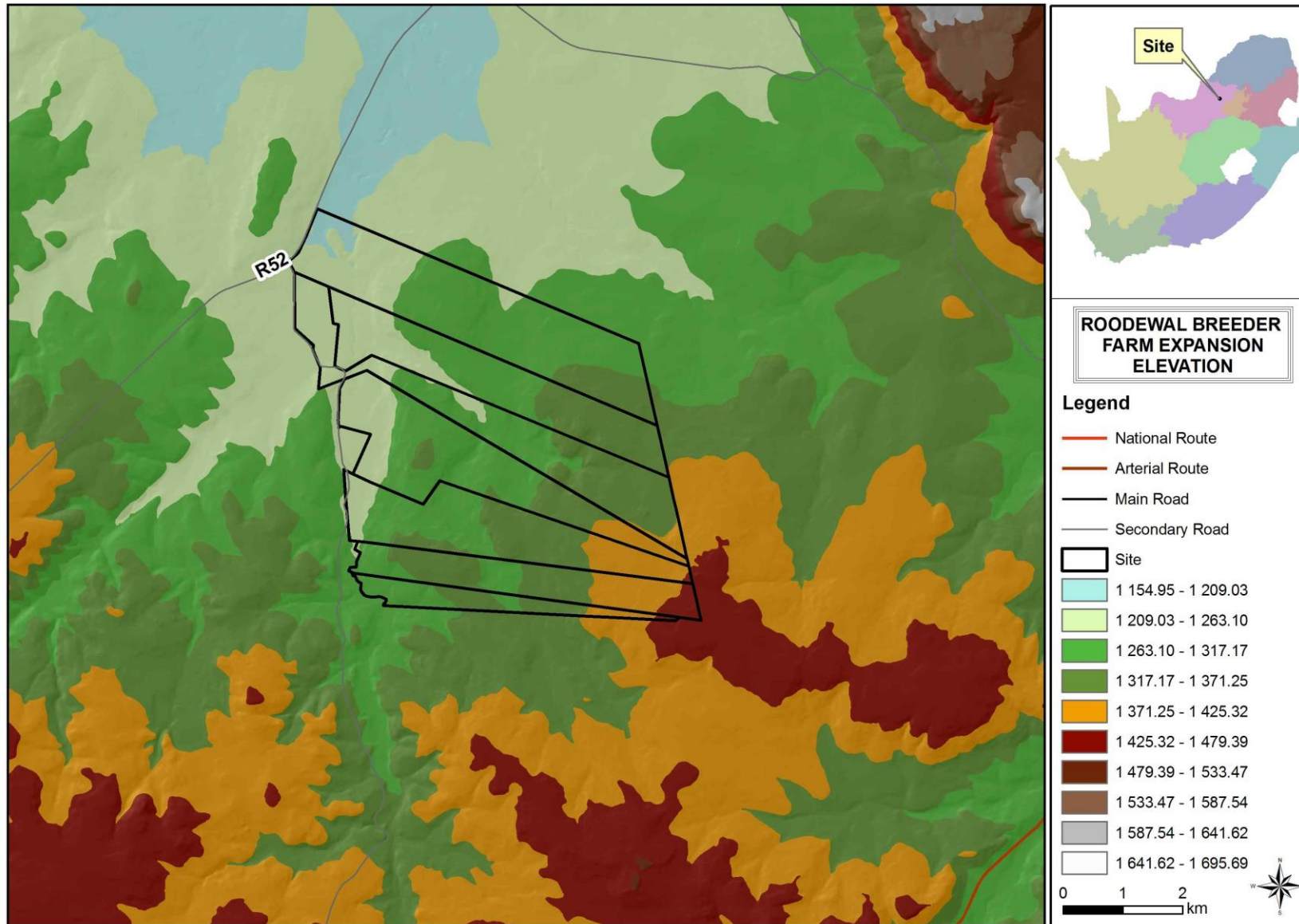


Figure 25: Elevation of the project site

## Hydrology

### General

The project site is situated in the A22C quaternary catchment. The depth to the groundwater is 20.3 metres below ground level and the recharge is 5mm/annum (DWA, 2010). The aquifers below the site are classified as minor aquifers (DWA, 2012), specifically d3 and d4 intergranular and fractured aquifers, with borehole yields of between 0.5 and 5.0litres per second (Geohydrological Map Sheet 2526: Johannesburg 1:500 000).

The perennial Selons River flows through the north-western sections of the project site, with numerous non-perennial tributaries also draining the site (Dimela Eco Consulting, 2016).

### Site Specific

Constant and step borehole yield tests were performed on all four boreholes that will be utilised for the provision of ground water to the farm. The results of these tests are summarised in the table below.

Table 5: Borehole yield test results

Borehole ID	Borehole depth (m)	GPS Coordinates	Sustainable yield (litres/second)	Duty cycle (hours)	Critical water level (m)
BH1	48.00	25.769090°; 27.079980°	8.00	12	20.00
BH2	48.00	25.770988; 27.082752	3.50	12	22.00
BH3	48.00	25.786752; 29.083134	10.00	12	18.00
BH4	48.00	25.793847°; 29.081395°	8.00	12	15.00

### 8.3.3 Biological

#### Fauna

A Fauna Assessment was undertaken for the project site by Rautenbach *et al.* The full report is attached under Appendix D.

The topography of the site consists of “randjie veld” (rocky undulating woodlands). The North West Environmental Management Plan consider a slope of >5° as a ridge, and the Classical Environmental Fauna Opinion (2015) reports ridges as a prominent environmental element on the study site. Rocky ridges typically present rupicolous habitat that provides nooks and crannies for rock-living creatures. Rupicolous habitat on the site is undeveloped since the “ridges” lack large(ish) rock faces and boulder accumulations to form crevices for dedicated rock-living species such as dassies. However, less-discerning rupicolous vertebrates are present such as Namaqua rock rats and red rock rabbits.

The dense stand of trees is dominated by olienhout trees (*Olea europaea*). However, thorn trees are also present in numbers. A well-developed understory is formed by shrubs and young trees. The terrestrial habitat type is spatially predominant. It is rocky and functionally overlaps with many areas regarded as “randjieveld”. The soil is a reddish soil with low clay content and is heavily imbedded with gravel and rocks. During the site visit, the terrestrial habitat displayed the effects of a long dry period during the winter and the preceding summer drought (shown through over-utilisation by browsing). Quantitatively, it therefore offers poor refuge and nourishment for terrestrial vertebrates. Termitaria are present and these structures are indicative of the presence of dwarf shrews and pygmy mice which have a fondness for using moribund termite mounds as refuges.

Although there are drainage lines present onsite, they are seasonal. A number of sizeable man-made dams were constructed in the drainage lines and decant overflow rain water from the upstream undulating terrain into the Selons River further downstream and outside of the study site. Further downstream, riparian zone woodlands are better developed and suitable habitat for wetland-reliant vertebrates is available.

## **Mammals**

The local occurrence of mammals is closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is therefore possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of global distribution ranges. All four of the major habitat types are represented on the project site, i.e. terrestrial, rupicolous, arboreal and wetlands.

Most of the site is ecotonal in character, i.e. terrestrial, arboreal and generally very rocky to the point of providing substandard rupicolous habitat. Basal cover was poor as a result of the preceding dry summer and winter as well as the shade effect of the dense stand of trees (in particular the olinhout trees), although dried tussocks of sour grass are present in abundance to provide refuges and nourishment. Mature thorn trees are present. This is important as tree rats have a fondness for thorn trees with dense canopies. Of interest are the denuded terrestrial habitats around historical settlements (visible on enlarged maps by Google Earth), most likely caused by cattle urine poisoning or long-term trampling and firewood harvesting.

Of further interest is the wetland habitat represented by a number of dams in drainage lines and the riparian forests along the seasonal streams to the west of the site. The fluctuating levels of the dams resulted in poorly-developed riparian vegetation. Riparian forests along the streambeds towards the west of the site are noticeable. In the past, fields have been planted in the alluvial soils along these streambeds, but these are now fallow.

The prevailing perception gained during the site visit is that mammal populations should be healthy (albeit low at the end of winter) and that refuges and sustenance are available year-round in the absence of veld fires.

Large mammals, such elephants, buffaloes, blue wildebeests, giraffe, red hartebeests, white rhinos, lions, spotted hyenas and others, have long since been eradicated for sport and later to favour grazing and growing crops. A surprising number of herbivores and carnivores (baboons, monkeys, duiker, steenbok and kudu) persisted in the rural and relatively unaltered property. Several large herbivores (zebras, giraffe, nyala, eland, blue wildebeest, red hartebeest and several others) were re-introduced at the site.

It is concluded that 73 species of mammals are still part of the present-day mammal species assemblage on the site. The presence of all larger and most of the medium-sized mammals was confirmed by Mr. van der Merwe, an employee of RCL Foods Limited. Most of the species of the resident diversity are common and widespread and include scrub hares, rodent moles, multimammate mice, pygmy mice, genets, mongooses and so forth. Many of the species are robust, some also having strong pioneering capabilities. The reason for their survival success is predominantly due to their remarkable reproduction potential (multimammate mice species are capable of producing approximately 12 pups per litter at intervals of three weeks) and to a lesser extent their shy and cryptic nature (especially scrub hares, genets and mongoose).

As a precautionary measure, the tree rat, the pygmy mouse and the dwarf shrew species are included in the list of occurrences. The latter species have a penchant to use moribund termitaria as refuges and are therefore assumed to be residents. Although there is not an abundance of mature thorn trees, it is submitted that tree rats are present.

It is most likely that the semi-aquatic vegetation along the watercourses will harbour cane rats, vlei rats and the listed shrews as these taxa have strong survival traits apart from their narrow dependence on wetland habitats. The lack of



permanent deep water hinders the presence of otter species, marsh mongooses and quite likely also white-tailed mongooses.

The rupicolous habitat is poor and lacks substantial rock faces and boulder accumulations to provide refuge for dassies. However, the rocky terrain is deemed sufficient to support rock elephant shrews, red rock rabbits and Namaqua rock rats.

Aardvark, porcupines, springhares, kudu, duikers, steenbok, baboons, vervet monkeys, galagos, black-backed jackals, leopards, caracal, serval, aardwolves, brown hyenas and others still occur in the district and, as can be expected, are still present on the site given its high conservation profile. In spite of their vulnerability to interference by humans and their pets, the extensive size of the site and adjoining district, together with the quality of conservation, prompt the inclusion of hedgehogs as likely occupants.

The listed Mauritian tomb bat, the two free-tailed bats and the three vespertilionid bats show remarkable adaptability by expanding their distributional ranges and population numbers significantly through capitalising on the roosting opportunities offered by manmade structures inland, such as against the trunks of large trees and in the houses onsite. Vesper bats are more tolerant towards roost opportunities and it is more than likely that small colonies found roosting opportunities in the roofs of buildings near the study site. Free-tailed bats are likewise partial to narrow-entrance roosts provided by buildings and in some instances roost occupation could numerically reach epidemic proportions. It can be expected that the watercourses, dams and stream beds are an excellent source of insects that rise in swarms at summer sunsets and function as feeding patches for hawking vesper bats.

African wild cats are submitted to be inhabitants, but they are inclined to interbreed with domestic cats and it is more likely that crossbred offspring persist. The two genet species as well as the yellow and slender mongooses all have wide habitat tolerances and this, together with their wide-ranging diets and shy habits render them persistent carnivores, even close to human settlements. Banded and dwarf mongooses are common bushveld carnivores.

The species richness is high, even for such an extensive area. That is ascribed to the fact that habitats have not been extensively compromised and that several herbivores have been re-introduced. Blesbuck have been introduced, but the site falls outside of their natural distribution area. The surrounding properties are in similar conservation condition, but connectivity is hindered by the game fence. The overall quality of conservation onsite is largely ranked as good.

The presence of the following species onsite was confirmed during the site visit:

- Scrub hare - *L. saxatilis* – confirmed based on observed faecal pellets
- African mole rat – *C. hottentotus* – confirmed based on observed tunnel systems
- Yellow mongoose - *C. penicillata* – confirmed based on site records
- Slender mongoose - *G. sanguinea* – reported by applicant
- Plains zebra - *E. quagga* - confirmed based on site records
- Giraffe - *G. Camelopardalis* - confirmed based on site records
- Kudu - *T. strepsiceros* - confirmed based on site records
- Eland - *T. oryx* - confirmed based on site records
- Impala - *A. melampus* - confirmed based on site records

### Red Listed Mammal Species

In terms of Friedman and Daly (editors), 2004: The rock dormouse, five shrew species and African weasel cited as 'Data Deficient' are not necessarily endangered. These small mammals have not been adequately studied to provide quantitative field data to accurately assign to a conservation ranking. As a precaution they are therefore considered as 'Data Deficient'. Shrews, to a lesser extent rock dormouse, as well as the African weasel exist at the apex of the food pyramid, which

means that their population numbers are inevitably significantly lower than that of similar-sized herbivorous mammals and especially of their smaller prey species. As a result of the diet of these ferocious little insectivores/carnivores, they are furthermore not readily trapped with conventional bait or traps. This could mean that their numbers are under-estimated.

Hedgehogs are 'Near Threatened' as result of interference by humans and their pets. Under natural conditions, the passive defence mechanisms of these rather docile insectivores are sufficient to maintain breeding populations in a healthy condition. Considering the size of the district and connectivity in all directions it is reported that a small population of hedgehogs persist. Bushveld gerbils are in fact common and colonies are often found in areas with softish sand that is amenable to burrowing. It is an enigma why Friedman and Daly (2004) list it as a Red Data species, *albeit* as "Data Deficient". Pangolins persist on the Rainbow properties as well as in the district. This is testimony to the high conservation profile of the two farms.

Brown hyenas have been prosecuted to the point that they are deemed as "Near Threatened". It is amazing how the fallacy of brown hyenas as 'sheep killers' persists. Brown hyenas are known to range far and wide and it must therefore be accepted that vagrants from the extensive district occasionally visit the study site.

Considering the good conservation character of the site and adjoining farms, it is submitted that the Red Data species mentioned here are not under survival pressure. No other Red Data or sensitive species are deemed present on the site, either since the site falls outside of the distributional ranges of some species, or does not offer suitable habitat(s).

In terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), the following protected species are deemed to occur onsite:

- African hedgehog; and
- Brown hyena.

None of the species reported to be residents of the project site and surrounding areas are endemic to the North-West Province.

### **Avifauna (birds)**

The project site lies within the Magaliesberg Important Bird and Biodiversity Area (IBA) (Marnewick *et al.*, 2015). This demands that particular care be taken to identify and mitigate negative impacts on avifauna. The dominant avian habitat type at the site is "randjiesveld" woodland, dominated by olienhout trees (*Olea europaea*) and interspersed with grassy patches and denser riparian vegetation along streambeds and in the vicinity of artificial dams.

A total of 374 species have been recorded in the area considered for the desktop study and of these, 69 were confirmed present at the site during the field survey. An additional 73 have a high likelihood of being present, given the habitats available onsite. The dense vegetation around artificial dams and along water courses supports several species that would likely not be present at the site otherwise. These include species such as the orange-breasted bushshrike.

A total of 22 threatened or near-threatened species have been recorded in the area considered for the desktop survey. Of these, the Cape Vulture and the Verreaux's Eagle (both *Vulnerable*) are the species most likely to periodically occur at the site. Both these species breed in mountainous areas, but are known to venture away from mountains when foraging (particularly the vultures). There are no red-listed species for which the site is likely to represent important breeding habitat.

From an avifaunal perspective, the site can be considered *moderately sensitive*. The avian community of the site is typical of relatively undisturbed woodland and bushveld and it is unlikely that the site provides critical breeding habitat for any

red-listed species. However, the sensitive nature of the vegetation at the site means that greater effort should be taken to minimise avifaunal impacts compared to what would be the case in a highly-disturbed area.

### **Herpetofauna**

From a herpetological habitat perspective, it was established that all four major habitats are naturally present on the study site, namely terrestrial, rupicolous, arboreal and wetland-associated vegetation cover.

Many parts of the study site consist of transformed habitat. The natural grasslands and arboreal habitat were first transformed for agricultural purposes like overgrazing and fields and later by anthropogenic influences such as roads and chicken farms units. The study site is therefore ecologically disturbed in some parts. Moribund termitaria were recorded on the study site. These structures are good indicators of the occurrence of small herpetofauna. Accordingly, it is estimated that the reptile and amphibian population density for the study site is higher. At the time of the site visit the basal cover was poor in many places and would not provide adequate cover for small terrestrial herpetofauna.

The terrain is generally very rocky to the point of providing rupicolous habitat for some herpetofauna, but due to the absence of large natural rupicolous habitat, some discerning species like common girdled lizard and rock agama were omitted from the species list for the site. Manmade rupicolous habitat exists in the form of buildings.

Mature thorn trees are present and provide arboreal habitat while riparian forests along the streambeds towards the west of the site are noticeable. Larger trees may offer refuge to tree-living reptiles like flap-neck chameleons and tree agamas. There are also dead logs that could provide shelter and food for some herpetofauna.

The wetland habitats are represented by a number of dams in drainage lines and the riparian forests along the seasonal streams to the west of the site. The fluctuating levels of the dams resulted in poorly-developed riparian vegetation and temporarily provide habitat for most water-dependent herpetofauna.

Of the 52 reptile species that may occur on the study site, none were confirmed during the site visit and of the 20 amphibian species that may possibly occur on the study site, none were confirmed during the site visit either.

The species assemblage is typical of what can be expected of habitat that is minimally disturbed, but with sufficient habitat to sustain populations. Most of the species of the resident diversity are fairly common and widespread (such as the common dwarf gecko, Transvaal gecko, Wahlberg's snake-eyed skink, speckled rock skink, southern rock monitor, common flap-neck chameleon, eastern ground agama, common house snake, puff adder, red toad, guttural toad, southern foam nest frog and Boettger's caco).

The species richness is fair to good due to the size of the study site, its above average conservation ranking and all four habitat types being present on the study site.

### **Red Data Listed Herpetofauna identified**

The project site lies within the natural range of the Nile crocodile, but there is no suitable habitat for this species and it should therefore not occur on the study site. The project site also lies within the natural range of the Southern African python. According to Broadley (1990), Southern African pythons favour moist, rocky, well-wooded valleys, plantations or bush country, but seldom if ever stray far from permanent water. The study site provides suitable habitat for the Southern African python and is large enough to support a viable population. It is estimated that a single python needs at least a 100ha area to forage. The Southern African python's national status has changed from Vulnerable (Branch, 1988) to

regional Least Concern (Alexander, 2014), although it is currently still a ToPS-listed species (Threatened or Protected Species).

The study site contains temporary water bodies that are potential breeding places for giant bullfrogs. Giant bullfrogs prefer warm, stagnant water, which giant bullfrog tadpoles need for rapid development (Van Wyk *et al.*, 1992). Bullfrog breeding sites are mostly temporary, in order to avoid predation from fish. Many of the dams on the study site have gentle slopes, which giant bullfrogs prefer. A gentle slope allows for shallow water (less than 10cm deep), that enables the female bullfrog to stand when she lays her eggs outside of the water, in order for the male to fertilise. Many parts of the study site consist of sandy soil and are very suitable as dispersal areas, which combine the feeding and aestivation phases. It is essential that the soil be suitable for burrowing on a daily basis during the short activity period at the beginning of the rainy season and for deeper retreats during the resting periods. It is important to note that in the latest literature (Measey (ed.), 2011 and Carruthers and Du Preez, 2011); the giant bullfrog's status has changed officially from *Near Threatened* (Minter *et al.*, 2004) to *Least Concern* in South Africa (Rautenbach *et al.*, 2016).

## Flora

A Vegetation Assessment was conducted for the project site by Dimela Eco Consulting. The full report is attached under Appendix D.

## Historical vegetation type

The project site lies within the Savanna biome of South Africa and specifically within the Central Bushveld Region. The Savanna biome is the largest biome in southern Africa, occupying more than a third of the surface area of the country (Mucina and Rutherford, 2006). It is characterised by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld. Where it is dense, it is referred to as Woodland and the intermediate stages are commonly known as Bushveld (Mucina and Rutherford, 2006).

The Central Bushveld Bioregion (a Bioregion is a vegetation organisation level between that of vegetation type and biome) comprises several vegetation types. The study area stretches over two vegetation types as shown in the following table and figure.

Table 6: Vegetation types of the project site

Vegetation type	Conservation status
<p><b>Moot Plants Bushveld – majority of the site</b></p> <p>The vegetation comprises open to closed, low, often thorny savanna dominated by various species of <i>Vachellia</i> and <i>Senegalia</i> in the bottomlands and plains, as well as woodlands of varying height and density on the lower hillsides. The herbaceous layer is dominated by grasses.</p>	<p>Vulnerable.</p> <p>About 13% of the extent of this vegetation type is conserved within the Magaliesberg Nature Area, while about 28% is transformed by cultivation and urban activities. The vegetation is prone to invasion by alien invasive plant species if not managed properly.</p>
<p><b>Zeerust Thornveld</b></p> <p>The vegetation comprises deciduous, open to dense, short thorny woodland, dominated by <i>Vachellia</i> and <i>Senegalia</i> species with a herbaceous layer of mainly grasses on deep, high base-status and some clay soils on plains and lowlands and also between rocky ridges.</p>	<p>Least threatened.</p> <p>Less than 4% of this vegetation's extent is statutorily conserved with about 16% transformed mainly by cultivation, with some changed to urban or built-up areas.</p>



Figure 26: Vegetation types of the project site

## Listed Ecosystems

The project site is not situated within a listed ecosystem in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), as amended.

## North West Biodiversity Conservation Assessment

The North West Biodiversity Conservation Assessment includes reference to Critical Biodiversity Areas (North West DACE, 2009). Critical Biodiversity Areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. These form the key output of a systematic conservation assessment and are the biodiversity sector's inputs into multi-sectoral planning and decision making. CBAs are therefore areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses (North West DACE, 2009).

In addition, the conservation assessment also made provision for Ecological Support Areas (ESAs), which are areas that are not essential for meeting biodiversity representation targets/thresholds, but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for CBAs (North West DACE, 2009).

As shown in *Figure 27* below, the majority of the proposed project site is situated within a terrestrial ESA1 with small portions of CBA2 present in the north-eastern corner and in the north-western corner of the site. Areas covering CBA2s are remaining natural patches larger than 5ha of provincially endangered and vulnerable ecosystems (in this case the Moot Plains Bushveld). Any further transformation of these vegetation types should be limited to existing transformed or heavily degraded areas. The ESA1 is based on much of the site falling within a protective 1km buffer area to the Magaliesberg Natural Area, corridors along the rivers as well as the presence of hills.

The North West Biodiversity Sector Plan (2015) contains regulations for land use in CBAs and ESAs. According to the Biodiversity Sector Plan, game farming as well as livestock production is allowed in CBAs and ESAs, but intensive animal farming (feedlot, dairy, piggery and chicken battery) is not allowed in CBA 1, CBA2 or ESA1 and should be regulated in ESA2.

## Protected Areas

No national protected areas are present within the project site. The Magaliesberg Natural Area and the Kgaswane Nature Reserve (formerly the Rustenburg Nature Reserve) is situated about 7km north-east of the site.

## Protected Areas Expansion Strategy

South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes and therefore the National Protected Area Expansion Strategy (NPAES) is being implemented (DEA, 2009). The NPAES was commissioned by the Department of Environmental Affairs (DEA), is co-ordinated by the South African National Biodiversity Institute (SANBI), and was drafted in close collaboration with South African National Parks (SANParks), other national conservation agencies and the Provincial conservation agencies. The goal of the NPAES is to achieve cost effective protected area expansion for ecological sustainability and increased resilience to climate change. The NPAES sets targets for PA expansion, provides maps of the most important areas for PA expansion and makes recommendations on mechanisms for PA expansion. The NPAES uses two factors, namely importance and urgency, to identify priority areas

for PA expansion in the terrestrial environment. Although not currently protected, these areas should be considered as being of high development constraint for infrastructure proposed to be located within or in close proximity to these areas.

Two portions of the North West/Gauteng Bushveld Focus Area for expansion are situated north-west, north and east of the project site (outside of the boundary of the site) and are shown in *Figure 28* at the end of this section.

### **Current Land Use**

The majority of the project site comprises of natural savanna vegetation. Along the western boundary, next to the Selons River, some cultivation took place.

### **Landscape Setting**

In terms of the landscape, the study site is situated to the south west of the Magaliesberg mountain range. To the north and eastern side of the Magaliesberg Mountains, lies the town of Rustenburg and the landscape here has been modified due to urban sprawl as well as mining activities. However, to the southern and western side of the mountain range, the landscape is largely intact and only fragmented by a limited number of roads and some agricultural fields, landing strips, agricultural homesteads and associated agricultural buildings (stores). Additionally, the transformed areas include the current RCL chicken houses close to the Magaliesberg mountain range (a different poultry farm) as well as on the study site.

### **Vegetation Survey Overview**

At the time of the survey, the area was still extremely dry and vegetation was poor as a result of the preceding drought. The majority of the expected geophyte-, grass- and annual forb layers were either absent or grazed short and in some instances not identifiable. Similarly, many of the dwarf shrubs were without any foliage and only a few were flowering. Therefore, it can be expected that several species were not recorded as they could not be distinguished from the more common species.

From the above it can be expected that several additional species, mostly annuals and species re-sprouting from underground storage organs, can emerge throughout the study area later during the rainfall season. This is confirmed by the preliminary statistical analysis of the survey data:

- Number of (indigenous and non-weed) species observed: 102
- Second-order jack-knife estimate: 165
- Number of weed and alien invasive species excluded from statistics: 11

The 165 species that may be present in the study area is only a rough estimate and has been used as a comparative tool to help assess the conservation value and sensitivities of habitats. This, in addition to the lack of layout plans available for the chicken houses as well as the associated road network, means a pre-construction walkthrough survey will be required and must be conducted between December-April, prior to commencement of the activity in order to ensure that all protected trees are marked and protected and endemic species' localities are identified and their GPS localities recorded to enable avoidance and/or rescue.

Vegetation associations identified during this study are based on the overall similarity in vegetation structure, species composition and abiotic features such as rivers and hills. However, phytosociological differences within each broadly grouped vegetation association are present. Vegetation associations occur in intricate mosaics throughout the study area, with edges of vegetation units generally very vague. Local species composition is primarily influenced by soil depth, soil surface texture and underlying geology. There is also a large degree of species overlap between the mapped edges of vegetation associations identified.

## Description of vegetation associations and their habitats

Four main vegetation groups were identified for the study site:

1. Bushveld (ridges and inselbergs);
2. Plains Bushveld;
3. Riparian woodland; and
4. Derelict fields.

Additionally transformed areas were identified during the mapping process. Each of the vegetation groups are described below. A complete list of species identified during the site visit is included in Annexure B of the specialist report (attached under Appendix D).

### Bushveld (Ridges and Inselbergs)

This vegetation unit is seen as primary bushveld with little to know disturbance, excluding grazing by game. It was present on the ridges and inselbergs within the study site. The dominant layers in this vegetation group were trees and shrubs and a very sparse grass and herb layer. Light still penetrated to the grass and herb layer as the canopy was not interlocking. Boulders formed an integral part of the micro and macro climate of this community. Patches of un-vegetated soils were also present in this vegetation group.

The dominant tree species within this vegetation group were *Olea europea* subsp. *africana* (Wild Olive) and *Searsia lancea* (Sour Karee). The shrub layer contained mainly *Buddleja saligna* (False Olive), *Euclea undulata* (Common Guarri) and *Euclea crispa* subsp. *Crispa* (Blue Guarri). Although a lush herb grass layer is not expected for this vegetation unit, the herb layer was affected by the reduced rainfall during 2016 as well as limited amount of rainfall during the current rainy season. Some areas along steeper slopes had little to no ground cover and erosion was observed in these areas. Additionally, in these steeper hillslope areas invasion by *Dichrostachys cinerea* (Sickle Bush) was observed. This vegetation group had the highest species diversity. Species of conservation concern included in this vegetation unit included the orchid *Eulophia hereroensis*, *Scadoxus puniceus* (Paintbrush), the tree *Cussonia paniculata* (Highveld Cabbage Tree) and the aloe species *Aloe verecunda*. Eight alien invasive species were recorded within this vegetation unit. These alien and invasive species were, however, observed in low abundance.

### Plains Bushveld

This vegetation occurs on the areas within the study site where the topography is relatively flat with the exclusion of the tops of hills/mountains and it shares a significant amount of species with the bushveld vegetation group. It can likely be seen as a sub-community of the bushveld vegetation group. However, in terms of structure, this vegetation group is different to the bushveld vegetation group. The herb and shrub layer was dominant and although not very abundant during the time of the site visit it is likely that the abundance will increase after the a few days of rain. This vegetation group is seen as relatively undisturbed with the exception of grazing pressure from the game present on the study site. There were also large patches of un-vegetated soils and rocky patches present. Two of the four protected plant species were present within this vegetation group: *Cussonia paniculata* (Highveld Cabbage Tree) and *Scadoxus puniceus* (Paintbrush). Alien invasive species were limited to two plant species occurring in low abundances.

### Riparian Woodland

This vegetation group is present along drainage lines, non-perennial- and perennial- rivers as well as dams and pans within the study site. The tree layer is the dominant layer in this vegetation group and the trees form a dense interlocking canopy representative of woodland vegetation. The herb and shrub layer is under developed in this vegetation group. Grass species adapted to reduced light conditions, such as *Panicum maximum* (Guinea Grass), were present within this vegetation group in low abundances. It is likely that after rains the grass and herb layer could improve, but the major limiting factor other than water in this vegetation group is light. Dominant tree species in this vegetation unit included



*Searsia lancea* (Sour Karee) and the diagnostic tree species was *Combretum erythrophyllum* (River Bushwillow). The shrub layer was well developed, often forming a thicket. Dominant shrubs included *Buddleja saligna* (False Olive) and *Euclea undulata* (Common Guarri). In terms of disturbance, natural scouring of the river and stream banks was observed. Due to the low cover of the grass and herb layer, erosion poses a threat to this vegetation group. Head cut erosion was visible along steeper slopes as well as drainage lines and poses a threat to this vegetation group as well as the associated aquatic ecosystems. No protected plant species were observed and only three alien invasive species were found to be present in this vegetation group.

### **Derelict Fields**

Historically as well as recently cultivated derelict fields were present along the western part of the study site boundary. These areas were easily accessible. The level of disturbance was high and consisted mainly of pioneer species. Loosely scattered trees were observed and the main species included *Vachellia karroo* (Sweet Thorn) and *Vachellia tortilis* (Umbrella thorn). The vegetation group had low species diversity both in terms of abundance and richness and included five alien invasive species.

### **Transformed Areas**

These areas are the buildings (offices, storage and existing chicken houses) present within the study site. The areas around the offices and existing chicken houses were cleared.

### **Plants of Conservation Concern**

Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes and include all plants that are *Threatened*, *Extinct in the wild*, *Data deficient*, *Near-threatened*, *Critically rare*, *Rare* and *Declining*. Chapter 4, Part 2 of the National Environmental Management: Biodiversity Act (No. 10 of 2004), (NEMBA) provides for the listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, that may involve such listed threatened or protected species and activities that may have a potential impact on their long-term survival.

A list of plants of conservation concern was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009), *Raimondo et al.*, (2009) and relevant literature pertaining to the area that the site is situated in. At least 14 plant species of conservation concern could occur within the greater study area, but none of these species were recorded, although suitable habitat for six species is present on the site (refer to Table 2 in the Flora Assessment Report for detail).

### **Protected Plants**

Chapter 4, Part 2 of the NEMBA, 2004, provides for listing of plant and animal species as *Threatened* or *Protected*. If a species is listed as *Threatened*, it must be further classified as *Critically Endangered*, *Endangered* or *Vulnerable*. At the time of this assessment, no TOPS listed species were recorded within the proposed development footprint.

### **Protected Trees**

A number of trees indigenous to South Africa are nationally protected under the National Forests Act, 1998 (Act No. 84 of 1998). The removal or pruning of these protected trees will require a permit from the Department of Agriculture Forestry and Fisheries. No protected tree species were identified during the site visit along the walked transects.

### **Provincially Protected Plants**

Provincially, a number of plants are protected by the Transvaal Nature Conservation Ordinance Act, 1983 (Act No. 12 of 1983) and the North West Biodiversity Bill (North West Provincial Gazette, No. 7603 of 2016). The removal or pruning of these plants will require a permit from the North West Department of Rural, Environment and Agriculture Development.

The table below lists provincially protected species that were confirmed to occur in the study area and those recorded in walked transects are geographically represented in Appendix A of the Flora Assessment Report.

Table 7: Provincially Protected Plant species that were confirmed to occur at the project site

Species	Common Name
<i>Eulophia hereroensis</i> species	Orchid
<i>Scadoxus puniceus</i>	Paintbrush (geophyte)
<i>Cussonia paniculata</i>	Highveld Cabbage Tree
<i>Aloe verecunda</i>	Aloe

### Alien Invasive Plant Species

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of the ecosystems. It is therefore important that these plants are controlled and eradicated by means of an Eradication and Monitoring Programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

The NEMBA, 2004, is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the NEMBA, 2004. The legislation calls for the removal and/or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river; stream; spring; natural channel in which water flows regularly or intermittently; lake; dam; or wetland. Category 3 plants are also prohibited from occurring within close proximity to a watercourse.

The alien plant species identified on the study site are listed in Appendix B. Note that according to the Regulations, a person who has under his or her control a Category 1b listed invasive species must immediately:

- a) notify the competent authority in writing
- b) take steps to manage the listed invasive species in compliance with
  - (i) section 75 of the Act;
  - (ii) the relevant invasive species management programme developed in terms of regulation 4; and
  - (iii) any directive issued in terms of section 73(3) of the Act.

Table 8: Alien invasive plants observed at the project site

Species	Category
<i>Achyranthes aspera</i> (M)	Category 1 (CARA)
<i>Argemone ochroleuca</i>	Category 1 (CARA)
<i>Cereus jamacaru</i>	Category 1b (NEMBA)
<i>Datura stramonium</i> (M)	Category 1b (NEMBA)
<i>Flaveria bidentis</i>	Category 1b invader (NEMBA)
<i>Opuntia ficus-indica</i>	Category 1b (NEMBA)
<i>Portulaca quadrifida</i>	Not listed
<i>Richardia brasiliensis</i>	Not listed
<i>Senna didymobotyra</i>	Category 3 (CARA)
<i>Solanum elaeagnifolium</i>	Not listed
<i>Verbena tenuisecta</i>	Not listed

## Sensitivity Ratings

In order to determine the sensitivity of the vegetation groups in the study site, weighting scores and criteria as in Appendix A of the Vegetation Assessment were applied. The results of the scoring placed the vegetation in either of the following sensitivity classifications:

- Low;
- Low – Medium;
- Medium;
- Medium – High; or
- High.

Vegetation with a low score is not considered to be sensitive. The precautionary approach was applied and all good condition natural vegetation was designated as sensitive, as well as confirmed localities and associated habitats for plant species that are of conservation concern. The results of the assessment indicated that both of the bushveld vegetation groups had a high sensitivity. Both of these vegetation groups contained provincially protected plants and fell into the Moot Plains Bushveld, which is listed as a vulnerable vegetation unit in terms of national conservation efforts. The transformed areas are considered to have a low sensitivity as they are heavily disturbed and most natural vegetation has been removed. The vegetation sensitivity is geographically represented in *Figure 29*.

## Vegetation of low sensitivity

Vegetation with low sensitivity is generally degraded or disturbed vegetation with little ecological function and is usually species poor (most species are usually exotic or pioneers). This was typical for the derelict fields within the study site. The main form of disturbance was the removal of vegetation due to ploughing and cultivation of crops. This vegetation group is deemed feasible for the proposed development.

## Vegetation of high sensitivity

As best practice, all good condition natural vegetation must be designated as ecologically sensitive. This was particularly applicable to the sandy bushveld that was in good condition with hardly any alien invasive species present and only a few individuals of *Dichrostachys cinerea*, as well as alien invasive species. The riparian woodland vegetation group is nationally protected by the National Water Act. The bushveld as well as the plains bushveld contained provincially protected plant species, suitable habitat for other plants of conservation concern and are provincially protected by the North West Biodiversity Sector Plan (READ, 2015). Vegetation observed on site was in primary condition with very low levels of invasion present. Additionally, the study site is in very close proximity the planned protected areas expansion programmes earmarked site. In terms of the landscape setting there is very limited habitat fragmentation on the south western side of the Magaliesberg mountain range. All these factors were taken into consideration when sensitivity of the vegetation groups was assigned.

Chicken houses, referred to as “chicken batteries” in the READ 2015 document, are not a supported land use in CBA1 or CBA2 and is a regulated land use in an ESA2. Therefore, the proposed land use is not aligned with provincial conservation planning strategies, particularly as the vegetation was found to be in good condition.

## Impact Statement

The study site contains sensitive ecosystems earmarked for conservation on a provincial level (CBA2 and ESA1). Additionally, all wetland and aquatic ecosystems are protected by the National Water Act. The study site also lies in close proximity to areas earmarked as part of the protected areas expansion project for statutory protection. In terms of the landscape setting, the study site is situated in a landscape to the south west of the Magaliesberg mountain range which has low levels of fragmentation. Therefore, the site plays an important role in meeting provincial conservation targets.

Four main vegetation groups were identified: bushveld, plains bushveld, riparian woodlands and derelict agricultural fields. The bushveld and riparian vegetation groups were largely natural, in a primary state, contained provincially protected plant species and had a low level of invasion by alien plant species. These vegetation groups were all assigned a high sensitivity value. The derelict fields had low species diversity and high level disturbance and subsequently high levels of invasion. This vegetation group was therefore assigned a low level of sensitivity and could support the proposed development.

The proposed development of fifteen (15) additional chicken houses and infrastructure such as a solar plant and waste water treatment works in areas of high sensitivity is not supported in terms of the guidelines set out in the North West Biodiversity Sector Plan for ESA1 (majority of the project site) and CBA2 areas (small areas of the site). The only vegetation group where this activity could be supported is the low sensitivity agricultural fields where all natural vegetation has already been cleared, or areas close to this to prevent fragmentation of the natural habitats. The bushveld, plains bushveld as well as riparian woodland vegetation groups are all deemed not feasible for the proposed development.

However, RCL Foods proposes to conserve the remainder of the vegetation and introduce game into the area. In addition, a limited number of chicken batteries will likely have a lesser impact than extensive livestock production (which is allowed in an ESA1) where overgrazing could lead to a change in the species composition. However, it is likely that in due time, an expansion of the chicken farm might be proposed which will result in cumulative impacts, particularly fragmentation, an increase in edge effects and loss of species diversity from the current good condition bushveld vegetation. The size of natural vegetated land affects the number, type and abundance of species they contain. Therefore, the larger the patch of the un-fragmented and undisturbed land, the more likely it is to be of conservation importance. At the periphery of such patches of land, influences of neighbouring activities or other patches become apparent, known as the 'edge effect'. Patch edges may be subjected to increased levels of heat, dust, desiccation, disturbance, invasion of exotic species and other factors and therefore these areas seldom contain species that are rare, habitat specialists or species that require larger tracts of undisturbed core habitat. Fragmentation due to development reduces core habitat and greatly extends edge habitat, which causes a shift in the species composition, which in turn puts great pressure on the dynamics and functionality of ecosystems (Perlman and Milder, 2005).

If new developments are kept as close as possible to existing developed and/or transformed areas, indirect and cumulative impacts can be reduced. If several developments are planned within close proximity, these developments should be situated as close together as possible.

If development is therefore grouped as close together or within transformed areas, the most significant impact is expected to occur during the construction phase. While the excavation of soil for the chicken house footprint would remove vegetation, the vegetation could be replanted after the construction and its re-establishment monitored to ensure that the soil and vegetation rehabilitated. The greatest threat to the rehabilitation of the land disturbed by construction is the potential of invasive plant species rapidly establishing on the disturbed soil and spreading into adjacent natural areas. If remedial measures and monitoring is properly implemented, the vegetation that will be disturbed during construction could rehabilitate well over time and long term impacts on vegetation and faunal habitats could therefore be minimal.

However, if development is not concentrated (as per the layout received in March 2017), fragmentation could lead to the decrease in species diversity and slow degradation of remaining patches. In addition, the applicant also intends to introduce game species. Such a layout and game introduction could only be supported if a commitment to conserve the remaining vegetation is formalised, with the understanding that no future increase in fragmentation (e.g. extension of the chicken houses and other infrastructure) should be allowed. If the North-West conservation authority does consider the proposed development, the protection of the remainder of the land must be formalised, no further development or expansion of the activities on the site should be allowed and the following should form part of an Ecological Management Plan for the site: Grazing Capacity and Management Plan, Alien Invasive Plant Species Management Plan, Sensitive

Species Management and Monitoring Plan, Erosion Monitoring and Management Plan. A fulltime, suitably qualified staff member(s) who will manage and continually evaluate any degradation in the vegetation composition and structure and who will report on the status of sensitive vegetation groups as well as the effective management of game and the ecosystem as a whole should be appointed. It is recommended that an external audit be conducted by an independent, SACNASP registered botanist or ecologist twice a year, to report on the state of the vegetation and effectiveness of the Reserve Management Plan. This report should be submitted to the North West authorities for comment and review (Dimela Eco Consulting, 2016).

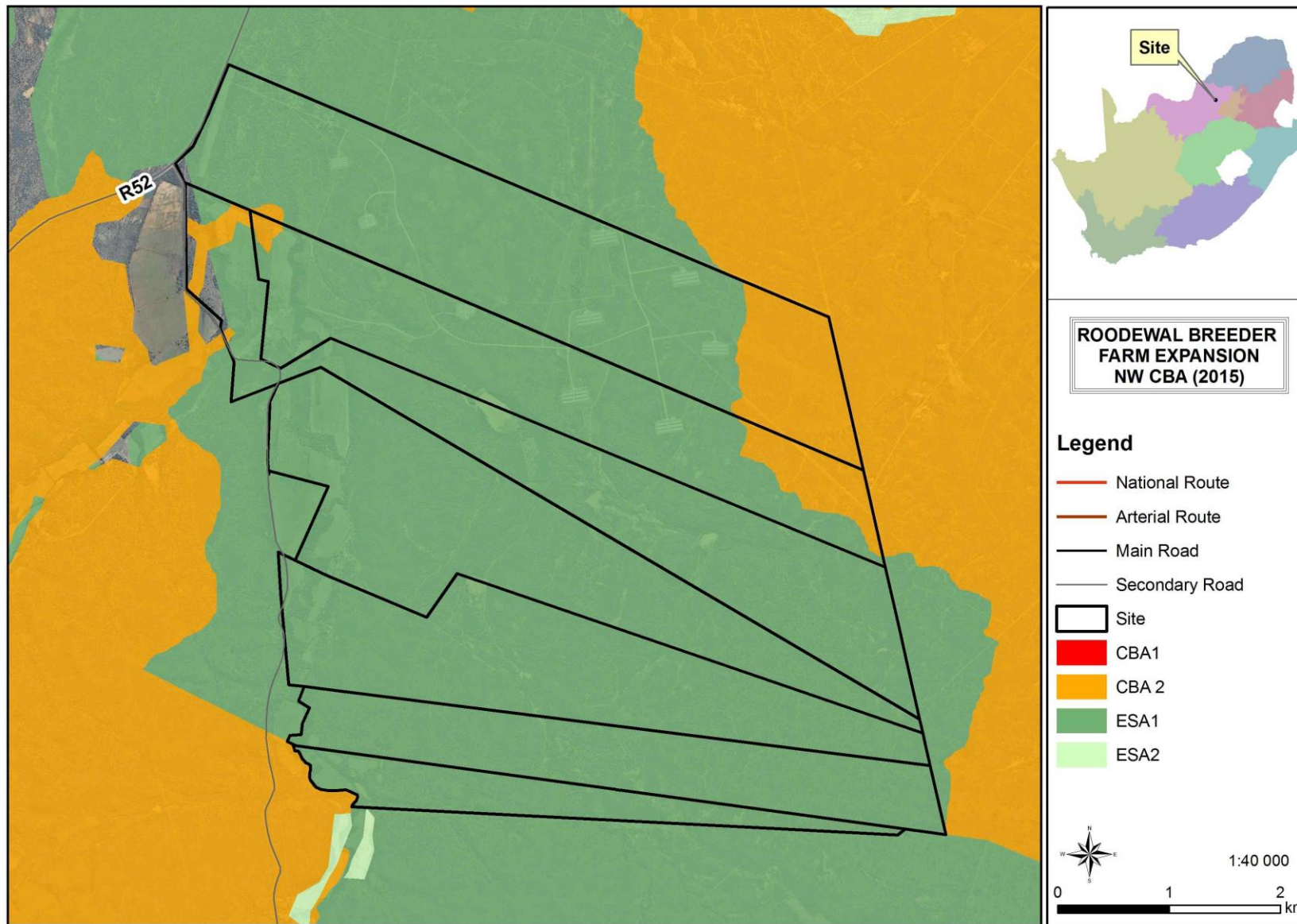


Figure 27: CBAs and ESAs within the project site

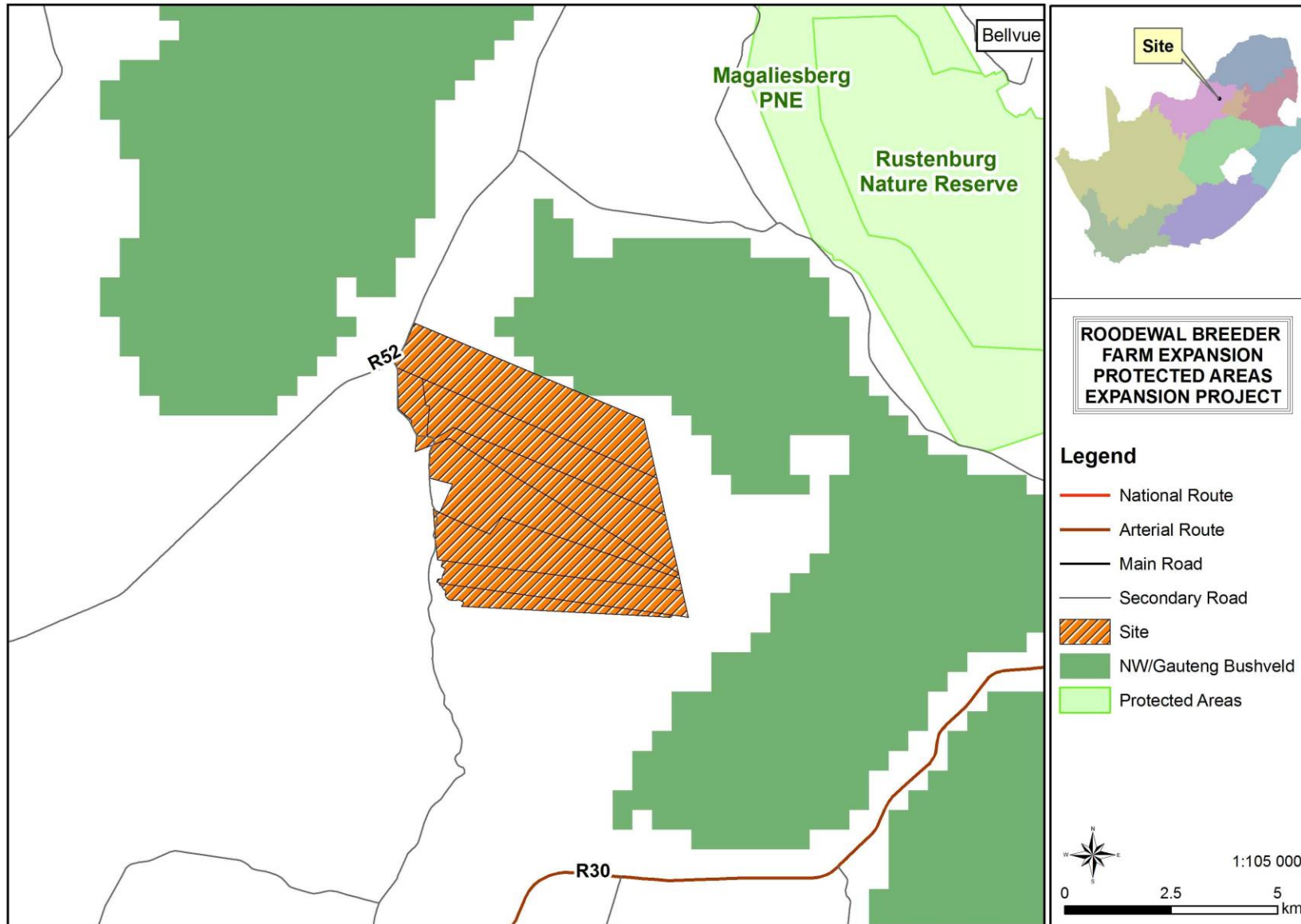


Figure 28: The project site in relation to the protected area expansion project

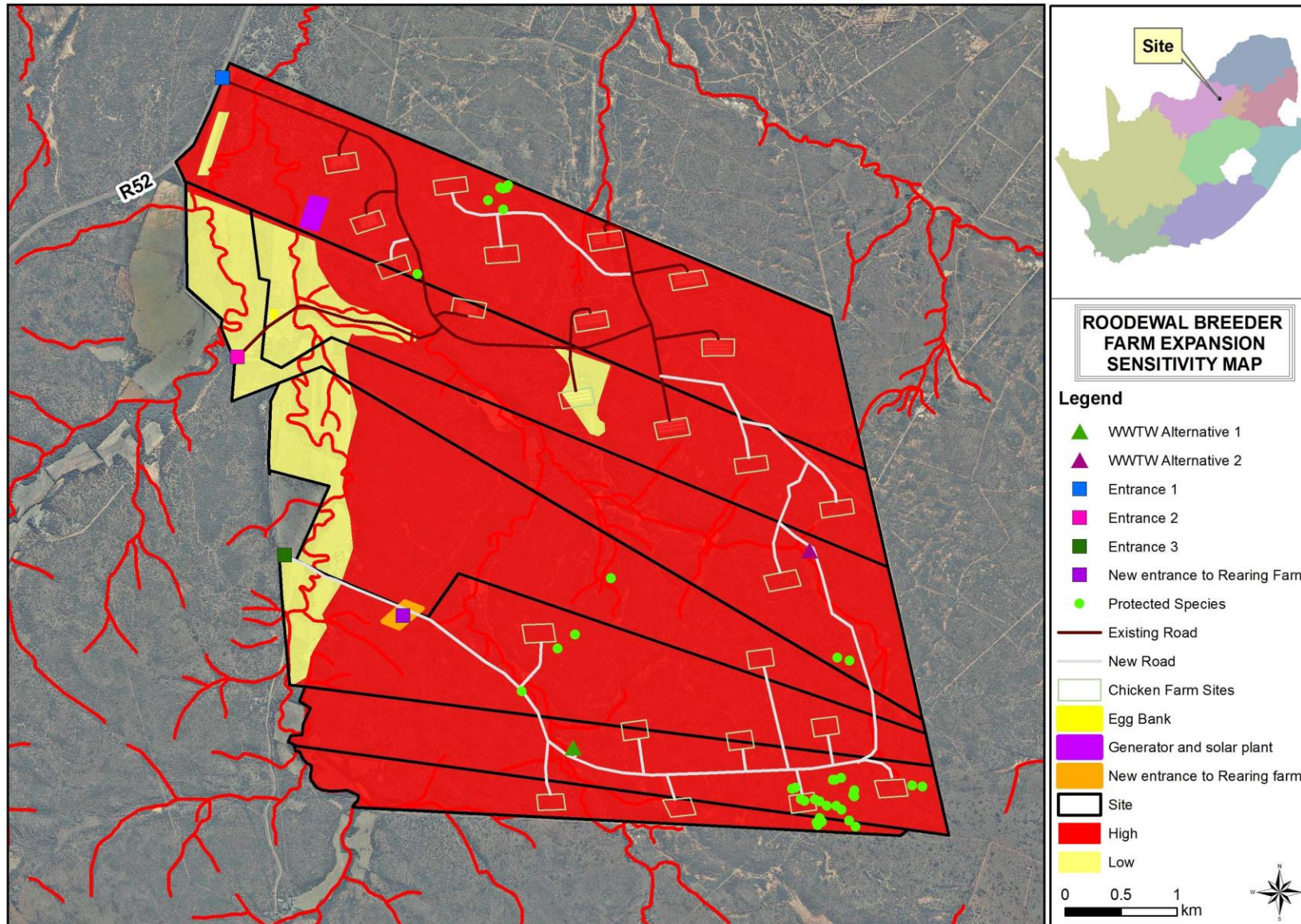


Figure 29: Vegetation sensitivity map of the project site



## Wetlands and watercourses

A Wetland/Riparian Delineation and Functional Assessment was conducted for the project site by Limosella Consulting. The full report is attached under Appendix D.

The study area is located within Quaternary Catchments A22C and is in the third Water Management Area (WMA), the Crocodile (West) and Marico WMA.

Five natural watercourses and numerous artificial waterbodies, including earthen farm dams and artificial canals were found on site. Of the five natural watercourses only two, the Selons River and the downstream sections of a smaller tributary of the Selons River, are classified as perennial rivers in terms of information from the National Geospatial Information (NGI) and National Freshwater Ecosystems Priority Areas (NFEPA). Site verification and information from the farm proved that these two watercourses are instead non-perennial ephemeral rivers. The remaining three watercourses are classified as ephemeral drainage lines (no flow for 3 – 6 months of the year). It should, however, be noted that due to the current droughts some of these ephemeral rivers might even be classified as “episodic” as the indication is that they only flow in response to extreme rainfall events. It should further be noted that each of the natural watercourses/aquatic ecosystems that were identified, delineated and assessed in this study included various small tributaries/headwater streams that drain into the main watercourses. The drainage lines in the south-east corner of the study area are located on the hillside. These hillside watercourses are difficult to identify, except during periods of rain, although indicators such as their topographic position (low points in the local landscape) and evidence of sediment deposition and debris can provide a sufficient indication. More watercourses not included in the assessment are located within the surrounding area. Another non-perennial ephemeral river not affected by the proposed poultry farm is located to the east and the north-east of the RCL properties. The rivers/watercourses that are likely to be impacted in some way by the proposed chicken runs are numbered as follows:

- Selons River (Non-Perennial River located in the north-west corner of the RCL properties);
- Non-Perennial 2 (tributary of the Selons River);
- Non-Perennial 3 (tributary of Non-Perennial 2);
- Non-Perennial 4 (tributary of Non-Perennial 3); and
- Non-Perennial 5 (tributary of a Non-Perennial River located to the North-East of the RCL properties).

A dense tree layer, including larger shrubs, is the dominant riparian vegetation along the watercourses and suppresses the development of a grass and herb layer. Historic overgrazing of the grass and herb layer together with periods of drought could have assisted with the formation of dense thickets (bush encroachment) evident from species such as *Dichrostachys cinerea* (Sickle Bush). Evidence of current grazing on the limited hydrophilic vegetation was also found during the site visit. The limited ground cover in the riparian areas resulted in little or no protection for the streambanks, thereby resulted in channelisation, channel collapse and headcut erosion. Grass species adapted to reduced light conditions such as *Panicum maximum* (Guinea Grass) were present along the watercourses. Other shade tolerant plants found along the banks of the watercourse included *Bryophyta* (Moss) and *Pteridophyta* (Ferns and fern allies). Mosses play an important role in controlling erosion in riparian areas and often do so by forming mats that bind the soil surface together and prevent it from being washed away. Dominant tree species found in the riparian areas included *Searsia lancea* (Sour Karee) and the diagnostic tree species within this vegetation group was *Combretum erytrophillum* (River Bushwillow). The shrubs were dominated by *Buddleja saligna* (False Olive) and *Euclea undulata* (Common Guarri).

The most common riparian and wetland species recorded in these rivers are listed below:

- *Cyperus sexangularis*;
- *Kylinga* spp.;
- *Pteridophytes* (Ferns and fern allies);

- *Bryophyta* (Moss); and
- *Typha capensis* (recorded in one of the earthen dams).

The proposed chicken run footprints do not traverse any major rivers, but are located in close proximity to the natural water courses associated with the Selons River, that drain into the Elands River.

All of the watercourses have been impacted to some degree. These impacts, together with their current integrity status and important factors relevant to the proposed project, are summarised in the following two tables.

Table 9: Watercourses identified onsite (Limosella Consulting, 2016)

No.	Affected watercourse	Linked to an important River system?	Approximate central coordinates	Recorded impacts	EC Score	QHI Score	Likely to be impacted by the proposed activity?
1	Selons River (Non-Perennial 1)	Yes – Elands River	25°45'32.90"S; 27° 4'22.78"E	Channelisation, channel collapse, increased runoff, erosion, soil compaction and subsequent sedimentation.	C/D	C/D	No
2	Non-Perennial 2		25°46'43.75"S; 27° 5'2.33"E	Channelisation, channel collapse, increased runoff, erosion, soil compaction and subsequent sedimentation.	C/D	C/D	No
3	Non-Perennial 3		25°46'34.73"S; 27° 5'54.64"E	Channelisation, channel collapse, increased runoff and erosion.	B/C	C	Yes (access roads)
4	Non-Perennial 4		25°47'8.43"S; 27° 6'44.44"E	Channelisation, channel collapse, increased runoff, erosion, soil compaction and subsequent sedimentation.	C	C	Yes (access roads)
5	Non-Perennial 5		25°45'46.15"S; 27° 6'10.99"E	Channelisation, channel collapse, increased runoff, erosion, soil compaction and subsequent sedimentation.	C	C	No

Table 10: Summary of wetland assessment findings (Limosella Consulting, 2016)

	Quaternary Catchment and WMA areas	Important Rivers possibly affected	Buffers
	A22C, Crocodile (West) and Marico (WMA)	Rivers potentially affected include natural watercourses that are associated with the Selons River and/or tributaries that drain into the Selons River. Major rivers in this catchment include the Crocodile, Marico, Elands, Pienaars and Molopo Rivers.	15m calculated buffer for all the natural watercourses (rivers) onsite (also refer to the following section for more detail regarding buffer zones).
NEMA Impact assessment	Most activities have a medium impact score before implementation of mitigation measures and a low score after mitigation.		
DWS Impact assessment	Most of the activities associated with the poultry farm fall in the low category. Construction of access roads and stormwater management fall in the medium category. This is primarily due to the long term effect of potential impacts, such as altered surface water runoff and potential changes to water flow paths that sustain the watercourses. It is possible that, during the detailed design phase, with the input of stormwater engineers and a geohydrologist or hydropedologist, it can be shown that mitigation for changes to the runoff properties of the infrastructure does not have a net effect on the regional hydrograph. The score may then be lowered to fall in the Low category. The DWS should be consulted regarding the necessity for application for a Water Use Licence.		
Does the specialist support the development?	Yes. However, it should be done in a manner that does not further alter the natural watercourses (rivers) and their catchments, particularly regarding potential pollution from animal waste.		
	The proposed development traverse ecological support areas (ESA1) and critical biodiversity areas (CBA2) and care should be taken to limit impacts in these areas to a minimum.		
Major concerns	<ul style="list-style-type: none"> <li>• Changing the quantity and fluctuation properties of the watercourse;</li> <li>• Changing the amount of sediment entering the water resource and associated change in turbidity (increasing or decreasing the amount);</li> <li>• Alteration of water quality – increasing the amounts of nutrients (phosphate, nitrite, nitrate);</li> <li>• Alteration of water quality – toxic contaminants, including toxic metal ions (e.g. copper, lead, zinc) and hydrocarbons;</li> <li>• Changing the physical structure within a water resource (habitat); and</li> <li>• Erosion in the Selons River and downstream rivers.</li> </ul>		
Recommendations	The placement of the chicken runs should exclude the natural watercourses/aquatic ecosystems as far as possible. Where alternatives have been investigated and watercourses and associated tributaries/headwater streams are in close proximity it is important that appropriate mitigation measures are put into place and carefully monitored to ensure minimal impact to regional hydrology.		

## Buffer Zones

A buffer zone is defined as a strip of land surrounding a wetland or riparian area in which activities are controlled or restricted (DWAF, 2005). A development has several impacts on the surrounding environment and on a wetland. The development changes habitats, the ecological environment, infiltration rate, amount of runoff and runoff intensity of the site and therefore the water regime of the entire site. An increased volume of stormwater runoff, peak discharges and frequency and severity of flooding is therefore often characteristic of transformed catchments. The buffer zone identified for this project serves to highlight an ecologically sensitive area in which activities should be conducted with this sensitivity in mind.

Buffer zones have been shown to perform a wide range of functions and have therefore been widely proposed as a standard measure to protect water resources and their associated biodiversity. These include (i) maintaining basic hydrological processes; (ii) reducing impacts on water resources from upstream activities and adjoining land uses; and (iii) providing habitat for various aspects of biodiversity. A brief description of each of the functions and associated services is outlined in the table below.

Table 11: Generic functions of buffer zones relevant to the study site (adapted from Macfarlane *et al.*, 2010) (Limosella Consulting, 2016)

Primary Role	Buffer Functions
Maintaining basic aquatic processes, services and values.	Groundwater recharge: Seasonal flooding into wetland areas allows infiltration to the water table and replenishment of groundwater. This groundwater will often discharge during the dry season providing the base flow for streams, rivers, and wetlands.
Reducing impacts from upstream activities and adjoining land uses.	<ul style="list-style-type: none"> <li>• Sediment removal: Surface roughness provided by vegetation, or litter, reduces the velocity of overland flow, enhancing settling of particles. Buffer zones can therefore act as effective sediment traps, removing sediment in runoff water from adjoining lands and thereby reducing the sediment load of surface waters.</li> <li>• Removal of toxics: Buffer zones can remove toxic pollutants, such as hydrocarbons, that would otherwise affect the quality of water resources and therefore their suitability for aquatic biota and human use.</li> <li>• Nutrient removal: Wetland vegetation and vegetation in terrestrial buffer zones may significantly reduce the amount of nutrients (Nitrogen and Phosphorous) entering a water body, thereby reducing the potential for excessive outbreaks of microalgae that can have an adverse effect on both freshwater and estuarine environments.</li> <li>• Removal of pathogens: By slowing water contaminated with faecal material, buffer zones encourage the deposition of pathogens, which soon die when exposed to the elements.</li> </ul>

Despite limitations, buffer zones are well suited to perform functions such as sediment trapping, erosion control and nutrient retention which can significantly reduce the impact of activities taking place adjacent to water resources. Buffer zones are therefore proposed as a standard mitigation measure to reduce impacts of land uses/activities planned adjacent to water resources. These must, however, be considered in conjunction with other mitigation measures.

New buffer tools have been developed and published as the “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries, Consolidated Report” by the WRC (Macfarlane *et al.*, 2015). This new buffer tool aims to calculate the best suited buffer for each wetland or section of a wetland based on numerous on-site observations. The resulting buffer area can therefore have large differences depending on the current state of the wetland as well as the nature of the proposed development. Developments with a high risk factor, such as mining, are likely to have a larger buffer area compared to a residential development with a lower risk factor. The minimum accepted buffer for low risk

developments is, however, 15 meters from the edge of the wetland (Macfarlane *et al.*, 2015) as opposed to the generic recommendation of 30m for wetlands inside of the urban edge and 50m outside of the urban edge (GDARD, 2012).

The proposed activities are likely to mostly occur outside the rivers/riparian areas delineated in the Wetland Assessment report. The calculated buffer for this study is amounts to 15m (Limosella Consulting, 2016).

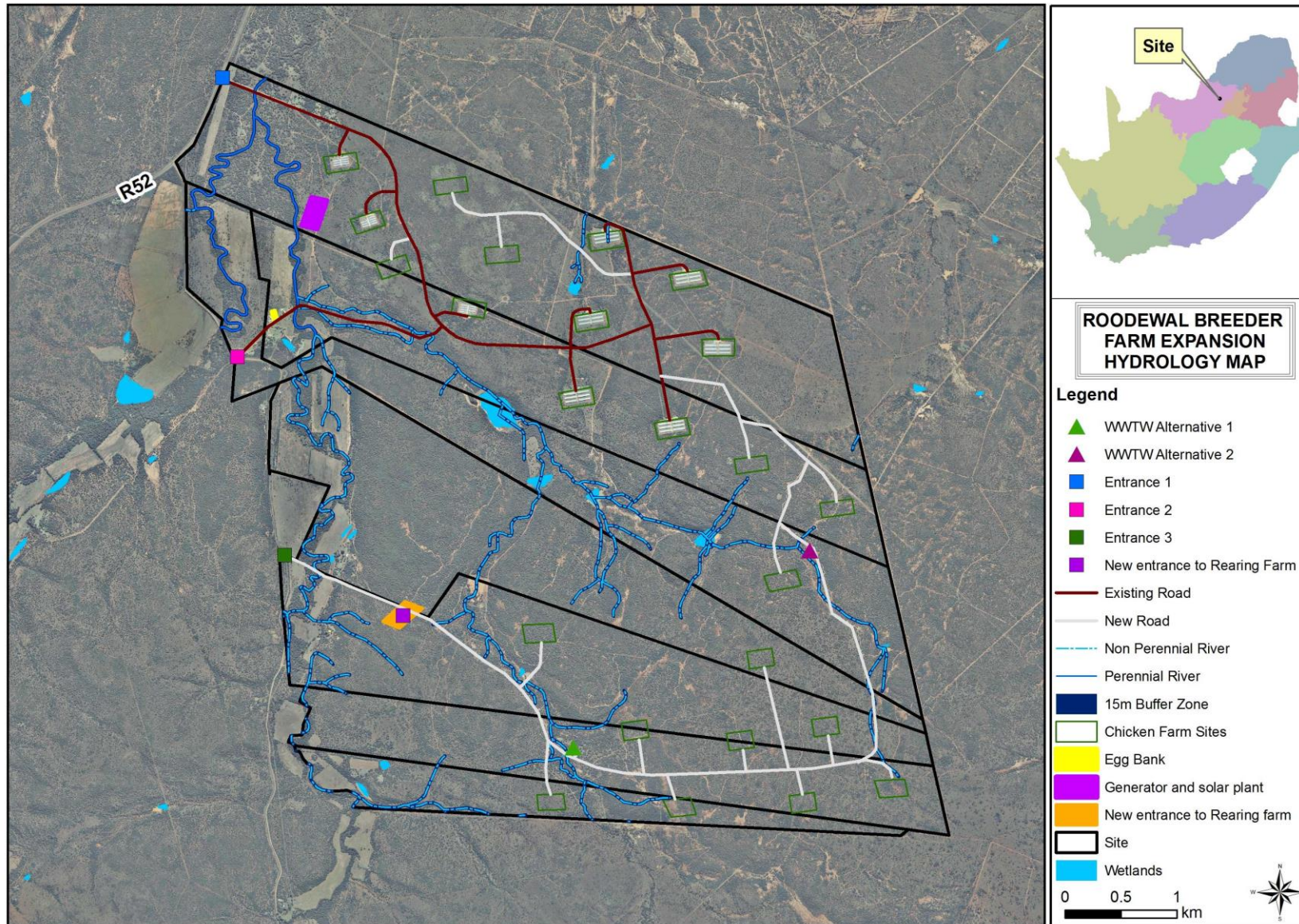


Figure 30: High level hydrology of the project site and surrounding areas

### 8.3.4 Social

The project site is situated within the Kgetlengrivier Local Municipality. According to the 2011 Census, the municipality had a population of 51 049 people, distributed between 14 673 households. There were therefore 3.5 persons per household in 2011.

The age structure of the municipal area was as follows:

- <15 years of age: 28.5%;
- 15-64 years of age: 65.6%; and
- 65+ years of age: 5.9%.

The dependency ratio was 52.5 persons per 100 persons and there were 112.6 men per 100 women in 2011. The population growth rate was 3.36% per annum. The official unemployment rate was 20.5% and the youth unemployment rate (15-34 years of age) was 26.7% (Statistics South Africa, 2011).

### 8.3.5 Economic

According to the Kgetlengrivier Local Municipality's Annual Report (June 2013), the main economic drivers in the municipality are agriculture, tourism, small-scale mining, trade and government services. The municipality's Local Economic Development strategy is being reviewed with the assistance of the Bojanala Platinum District Municipality (Kgetlengrivier Local Municipality, 2013). Some of the key objectives for Local Economic Development in the municipality are the establishment of paving brick-, crop farming- and poultry cooperatives; the establishment of small-scale manufacturing operations; and the provision of communal grazing land for existing emerging farmers ([www.localgovernment.co.za/locals/view/187/Kgetlengrivier-Local-Municipality#economic-development](http://www.localgovernment.co.za/locals/view/187/Kgetlengrivier-Local-Municipality#economic-development)).

### 8.3.6 Archaeological and Cultural Heritage

A Phase 1 Heritage Impact Assessment was conducted for the project site by APelser Archaeological Consulting. The full report is attached under Appendix D.

Background research indicated that there are a number of cultural heritage (archaeological and historical) sites and features in the larger geographical area within which the study site lies. The Heritage (mainly archaeological) assessment focused on specific areas earmarked for development actions (chicken farms; wastewater treatment area; reservoirs; roads; water reticulation network; etc.). A number of sites, features and objects were recorded and identified during the assessment. The 2016 assessment built upon the preliminary assessment that was conducted in 2015.

#### 2015 Assessment

The 2015 preliminary assessment focussed on areas that would have been favoured for settlement and utilisation by humans during prehistoric and later times, including ridges and areas close to drainage lines, while areas with unnatural looking clumps of trees, erosion and open areas where evidence of human utilisation and presence could be identified were also included. A total of 15 individual sites, dating to the Stone Age, Iron Age and more recent historical times were identified and recorded. In some cases the Stone Age and Iron Age occurrences were found on the same sites. Due to the size of the land area that formed part of the study area, as well as time-constraints, it was not possible to cover the area in totality. It is therefore possible that many more similar sites could be located here. Dense vegetation in some sections also made visibility difficult and some sites could have been missed during the preliminary assessment. This could include unknown or unmarked graves. It was recommended that a more detailed, full Archaeological Impact Assessment/Heritage Impact Assessment be carried out once the location of the Poultry Facility had been finalised. The October 2016 assessment was the result of this recommendation.



Most of the sites identified in 2015 were located close to drainage lines, in erosion areas and patches of open land. In some cases, small sections of stone walling in association with pieces of undecorated pottery were also identified, although these “stonewalls” could be the result of efforts to stop erosion in some areas.

The stone tools found are either single flakes or larger/denser scatters of stone tools including cores, flakes, scrapers and other flake-tools that could be an indication of these sites being areas where stone tool manufacturing took place (knapping areas). Based on a preliminary identification it seems as if the Stone Age tools date to the Middle and Later Stone Ages, giving them a date of between 300 000 and 2 000 years ago. A number of these open-air Stone Age and Iron Age sites are large and significant from an archaeological point of view and should be mitigated should there be any possible impact on them by any development actions.

The following sites were identified during the 2015 assessment:

1. S25.79389 E27.09115: Stone Age site
2. S25.79363 E27.09158: Stone Age site
3. S25.79342 E27.09448: Stone Age site
4. S25.79189 E27.09606: Stone Age site
5. S25.78753 E27.09603: Iron Age site
6. S25.78605 E27.09517: Iron Age site
7. S25.78555 E27.09577: Iron Age site
8. S25.79512 E27.09482: Stone Age site
9. S25.79613 E27.09575: Stone Age & Iron Age site
10. S25.79618 E27.09530: Iron Age site
11. S25.79976 E27.09996: Stone Age & Iron Age site
12. S25.80000 E27.10020: Stone Age & Iron Age site
13. S25.80318 E27.10055: Stone Age & Iron Age site
14. S25.79309 E27.08286: Historical/Main House
15. S25.79316 E27.08364: Historical Graves

Site 14 (*Figure 31*) is the location of the main farmhouse on the property and the house is definitely older than 60 years of age. It is highly likely to date to between the mid-19<sup>th</sup> and late-19<sup>th</sup> centuries when the first European farmers started to move into the area. The house is in a good condition and although it will more than likely not be impacted by the proposed development, the house needs to be preserved as it is part of the farm’s history.



*Figure 31: A view of the historical farmhouse (Site 14)*

Site 15 (Figure 32) is an old graveyard containing around 10 possible graves located close to Site 14. Many of the graves are packed with bricks, only with single stones and without any inscription as headstones. There are two graves with more formal cement dressing and demarcation, containing a headstone with inscriptions. The headstone has been broken. The headstone contains the names of both individuals buried here, namely Barend Izak Jag Van Heerden (born in 1865 and died in 1929) and Susanna Sophia Van Heerden born Erasmus (born 1868 and died in 1926). The other graves might be those of their children and/or farmworkers. Graves always carry a High Significance in terms of Cultural Heritage and should at all costs be left intact and not disturbed. It is recommended that this site be cleaned and properly fenced and protected.



Figure 32: One of the brick-packed graves on Site 15

### 2016 Assessment

The October 2016 fieldwork focused on the existing chicken farms and the sites for the new chicken farms, as indicated by the client. A known Late Iron Age (LIA) stone-walled site, where a new chicken farm is proposed (numbered No. 19 in this report) was also assessed. The roads that will connect these features basically follow existing dirt roads on the farms and the possible impact of upgrading these, together with the construction of new connection routes, was also taken into consideration. During the assessment that was done on foot, areas wider than the footprints of the chicken farms were also traversed, while the location of sites found during 2015 were also considered in determining the possible impacts of the proposed development. The final location of the proposed reservoirs, a water reticulation network and Waste Water Treatment plant will be determined based on the results of the heritage assessment to ensure that there are no impacts on any cultural heritage sites. A number of previously unknown sites were identified and recorded during the 2016 assessment.

### Site 16

The remains of an old windmill, cement and corrugated iron dam, irrigation pipes, bricks and cement rubble was found in the area. These remains are, however, not significant and fairly recent in age. **No further mitigation measures are therefore required for this site.**

**GPS Location:** S25.78761; E27.10541

### Site 17

The site is characterized by a continuous boundary wall enclosing smaller enclosures such as livestock enclosures and hut bays. Some fragments of undecorated pottery were also identified. It is recommended that the site should not be impacted on or disturbed by the proposed development and that a buffer zone should be placed around it to prevent any damage to it. Fencing in the site should also be considered.

**GPS Location:** S25.79369; E27.11707 and S25.79333; E27.11646

**Cultural Significance:** Low to Medium.

**Heritage Significance:** Grade III: Other heritage resources of local importance and therefore worthy of conservation.

**Field Ratings:** General protection B (IV B): the site should be recorded before destruction (medium significance).

**Mitigation:** Do not disturb/damage. Buffer zone. Possible fencing of the site.



Figure 33: View of some of the stone walling on Site 17

### Site 18

This site is represented by a small scatter of undecorated pottery fragments and the site is deemed of low significance. No mitigation is required.

### Site 19 and 20

Two cultural heritage sites (Site 19 and Site 20) were identified and recorded in close proximity to one of the Chicken Houses pointed out to the team by RCL Foods during the field assessment. Site 19 is a single rock with evidence of pecking on it and was most likely a gong rock. These rocks were used as gongs to sound alarm, call people to meetings or to make music. Site 20 is a single small circular enclosure, possibly used for cattle or smaller livestock or as hut bay. A possible lower grinding stone was also found close by. It is recommended that these sites should not be disturbed by the proposed development and that a buffer zone be placed around them and that no development should take place close to the sites.

**GPS Location:** S25.80398; E27.12954 (Site 19) and S25.80433; E27.13078 (Site 20).

**Cultural Significance:** Low to Medium.

**Heritage Significance:** Grade III: Other heritage resources of local importance and therefore worthy of conservation.

**Field Ratings:** General protection B (IV B): site should be recorded before destruction (medium significance).

**Mitigation:** Do not disturb/damage. Buffer zone.



Figure 34: Site 19 gong rock. Note the peckings on the rock as well as the smaller stones around it that could have been used to hit the rock with to make the sounds.



Figure 35: Site 20 stone-walled enclosure.



Figure 36: Lower grinding stone close to the Site 20 enclosure.

### Site 21

A single undecorated potsherd was found in the area, but as this is deemed to be an “out of context find” the site is of no significance and no mitigation is required. No other visible sites or features (such as stone walling that could be associated with the site) were identified close by.

**GPS Location:** S25.80595; E27.12091.

### Site 22

A small scatter of undecorated pottery fragments were identified on Site 22. The site is of low significance as this is seen as an “out of context find”. Therefore, no mitigation measures are required and development can continue here. No other visible sites or features that could be associated with this find were identified here.

**GPS Location:** S25.79160; E27.12304.

### Site 23

A fairly extensive Late Iron Age (LIA) stone-walled site was identified and recorded here. The site has a continuous surrounding/boundary wall, enclosing a number of smaller enclosures for livestock, huts and other features. Possible terracing for agricultural purposes is also present, while a piece of hut clay with pole marks was also found. Although the site will not be directly impacted on by the proposed development it is located in fairly close proximity to it and the site needs to be protected against any possible negative impacts. A buffer zone should be placed around the site and no development should be allowed close to it. The fencing-in of the site should be considered.

**GPS Location:** S25.76417; E27.08930 and S25.76303; E27.08920.

**Cultural Significance:** Medium

**Heritage Significance:** Grade III: Other heritage resources of local importance and therefore worthy of conservation.

**Field Ratings:** General protection B (IV B): site should be recorded before destruction (medium significance).

**Mitigation:** Do not disturb/damage. Buffer zone. Possible fencing of the site. If disturbance cannot be avoided, Phase 2 Archaeological work including mapping and excavations should be undertaken. A SAHRA permit would be required.



Figure 37: A view of some of the stone walling at Site 23.



Figure 38: Another view of the stone walling at Site 23.



Figure 39: One of the circular enclosures on Site 23.



Figure 40: Possible terracing at Site 23.



Figure 41: A lower grinding stone on the site.



Figure 42: A piece of hut clay with pole impression.

#### Site 24

This is the location of a fairly extensive stone-walled LIA site, known to RCL Foods, that will be directly impacted on by the development of one of the proposed chicken farms in the area. The client, as part of this assessment, requested APAC to determine the significance of the site and whether it would be possible to demolish the site once Phase 2 Archaeological Excavations have been conducted.

The stone-walled site is fairly extensive and consists of various stone walled enclosures bounded by a larger, continuous boundary wall. The site also contains some granary stands (stone cairns), hut bays and other features. Archaeological deposits in the form of pottery were also identified on the site. The site has been partially disturbed in the recent past by Eskom power lines as well as the servitude road that runs with these lines. Large sections of the site have, however, not been disturbed. As the site is located in the area close to where the chicken house position has been selected, it will be further impacted upon. It is believed that the site is of some archaeological/heritage significance in that it is very good example of the LIA occupation of and settlement in the area and can serve as a “control” for the other known sites on the property that will not be impacted and demolished. Through the archaeological mitigation measures that are to be recommended, valuable information on settlement layout, time-frame of occupation, the cultural identity of its occupants and material and social economy can be determined. It is therefore recommended that the site be archaeologically investigated prior to demolition and commencement of any development. The client has already indicated their support of and willingness for this to take place.

**GPS Location:** S25.75346; E27.09635.

**Cultural Significance:** Medium to High.

**Heritage Significance:** Grade III: Other heritage resources of local importance and therefore worthy of conservation.

**Field Ratings:** General protection A (IV A): Site should be mitigated before destruction (High/Medium significance).

**Mitigation:** Archaeological mitigation measures. Map site in detail. Archaeological excavations after obtaining a permit from SAHRA. Demolition once the work has been completed.



Figure 43: View of power lines across section of the stonewalled site.



Figure 44: View of a section of well-preserved stone walling.



Figure 45: More stone walling on Site 24.



Figure 46: Other sections of well-preserved walling on Site 24.

## Conclusion

In conclusion it is possible to say that the Phase HIA and fieldwork verification study was conducted successfully. During the 2015 preliminary HIA study, a total of 15 individual sites, dating to the Stone Age, Iron Age and more recent historical times (a historical house and graves) were identified and recorded. In some cases the Stone Age and Iron Age occurrences were found on the same sites. As the 2015 survey was only a Preliminary assessment, it was recommended that a more detailed, full AIA/HIA be carried out once the location of the various structures and other related features for the Chicken Farms had been finalised. A number of previously unknown/unrecorded sites, features and objects were recorded and identified during the 2016 assessment. The mitigation of sites that will be impacted by the proposed development will be implemented as part of the recommended Phase 2 Archaeological work.

Only Site 13 (possible Stone Age knapping area and Open Air surface site) and Site 24 (LIA stone-walled settlement site) will be impacted upon directly by the proposed development. Sites 18 and 21 (pottery scatters) are located close to Chicken House clusters but are of no significance. Sites 17, 19, 20 and 23 are situated in close proximity to proposed developments, but will not be directly impacted on. It is recommended that last mentioned sites are fenced-in or that a buffer zone be applied to avoid any impacts by the planned developments.

For Sites 13 and 24 the following is recommended: Archaeological mitigation measures need to be implemented. This will include mapping the sites in detail, the collection of representative samples of material (for Stone Age Site 13) as well as

Archaeological Excavation work on Site 24 after obtaining the required permits from SAHRA. The sites can be demolished once this work has been completed and the go-ahead has been obtained from SAHRA. The applicant has indicated their support of this process and has given the go-ahead for the archaeological work to be conducted once valid permits have been obtained from SAHRA.

From a cultural heritage point of view the development should be allowed to continue once the above recommendations have been adhered to. Furthermore, the subterranean presence of archaeological or historical sites, features or objects should always be kept in mind. Should any be uncovered during the development process, an archaeologist should be called in to investigate and recommend on the best way forward. The presence of other low stone-packed or unmarked graves should also be kept in mind (APelser Archaeological Consulting, 2016).



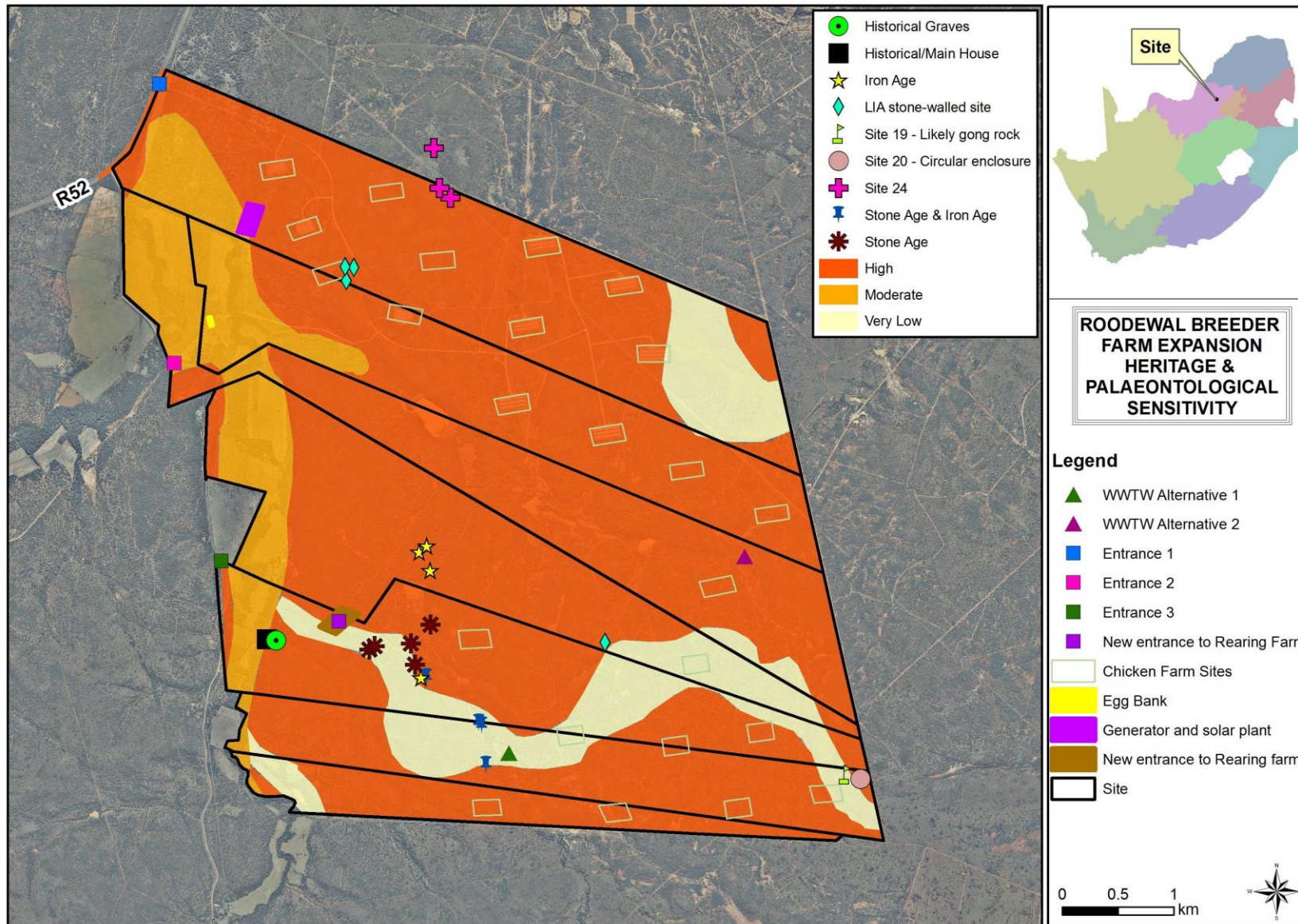


Figure 47: Heritage and Palaeontological Sensitivity of the project site

### 8.3.7 Palaeontological

A Desktop Palaeontological Impact Assessment was conducted for the project site by Gideon Groenewald. The full report is attached under Appendix D. A Protocol for Change Find of Fossils has also been compiled and is also attached under Appendix D.

The project site is underlain by Vaalian aged shale and volcanic rocks of the Silverton Formation, diabase and alluvial material. The Silverton Formation, Vaalian aged Diabase and Quaternary aged alluvium are all present onsite. The Silverton Formation consists of slate, shale, hornfels, quartzite and andalusite, contains micro-fossils, and in some cases, thin bands of stromatolitic limestones. Diabase does not contain fossils. No significant fossils have been recorded from the alluvial deposits in this area although fossils have been recorded from similar deposits elsewhere in South Africa.

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of bedrock excavation envisaged. The different sensitivity classes used are explained in the table below. Refer to *Figure 47* above for the sensitivity of the project site.

Table 12: Palaeontological sensitivity classification

#### PALAEONTOLOGICAL SIGNIFICANCE/VULNERABILITY OF ROCK UNITS

This classification of sensitivity is adapted from that of Almond *et al.* (2008) and Groenewald *et al.* (2014).

**Very High** Palaeontological sensitivity/vulnerability. Development will most likely have a very significant impact on the Palaeontological Heritage of the region. Very high possibility that significant fossil assemblages will be present in all outcrops of the unit. Appointment of professional palaeontologist, desktop survey, phase I Palaeontological Impact Assessment (PIA) (field survey and recording of fossils) and phase II PIA (rescue of fossils during construction) as well as application for collection and destruction permit compulsory.

**High** Palaeontological sensitivity/vulnerability. High possibility that significant fossil assemblages will be present in most of the outcrop areas of the unit. Fossils most likely to occur in associated sediments or underlying units, for example in the areas underlain by Transvaal Supergroup dolomite where Cenozoic cave deposits are likely to occur. Appointment of professional palaeontologist, desktop survey and phase I Palaeontological Impact Assessment (field survey and collection of fossils) compulsory. Early application for collection permit recommended. Highly likely that a Phase II PIA will be applicable during the construction phase of projects.

**Moderate** Palaeontological sensitivity/vulnerability. High possibility that fossils will be present in the outcrop areas of the unit or in associated sediments that underlie the unit. For example, areas underlain by the Gordonia Formation or undifferentiated soils and alluvium. Fossils described in the literature are visible with the naked eye and development can have a significant impact on the Palaeontological Heritage of the area. Recording of fossils will contribute significantly to the present knowledge of the development of life in the geological record of the region. The minimum requirement is the appointment of a professional palaeontologist to do a desktop survey and phase I PIA (ground proofing of desktop survey) during initial excavation of more than 1.5m depth.

**Low** Palaeontological sensitivity/vulnerability. Low possibility that fossils that are described in the literature will be visible to the naked eye or be recognized as fossils by untrained persons. Fossils of, for example, small domal Stromatolites as well as micro-bacteria are associated with these rock units. Fossils of micro-bacteria are extremely important for our understanding of the development of Life, but are only visible under large magnification. Recording of the fossils will contribute significantly to the present knowledge and understanding of the development of Life in the region. Where geological units are allocated a blue colour of significance, and the geological unit is surrounded by highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a blue colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in dolerite sill outcrops.

## PALAEONTOLOGICAL SIGNIFICANCE/VULNERABILITY OF ROCK UNITS

Collection of a representative sample of potential fossiliferous material is recommended. The minimum requirement is a Desktop Survey by suitably qualified Palaeontologist and a phase I investigation as soon as excavation of deeper than 1.5m is done on the site.

**Very Low** Palaeontological sensitivity/vulnerability. Very low possibility that significant fossils will be present in the bedrock of these geological units. The rock units are associated with intrusive igneous activities and no life would have been possible during emplacement of the rocks. It is, however, essential to note that the geological units mapped out on the geological maps are invariably overlain by Cenozoic aged sediments that might contain significant fossil assemblages and archaeological material. Examples of significant finds occur in areas underlain by granite, just to the west of Hoedspruit in the Limpopo Province, where significant assemblages of fossils and clay-pot fragments are associated with large termite mounds. Where geological units are allocated a grey colour of significance, and the geological unit is surrounded by very high and highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a grey colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in dolerite sill outcrops. It is important that the report should also refer to archaeological reports and possible descriptions of palaeontological finds in Cenozoic aged surface deposits. The minimum requirement is a Desktop Survey by a suitably qualified Palaeontologist and a site visit (phase I PIA) during initial excavation of more than 1.5m.

Due to deep soils in the region of the project site, little information on the palaeontological heritage of the sites is known. Recording of fossils during excavation for foundations will contribute significantly to the understanding of the palaeoenvironments of the region and the Moderate to High Palaeontological Sensitivity for the sites underlain by potentially fossiliferous rocks is retained. Although Moderate to High sensitivity is allocated to areas underlain by alluvium and rocks of the Silverton Formation, no significant fossil finds are expected in this study area before any excavations of deeper than 1.5m are made, where bedrock will be exposed (Groenewald, 2017).

## **9. ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS THAT THE PROPOSED ACTIVITY AND ASSOCIATED STRUCTURES AND INFRASTRUCTURE WILL IMPOSE ON THE PREFERRED DEVELOPMENT FOOTPRINT)**

### **9.1 Objectives of the EIA process**

According to the Environmental Impact Assessment Regulations, 2014, the objective of the environmental impact assessment process is to, through a consultative process-

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the--
  - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - (ii) degree to which these impacts-
    - (aa) can be reversed;
    - (bb) may cause irreplaceable loss of resources, and
    - (cc) can be avoided, managed or mitigated;
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to avoid, manage or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

### **9.2 Description of alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity**

The alternatives that have been considered have been discussed under Section 8.1 of this report.

### **9.3 Description of the aspects that have been as part of the EIA process**

The following aspects have been assessed as part of the Environmental Impact Assessment process:

- Fauna and flora;
- Sensitive environments (wetlands);

- Surface water and groundwater;
- Geology;
- Soils;
- Cultural and heritage resources;
- Palaeontological;
- Socio-economic; and
- Traffic.

## 9.4 Aspects assessed by specialists

The following specialist studies have been conducted and incorporated into the Environmental Impact Assessment Report for this project:

- Wetland/Riparian Delineation and Functional Assessment;
- Vegetation Assessment;
- Fauna Assessment;
- Phase 1 Heritage Impact Assessment; and
- Desktop Palaeontological Impact Assessment and Protocol of Finds.

The specialist investigations covered the following aspects and were conducted in line with the requirements of Appendix 6 of the Environmental Impact Assessment Regulations, 2014:

### Wetland/Riparian Delineation and Functional Assessment

- To delineate the wetland/riparian areas;
- To classify the watercourse according to the system proposed in the national wetlands inventory, if possible;
- To undertake the functional assessment of wetlands and/or riparian areas within the area assessed;
- To recommend suitable buffer zones; and
- To discuss potential impacts, mitigation and management procedures relevant to the conservation of wetland areas on the project site.

### Fauna Assessment

- To qualitatively and quantitatively assess the significance of the habitat components and current general conservation status of the study site;
- Identify and comment on ecologically sensitive areas or ecological services;
- To comments on connectivity with natural vegetation and habitats on adjacent terrain;
- To provide a list of occurrences and to identify species of conservation importance;
- To highlight potential impacts of the proposed development on the mammals, birds, reptiles and frogs and their habitats;
- To investigate the possibility of knock-on effects on the district as result of the development;
- To provide management recommendations to mitigate negative impacts and enhance positive impacts should the proposed development be approved; and
- To calculate a significance rating for the proposed development.

### Flora Assessment

- To conduct a field survey with specific reference to plants of conservation concern that could occur within the footprints of the proposed project;
- To provide a broad description of the vegetation associations found on the site compared to the expected natural state as listed in the national vegetation map (Mucina and Rutherford, 2006);
- To compile sensitivity maps, including possible or confirmed localities of plants of conservation concern (previously termed “red data plants”) and sensitive vegetation associations that could be impacted by the proposed developments; and
- To provide an impact assessment, mitigation measures and recommendations to limit the potential impact(s) that the proposed development could have on natural and sensitive vegetation.

### Phase 1 Heritage Impact Assessment

- To identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portions of land that will be impacted upon by the proposed development;
- To assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
- To describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
- To propose suitable mitigation measures to minimise possible negative impacts on the cultural resources; and
- To review applicable legislative requirements.

### Desktop Palaeontological Impact Assessment

- To identify exposed and subsurface rock formations that are considered to be paleontologically significant;
- To assess the level of palaeontological significance of these formations;
- To comment on the impact of the development on these exposed and/or potential fossil resources; and
- To make recommendations as to how the developer should conserve or mitigate damage to these resources.

## 9.5 Description of the method of assessing the environmental aspects and impacts

Elements of the proposed development that can interact with the environment are deemed to be environmental aspects. These have been identified during the Environmental Impact Assessment, for each phase of the proposed development. Thereafter, the potential impacts that can result from the development’s aspects were identified. The impacts, whether positive or negative, are defined as any change to the environment resulting from the identified environmental aspects.

Assessing the significance of the potential impacts has been conducted using the parameters below. Direct, indirect and cumulative impacts have been assessed.

The **nature** of the impact: This will include a qualitative description of what caused the impact and how it will affect the environment;

The **extent** of the impact: The size (physical/geographical) that will be affected by the impact. The following weighting will be used:

- Onsite: Weighting value **1**: The impact is confined to the project site/property
- Local: Weighting value **2**: The impact is confined to the project site/property and a 10km radius around the project site/property
- Regional: Weighting value **3**: The impact extends further than a 10km radius around the project site/property

The **duration** of the impact: The length of time over which the impact will persist. The following weighting will be used:

- Short term: Weighting value **1**: The impact will persist for up to one year
- Medium term: Weighting value **2**: The impact will persist for longer than one year, but shorter than five years
- Long term: Weighting value **3**: The impact will persist for longer than five years

The **magnitude** of the impact: The intensity of the impact on the environment. The following weighting will be used:

- Low: Weighting value **1**: Natural processes continue, albeit in an altered manner
- Medium: Weighting value **2**: Natural processes cease temporarily
- High: Weighting value **3**: Natural processes cease indefinitely

The **probability** of the impact: How likely it is that the impact will happen. The following weighting will be used:

- Improbable: Weighting value **1**: It is unlikely that the impact will occur
- Probable: Weighting value **2**: There is a chance that the impact will occur
- Definite: Weighting value **3**: The impact will most certainly occur

The **status** of the impact: This will include a qualitative description of the following:

- Whether the impact is **positive** or **negative** in nature
- The degree to which the impact can be reversed
- The degree to which the impact can be mitigated
- The degree to which the impact may cause irreplaceable loss of resources

The **significance** of the impact: This will be calculated using the formula below:

Significance = (Duration + Extent + Magnitude) x Probability

The significance of the impact will be divided into the following classes, based on the result of the above given equation:

- **Low Impact: Weighting value: 1-9**
- **Medium Impact: Weighting value: 10-18**
- **High Impact: Weighting value: 19-27**

The aspects to be assessed by specialists have been listed under Section 9.4. The impacts of the proposed project will be assessed by each specialist, mostly also using the following formula:

Significance = (Duration + Extent + Magnitude) x Probability

The specialist's impact assessments are contained in each individual specialist report.

## 9.6 Environmental Impacts (Issues) and Risks identified during the Environmental Impact Assessment process

The following impacts and risks have been identified for the preferred alternative:

### Wetlands

#### Construction Phase

- Changing the quantity and fluctuation properties of the watercourse by, for example, storm water input, or restricting water flow. The sources of this impacts include:
  - The compaction of soil;

- The removal of vegetation;
- Surface water redirection; and
- The construction of infrastructure.
- Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Construction, operational and decommissioning activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the wetland and increase the turbidity of the water. Possible sources of the impacts include:
  - Earthwork activities during construction of the chicken runs and associated infrastructure such as access roads;
  - Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soils;
  - Disturbance of the soil surface;
  - Disturbance of slopes through the creation of roads and tracks adjacent to the watercourses; and
  - Erosion (e.g. gully formation and bank collapse).
- Introduction and spread of alien vegetation. The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a wetland, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system, alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.
- Changes in water quality due to foreign materials and increased nutrients impact ratings. Construction, operational and decommissioning activities will result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in wetland function as well as human and animal waste. Could possibly impact on groundwater.
- Establishment of an artificial wetland ecosystem, linked to the proposed wastewater treatment plant. Provision of a habitat for fauna species.

### Operational Phase

- Changing the quantity and fluctuation properties of the watercourse by, for example, storm water input, or restricting water flow. The sources of this impacts include:
  - The compaction of soil;
  - The removal of vegetation;
  - Surface water redirection; and
  - The construction of infrastructure.
- Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Construction, operational and decommissioning activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the wetland and increase the turbidity of the water. Possible sources of the impacts include:
  - Earthwork activities during construction of the chicken runs and associated infrastructure such as access roads;
  - Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soils;
  - Disturbance of the soil surface;
  - Disturbance of slopes through the creation of roads and tracks adjacent to the watercourses; and
  - Erosion (e.g. gully formation and bank collapse).
- Introduction and spread of alien vegetation. The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can



impact on hydrology, by reducing the quantity of water entering a wetland, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system, alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.

- Changes in water quality due to foreign materials and increased nutrients impact ratings. Construction, operational and decommissioning activities will result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in wetland function as well as human and animal waste. Could possibly impact on groundwater.
- Management of an artificial wetland ecosystem. Provision of a habitat for fauna species.

#### **Cumulative**

- Should mitigation measure not be implemented and changes made to the bed or banks of watercourse unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site. Reversing this process is unlikely and should be prevented in the first place. Expected to be moderate.
- Construction areas within the watercourses along the proposed servitude can experience an increased alien invasion if mitigation is not implemented or implemented correctly. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed. Expected to be moderate to high.
- Once in the system it may take many years for some toxins to be eradicated. Expected to be moderate.

## **Surface and Groundwater**

### **Construction Phase**

- Pollution of surface and/or groundwater resources due to the potential release of pollutants, such as chemicals.
- Pollution of surface and/or groundwater resources due to the incorrect management of chemical substances and dangerous goods.
- Pollution of surface and/or groundwater resources due to poor waste management.
- Pollution of surface and/or groundwater resources due to runoff of contaminated stormwater.
- Pollution of surface and/or groundwater resources due to the incorrect management of concrete mixing.

### **Operational Phase**

- Pollution of surface and/or groundwater resources due to the incorrect management of chemical substances and dangerous goods.
- Pollution of surface and/or groundwater resources due to the potential release of wastewater (sewage and wash water).
- Pollution of surface and/or groundwater resources due to poor waste management.
- Unsustainable utilisation of groundwater.
- Pollution of surface and/or groundwater resources due to runoff of contaminated stormwater.

#### **Cumulative**

None anticipated.

## **Fauna**

### **Construction Phase**

- Direct impact on mammal and herpetofaunal communities: The construction of the chicken farms will each displace natural habitat over a small area, and relative to the 3 200 hectares extent of the property, will be insignificant.

- Loss of mammal and herpetofaunal habitat and ecological structure: The construction of the chicken farms will entirely displace natural habitats.
- Loss of avian habitats: Depending on the size of the chicken facilities, an area in the region of 100ha of avian habitats comprising mainly “randjiesveld” woodland will be destroyed by the proposed development. The construction of road network will result in additional losses. This will represent a moderate loss of habitat and is unlikely to significantly negatively impact bird communities at the site or in the region.
- Increased disturbance of birds by human activities: In addition to direct habitat loss, the disturbance of birds in the surrounding areas will increase because of increased human activity and movements in the area. This impact will be more pronounced during the construction phase than the operational phase.
- Mortality associated with new roads linking the chicken facilities: Vehicles using the roads will result in an increased mortality risk for birds, mammals, reptiles and amphibians through collisions with moving vehicles.
- Environmental contamination, including disease transmission from chickens to wild birds: The new chicken facilities will create a risk of contamination of natural habitats in the surrounding areas if spillages of substances such as chicken manure occur. A related risk concerns the possibility of contact between chickens and wild birds and the possibility of disease transmission subsequently occurring.
- Power lines: collision and electrocution risk to birds: It is assumed that new distribution lines will need to be constructed to provide power to the chicken facilities. These will create electrocution and collisions risks for birds, although these will be minor compared to those associated with large transmission lines.

### **Operational Phase**

- Direct impact on mammal and herpetofaunal communities: The construction of the chicken farms will each displace natural habitat over a small area, and relative to the 3 200 hectares extent of the property, will be insignificant.
- Loss of mammal and herpetofaunal habitat and ecological structure: The construction of the chicken farms will entirely displace natural habitats.
- Loss of avian habitats: Depending on the size of the chicken facilities, an area in the region of 100ha of avian habitats comprising mainly “randjiesveld” woodland will be destroyed by the proposed development. The construction of road network will result in additional losses. This will represent a moderate loss of habitat and is unlikely to significantly negatively impact bird communities at the site or in the region.
- Increased disturbance of birds by human activities: In addition to direct habitat loss, the disturbance of birds in the surrounding areas will increase because of increased human activity and movements in the area. This impact will be more pronounced during the construction phase than the operational phase.
- Mortality associated with new roads linking the chicken facilities: Vehicles using the roads will result in an increased mortality risk for birds, mammals, reptiles and amphibians through collisions with moving vehicles.
- Environmental contamination, including disease transmission from chickens to wild birds: The new chicken facilities will create a risk of contamination of natural habitats in the surrounding areas if spillages of substances such as chicken manure occur. A related risk concerns the possibility of contact between chickens and wild birds and the possibility of disease transmission subsequently occurring.
- Power lines: collision and electrocution risk to birds: It is assumed that new distribution lines will need to be constructed to provide power to the chicken facilities. These will create electrocution and collisions risks for birds, although these will be minor compared to those associated with large transmission lines.

## Cumulative

- The proposed development will result in additional avifaunal habitat loss in the region. However, the small area involved means that this impact is minor.
- Increased disturbance at a local scale, but unlikely to be significant.
- Increased road kill mortality at a local scale, but unlikely to be significant.
- Poultry farms, by their nature, elevate the risk of disease transmission between wild and domestic species. However, as long as adequate biosecurity measures are put in place, the cumulative impact should not be cause for concern.

## Flora

### Construction Phase

- Removal of natural, good condition vegetation:
  - Destruction of vegetation;
  - Potential loss of individuals of large tree species and associated microhabitats;
  - Potential loss of species of conservation concern and their habitats;
  - Potential increase in runoff and erosion;
  - Potential spread of alien invasive vegetation; and
  - Potential contamination of soils with hydrocarbons and/or other pollutants.
- Erosion, soil compaction and subsequent sedimentation:
  - Soil compaction;
  - Potential increase in runoff and erosion;
  - Possible change of natural runoff and drainage patterns;
  - Possible permanent loss of re-vegetation potential of soil surface;
  - Potential spread of alien invasive vegetation; and
  - Negative impact on indigenous species' growing conditions.
- Removal of protected species or species of conservation concern:
  - Potential loss of individuals or populations of conservation concern; and
  - Changes in species composition.
- Invasion by alien invasive plant species:
  - Increase in alien invasive plant species and densities on the site.
- Bush densification:
  - Increase in bush encroacher species; and
  - Change in vegetation structure.
- Deterioration of watercourses and riparian vegetation:
  - Destruction of vegetation;
  - Deterioration of vegetation and watercourse; and
  - Potential contamination of soils with hydrocarbons and/or other pollutants.

### Operational Phase

- Invasion by alien invasive plant species:
  - Increase in alien invasive plant species and densities on the site.
- Bush densification:
  - Increase in bush encroacher species; and
  - Change in vegetation structure.

## Cumulative

- Removal of natural, good condition vegetation:
  - Possible erosion of surrounding areas if no mitigation is implemented;
  - Possible increased fragmentation of remaining natural vegetation;
  - Possible bush densification or invasion by alien invasive plant species; and
  - Possible expansion of the chicken farm with additional infrastructure and chicken houses that will increase fragmentation and impact on the vegetation composition and structure.
- Erosion, soil compaction and subsequent sedimentation:
  - Sedimentation;
  - Possible bush densification or invasion by alien invasive plant species;
  - Further fragmentation of natural habitats;
  - Altered topsoil conditions; and
  - Potential barren areas remaining after construction.
- Removal of protected species or species of conservation concern:
  - Loss of diversity;
  - Decline in provincial or national numbers of species of conservation concern; and
  - Future expansion of the chicken farm will lead to a further reduction in these species and fragmentation and should therefore be prohibited.
- Invasion by alien invasive plant species:
  - Increase in alien invasive plant species in the area that the site is situated in; and
  - Loss of indigenous species diversity.
- Bush densification:
  - Possible bush densification on the site and loss of indigenous species diversity.
- Deterioration of watercourses and riparian vegetation:
  - Possible loss of the ecological function of riparian vegetation and erosion of riverbanks;
  - Decrease in water quality; and
  - Flooding downstream.

## Heritage Resources

### Construction Phase

- Disturbance or destruction of cultural and heritage resources.

### Operational Phase

- Disturbance or destruction of cultural and heritage resources.

### Cumulative

- Disturbance or destruction of cultural and heritage resources onsite resulting in a decline in the overall cultural and heritage value of the greater area.

## Palaeontological resources

### Construction Phase

- High possibility that significant micro-organism fossil remains may be present in the Silverton Formation parts of the site. The alluvium areas may also contain significant fossils not yet recorded for the area. Stromatolitic structures may be uncovered if bedrock is exposed during foundation excavations.

### **Operational Phase**

None anticipated.

### **Cumulative**

None anticipated.

## **Air Quality and Noise**

### **Construction Phase**

- Generation of dust.
- Release of vehicle emissions from construction vehicles.
- Generation of nuisance and noise.

### **Operational Phase**

- Generation of emissions, such as carbon dioxide, carbon monoxide, sulphur dioxide and nitrous oxides, from coal hot water boilers.

### **Cumulative**

- The greenhouse gas emissions from the vehicles and coal hot water boilers will combine with other greenhouse gasses in the atmosphere and contribute towards the global Climate Change effect.

## **Soil**

### **Construction Phase**

- Soil erosion due to the clearance of vegetation.
- Soil compaction to create foundations for buildings and other associated infrastructure.
- Soil pollution due to the incorrect management of chemical substances and dangerous goods.
- Soil pollution due to poor waste management (general and hazardous waste).
- Soil pollution due to potential spillages from chemical toilets.
- Soil pollution due to the incorrect management of concrete mixing.
- Soil pollution due to runoff of contaminated stormwater.

### **Operational Phase**

- Soil pollution due to the incorrect management of chemical substances and dangerous goods.
- Soil pollution due to poor waste management (general and hazardous waste).
- Soil pollution due to runoff of contaminated stormwater.

### **Cumulative**

None anticipated.

## **Socio-economic**

### **Construction Phase**

- Generation of a large number of job opportunities.
- The stimulation of the local and provincial economy and supply chain industries.
- Potential increase in crime due to the influx of workers.

### Operational Phase

- Generation of a large number of job opportunities.
- The stimulation of the local and provincial economy and supply chain industries.
- Contributing to food security in South Africa.

### Post-construction and Rehabilitation Phase

- The stimulation of the local and provincial economy and supply chain industries.
- Generation of a number of job opportunities.

### Cumulative

None anticipated.

## Traffic

### Construction Phase

- Increase in traffic volumes to the site

### Operational Phase

- Increase in traffic volumes to the site

### Cumulative

None anticipated.

## 9.7 Impact Assessment [Assessment of the significance of each impact (issue) and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures]

The following tables discuss the impacts and risks identified for each alternative, including the nature, significance, consequences, extent, duration and probability of the impacts, including the degree to which the impacts can be reversed; may cause irreplaceable loss of resources; and can be avoided, managed or mitigated, based on the information available at this stage of the process.

## Preferred Alternative

### Wetlands

<b>Aspect</b>	Changing the quantity and fluctuation properties of the watercourse.	
<b>Impact and Nature</b>	Changing the quantity and fluctuation properties of the watercourse by, for example, storm water input, or restricting water flow. The sources of this impacts include: <ul style="list-style-type: none"> <li>• The compaction of soil;</li> <li>• The removal of vegetation;</li> <li>• Surface water redirection; and</li> <li>• The construction of infrastructure.</li> </ul>	
<b>Impact Rating</b>	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
<b>Extent</b>	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
<b>Duration</b>		
<b>Magnitude</b>		
<b>Probability</b>		

Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount).	
Impact and Nature	<p>Construction, operational and decommissioning activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the wetland and increase the turbidity of the water. Possible sources of the impacts include:</p> <ul style="list-style-type: none"> <li>• Earthwork activities during construction of the chicken runs and associated infrastructure such as access roads;</li> <li>• Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soils;</li> <li>• Disturbance of the soil surface;</li> <li>• Disturbance of slopes through the creation of roads and tracks adjacent to the watercourses; and</li> <li>• Erosion (e.g. gully formation and bank collapse).</li> </ul>	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	

Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Introduction and spread of alien vegetation.	
Impact and Nature	The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a wetland, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented, alien plants can easily colonise and impact on downstream users.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Changes in water quality due to foreign materials and increased nutrients impact ratings.	
Impact and Nature	Construction, operational and decommissioning activities will result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in wetland function as well as human and animal waste. Could possibly impact on groundwater.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		



Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

Aspect	Construction and management of the wastewater treatment plant.	
Impact and Nature	Establishment and management of an artificial wetland ecosystem, linked to the proposed wastewater treatment plant. Provision of a habitat for fauna species.	

Impact Rating	Before mitigation	After mitigation
<b>Construction Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance	Positive impact	No mitigation required – positive impact

<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance	Positive impact	No mitigation required – positive impact

<b>Status of Impact</b>		
Consequence	Positive	
Degree to which impact can be reversed	N/A – positive impact	
Degree to which impact may cause irreplaceable loss of resources	N/A – positive impact	
Degree to which impact can be avoided, managed or mitigated	N/A – positive impact	

### Cumulative Impacts

Aspect	Should mitigation measure not be implemented and changes made to the bed or banks of watercourse unstable channel conditions may result.	
Impact and Nature	Erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site. Reversing this process is unlikely and should be prevented in the first place. Expected to be moderate.	
Impact Rating	Before mitigation	After mitigation
<b>Cumulative Impact</b>		
Extent	Rating as provided in specialist report	
Duration		

Magnitude		
Probability		
Significance	<b>Medium</b>	<b>Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Should mitigation measures for the management of alien invasive species not be implemented, or not be implemented correctly.	
Impact and Nature	Construction areas within the watercourses along the proposed servitude can experience an increased alien invasion. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed. Expected to be moderate to high.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Cumulative Impact</b>		
Extent	Rating as provided in specialist report	
Duration		
Magnitude		
Probability		
Significance	<b>Medium/High</b>	<b>Medium /Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	The introduction of toxins into the environmental system.	
Impact and Nature	Once in the system it may take many years for some toxins to be eradicated. Expected to be moderate.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Cumulative Impact</b>		
Extent	Rating as provided in specialist report	
Duration		
Magnitude		
Probability		
Significance	<b>Medium</b>	<b>Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	

Degree to which impact can be avoided, managed or mitigated	High degree
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### Surface and Groundwater

Aspect	Construction and operational activities.	
Impact and Nature	Pollution of surface and/or groundwater resources due to the release of pollutants, such as chemicals.  Pollution of surface and/or groundwater resources due to the incorrect management of chemical substances and dangerous goods.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	2	1
Duration	2	2
Magnitude	3	3
Probability	2	1
Significance	<b>14 – Medium</b>	<b>6 – Low</b>
<b>Operational Phase</b>		
Extent	2	1
Duration	2	2
Magnitude	3	3
Probability	2	1
Significance	<b>14 – Medium</b>	<b>6 – Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	Medium degree	

Aspect	Operational activities.	
Impact and Nature	Pollution of surface and/or groundwater resources due to the potential release of wastewater (sewage and wash water) during the operational phase.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Operational Phase</b>		
Extent	2	1
Duration	2	2
Magnitude	3	3
Probability	2	1
Significance	<b>14 - Medium</b>	<b>6 - Low</b>
Significance		
<b>Status of Impact</b>		
Consequence	Negative	

Degree to which impact can be reversed	Medium degree
Degree to which impact may cause irreplaceable loss of resources	Medium degree
Degree to which impact can be avoided, managed or mitigated	High degree

Aspect	Construction and operational activities.	
Impact and Nature	Pollution of surface and/or groundwater resources due to poor waste management.	

Impact Rating	Before mitigation	After mitigation
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**Construction Phase**

Extent	2	1
Duration	2	1
Magnitude	3	3
Probability	2	1
Significance	<b>14 - Medium</b>	<b>5 - Low</b>

**Operational Phase**

Extent	2	1
Duration	2	1
Magnitude	2	2
Probability	2	1
Significance	<b>12 - Medium</b>	<b>4 - Low</b>

**Status of Impact**

Consequence	Negative
Degree to which impact can be reversed	Medium degree
Degree to which impact may cause irreplaceable loss of resources	Medium degree
Degree to which impact can be avoided, managed or mitigated	High degree

Aspect	Construction and operational activities.	
Impact and Nature	Pollution of surface and/or groundwater resources due to runoff of contaminated stormwater.	

Impact Rating	Before mitigation	After mitigation
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**Construction Phase**

Extent	2	1
Duration	2	1
Magnitude	3	3
Probability	2	1
Significance	<b>14 - Medium</b>	<b>5 - Low</b>

**Operational Phase**

Extent	2	1
Duration	2	1
Magnitude	2	2
Probability	2	1
Significance	<b>12 - Medium</b>	<b>4 - Low</b>

**Status of Impact**

Consequence	Negative
Degree to which impact can be reversed	Medium degree
Degree to which impact may cause irreplaceable loss of resources	Medium degree

Degree to which impact can be avoided, managed or mitigated	Medium degree	
Aspect	The mixing of concrete.	
Impact and Nature	Pollution of surface and/or groundwater resources due to the incorrect management of concrete mixing.	
Impact Rating	Before mitigation	After mitigation
<b>Construction Phase</b>		
Extent	2	1
Duration	2	1
Magnitude	3	3
Probability	2	1
Significance	<b>14 - Medium</b>	<b>5 - Low</b>
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Operational activities.	
Impact and Nature	Unsustainable utilisation of groundwater.	
Impact Rating	Before mitigation	After mitigation
<b>Construction Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Operational Phase</b>		
Extent	3	3
Duration	2	2
Magnitude	2	2
Probability	2	1
Significance	<b>14 - Medium</b>	<b>7 - Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

## Fauna

Aspect	Direct impact on mammal and herpetofaunal communities.	
Impact and Nature	The construction of the chicken farms will each displace natural habitat over a small area, but relative to the extent of the property this <b>will be insignificant</b> .	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>High (but insignificant) (as per specialist report)</b>	<b>High (but insignificant) (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>High (but insignificant) (as per specialist report)</b>	<b>High (but insignificant) (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	High degree	
Degree to which impact can be avoided, managed or mitigated	Low degree	
Aspect	Loss of mammal and herpetofaunal habitat and ecological structure.	
Impact and Nature	The construction of the chicken farms will entirely displace natural habitats.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>High (as per specialist report)</b>	<b>High (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>High (as per specialist report)</b>	<b>High (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	High degree	
Degree to which impact can be avoided, managed or mitigated	Low degree	

Aspect	Loss of avian habitats.	
Impact and Nature	Depending on the size of the chicken facilities, an area in the region of 100ha of avian habitats comprising mainly “randjiesveld” woodland will be destroyed by the proposed development. The construction of road network will result in additional losses. This will represent a moderate loss of habitat and is unlikely to significantly negatively impact bird communities at the site or in the region.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Increased disturbance of birds by human activities.	
Impact and Nature	In addition to direct habitat loss, the disturbance of birds in the surrounding areas will increase because of increased human activity and movements in the area. This impact will be more pronounced during the construction phase than the operational phase.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		

Consequence	Negative
Degree to which impact can be reversed	High degree
Degree to which impact may cause irreplaceable loss of resources	Low degree
Degree to which impact can be avoided, managed or mitigated	High degree

Aspect	Mortality associated with new roads linking the chicken facilities.
Impact and Nature	Vehicles using the roads will result in an increased mortality risk for birds, mammals, reptiles and amphibians through collisions with moving vehicles.

Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
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**Construction Phase**

Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>

<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium (as per specialist report)</b>	<b>Low (as per specialist report)</b>

**Status of Impact**

Consequence	Negative
Degree to which impact can be reversed	High degree
Degree to which impact may cause irreplaceable loss of resources	Low degree
Degree to which impact can be avoided, managed or mitigated	Low degree

Aspect	Environmental contamination, including disease transmission from chickens to wild birds.
Impact and Nature	The new chicken facilities will create a risk of contamination of natural habitats in the surrounding areas if spillages of substances such as chicken manure occur. A related risk concerns the possibility of contact between chickens and wild birds and the possibility of disease transmission subsequently occurring.

Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
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**Construction Phase**

Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low (as per specialist report)</b>	<b>Low (as per specialist report)</b>

<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		



Magnitude		
Probability		
Significance	<b>High (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	High degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Power lines: collision and electrocution risk to birds.	
Impact and Nature	It is assumed that new distribution lines will need to be constructed to provide power to the chicken facilities. These will create electrocution and collisions risks for birds, although these will be minor compared to those associated with large transmission lines.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low (as per specialist report)</b>	<b>Low (as per specialist report)</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	High degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

### Cumulative Impacts

Aspect	Development associated with the proposed project.	
Impact and Nature	The proposed development will result in additional avifaunal habitat loss in the region. However, the small area involved means that this impact is minor.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Cumulative Impact</b>		
Extent	Rating as provided in specialist report	
Duration		
Magnitude		
Probability		
Significance	<b>Low</b>	<b>Low</b>
<b>Status of Impact</b>		
Consequence	Negative	

Degree to which impact can be reversed	Low degree
Degree to which impact may cause irreplaceable loss of resources	Low degree
Degree to which impact can be avoided, managed or mitigated	High degree

Aspect	Development associated with the proposed project.	
Impact and Nature	Increased disturbance at a local scale, but unlikely to be significant.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Cumulative Impact</b>		
Extent	Rating as provided in specialist report	
Duration		
Magnitude		
Probability		
Significance	<b>Low</b>	<b>Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	High degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

Aspect	Construction and operational activities.	
Impact and Nature	Increased road kill mortality at a local scale, but unlikely to be significant.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Cumulative Impact</b>		
Extent	Rating as provided in specialist report	
Duration		
Magnitude		
Probability		
Significance	<b>Low</b>	<b>Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	High degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	Low degree	

Aspect	Operation of the breeder farm.	
Impact and Nature	Poultry farms, by their nature, elevate the risk of disease transmission between wild and domestic species. However, as long as adequate biosecurity measures are put in place, the cumulative impact should not be cause for concern.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Cumulative Impact</b>		
Extent		Rating as provided in specialist report
Duration		
Magnitude		
Probability		
Significance		
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	High degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

## Flora

<b>Aspect</b>	Removal of natural, good condition vegetation.	
<b>Impact and Nature</b>	<ul style="list-style-type: none"> <li>• Destruction of vegetation;</li> <li>• Potential loss of individuals of large tree species and associated microhabitats;</li> <li>• Potential loss of species of conservation concern and their habitats;</li> <li>• Potential increase in runoff and erosion;</li> <li>• Potential spread of alien invasive vegetation; and</li> <li>• Potential contamination of soils with hydrocarbons and/or other pollutants.</li> </ul>	
<b>Impact Rating</b>	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
<b>Extent</b>	1	1
<b>Duration</b>	2	2
<b>Magnitude</b>	2	2
<b>Probability</b>	3	2
<b>Significance</b>	<b>15 – Medium (as per specialist report)</b>	<b>10 - Medium (assuming that the development footprint remains as small as possible and no further expansion is planned) (as per specialist report)</b>
<b>Operational Phase</b>		
<b>Extent</b>		
<b>Duration</b>		
<b>Magnitude</b>		
<b>Probability</b>		
<b>Significance</b>		
<b>Status of Impact</b>		
<b>Consequence</b>	Negative	
<b>Degree to which impact can be reversed</b>	Medium degree	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	Medium degree	
<b>Degree to which impact can be avoided, managed or mitigated</b>	Low degree	
<b>Aspect</b>	Erosion, soil compaction and subsequent sedimentation.	
<b>Impact and Nature</b>	<ul style="list-style-type: none"> <li>• Soil compaction;</li> <li>• Potential increase in runoff and erosion;</li> <li>• Possible change of natural runoff and drainage patterns;</li> <li>• Possible permanent loss of re-vegetation potential of soil surface;</li> <li>• Potential spread of alien invasive vegetation; and</li> <li>• Negative impact on indigenous species growing conditions.</li> </ul>	
<b>Impact Rating</b>	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
<b>Extent</b>	1	1
<b>Duration</b>	3	2
<b>Magnitude</b>	3	2
<b>Probability</b>	2	1
<b>Significance</b>	<b>14 – Medium (as per specialist report)</b>	<b>5 –Low (as per specialist report)</b>
<b>Operational Phase</b>		
<b>Extent</b>		

Duration		
Magnitude		
Probability		
Significance		

**Status of Impact**

Consequence	Negative
Degree to which impact can be reversed	Medium degree
Degree to which impact may cause irreplaceable loss of resources	Medium degree
Degree to which impact can be avoided, managed or mitigated	Medium degree

Aspect	Removal of protected species or species of conservation concern.	
Impact and Nature	<ul style="list-style-type: none"> <li>Potential loss of individuals or populations of conservation concern; and</li> <li>Changes in species composition.</li> </ul>	

Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
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**Construction Phase**

Extent	3	1
Duration	2	1 – avoidance or relocation
Magnitude	3	1
Probability	2	2 - assuming that final development footprint is surveyed for these species and are amended to avoid them where possible
Significance	<b>16 - High (as per specialist report)</b>	<b>6 - Low (assuming that the final development footprint is surveyed for these species and the layouts are amended to avoid them where possible) (as per specialist report)</b>

**Operational Phase**

Extent		
Duration		
Magnitude		
Probability		
Significance		

**Status of Impact**

Consequence	Negative
Degree to which impact can be reversed	Low degree
Degree to which impact may cause irreplaceable loss of resources	High degree
Degree to which impact can be avoided, managed or mitigated	High degree

Aspect	Invasion by alien invasive plant species.	
Impact and Nature	Increase in alien invasive plant species and densities on the site.	

Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
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**Construction Phase**

Extent	2	1
Duration	3	2
Magnitude	2	1
Probability	2	1

Significance	<b>14 – Medium (as per specialist report)</b>	<b>4 – Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	2	1
Duration	3	2
Magnitude	2	1
Probability	2	1
Significance	<b>14 – Medium</b>	<b>4 – Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Bush densification.	
Impact and Nature	<ul style="list-style-type: none"> <li>• Increase in bush encroacher species; and</li> <li>• Change in vegetation structure.</li> </ul>	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	1	1
Duration	3	2
Magnitude	2	1
Probability	2	1
Significance	<b>12 – Medium (as per specialist report)</b>	<b>4 – Low (as per specialist report)</b>
<b>Operational Phase</b>		
Extent	1	1
Duration	3	2
Magnitude	2	1
Probability	2	1
Significance	<b>12 – Medium</b>	<b>4 – Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Deterioration of watercourses and riparian vegetation.	
Impact and Nature	<ul style="list-style-type: none"> <li>• Destruction of vegetation;</li> <li>• Deterioration of vegetation and watercourse; and</li> <li>• Potential contamination of soils with hydrocarbons and/or other pollutants.</li> </ul>	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	2	1
Duration	2	1
Magnitude	3	2
Probability	3	2

Significance	<b>21 – High (as per specialist report)</b>	<b>8 – Medium (as per specialist report)</b>
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Medium - High degree	
Degree to which impact can be avoided, managed or mitigated	Medium degree	

### Cumulative Impacts

Aspect	Construction and operational activities.	
Impact and Nature	<ul style="list-style-type: none"> <li>• Removal of natural, good condition vegetation: <ul style="list-style-type: none"> <li>▪ Possible erosion of surrounding areas if no mitigation is implemented;</li> <li>▪ Possible increased fragmentation of remaining natural vegetation;</li> <li>▪ Possible bush densification or invasion by alien invasive plant species; and</li> <li>▪ Possible expansion of the chicken farm with additional infrastructure and chicken houses that will increase fragmentation and impact on the vegetation composition and structure (<b>Note:</b> no expansion is planned by the applicant).</li> </ul> </li> </ul>	

Impact Rating	Before mitigation	After mitigation
<b>Cumulative Impact</b>		
Extent	2	2
Duration	3	3
Magnitude	3	3
Probability	2	1
Significance	<b>16 - Medium</b>	<b>8 - Low</b>

<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	Low degree	

Aspect	Construction and operational activities.	
Impact and Nature	<ul style="list-style-type: none"> <li>• Erosion, soil compaction and subsequent sedimentation: <ul style="list-style-type: none"> <li>▪ Sedimentation;</li> <li>▪ Possible bush densification or invasion by alien invasive plant species;</li> </ul> </li> </ul>	

	<ul style="list-style-type: none"> <li>▪ Further fragmentation of natural habitats;</li> <li>▪ Altered topsoil conditions; and</li> <li>▪ Potential barren areas remaining after construction.</li> </ul>																					
<b>Impact Rating</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Before mitigation</th> <th style="width: 25%; text-align: center;">After mitigation</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;"><b>Cumulative Impact</b></td> </tr> <tr> <td>Extent</td> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Duration</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Magnitude</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Probability</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Significance</td> <td style="text-align: center;"><b>16 - Medium</b></td> <td style="text-align: center;"><b>8 - Low</b></td> </tr> </tbody> </table>		Before mitigation	After mitigation	<b>Cumulative Impact</b>			Extent	2	2	Duration	3	3	Magnitude	3	3	Probability	2	1	Significance	<b>16 - Medium</b>	<b>8 - Low</b>
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Degree to which impact can be reversed	Medium degree																					
Degree to which impact may cause irreplaceable loss of resources	Medium degree																					
Degree to which impact can be avoided, managed or mitigated	Medium degree																					
<b>Aspect</b>	Site clearance.																					
<b>Impact and Nature</b>	<ul style="list-style-type: none"> <li>• Removal of protected species or species of conservation concern: <ul style="list-style-type: none"> <li>▪ Loss of diversity;</li> <li>▪ Decline in provincial or national numbers of species of conservation concern; and</li> <li>▪ Future expansion of the chicken farm will lead to a further reduction in these species and fragmentation and should therefore be prohibited (<b>Note:</b> no expansion is planned by the applicant).</li> </ul> </li> </ul>																					
<b>Impact Rating</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Before mitigation</th> <th style="width: 25%; text-align: center;">After mitigation</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;"><b>Cumulative Impact</b></td> </tr> <tr> <td>Extent</td> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Duration</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Magnitude</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Probability</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Significance</td> <td style="text-align: center;"><b>18 - Medium</b></td> <td style="text-align: center;"><b>8 - Low</b></td> </tr> </tbody> </table>		Before mitigation	After mitigation	<b>Cumulative Impact</b>			Extent	3	2	Duration	3	3	Magnitude	3	3	Probability	2	1	Significance	<b>18 - Medium</b>	<b>8 - Low</b>
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<b>Cumulative Impact</b>																						
Extent	3	2																				
Duration	3	3																				
Magnitude	3	3																				
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Significance	<b>18 - Medium</b>	<b>8 - Low</b>																				
<b>Status of Impact</b>																						
Consequence	Negative																					
Degree to which impact can be reversed	Low degree																					
Degree to which impact may cause irreplaceable loss of resources	High degree																					
Degree to which impact can be avoided, managed or mitigated	High degree																					
<b>Aspect</b>	Construction and operational activities.																					
<b>Impact and Nature</b>	<ul style="list-style-type: none"> <li>• Invasion by alien invasive plant species: <ul style="list-style-type: none"> <li>▪ Increase in alien invasive plant species in the area that the site is situated in; and</li> <li>▪ Loss of indigenous species diversity.</li> </ul> </li> </ul>																					



Impact Rating	Before mitigation	After mitigation
<b>Cumulative Impact</b>		
Extent	2	1
Duration	2	2
Magnitude	2	2
Probability	2	1
Significance	<b>12 - Medium</b>	<b>5 - Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

Aspect	Construction and operational activities.	
Impact and Nature	<ul style="list-style-type: none"> <li>• Bush densification: <ul style="list-style-type: none"> <li>▪ Possible bush densification on the site and loss of indigenous species diversity.</li> </ul> </li> </ul>	

Impact Rating	Before mitigation	After mitigation
<b>Cumulative Impact</b>		
Extent	2	1
Duration	2	2
Magnitude	3	3
Probability	2	1
Significance	<b>14 - Medium</b>	<b>6 - Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

Aspect	Construction and operational activities.	
Impact and Nature	<ul style="list-style-type: none"> <li>• Deterioration of watercourses and riparian vegetation: <ul style="list-style-type: none"> <li>▪ Possible loss of the ecological function of riparian vegetation and erosion of riverbanks;</li> <li>▪ Decrease in water quality; and</li> <li>▪ Flooding downstream.</li> </ul> </li> </ul>	

Impact Rating	Before mitigation	After mitigation
<b>Cumulative Impact</b>		
Extent	3	2
Duration	3	2
Magnitude	3	3
Probability	2	1
Significance	<b>18 - Medium</b>	<b>7 - Low</b>
<b>Status of Impact</b>		

Consequence	Negative
Degree to which impact can be reversed	Low degree
Degree to which impact may cause irreplaceable loss of resources	Medium - High degree
Degree to which impact can be avoided, managed or mitigated	Medium degree

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## Heritage Resources

Aspect	Construction and operational activities.	
Impact and Nature	Disturbance or destruction of cultural and heritage resources – Site 13 (possible Stone Age knapping area and open air surface site) and Site 24 (LIA stone-walled settlement site) – Phase 2 archaeological mitigation measures need to be implemented and a Destruction Permit obtained from SAHRA before these sites can be destroyed.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>High</b>	<b>Medium</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>High</b>	<b>Medium</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	High degree	
Degree to which impact can be avoided, managed or mitigated	Medium degree	
Aspect	Construction and operational activities.	
Impact and Nature	Disturbance or destruction of cultural and heritage resources – Sites 17, 19, 20 and 23 – the sites will not be directly impacted upon.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium</b>	<b>Low</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Medium</b>	<b>Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	High degree	
Degree to which impact may cause irreplaceable loss of resources	High degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Construction and operational activities.	

Impact and Nature	Disturbance or destruction of cultural and heritage resources – Sites 18 and 21 (pottery scatters) – the sites are of no significance.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low</b>	<b>Low</b>
<b>Operational Phase</b>		
Extent	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
Duration		
Magnitude		
Probability		
Significance	<b>Low</b>	<b>Low</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	High degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

#### Cumulative Impact

Aspect	Construction and operational activities.	
Impact and Nature	Disturbance or destruction of cultural and heritage resources onsite resulting in a decline in the overall cultural and heritage value of the greater area.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Cumulative Impact</b>		
Extent	1	1
Duration	3	3
Magnitude	3	1
Probability	3	3
Significance	<b>21 - High</b>	<b>15 - Medium</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	High degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	

## Palaeontological resources

<b>Aspect</b>	Construction activities, if deep excavation is envisaged.	
<b>Impact and Nature</b>	High possibility that significant micro-organism fossil remains may be present in the Silverton Formation parts of the site. The alluvium areas may also contain significant fossils not yet recorded for the area. Stromatolitic structures may be uncovered if bedrock is exposed during foundation excavations.	
<b>Impact Rating</b>	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
<b>Extent</b>	Rating as provided in specialist report and methodology	Rating as provided in specialist report and methodology
<b>Duration</b>		
<b>Magnitude</b>		
<b>Probability</b>		
<b>Significance</b>	<b>High</b>	<b>Medium</b>
<b>Operational Phase</b>		
<b>Extent</b>		
<b>Duration</b>		
<b>Magnitude</b>		
<b>Probability</b>		
<b>Significance</b>		
<b>Status of Impact</b>		
<b>Consequence</b>	Negative	
<b>Degree to which impact can be reversed</b>	Low degree	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	High degree	
<b>Degree to which impact can be avoided, managed or mitigated</b>	Medium degree	

## Air Quality and Noise

Aspect	Construction activities.	
Impact and Nature	Generation of dust.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	2	2
Duration	1	1
Magnitude	2	1
Probability	3	2
Significance	<b>15 - Medium</b>	<b>8 - Low</b>

<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		

<b>Status of Impact</b>	
Consequence	Negative
Degree to which impact can be reversed	Medium degree
Degree to which impact may cause irreplaceable loss of resources	Low degree
Degree to which impact can be avoided, managed or mitigated	Medium degree

Aspect	Construction activities.	
Impact and Nature	Release of emissions from construction vehicles.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	3	3
Duration	1	1
Magnitude	2	2
Probability	3	1
Significance	<b>18 - Medium</b>	<b>6 - Low</b>

<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		

<b>Status of Impact</b>	
Consequence	Negative
Degree to which impact can be reversed	Low degree
Degree to which impact may cause irreplaceable loss of resources	Low degree
Degree to which impact can be avoided, managed or mitigated	Low degree

Aspect	Construction activities.	
Impact and Nature	Generation of nuisance and noise.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	2	2

Duration	2	2
Magnitude	2	1
Probability	3	2
Significance	<b>18 - Medium</b>	<b>10 - Medium</b>

**Operational Phase**

Extent		
Duration		
Magnitude		
Probability		
Significance		

**Status of Impact**

Consequence	Negative
Degree to which impact can be reversed	Low degree
Degree to which impact may cause irreplaceable loss of resources	Low degree
Degree to which impact can be avoided, managed or mitigated	Medium degree

Aspect	Operational activities.	
Impact and Nature	Generation of emissions, such as carbon dioxide, carbon monoxide, sulphur dioxide and nitrous oxides, from coal hot water boilers.	

Significance – Operational Phase	<b>Before mitigation</b>	<b>After mitigation</b>
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**Construction Phase**

Extent		
Duration		
Magnitude		
Probability		
Significance		

**Operational Phase**

Extent	3	3
Duration	3	3
Magnitude	2	1
Probability	3	2
Significance	<b>24 – High</b>	<b>14 – Medium</b>

**Status of Impact**

Consequence	Negative
Degree to which impact can be reversed	Low degree
Degree to which impact may cause irreplaceable loss of resources	Medium degree
Degree to which impact can be avoided, managed or mitigated	Low degree

**Cumulative Impact**

Aspect	Operational activities – operation of vehicles and coal hot water boilers.	
Impact and Nature	The greenhouse gas emissions from the vehicles and coal hot water boilers will combine with other greenhouse gasses in the atmosphere and contribute towards the global Climate Change effect.	

Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
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**Cumulative Impact**

Extent	3	3
Duration	3	3
Magnitude	2	1

Probability	3	2
Significance	<b>24 – High</b>	<b>14 – Medium</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low	
Degree to which impact may cause irreplaceable loss of resources	High	
Degree to which impact can be avoided, managed or mitigated	Medium	



## Soil

Aspect	Site clearance during the construction phase.	
Impact and Nature	Soil erosion due to the clearance of vegetation.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	1	1
Duration	2	1
Magnitude	3	2
Probability	2	1
Significance	<b>12 - Medium</b>	<b>4 - Low</b>
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	Medium degree	
Aspect	Construction activities.	
Impact and Nature	Soil compaction to create foundations for buildings and other associated infrastructure.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	1	1
Duration	2	1
Magnitude	2	1
Probability	3	2
Significance	<b>15 - Medium</b>	<b>6 - Low</b>
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	High degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	Medium degree	
Aspect	Construction and operational activities.	
Impact and Nature	Soil pollution due to the incorrect management of chemical substances and dangerous goods.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>

Construction Phase		
Extent	2	1
Duration	2	2
Magnitude	3	3
Probability	3	2
Significance	<b>21 - High</b>	<b>12 - Medium</b>
Operational Phase		
Extent	1	1
Duration	2	2
Magnitude	3	3
Probability	2	1
Significance	<b>12 - Medium</b>	<b>6 - Low</b>
Status of Impact		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	Medium degree	
Aspect	Construction and operational activities.	
Impact and Nature	Soil pollution due to poor waste management (general waste).	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
Construction Phase		
Extent	2	1
Duration	1	1
Magnitude	2	1
Probability	2	1
Significance	<b>10 - Medium</b>	<b>3 - Low</b>
Operational Phase		
Extent	2	1
Duration	1	1
Magnitude	2	1
Probability	2	1
Significance	<b>10 - Medium</b>	<b>3 - Low</b>
Status of Impact		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Low degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Construction and operational activities.	
Impact and Nature	Soil pollution due to poor waste management (hazardous waste).	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
Construction Phase		
Extent	2	1
Duration	2	2
Magnitude	3	3
Probability	3	2
Significance	<b>21 - High</b>	<b>12 - Medium</b>

Operational Phase		
Extent	2	2
Duration	2	2
Magnitude	3	3
Probability	2	1
Significance	<b>14 – Medium</b>	<b>7 – Low</b>
Status of Impact		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Construction activities.	
Impact and Nature	Soil pollution due to potential spillages from chemical toilets.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
Construction Phase		
Extent	2	2
Duration	2	2
Magnitude	3	3
Probability	2	1
Significance	<b>14 – Medium</b>	<b>7 – Low</b>
Operational Phase		
Extent		
Duration		
Magnitude		
Probability		
Significance		
Status of Impact		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Mixing of concrete.	
Impact and Nature	Soil pollution due to the incorrect management of concrete mixing.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
Construction Phase		
Extent	2	2
Duration	2	2
Magnitude	2	2
Probability	2	1
Significance	<b>12 – Medium</b>	<b>6 – Low</b>
Operational Phase		
Extent		
Duration		
Magnitude		
Probability		
Significance		

Status of Impact	
Consequence	Negative
Degree to which impact can be reversed	Medium degree
Degree to which impact may cause irreplaceable loss of resources	Medium degree
Degree to which impact can be avoided, managed or mitigated	High degree

Aspect	Runoff of contaminated stormwater.	
Impact and Nature	Soil pollution.	
Impact Rating	Before mitigation	After mitigation

Construction Phase		
Extent	2	2
Duration	2	2
Magnitude	2	2
Probability	2	1
Significance	<b>12 – Medium</b>	<b>6 – Low</b>

Operational Phase		
Extent	2	2
Duration	2	2
Magnitude	2	2
Probability	2	1
Significance	<b>12 – Medium</b>	<b>6 – Low</b>

Status of Impact	
Consequence	Negative
Degree to which impact can be reversed	Medium degree
Degree to which impact may cause irreplaceable loss of resources	Medium degree
Degree to which impact can be avoided, managed or mitigated	High degree

Aspect	Rehabilitation activities.	
Impact and Nature	Soil erosion due to inefficient rehabilitation of construction areas.	
Impact Rating	Before mitigation	After mitigation

Construction Phase		
Extent		
Duration		
Magnitude		
Probability		
Significance		

Operational Phase		
Extent		
Duration		
Magnitude		
Probability		
Significance		

Post-construction and Rehabilitation Phase		
Extent	2	1
Duration	2	2
Magnitude	3	2
Probability	2	1
Significance	<b>14 - Medium</b>	<b>5 - Low</b>

<b>Status of Impact</b>	
<b>Consequence</b>	Negative
<b>Degree to which impact can be reversed</b>	Medium degree
<b>Degree to which impact may cause irreplaceable loss of resources</b>	Medium degree
<b>Degree to which impact can be avoided, managed or mitigated</b>	High degree

## Socio-economic

Aspect	Construction and operational activities.	
Impact and Nature	Generation of a large number of job opportunities.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance	Positive impact	No mitigation required – positive impact
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance	Positive impact	No mitigation required – positive impact
<b>Status of Impact</b>		
Consequence	Positive	
Degree to which impact can be reversed	N/A – positive impact	
Degree to which impact may cause irreplaceable loss of resources	N/A – positive impact	
Degree to which impact can be avoided, managed or mitigated	N/A – positive impact	
Aspect	Construction and operational activities.	
Impact and Nature	The stimulation of the local and provincial economy and supply chain industries.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance	Positive impact	No mitigation required – positive impact
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance	Positive impact	No mitigation required – positive impact
<b>Status of Impact</b>		
Consequence	Positive	
Degree to which impact can be reversed	N/A – positive impact	
Degree to which impact may cause irreplaceable loss of resources	N/A – positive impact	
Degree to which impact can be avoided, managed or mitigated	N/A – positive impact	

Aspect	Construction activities.	
Impact and Nature	Potential increase in crime due to the influx of workers, especially during the construction phase.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	2	2
Duration	2	2
Magnitude	3	1
Probability	2	1
Significance	<b>14 - Medium</b>	<b>5 - Low</b>
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Low degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	High degree	
Aspect	Operational activities.	
Impact and Nature	Contributing to food security in South Africa.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance		
<b>Operational Phase</b>		
Extent		
Duration		
Magnitude		
Probability		
Significance	Positive impact	No mitigation required – positive impact
<b>Status of Impact</b>		
Consequence	Positive	
Degree to which impact can be reversed	N/A – positive impact	
Degree to which impact may cause irreplaceable loss of resources	N/A – positive impact	
Degree to which impact can be avoided, managed or mitigated	N/A – positive impact	

## Traffic

Aspect	Construction and operational activities.	
Impact and Nature	Increase in traffic volumes to the site in both the construction and operational phases.	
Impact Rating	<b>Before mitigation</b>	<b>After mitigation</b>
<b>Construction Phase</b>		
Extent	3	3
Duration	2	2
Magnitude	2	1
Probability	3	3
Significance	<b>21 – High</b>	<b>18 - Medium</b>
<b>Operational Phase</b>		
Extent	3	3
Duration	3	3
Magnitude	2	1
Probability	3	3
Significance	<b>24 - High</b>	<b>21 - High</b>
<b>Status of Impact</b>		
Consequence	Negative	
Degree to which impact can be reversed	Medium degree	
Degree to which impact may cause irreplaceable loss of resources	Medium degree	
Degree to which impact can be avoided, managed or mitigated	Low degree	



## No-Go Option

The No-Go Option would be where the project site is not developed any further. The existing laying and rearing farms will continue to operate and the southern properties of the site will remain undeveloped. Without the applicant's use of the southern properties, it is likely that they will again be used for commercial cattle farming, as was the case in the past. In this scenario, no areas of this land will be set aside for conservation purposes. In the Vegetation Assessment it is stated that extensive livestock production, such as cattle farming, and which is allowed in an ESA1 area, could lead to an undesirable change in flora species composition. The contributions to the local and regional economy and the provision of many new job opportunities will also not be fulfilled should the No-Go option prevail.

## 9.8 Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks

Please refer to Section 9.7 of this report.

## 9.9 Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected

As detailed under Sections 9.6 and 9.7 above.

## 9.10 Possible mitigation measures that could be applied and level of residual risk

Detailed mitigation measures have also been included in the Environmental Management Programme (EMPr) that forms part of this Environmental Impact Assessment Report. The following table contains possible mitigation measures (as identified in the Scoping Phase and upon which the mitigation measures have been elaborated in the EMPr).

Impact	Possible mitigation measures
<p><b>Wetlands</b></p> <p>Changing the quantity and fluctuation properties of the watercourse by, for example, storm water input, or restricting water flow. The sources of this impacts include:</p> <ul style="list-style-type: none"> <li>• The compaction of soil;</li> <li>• The removal of vegetation;</li> <li>• Surface water redirection; and</li> <li>• The construction of infrastructure.</li> </ul> <p>Residual Impacts: Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>	<ul style="list-style-type: none"> <li>• No activities should take place in the watercourses and associated buffer zone. Where the above is unavoidable, only the construction footprint and no access roads can be considered. This is subjected to authorisation by means of a Water Use License.</li> <li>• Construction must be restricted to the dryer winter months where possible.</li> <li>• A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse.</li> <li>• Effective stormwater management should be a priority during both the construction and operational phase. This should be monitored as part of the EMPr. High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) on the site above the river/wetland area</li> </ul>

Impact	Possible mitigation measures
<p>Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Construction, operational and decommissioning activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the wetland and increase the turbidity of the water. Possible sources of the impacts include:</p> <ul style="list-style-type: none"> <li>• Earthwork activities during construction of the chicken runs and associated infrastructure such as access roads;</li> <li>• Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soils;</li> <li>• Disturbance of the soil surface;</li> <li>• Disturbance of slopes through the creation of roads and tracks adjacent to the watercourses; and</li> <li>• Erosion (e.g. gully formation and bank collapse).</li> </ul> <p>Residual Impacts: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>	<p>resulting from the proposed chicken run development should be taken into account.</p> <ul style="list-style-type: none"> <li>• Water may seep into earthworks. It is likely that water will be contaminated within these earthworks and should therefore be cleaned or dissipated into a structure that allows for additional sediment input and slows down the velocity of the water, thereby reducing the risk of erosion. Effective sediment traps should be installed.</li> <li>• Construction in and around watercourses must be restricted to the dryer winter months where possible.</li> <li>• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area (DWAF, 2005).</li> <li>• Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.</li> <li>• Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction.</li> <li>• Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.</li> <li>• During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation.</li> <li>• Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.</li> <li>• Runoff from the construction area must be managed to avoid erosion and pollution problems.</li> <li>• Implementation of best management practices.</li> <li>• Source-directed controls.</li> <li>• Buffer zones to trap sediments.</li> <li>• Monitoring should be done to ensure that sediment pollution is timeously dressed.</li> </ul>
<p>Introduction and spread of alien vegetation. The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a wetland, and outcompete natural vegetation,</p>	<ul style="list-style-type: none"> <li>• Weed control.</li> <li>• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards.</li> </ul>

Impact	Possible mitigation measures
<p>decreasing the natural biodiversity. Once in a system, alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.</p> <p>Residual Impacts: Expected to be limited provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>● Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.</li> <li>● Rehabilitate or re-vegetate disturbed areas.</li> </ul>
<p>Changes in water quality due to foreign materials and increased nutrients impact ratings. Construction, operational and decommissioning activities will result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in wetland function as well as human and animal waste. Could possibly impact on groundwater.</p> <p>Residual Impacts: Expected to be limited provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>● Provision of adequate sanitation facilities located outside of the watercourse/riparian area or its associated buffer zone.</li> <li>● Implementation of appropriate stormwater management around the excavations to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourses.</li> <li>● During decommissioning activities, workers are not allowed to use watercourse and associated buffers as ablution facilities.</li> <li>● Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone.</li> <li>● The development footprint must be fenced off from the watercourse and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc.</li> <li>● After construction, the land must be cleared of rubbish, surplus materials and equipment and all parts of the land shall be left in a condition as close as possible to that prior to use.</li> <li>● Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer.</li> <li>● Maintenance of buffer zones to trap sediments with associated toxins.</li> <li>● Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects.</li> <li>● Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse.</li> <li>● Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects.</li> <li>● Regular independent water quality monitoring should form part of operational procedures in order to identify any pollution.</li> </ul>

Impact	Possible mitigation measures
<p>Establishment and maintenance of an artificial wetland ecosystem, linked to the proposed wastewater treatment plant. Provision of a habitat for fauna species.</p> <p>Residual Impacts: The ongoing provision of an artificial wetland ecosystem and its positive contribution to the diversity of the site.</p>	<ul style="list-style-type: none"> <li>• Treatment of any pollution identified should be prioritised accordingly.</li> </ul> <p>This is a positive impact and no mitigation measures are therefore required.</p>
<b>Surface and Groundwater</b>	
<p>Pollution of surface and/or groundwater resources due to the potential release of pollutants, such as chemicals, especially during the construction phase.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• No wastewater or wash water may be released into the environment from construction activities.</li> <li>• Vehicles should regularly be inspected to ensure that any fuel or oil leaks are repaired.</li> <li>• Spill kits must be onsite to clean up any hydrocarbon spillages.</li> <li>• The Wastewater Treatment Plant must treat the wastewater to a quality that at least complies with the Department of Water Affairs' General Limit Standards for discharge of wastewater into a water resource.</li> </ul>
<p>Pollution of surface and/or groundwater resources due to the potential release of wastewater (sewage and wash water) during the operational phase.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• All wastewater (sewage and wash water) must be collected in appropriate holding/conservancy tanks and may not come into contact with the environment prior to treatment in the proposed wastewater treatment plant.</li> <li>• All wastewater must be treated in the proposed wastewater treatment plant.</li> <li>• Sufficient ablution facilities must be provided.</li> <li>• The integrity of the holding/conservancy tanks must be checked at a frequency as determined by the tank suppliers.</li> </ul>
<p>Pollution of surface and/or groundwater resources due to poor waste management.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• Waste must be managed according to its hazard classification (i.e. general vs. hazardous waste) and general and hazardous waste streams should not be mixed.</li> <li>• Waste stored onsite must be kept in appropriate containers with lids that can be closed.</li> <li>• Waste must be taken to appropriately licensed facilities for reuse, recycling, recovery or disposal.</li> <li>• No waste may be stored on open soil or within wetlands and/or watercourses.</li> </ul>
<p>Pollution of surface and/or groundwater resources due to the incorrect management of chemical substances and dangerous goods.</p>	<ul style="list-style-type: none"> <li>• A register must be compiled of all chemical substances and dangerous goods used onsite.</li> </ul>

Impact	Possible mitigation measures
<p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• MSDS' (Material Safety Data Sheets) must be maintained for all chemical substances and dangerous goods. The MSDS' must also be displayed onsite.</li> <li>• The chemical substances and dangerous goods must be stored safely and as per the requirements of the MSDS for each chemical substances and dangerous goods. Locked storage areas are preferable.</li> <li>• Drip trays must be readily available onsite and used for any repair work, maintenance work of refuelling undertaken onsite.</li> <li>• Spill kits must be readily available onsite and personnel must be trained on the appropriate procedures to clean hydrocarbon spillages.</li> </ul>
<p>Pollution of surface and/or groundwater resources due to runoff of contaminated stormwater.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• Storm water must be diverted around areas where there are pollution sources.</li> <li>• Storm water drainage infrastructure must be regularly inspected for obstructions.</li> <li>• No contaminated storm water may be released into the environment from the construction activities.</li> <li>• Washing or cleaning of equipment or machinery must occur in a designated area and the contaminated wash water must be contained. Such an area could be a plastic drum, a container or a plastic lined pit.</li> </ul>
<p>Pollution of surface and/or groundwater resources due to the incorrect management of concrete mixing.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• Concrete should ideally be mixed on an impermeable surface such as a concrete slab.</li> <li>• Cement bags (new and used) must be stored under roof or in closed containers where they will not be exposed to rain.</li> <li>• Dry concrete must be removed and disposed of together with other building rubble.</li> <li>• Ready-mix concrete trucks may clean chutes into foundations, but not elsewhere onsite.</li> </ul>
<p>Unsustainable utilisation of groundwater.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• Determine the sustainable yield of each borehole that is to be used for the development.</li> <li>• Only abstract groundwater at the sustainable yield rate, as determined from the borehole yield pump tests.</li> <li>• Install water meters to measures the quantity of water abstracted on a daily basis from each borehole.</li> <li>• Regularly inspect reservoirs, water pipes, JoJo tanks and taps for leakages and repair where necessary.</li> <li>• All hose pipes must be fitted with the correct nozzle attachments and high-pressure hoses must be used where possible.</li> </ul>

Impact	Possible mitigation measures
<p>Direct impact on mammal and herpetofaunal communities: The construction of the chicken farms will each displace natural habitat over a small area, and relative to the 3 200 hectares extent of the property will be insignificant.</p> <p>Residual Impacts: Local displacement of resident species on 17 small sites of extraordinary high vertebrate species richness.</p>	<p>Cannot be mitigated, but no sensitive species, sensitive areas, ecological systems or services will be significantly negatively affected by the proposed development.</p>
<p>Loss of mammal and herpetofaunal habitat and ecological structure: The construction of the chicken farms will entirely displace natural habitats.</p> <p>Residual Impacts: The habitats on the footprints of the 15 new chicken farms will be entirely displaced.</p>	<p>Obligatory rehabilitation at the cessation of chicken production.</p>
<p>Loss of avian habitats: Depending on the size of the chicken facilities, an area in the region of 100ha of avian habitats comprising mainly “randjiesveld” woodland will be destroyed by the proposed development. The construction of the road network will result in additional losses. This will represent a moderate loss of habitat and is unlikely to significantly negatively impact bird communities at the site or in the region.</p> <p>Residual Impacts: None.</p>	<p>Areas cleared for the chicken facilities, roads and other infrastructure must be minimised during both the construction and operational phases.</p>
<p>Increased disturbance of birds by human activities: In addition to direct habitat loss, the disturbance of birds in the surrounding areas will increase because of increased human activity and movements in the area. This impact will be more pronounced during the construction phase than the operational phase.</p> <p>Residual Impacts: None.</p>	<ul style="list-style-type: none"> <li>● Construction activities must be limited to the sites of the chicken facilities and personnel should not be allowed to disturb birds in the surrounding areas.</li> <li>● Measures must be put in place to ensure that no illegal hunting of birds takes place on the property or in surrounding areas.</li> </ul>
<p>Mortality associated with new roads linking the chicken facilities: Vehicles using the roads will result in an increased mortality risk for birds, mammals, reptiles and amphibians through collisions with moving vehicles.</p> <p>Residual Impacts: None.</p>	<ul style="list-style-type: none"> <li>● Strict enforcement of a 40 km/h speed limit onsite.</li> <li>● Minimise unnecessary driving, and in particular limit driving at night.</li> <li>● Ensure all personnel driving on the property are aware of the risk of road kill.</li> </ul>
<p>Environmental contamination, including disease transmission from chickens to wild birds: The new chicken facilities will create a risk of contamination of natural habitats in the surrounding areas if spillages of substances such as chicken manure occur. A related risk concerns the possibility of contact between chickens and</p>	<p>Standard biosecurity procedures must be implemented in order to ensure that no contact between chickens and wild birds, mammals or any other groups takes place.</p>

Impact	Possible mitigation measures
<p>wild birds and the possibility of disease transmission subsequently occurring.</p> <p>Residual Impacts: Elevated risk of disease transmission between domestic and wild birds.</p> <p>Power lines: collision and electrocution risk to birds: It is assumed that new distribution lines will need to be constructed to provide power to the chicken facilities. These will create electrocution and collisions risks for birds, although these will be minor compared to those associated with large transmission lines.</p> <p>Residual Impacts: None.</p>	<ul style="list-style-type: none"> <li>Assuming that the usual small transmission lines are used, no specific mitigation measures are required. If any collisions are recorded subsequently, the installation of devices to increase the visibility of lines to birds can be considered. But the risk posed by low distribution lines is very minor compared to larger transmission lines.</li> <li>Information regarding the design of these lines should be made available to the ornithologist before construction commences, in order to confirm the assumptions made here about their height and likely impacts.</li> </ul>
Flora	
<p>Removal of natural, good condition vegetation:</p> <ul style="list-style-type: none"> <li>Destruction of vegetation;</li> <li>Potential loss of individuals of large tree species and associated microhabitats;</li> <li>Potential loss of species of conservation concern and their habitats;</li> <li>Potential increase in runoff and erosion;</li> <li>Potential spread of alien invasive vegetation; and</li> <li>Potential contamination of soils with hydrocarbons and/or other pollutants.</li> </ul> <p>Residual Impacts: A decline in land remaining in CBA2 and ESA1 areas and a decrease in the number of species of conservation concern.</p>	<p><b>Planning phase</b></p> <ul style="list-style-type: none"> <li>Due to the high sensitivity and good ecological condition of most of the vegetation on site, these areas must be avoided as far as possible and fragmentation of the habitat limited as much as possible.</li> <li>No areas of high sensitivity should be unduly fragmented.</li> <li>Plan to keep as many large trees intact as possible. Plan the layout to take cognisance of the localities of these trees.</li> <li>Ideally, an on-site ecologist should be present when excavation takes place to ensure that any uncovered species of conservation concern are protected from destruction. Note that the species could be dormant until favourable conditions arise.</li> </ul> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>An independent Ecological Control Officer (ECO) should be appointed to oversee construction.</li> <li>Planning of the construction site must incorporate eventual rehabilitation of areas destroyed by construction and that do not contain infrastructure.</li> <li>Plan the site layout and construction plan to leave as much of the natural vegetation intact as possible, while limiting the removal of tree species. Leaving groundcover and surrounding trees intact could help with dust suppression, as well as erosion control.</li> </ul>

- A perimeter fence must be erected around the works area to prevent access to sensitive environs.
- Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. Ideally, the construction areas should be fenced off.
- Maintain site demarcations in position until the cessation of construction work.
- Prevent spillage of construction material, oils or other chemicals, strictly prohibit other pollution.
- Ensure there is a method statement in place to remedy any accidental spillages immediately.

#### General

- A rehabilitation plan, using indigenous species from the study area, must be implemented that will restore disturbed areas beyond the footprint of the infrastructure to what it was prior to construction, thereby making the impact on the remainder of the site negligible in the long term. Due to the dry climate, natural colonisation could take a long time, in which vegetation may degrade further or become dominated by encroacher species. Therefore, timeous rehabilitation is imperative. Even in the event of good rains, annual pioneer plants are short-lived and therefore an effort must be made to keep as many shrubs in place as possible or to replace these as part of rehabilitation. As a start, runoff water needs to be trapped by either the mechanical breaking of the soil surface to trap water, packing of stones, tyres or brush along contours to trap mulch, slow down water movement and reduce the impact on bare soil (Esler, *et al.*, 2006). Pitter basins work well on fine textured soil and must be orientated and shaped to face upslope. The basins trap seeds, organic matter and water which could lead to rapid colonisation after rains (Esler *et al.*, 2006).
- No open fires are permitted under trees or within naturally vegetated areas.
- No vegetative matter may be removed for firewood or any other purpose other than the approved activity.
- Do not remove any large tree without the permission of the ECO. In all areas, mark trees earmarked for removal prior to felling for approval by the ECO. No



Impact	Possible mitigation measures
	<p>protected trees or plants may be removed without the relevant permits from the local authority.</p> <ul style="list-style-type: none"> <li>• Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.</li> <li>• Workers may not tamper or remove flora and neither may anyone collect seed from the plants without permission from the local authority.</li> <li>• Do not permit vehicular or pedestrian access into natural areas.</li> <li>• Removed herbaceous plants could be housed in a temporary nursery and used to rehabilitate the areas affected during construction. The nursery and rehabilitation should form part of the rehabilitation plan.</li> <li>• The planned conservation of the remainder of the farm must be formalised and written into the record of decision for this proposed development. The protection of this area should be enhanced by implementing amongst others a Vegetation and Grazing Management Plan, based on the carrying capacity of the land, as well as an Alien Invasive Species Management Plan.</li> </ul>
<p>Erosion, soil compaction and subsequent sedimentation:</p> <ul style="list-style-type: none"> <li>• Soil compaction;</li> <li>• Potential increase in runoff and erosion;</li> <li>• Possible change of natural runoff and drainage patterns;</li> <li>• Possible permanent loss of re-vegetation potential of soil surface;</li> <li>• Potential spread of alien invasive vegetation; and</li> <li>• Negative impact on indigenous species growing conditions.</li> </ul> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<p><b>Planning phase</b> An ecologically sound, storm water management plan must be implemented.</p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>• No storm water from the construction site (or operational site) is allowed to be channelled directly into a non-perennial drainage line or a pan. Any water released from the site should be conform to specification as per a licence granted by the DWA.</li> <li>• Do not allow erosion to develop on a large scale before taking action.</li> <li>• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005).</li> <li>• Runoff from roads must be managed to avoid erosion and pollution problems.</li> <li>• Remove only the vegetation where essential for operation and do not allow any disturbance to the adjoining natural vegetation cover.</li> <li>• Where topsoil needs to be removed, store such in a separate area where such soils can be protected until</li> </ul>

they can be re-used for post-construction rehabilitation. Never mix topsoil with subsoils or other spoil materials.

- Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.
- Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.
- Runoff water needs to be trapped by either the mechanical breaking of the soil surface to trap water, packing of stones, tyres or brush along contours to trap mulch, slow down water movement and reduce the impact on bare soil (Esler *et al.*, 2006). Pitter basins work well on fine textured soil and must be orientated and shaped to face upslope. The basins trap seeds, organic matter and water which could lead to rapid colonisation after rains (Esler, et al, 2006).
- Mulch and brush also reduces the force of raindrops, limiting the dispersion of clay and the extent of mineral crusting (Esler *et al.*, 2006). It also traps dust, sand and seeds to ensure plant establishment (Esler *et al.*, 2006).
- Vehicles may not veer from the dedicated roads.
- Once construction is complete, obsolete roads should be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion, while the natural species composition should be re-established.

#### Operational Phase

- After construction clear any temporarily impacted areas of all foreign materials, re-apply and/or loosen topsoil and landscape to surrounding level.
- Disturbed areas must be re-vegetated as soon as possible.
- Ideally, grass sods should be removed prior to construction and these sods should be re-used for re-vegetation. Smaller plant species that were removed from the development footprint should also be re-planted where possible. The areas could be left to re-vegetate naturally, provided that the establishment of indigenous vegetation similar to that which was removed are monitored. Monitoring must prevent

Impact	Possible mitigation measures
	<p>invasion by alien invasive species and ensure indigenous vegetation cover within 2-3 years.</p> <ul style="list-style-type: none"> <li>• Bare soils must be protected from erosion and compaction until such time as an indigenous vegetation cover was re-established.</li> </ul>
<p>Removal of protected species or species of conservation concern:</p> <ul style="list-style-type: none"> <li>• Potential loss of individuals or populations of conservation concern; and</li> <li>• Changes in species composition.</li> </ul> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<p><b>Planning phase</b></p> <ul style="list-style-type: none"> <li>• Plan the layout to avoid areas of high sensitivity. Due to the high sensitivity and good ecological condition of most of the vegetation on site, these areas must be avoided as far as possible and fragmentation of the habitat limited as much as possible.</li> <li>• A suitably qualified person (e.g. botanist/horticulturist) should survey the final layout within the growing season of the plants (summer months, preferably between November and February), in order to confirm whether these plants occur within the development footprint. The layout should be flexible to avoid these species were recorded.</li> <li>• Implement a Plant Rescue and Rehabilitation Plan: Where the plants of conservation concern are deemed to be under threat from the construction activities, the plants should be removed (if they could survive this process) by a suitably qualified specialist and replanted as part of vegetation rehabilitation after the construction (note, these plants may only be removed with the permission of the provincial authority).</li> <li>• Ideally, an on-site ecologist should be present when excavation takes place to ensure that any species not identified during the EIA phase are protected from destruction. Note that the species could be dormant for some time until favourable conditions arise.</li> <li>• Plan the layout to make use of existing disturbed areas, focusing on areas of low sensitivity and then as little portion of high sensitivity situated close to the low sensitivity areas as possible.</li> <li>• No areas of high sensitivity should be unduly fragmented.</li> <li>• Plan to keep as many large trees intact as possible. Plan the layout to take cognisance of the localities of these trees.</li> </ul>

Impact	Possible mitigation measures
	<p><b>Construction Phase</b></p> <p>Construction workers may not tamper or remove these plants and neither may anyone collect seed from the plants without permission from the local authority.</p>
<p>Invasion by alien invasive plant species:</p> <ul style="list-style-type: none"> <li>Increase in alien invasive plant species and densities on the site.</li> </ul> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<p><b>Planning phase</b></p> <p>Alien invasive species that were identified within the study area should be removed prior to construction-related soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils. This could therefore have a positive impact on the surrounding natural vegetation.</p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>All alien seedlings and saplings must be removed as they become evident for the duration of construction.</li> <li>Manual/mechanical removal is preferred to chemical control.</li> <li>All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access to the construction areas. This should be verified by the ECO.</li> <li>Dispose of the eradicated plant material at an approved solid waste disposal site.</li> </ul> <p><b>Operational Phase</b></p> <ul style="list-style-type: none"> <li>Dispose of eradicated plant material at an approved solid waste disposal site.</li> <li>Compile and implement an alien invasive monitoring plan to remove alien invasive plant species as they become apparent.</li> <li>Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.</li> <li>Ensure that only properly trained people handle and make use of chemicals.</li> <li>Rehabilitate all areas cleared of invasive plants as soon as practically possible, utilising specified methods and species.</li> <li>In addition, only indigenous plant species naturally occurring in the area should be used during the rehabilitation of the areas affected by the construction activities.</li> </ul>
<p>Bush densification:</p> <ul style="list-style-type: none"> <li>Increase in bush encroacher species; and</li> </ul>	<p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>Leave as much natural vegetation intact as possible.</li> </ul>

Impact	Possible mitigation measures
<ul style="list-style-type: none"> <li>• Change in vegetation structure.</li> </ul> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>• Do not disturb soil unnecessarily.</li> <li>• Monitor rehabilitation and do not allow grazing to take place until such time that re-vegetation was found to be successful.</li> <li>• Ensure that areas outside of the operational footprint that were disturbed, are adequately rehabilitated and that dense stands of encroacher species are prevented.</li> <li>• Develop a burning, cutting and/or grazing management plan with an ecologist that takes into account safety of the operation, local by-laws and national legislation, in order to effectively manage veld areas.</li> </ul> <p><b>Operational Phase</b></p> <ul style="list-style-type: none"> <li>• Monitor the establishment of dense stands of encroacher species and remove as soon as detected.</li> <li>• A rehabilitation plan, using indigenous species from the study area, must be implemented that will restore disturbed areas beyond the footprint of the infrastructure to what it was prior to construction, thereby making the impact on the remainder of the site negligible in the long term.</li> </ul>
<p>Deterioration of watercourses and riparian vegetation:</p> <ul style="list-style-type: none"> <li>• Destruction of vegetation;</li> <li>• Deterioration of vegetation and watercourse; and</li> <li>• Potential contamination of soils with hydrocarbons and/or other pollutants.</li> </ul> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<p><b>Planning phase</b></p> <p>A 100m buffer around the rivers on the site is recommended in which no development should take place, with the minimum buffer area of 15m as recommended by the wetland specialists (Limosella Consulting, 2017).</p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>• Where access through drainage lines and non-perennial rivers is unavoidable, only one road is permitted, constructed perpendicular to the drainage line. Avoid roads that follow drainage lines within the floodplain. Access roads through the watercourses should be formalised and any road construction within watercourses could only be undertaken if authorised by a Water Use License or permission from the Department of Water and Sanitation (DWS).</li> <li>• No storm water from the construction sites (or operational sites) is allowed to be channelled directly into a non-perennial or perennial river. Any water released from the site should conform to specification as per a licence granted by the DWS.</li> </ul>

Impact	Possible mitigation measures
	<ul style="list-style-type: none"> <li>An ecologically sound, storm water management plan must be implemented, including all measures as set out above.</li> </ul>
<b>Heritage Resources</b>	
<p>Disturbance or destruction of cultural and heritage resources.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<p>The subterranean presence of archaeological or historical sites, features or objects should always be kept in mind. Should any be uncovered during the development process, an archaeologist should be called in to investigate and recommend on the best way forward. The presence of other low stone packed or unmarked graves should also be kept in mind.</p> <p>For Sites 13 and 24 the following measures need to be implemented:</p> <ul style="list-style-type: none"> <li>Archaeological mitigation measures need to be implemented. This will include mapping the sites in detail, the collection of representative samples of material (for Stone Age Site 13) as well as Archaeological Excavation work on Site 24, after obtaining permits from SAHRA. Once this work has been completed and the go-ahead has been obtained from SAHRA, these sites can be demolished.</li> </ul>
<b>Palaeontological Resources</b>	
<p>High possibility that significant micro-organism fossil remains may be present in the Silverton Formation parts of the site. The alluvium areas may also contain significant fossils not yet recorded for the area. Stromatolitic structures may be uncovered if bedrock is exposed during foundation excavations.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>The EAP as well as the ECO for this project must be made aware of the fact that the Silverton Formation sediments are Highly significant for fossil remains of micro-organisms and the alluvium might contain significant fossils not yet recorded for this area.</li> <li>If bedrock is exposed during excavation for foundations, the ECO must report exposure of possible stromatolitic structures. The likely hood of these structures being present is, however, small.</li> <li>A suitably qualified palaeontologist must be appointed to do a Phase 1 PIA investigation at the onset of excavations and follow as well as upgrade the basic recommendations made in the “Chance Find Protocol”, which must be included in the EMP of the project.</li> </ul>
<b>Air Quality and Noise</b>	
<p>Generation of dust.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>Implement dust suppression techniques.</li> <li>Limit vegetation clearance until it is necessary for soil stripping.</li> </ul>
<p>Release of vehicle emissions from construction vehicles.</p>	<ul style="list-style-type: none"> <li>Regular maintenance of vehicles to minimise the release of emissions.</li> </ul>

Impact	Possible mitigation measures
Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.	
<p>Generation of emissions, such as carbon dioxide, carbon monoxide, sulphur dioxide and nitrous oxides, from coal hot water boilers.</p> <p>Residual Impacts: Emissions released into the atmosphere cannot be removed and will contribute towards air pollution and the global Greenhouse Effect and Climate Change.</p>	<ul style="list-style-type: none"> <li>● Use high-grade coal as far as possible to decrease sulphur emissions.</li> <li>● Hot water boilers must be maintained according to the supplier's maintenance schedules to minimise emissions.</li> <li>● Mitigation measures should be implemented on the hot water boilers to minimise particulate matter emissions.</li> <li>● Ash should be stored in enclosed containers/areas.</li> </ul>
<p>Generation of nuisance and noise.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>● Noisy activities must be scheduled during times of the day that will result in the least disturbance to adjacent sensitive receptors.</li> <li>● Noisy work must be avoided on weekends and public holidays.</li> </ul>
Soil	
<p>Soil erosion due to the clearance of vegetation.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>● Limiting vegetation clearance until it is necessary for soil stripping.</li> <li>● Implement adequate erosion prevention measures, such as measures to dissipate runoff water velocities.</li> <li>● Implement adequate storm water management measures.</li> </ul>
<p>Soil compaction to create foundations for buildings and other associated infrastructure.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<p>The development footprint must be optimised and minimised to minimise the area that will be compacted during the construction activities.</p>
<p>Soil pollution due to the incorrect management of chemical substances and dangerous goods.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>● Use drip trays for any machinery and/or vehicle repair work.</li> <li>● Immediately repair any leaking machinery or vehicles.</li> <li>● Place oil drums on impermeable surfaces or plastic liners.</li> <li>● Immediately clean any hydrocarbon spillages and dispose of as hazardous waste.</li> </ul>
<p>Soil pollution due to poor waste management.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>● Waste must be managed according to its hazard classification (i.e. general vs. hazardous waste) and general and hazardous waste streams should not be mixed.</li> <li>● Waste stored onsite must be kept in appropriate containers with lids that must be kept closed.</li> <li>● Waste must be taken to appropriately licensed facilities for reuse, recycling, recovery or disposal.</li> </ul>

Impact	Possible mitigation measures
<p>Soil pollution due to potential spillages from chemical toilets.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>• No waste may be stored on open soil or within wetlands and/or watercourses.</li> <li>• Sufficient ablution facilities must be provided.</li> <li>• Chemical toilets must be serviced regularly.</li> <li>• Any spillages from the chemical toilets must immediately be cleaned and the contaminated soil disposed of as hazardous waste. Safe Disposal Certificates must be obtained and kept on record.</li> </ul>
<p>Soil pollution due to the incorrect management of concrete mixing.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>• Concrete should ideally be mixed on an impermeable surface such as a concrete slab.</li> <li>• Cement bags (new and used) must be stored under roof or in closed containers where they will not be exposed to rain.</li> <li>• Dry concrete must be removed and disposed of together with other building rubble.</li> <li>• Ready-mix concrete trucks may clean chutes into foundations, but not elsewhere onsite.</li> </ul>
<p>Soil pollution due to runoff of contaminated stormwater.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.</p>	<ul style="list-style-type: none"> <li>• Storm water must be diverted around areas where there are pollution sources.</li> <li>• Storm water drainage infrastructure must be regularly inspected for obstructions.</li> <li>• No contaminated storm water may be released into the environment from the construction activities.</li> <li>• Washing or cleaning of equipment or machinery must occur in a designated area and the contaminated wash water must be contained. Such an area could be a plastic drum, a container or a plastic lined pit.</li> </ul>
<p>Soil erosion due to inefficient rehabilitation of construction areas.</p> <p>Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>	<ul style="list-style-type: none"> <li>• Areas under rehabilitation must be cordoned off to prevent pedestrian and vehicular access.</li> <li>• Re-vegetation must be undertaken using indigenous species.</li> <li>• Areas under rehabilitation must be monitored to ensure successful vegetation establishment. Organic fertilizers and topsoil should be added to areas where vegetation establishment is not effective.</li> </ul>
Socio-economic	
<p>Generation of a large number of job opportunities.</p> <p>Residual Impacts: Permanent, positive impact.</p>	<p>This is a positive impact and no mitigation measures are therefore required.</p>
<p>The stimulation of the local and provincial economy and supply chain industries.</p> <p>Residual Impacts: Permanent, positive impact.</p>	<p>This is a positive impact and no mitigation measures are therefore required.</p>
<p>Potential increase in crime due to the influx of workers, especially during the construction phase.</p>	<ul style="list-style-type: none"> <li>• Reference checks should be conducted on all workers before they are appointed.</li> </ul>



Impact	Possible mitigation measures
Residual Impacts: None anticipated provided that the mitigation measures are implemented correctly.	<ul style="list-style-type: none"> <li>Workers should not be allowed to leave the construction site during the day and should be transported to and from the site on a daily basis.</li> </ul>
Contributing to food security in South Africa.	This is a positive impact and no mitigation measures are therefore required.
Residual Impacts: Positive impact.	
Traffic	
Increase in traffic volumes to the site in both the construction and operational phases.	<ul style="list-style-type: none"> <li>Drivers must adhere to all speed restrictions and road rules.</li> <li>Routing of vehicles must take other road users into account.</li> <li>Load restrictions must be adhered to.</li> </ul>
Residual Impacts: Higher traffic volumes.	

### 9.11 Outcome of the site selection matrix

The outcome of the site selection matrix was discussed under Section 8.1.1 of this report.

### 9.12 Motivation for not considering alternatives (including development footprint alternatives)

The motivation for not considering certain alternatives was discussed under Section 8.1 of this report.

### 9.13 Concluding statement

The preferred alternative development footprint is the proposed project/development (the Roodewal Breeder Farm Expansion) and the preferred location for the development is the seven project properties, as detailed under Section 4 of this report.

## 9.14 Summary of the findings and recommendations of specialist reports complying with Appendix 6 of the EIA Regulations, 2014, and an indication as to how these findings and recommendations have been included in this Environmental Impact Assessment Report

Herewith a summary of the findings and recommendations of the various specialist reports:

### Desktop Palaeontological Impact Assessment

There is a high possibility that significant micro-organism fossil remains may be present in the Silverton Formation parts of the site. The alluvium areas may also contain significant fossils not yet recorded for the area. Stromatolitic structures may be uncovered if bedrock is exposed during foundation excavations.

Recommendations:

- The EAP as well as the ECO for this project must be made aware of the fact that the Silverton Formation sediments are Highly significant for fossil remains of micro-organisms and the alluvium might contain significant fossils not yet recorded for this area.
- If bedrock is exposed during excavation for foundations, the ECO must report exposure of possible stromatolitic structures. The likelihood of these structures being present is, however, small.
- A suitably qualified palaeontologist must be appointed to do a Phase 1 PIA investigation at the onset of excavations and to also update the basic recommendations made in the “Chance Find Protocol”.
- The Chance Finds Protocols must be implemented. (Groenewald, 2017).

### Fauna Assessment

The new chicken farms and other facilities will entirely displace all biota on their development footprints. Whereas environmental impacts on these areas will be Very High, the collective area to be sacrificed for construction will be a small percentage of the total size of the entire project site.

The impact of the construction of the chicken farms on its footprints will at most be 70% and the impact during the operational phase over a period of >15 years will at most be 80%. This is deemed to be Very High. Add to this the impact of the service roads. This will still be insignificant considering the commercial objective of the properties and the size of the land sacrificed (within a significantly larger conservation area) for this purpose.

The applicant manages the areas not utilised for chicken production as a commercial game farm. In terms of environmental conservation it makes no sense that game are to be relocated and kept on the fallow fields like domestic animals, in order to construct chicken farms on prime veld. It makes more sense to build the chicken farms on the fallow fields and manage the game on the natural habitats.

The Vegetation Assessment, dealing with impacts on the flora of the site, points out that the planned development of the new farms will place endangered/sensitive species at risk and suggests that the new farms are built amongst the nine existing farms as well as along the secondary grassland, along the western portion of the property. We support this notion, especially since the main portion of the Roodewal and Kwa-mmatau Farms will therefore remain undisturbed and can be managed within the context of an Ecological Management Plan that will include the game species.

No sensitive species, sensitive areas, ecological systems or services will be significantly negatively affected by the proposed development. We can therefore not submit reasonable objections to the proposed development, but must point out that should the developments be on fallow fields, the environmental and conservation impact would be virtually nil.

### **Phase 1 Heritage Impact Assessment**

During the 2015 preliminary HIA study, a total of 15 individual sites, dating to the Stone Age, Iron Age and more recent historical times (a historical house and graves) were identified and recorded. In some cases the Stone Age and Iron Age occurrences were found on the same sites. As the 2015 survey was only a Preliminary assessment, it was recommended that a more detailed, full AIA/HIA be carried out once the location of the various structures and other related features for the Chicken Farms had been finalised. A number of previously unknown/unrecorded sites, features and objects were recorded and identified during the 2016 assessment. The mitigation of sites that will be impacted by the proposed development will be implemented as part of the recommended Phase 2 Archaeological work.

Only Site 13 (possible Stone Age knapping area and Open Air surface site) and Site 24 (LIA stone-walled settlement site) will be impacted upon directly by the proposed development. Sites 18 and 21 (pottery scatters) are located close to Chicken House clusters, but are of no significance. Sites 17, 19, 20 and 23 are situated in close proximity to proposed developments, but will not be directly impacted on. It is recommended that last mentioned sites are fenced-in or that a buffer zone be applied to avoid any impacts by the planned developments.

For Sites 13 and 24 the following is recommended: Archaeological mitigation measures need to be implemented. This will include mapping the sites in detail, the collection of representative samples of material (for Stone Age Site 13) as well as Archaeological Excavation work on Site 24 after obtaining the required permits from SAHRA. The sites can be demolished once this work has been completed and the go-ahead has been obtained from SAHRA. The applicant has indicated their support of this process and has given the go-ahead for the archaeological work to be conducted once valid permits have been obtained from SAHRA.

From a cultural heritage point of view the development should be allowed to continue once the above recommendations have been adhered to. Furthermore, the subterranean presence of archaeological or historical sites, features or objects should always be kept in mind. Should any be uncovered during the development process, an archaeologist should be called in to investigate and recommend on the best way forward. The presence of other low stone-packed or unmarked graves should also be kept in mind (APelser Archaeological Consulting, 2016).

### **Vegetation Assessment**

The study site contains sensitive ecosystems earmarked for conservation on a provincial level (CBA2 and ESA1). Additionally, all wetland and aquatic ecosystems are protected by the National Water Act, 1998. The study site also lies in close proximity to areas earmarked as part of the protected areas expansion project for statutory protection. In terms of the landscape setting the study site is situated in a landscape to the south west of the Magaliesberg mountain range that has low levels of fragmentation. This therefore, plays an important role in meeting provincial conservation targets.

Four main vegetation groups were identified onsite: bushveld, plains bushveld, riparian woodlands and derelict agricultural fields. The bushveld and riparian vegetation groups were largely natural; in a primary state; contained provincially protected plant species and had a low level of invasion by alien plant species. These vegetation groups were all assigned a high sensitivity value. The derelict fields had low species diversity, high levels of disturbance, and subsequent high levels of invasion. This vegetation group was therefore assigned a low level of sensitivity and could support the proposed development.

The proposed development of seventeen (17) additional chicken houses and infrastructure such as a solar plant and waste water treatment works in areas of high sensitivity is not supported in terms of the guidelines set out in the North West Biodiversity Sector Plan for ESA1 and CBA2 areas. The only vegetation group where these activities could be supported is the low sensitivity agricultural fields where all natural vegetation has already been cleared, or areas close to this to

prevent fragmentation of the natural habitats. The bushveld, plains bushveld as well as riparian woodland vegetation groups are all deemed not feasible for the proposed development.

However, RCL Foods proposes to conserve the remainder of the vegetation and introduce game into the area. In addition, a limited number of chicken batteries (farms) will likely have a lesser impact than extensive livestock production (which is allowed in an ESA1) where overgrazing could lead to a change in the species composition.

The site is deemed sensitive from a vegetation perspective and the proposed development outside of the current low sensitivity areas and adjacent land is not supported. If the North-West conservation authority does consider the proposed development, the protection of the remainder of the land must be formalised, no further development or expansion of the activities on the site should be allowed. The following should form part of an Ecological Management Plan for the site: Grazing Capacity and Management Plan; Alien Invasive Plant Species Management Plan; Sensitive Species Management and Monitoring Plan; and an Erosion Monitoring and Management Plan. A fulltime, suitably qualified staff member(s) who will manage and continually evaluate any degradation in the vegetation composition and structure and who will report on the status of sensitive vegetation groups as well as the effective management of game and the ecosystem as a whole should be appointed. It is recommended that an external audit be conducted by an independent ecologist twice a year, to report on the state of the vegetation and effectiveness of the Reserve Management Plan. This report should be submitted to the North West authorities for comment and review (Dimela Eco Consulting, 2017).

### **Wetland Assessment**

A total of five natural watercourses and numerous artificial water bodies including farm (earthen) dams and artificial canals were found on site. Of the five natural watercourses only two, the Selons River and the downstream sections of a smaller tributary of the Selons River, are classified as perennial rivers in terms of information from the National Geospatial Information (NGI) and the National Freshwater Ecosystems Priority Areas (NFEPA). Site verification and information from the farm proved that these two watercourses are instead non-perennial ephemeral rivers. The remaining three watercourses are classified as ephemeral drainage lines (no flow for 3 – 6 months). It should, however, be noted that due to the current droughts some of these ephemeral rivers might even be classified as “episodic” as the indication is that they only flow in response to extreme rainfall events. It should further be noted that each of these natural watercourses/aquatic ecosystems identified, delineated and assessed in this study include various small tributaries/headwater streams that drain into the main watercourses. The drainage lines in the south-east corner of the study area are located on the hillside. These watercourses are difficult to identify except during periods of rain although indicators such as their topographic position (low points in the local landscape) and evidence of sediment deposition and debris can provide a sufficient indication. More watercourses not included in the assessment are located within the surrounding area. Another non-perennial ephemeral river not affected by the proposed poultry farm is located to the east and the north-east of the RCL properties (Limosella Consulting, 2016).

Details pertaining to the watercourses are summarised in the table below:

Table 13: Summary of wetland assessment findings (Limosella Consulting, 2016)

	Quaternary Catchment and WMA areas	Important Rivers possibly affected	Buffers
	A22C, Crocodile (West) and Marico (WMA)	Rivers potentially affected include natural watercourses that are associated with the Selons River and/or tributaries that drain into the Selons River. Major rivers in this catchment include the Crocodile, Marico, Elands, Pienaars and Molopo Rivers.	15m calculated buffer for all the natural watercourses (rivers) onsite (also refer to the following section for more detail regarding buffer zones).
NEMA Impact assessment	Most activities have a medium impact score before implementation of mitigation measures and a low score after mitigation.		
DWS Impact assessment	Most of the activities associated with the poultry farm fall in the low category. Construction of access roads and stormwater management fall in the medium category. This is primarily due to the long term effect of potential impacts, such as altered surface water runoff and potential changes to water flow paths that sustain the watercourses. It is possible that, during the detailed design phase, with the input of stormwater engineers and a geohydrologist or hydropedologist, it can be shown that mitigation for changes to the runoff properties of the infrastructure does not have a net effect on the regional hydrograph. The score may then be lowered to fall in the Low category. The DWS should be consulted regarding the necessity for application for a Water Use Licence.		
Does the specialist support the development?	Yes. However, it should be done in a manner that does not further alter the natural watercourses (rivers) and their catchments, particularly regarding potential pollution from animal waste.		
	The proposed development traverse ecological support areas (ESA1) and critical biodiversity areas (CBA2) and care should be taken to limit impacts in these areas to a minimum.		
Major concerns	<ul style="list-style-type: none"> <li>• Changing the quantity and fluctuation properties of the watercourse;</li> <li>• Changing the amount of sediment entering the water resource and associated change in turbidity (increasing or decreasing the amount);</li> <li>• Alteration of water quality – increasing the amounts of nutrients (phosphate, nitrite, nitrate);</li> <li>• Alteration of water quality – toxic contaminants, including toxic metal ions (e.g. copper, lead, zinc) and hydrocarbons;</li> <li>• Changing the physical structure within a water resource (habitat); and</li> <li>• Erosion in the Selons River and downstream rivers.</li> </ul>		
Recommendations	The placement of the chicken runs should exclude the natural watercourses/aquatic ecosystems as far as possible. Where alternatives have been investigated and watercourses and associated tributaries/headwater streams are in close proximity it is important that appropriate mitigation measures are put into place and carefully monitored to ensure minimal impact to regional hydrology.		

The findings and recommendations of the specialist reports have been incorporated in this Environmental Impact Assessment Report under Sections 8.3 and 9.10. The findings and recommendations have also been incorporated into Section 8.1 of the draft Environmental Management Programme that forms part of this report.

## 10. ENVIRONMENTAL IMPACT STATEMENT

### 10.1 Summary of the key findings of the Environmental Impact Assessment

The summary of the key findings of this Environmental Impact Assessment process are as follows:

- The majority of the project site lies within an Ecological Support Area 1, with small areas of the site (the north-west and north-east corners) lying within a Critical Biodiversity 2 area according to the 2015 North West Biodiversity Sector Plan;
- The total land area that will be disturbed after the expansion project (this includes the existing and proposed disturbances), should the proposed project be authorised, will be  $\pm 5\%$  of the total land area of the project site (a combination of all the project properties). This is calculated as  $\pm 141.5\text{ha}$  out of the total  $2\,830.3021\text{ha}$  size of the project site.
- No sensitive species, sensitive areas, ecological systems or services will be significantly negatively affected by the proposed development. The fauna specialist could therefore not submit reasonable objections to the proposed development, but did point out that should the developments be on fallow fields, the environmental and conservation impact would be virtually nil.
- There is a high possibility that significant micro-organism fossil remains may be present in the Silverton Formation parts of the site. The alluvium areas may also contain significant fossils not yet recorded for the area. Stromatolitic structures may be uncovered if bedrock is exposed during foundation excavations.
- In terms of Archaeological and Heritage Sites, a number of sites have been identified. Of these, only Site 13 (possible Stone Age knapping area and Open Air surface site) and Site 24 (LIA stone-walled settlement site) will be impacted upon directly by the proposed development. Sites 18 and 21 (pottery scatters) are located close to Chicken House clusters, but are of no significance. Sites 17, 19, 20 and 23 are situated in close proximity to proposed developments, but will not be directly impacted on. For Sites 13 and 24 the following is recommended: Archaeological mitigation measures need to be implemented. This will include mapping the sites in detail, the collection of representative samples of material (for Stone Age Site 13) as well as Archaeological Excavation work on Site 24 after obtaining the required permits from SAHRA. The sites can be demolished once this work has been completed and the go-ahead has been obtained from SAHRA. The applicant has indicated their support of this process and has given the go-ahead for the archaeological work to be conducted once valid permits have been obtained from SAHRA.
- The study site contains sensitive ecosystems earmarked for conservation on a provincial level (CBA2 and ESA1). The study site also lies in close proximity to areas earmarked as part of the protected areas expansion project for statutory protection. Four main vegetation groups were identified onsite: bushveld, plains bushveld, riparian woodlands and derelict agricultural fields. The bushveld and riparian vegetation groups were largely natural; in a primary state; contained provincially protected plant species and had a low level of invasion by alien plant species. These vegetation groups were all assigned a high sensitivity value. The derelict fields had low species diversity, high levels of disturbance and subsequent high levels of invasion. This vegetation group was therefore assigned a low level of sensitivity and could support the proposed development. The proposed development of seventeen (17) additional chicken houses and infrastructure such as a solar plant and waste water treatment works in areas of high sensitivity is not supported in terms of the guidelines set out in the North West Biodiversity Sector Plan for ESA1 and CBA2 areas. The only vegetation group where these activities could be supported is the low sensitivity agricultural fields where all natural vegetation has already been cleared, or areas close to this to prevent fragmentation of the natural habitats. The bushveld, plains bushveld as well as riparian woodland vegetation groups are all deemed not

feasible for the proposed development. However, RCL Foods proposes to conserve the remainder of the vegetation and introduce game into the area. In addition, a limited number of chicken farms will likely have a lesser impact than extensive livestock production (which is allowed in an ESA1) where overgrazing could lead to a change in the species composition. The site is deemed sensitive from a vegetation perspective and the proposed development outside of the current low sensitivity areas and adjacent land is not supported. If the North-West conservation authority does consider the proposed development, the protection of the remainder of the land must be formalised, no further development or expansion of the activities on the site should be allowed. The following should form part of an Ecological Management Plan for the site: Grazing Capacity and Management Plan; Alien Invasive Plant Species Management Plan; Sensitive Species Management and Monitoring Plan; and an Erosion Monitoring and Management Plan. A fulltime, suitably qualified staff member(s) who will manage and continually evaluate any degradation in the vegetation composition and structure and who will report on the status of sensitive vegetation groups as well as the effective management of game and the ecosystem as a whole should be appointed. It is recommended that an external audit be conducted by an independent ecologist twice a year, to report on the state of the vegetation and effectiveness of the Reserve Management Plan. This report should be submitted to the North West authorities for comment and review.

- The proposed development will result in a positive socio-economic impact through the provision of a number of temporary and permanent job opportunities as well as the stimulation of the local economy. The development will also contribute towards food security in South Africa;
- The environmental impacts associated with the proposed development have been identified and assessed in terms of their significance in this report. The most significant impacts relate to the disturbance and/or destruction of the highly sensitive bushveld and riparian vegetation groups that are largely in a natural, primary state with a low level of invasion by alien plant species and that contain provincially protected plant species; as well as the disturbance and/or destruction of Heritage Sites 13 and 24; and
- The majority of the impacts are rated as having a “Medium” significance before mitigation, and a “Low” significance after mitigation.

## 10.2 Environmental sensitivity overlay maps

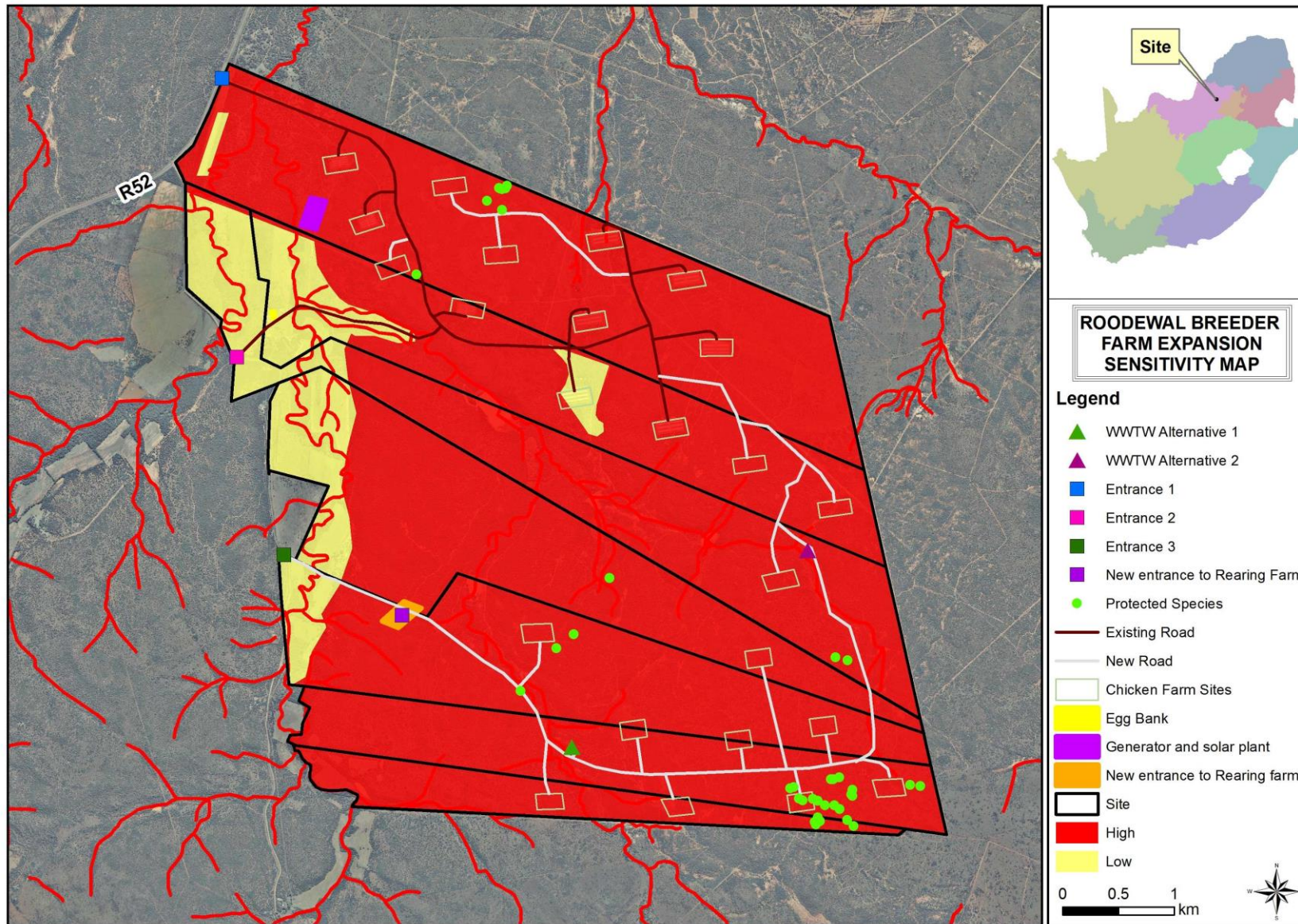


Figure 48: Vegetation sensitivity map of the project site



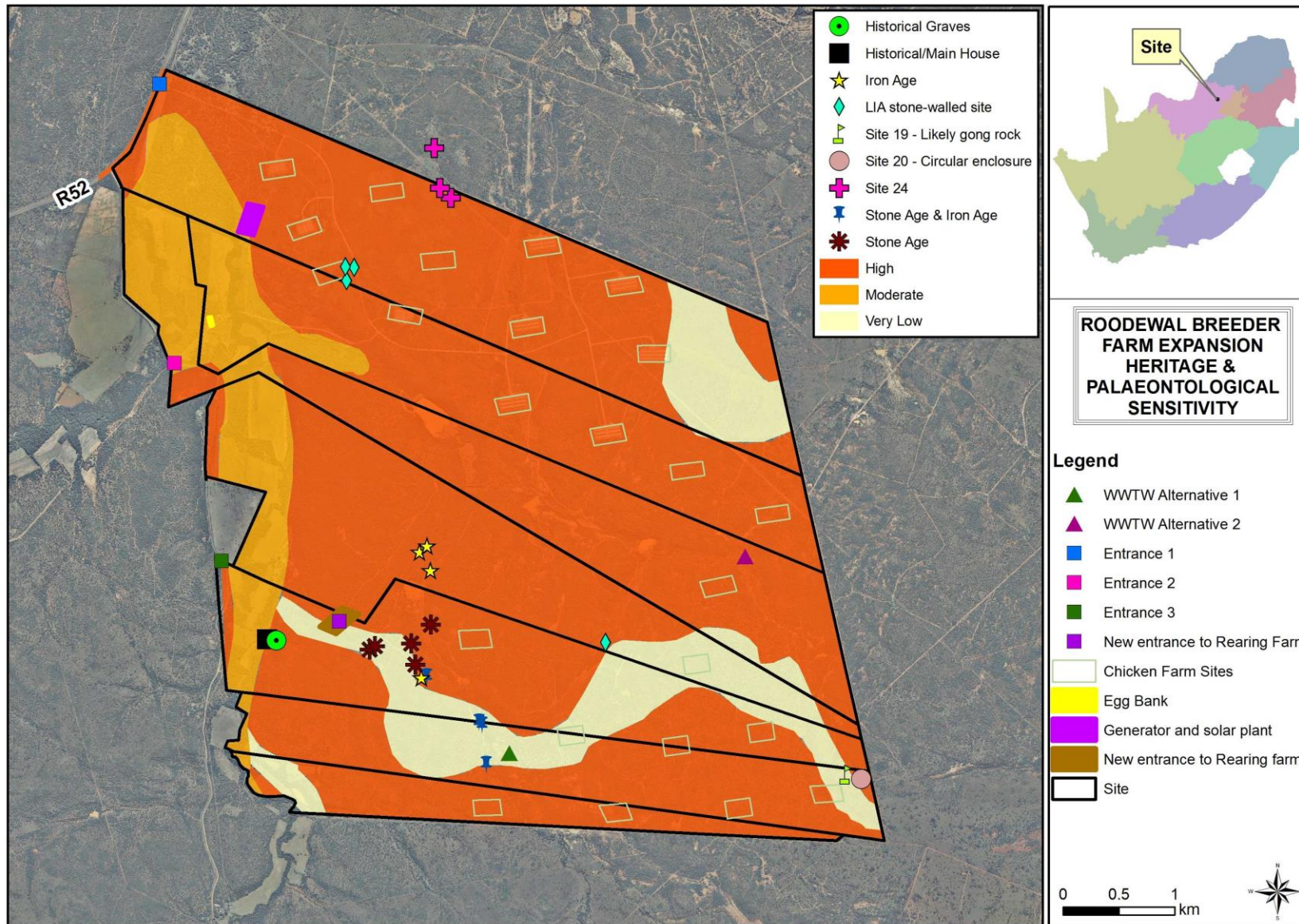


Figure 49: Heritage and Palaeontological Sensitivity of the project site

### 10.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

The following main positive and potential negative impacts and risks have been identified for the proposed project:

#### Positive impacts

- The generation of temporary and permanent job opportunities.
- The stimulation of the local economy.
- Establishment of an artificial wetland ecosystem, linked to the proposed wastewater treatment plant. Provision of a habitat for fauna species.
- Contributing to food security in South Africa.

#### Negative impacts

- Changing the quantity and fluctuation properties of the watercourse by, for example, storm water input, or restricting water flow.
- Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount).
- Introduction and spread of alien vegetation.
- Pollution of surface and/or groundwater resources due to the potential release of pollutants, such as chemicals.
- Pollution of surface and/or groundwater resources due to the incorrect management of chemical substances and dangerous goods.
- Pollution of surface and/or groundwater resources due to poor waste management.
- Loss of mammal and herpetofaunal habitat and ecological structure.
- Removal of natural, good condition vegetation: Potential loss of species of conservation concern and their habitats.
- Erosion, soil compaction and subsequent sedimentation: Possible permanent loss of re-vegetation potential of soil surface.
- Removal of protected species or species of conservation concern.
- Bush densification.
- Deterioration of watercourses and riparian vegetation.
- Disturbance or destruction of cultural and heritage resources.
- High possibility that significant micro-organism fossil remains may be present in the Silverton Formation parts of the site. The alluvium areas may also contain significant fossils not yet recorded for the area. Stromatolitic structures may be uncovered if bedrock is exposed during foundation excavations.
- Generation of dust.
- Release of vehicle emissions from construction vehicles.
- Generation of nuisance and noise.
- Soil erosion due to the clearance of vegetation.
- Soil pollution due to the incorrect management of chemical substances and dangerous goods.
- Soil pollution due to poor waste management (general and hazardous waste).
- Soil pollution due to potential spillages from chemical toilets.
- Potential increase in crime due to the influx of workers.
- Increase in traffic volumes to the site.

## **10.4 Impact management measures from specialist reports and the recording of the proposed impact management outcomes for the development, for inclusion in the EMPr**

The impact management measures that have been provided in the various specialist reports have been included under Section 9.10 of this report and have also been included under Section 8.1 of the Environmental Management Programme.

## **10.5 The final proposed alternatives which respond to the impact management measures, avoidance and mitigation measures identified through the assessment**

The final property alternative for the Roodewal Breeder Farm Expansion project is on the following properties (collectively known as the proposed development site):

- The Remaining Extent of Portion 6 of the Farm Roodewal 322 JQ
- Portion 8 of the Farm Roodewal 322 JQ
- Portion 11 of the Farm Roodewal 322 JQ
- Portion 12 of the Farm Roodewal 322 JQ
- Portion 15 of the Farm Roodewal 322 JQ
- Portion 17 of the Farm Roodewal 322 JQ
- Portion 58 of the Farm Elandsfontein 366 JQ

The final site-; layout-; routing; and scale and magnitude alternatives for the proposed project are shown on the following figures (*Figure 50, Figure 51 and Figure 52*).

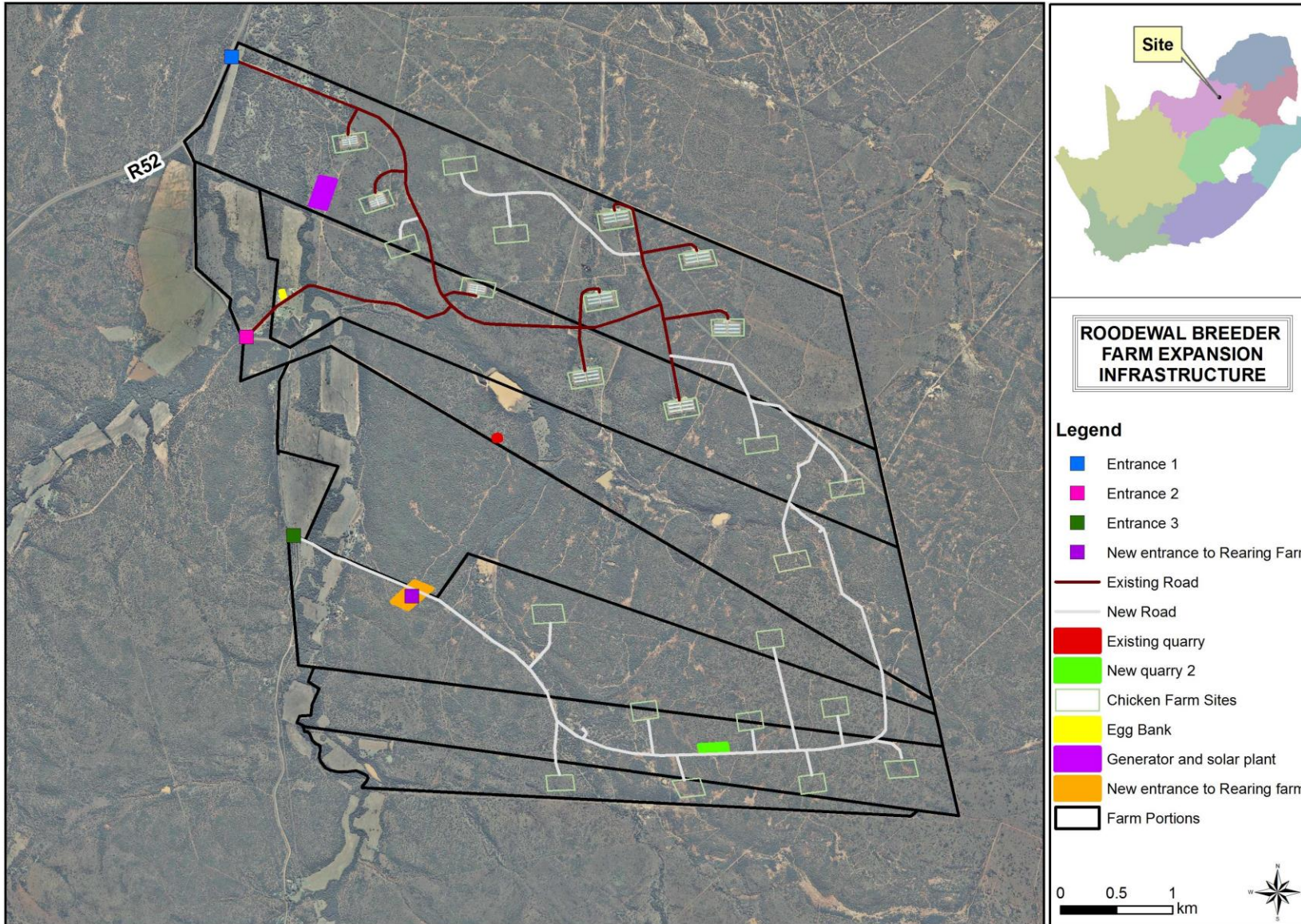


Figure 50: Existing and proposed road infrastructure on the project site

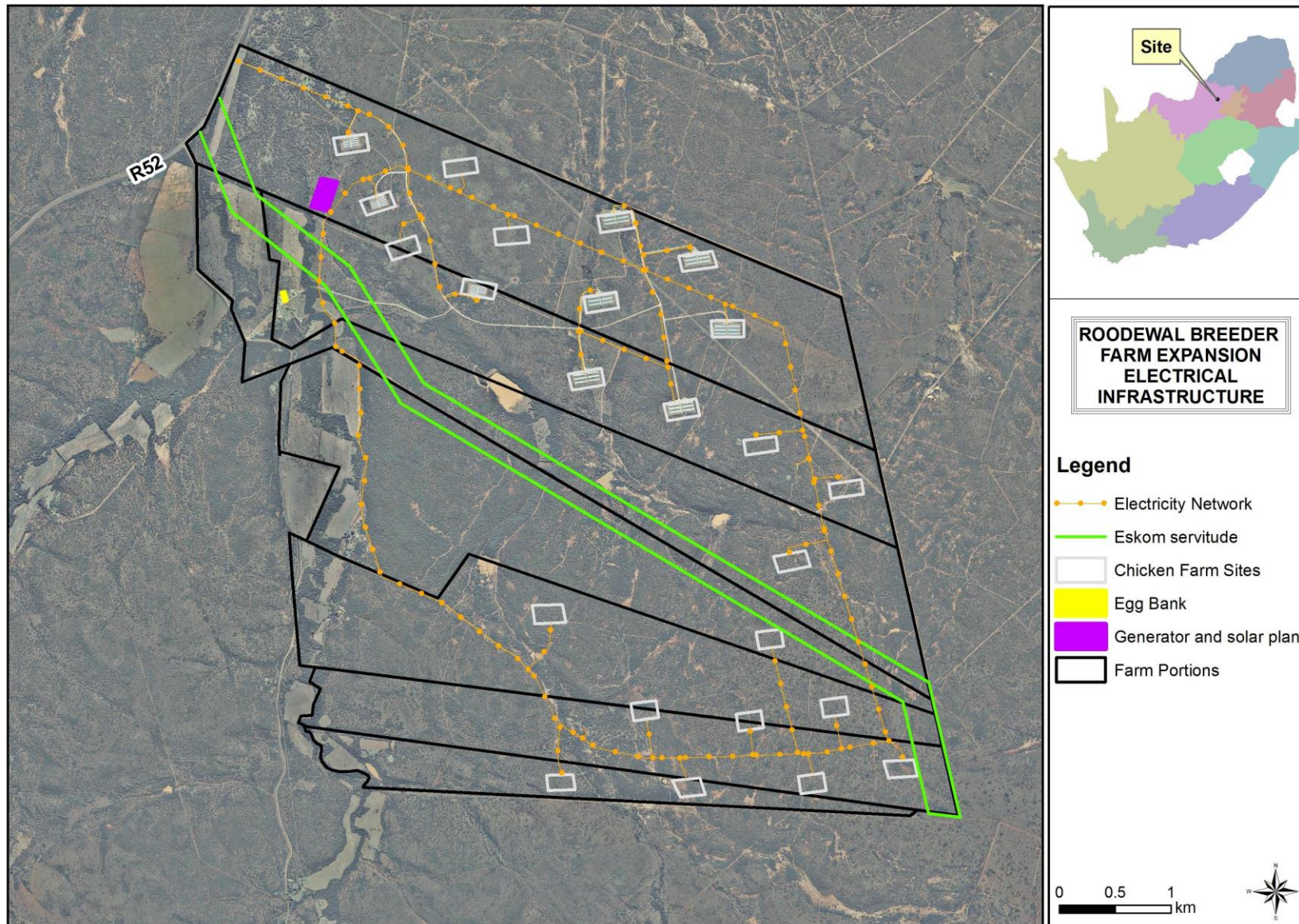


Figure 51: Electricity distribution network for the project site, including the generator and solar PV plant

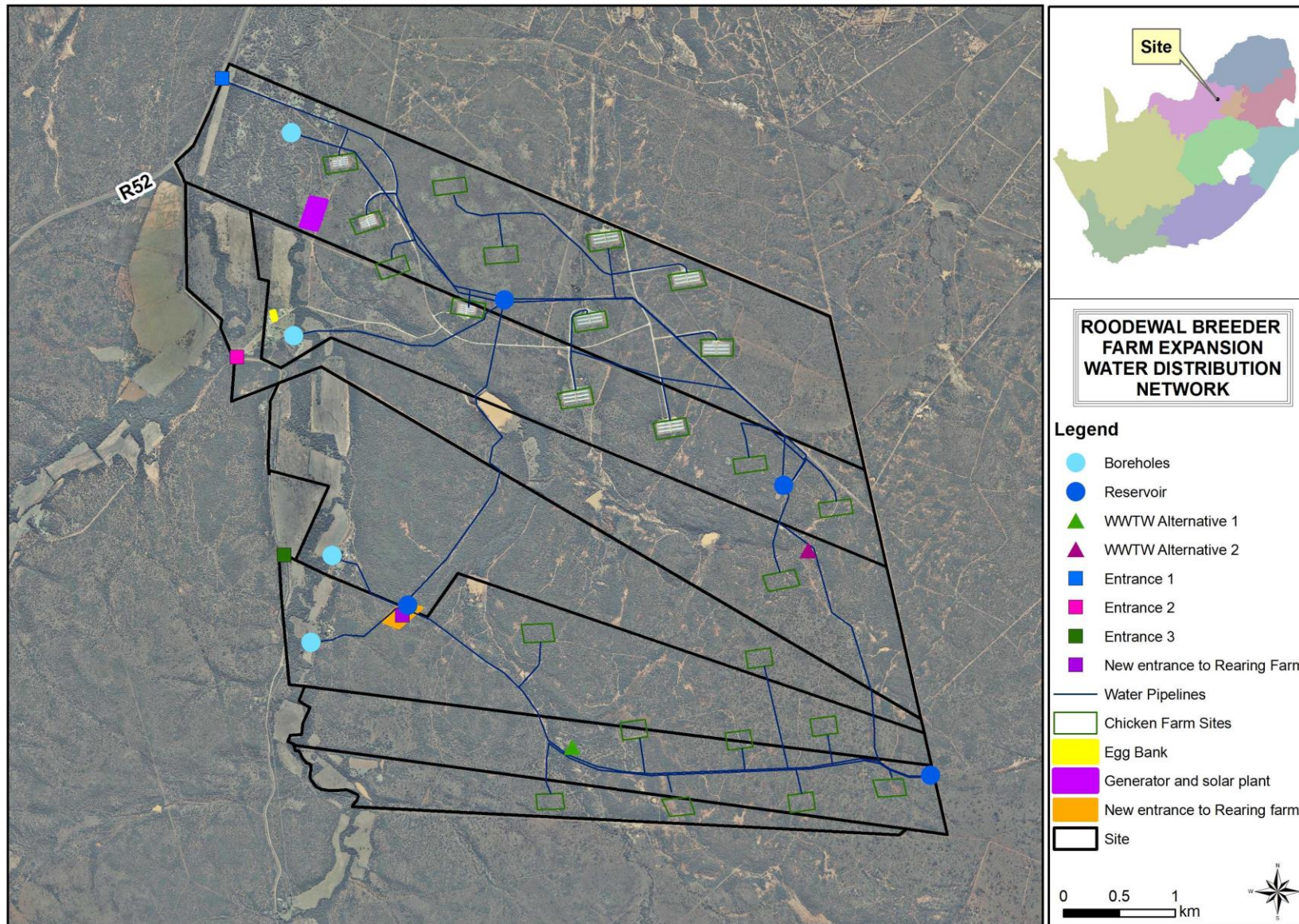


Figure 52: Water distribution network for the project site

## **10.6 Aspects which were conditional to the findings of the assessment either by the EAP or specialists and which are to be included as conditions of authorisation**

The following conditions must be included in the Environmental Authorisation, should the proposed development be authorised:

- The mitigation measures contained in the Environmental Management Programme must be implemented during each developmental phase of the proposed project;
- An independent Environmental Control Officer must be appointed to audit compliance to the Environmental Management Programme during the construction phase of the proposed development.
- A Heritage Management Plan (HMP) must be developed for *in situ* conservation and management of heritage resources located within the development footprint. The HMP must be submitted to SAHRA for approval.
- A suitably qualified palaeontologist must be appointed to do a Phase 1 PIA investigation at the onset of excavations and to also update the basic recommendations made in the “Chance Find Protocol”.
- An Ecological Management Plan must be compiled for the site. This plan must include a Grazing Capacity and Management Plan, Alien Invasive Plant Species Management Plan, Sensitive Species Management and Monitoring Plan and an Erosion Monitoring and Management Plan. The plan must be submitted to the Competent Authority for approval.
- The planned conservation of the remainder of the farm must be a requirement of the Environmental Authorisation.
- A minimum buffer area of 15m around the rivers onsite must be maintained, as recommended by the wetland specialists. A Water Use Licence or Registration must be obtained for construction within the 15m buffer.

## **10.7 Description of assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed**

The following assumptions were made during this Environmental Impact Assessment process:

- That all research and reference sources or material is accurate and up to date;
- That the project information, as provided by the applicant, is correct;
- That the specialist opinions are scientifically grounded and accurate; and
- That the proposed development will be operated according to the Environmental Management Programme and in a responsible manner.

## **10.8 Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation**

It is Labesh’s independent and reasoned opinion that the identified and assessed environmental impacts can be mitigated and that an Environmental Authorisation should therefore be issued for the proposed Roodewal Breeder Farm Expansion project.

Please refer to Section 10.6 above for conditions that should be included in respect of the Environmental Authorisation.

## **10.9 Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised**

Not applicable. The proposed activity does include operational aspects.

## **11. ENVIRONMENTAL ASSESSMENT PRACTITIONER UNDERTAKING**

I, Lourens de Villiers, hereby confirm the following:

- The correctness of information provided in this Environmental Impact Assessment Report and the Environmental Management Programme;
- The inclusion of all comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports, where relevant; and
- Any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs have been included in this report.

I further confirm that I have no business, financial, personal or other interest in the activity or application in respect of which I have been appointed as EAP, in terms of the EIA Regulations, other than fair remuneration for work performed in connection with this application for Environmental Authorisation.

## **12. DETAILS OF ANY FINANCIAL PROVISION FOR THE REHABILITATION, CLOSURE AND ONGOING POST DECOMMISSIONING MANAGEMENT OF NEGATIVE ENVIRONMENTAL IMPACTS**

No financial provisioning applicable to the proposed project.

## **13. INDICATION OF ANY DEVIATION FROM THE APPROVED SCOPING REPORT, INCLUDING THE PLAN OF STUDY**

There have been no deviations from the approved Scoping Report and Plan of Study.

## **14. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

The North West Department of Rural, Environmental and Agricultural Development, in their letter dated 12 October 2017, stated that the following:

2. This Department hereby accepts the Scoping Report including Plan of Study for scoping in terms of Regulation 22(a) of the EIA Regulations of 2014, as amended, on condition that the following information is included in the Environmental Impact Assessment Report.

- (a) A revised layout plan for the proposed chicken houses, taking into consideration recommendations included in the Fauna Assessment report compiled by Limosella Consulting (Pty) Ltd (dated November 2016) and the Vegetation



Assessment report compiled by Dimela Eco Consulting (dated November 2016, updated March 2017) regarding the placement of chicken houses within the low sensitivity vegetation groups.

The applicant responded to this letter from the Department as follows, in a letter sent to the Department via email on the 10<sup>th</sup> of November 2017:

### **Reply to letter Date 12 / 10 / 2017**

Dear Lady

With the letter that you have dated on 12 October 2017 you have requested that RCL Foods take into consideration the recommendations from Limosella Consulting, Dated Nov 2016 and Dimela Consulting, Dated November 2016 and March 2017.

With this letter I want to share with you the reasoning that we used to compile the proposed layout of the farm and the consideration that we took into account with the layout of the property.

Here follows a list of the reasonings that were used to select the layout of the farm.

1. We need to increase the capacity of the Rearing Farms from three- to eight farms.
2. We need to increase the Laying Farms from six- to sixteen farms.
3. We are not allowed to place any sites within a drainage line or the 15m buffer from a drainage line.
4. All sites should be built above the 1:100 year flood line.
5. All sites need to be 500m apart to eliminate the Avian influenza contamination risk.
6. No roads should pass within 200m of any site to reduce manure infection risk when stripping and cleaning farms.
7. Rearing and Laying farms should have a space of no less than 1 km between the farms.
8. No farm should be closer than 1 km from any commercial road.
9. All farms need to be as flat as possible to limit the disturbance of the natural contours, storm water drainage and plants.
10. Roads and other servitudes need to be planned to cover the least distance and to limit soil disturbance to the minimum.

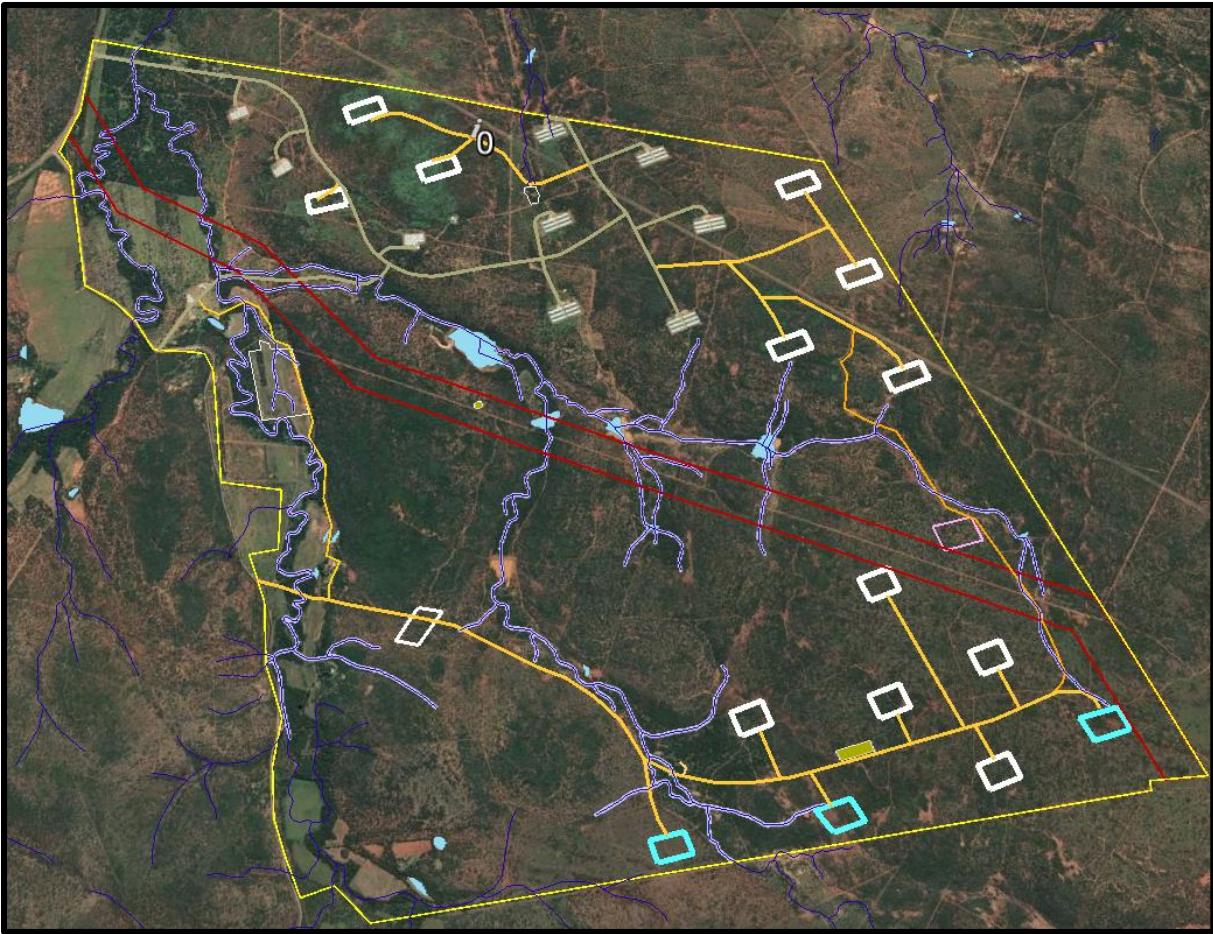


Figure 53: Sketch 1

**Please note**

- On the western side of the farm, there are numerous drainage lines. This area is also within the 1:100 year flood line.
- The R 30 gravel road also passes on the western side of the farm and we do not want to build any chicken houses within 1 km of this road since local farmers transport their birds on this road and we want to ensure that no local birds traveling on this road will infect our flocks; therefore the 1 km rule.
- For the same reason as above, we maintain a space of 1km between laying and rearing farms.
- To place the proposed sites (farms) on the property, we appointed a land surveyor to identify the sites and to ensure that we have the spacing correct in terms of biosecurity. Also, to ensure that roads and services can be accommodated (see sketch below). We were only able to identify 17 sites with the least impact and not within drainage lines. It has to be mentioned that the western side of the farm is on the road as well as lying within the 1:100 year water mark, from there it climb up a very big bank that gives a natural barrier between the road and the chicken houses.

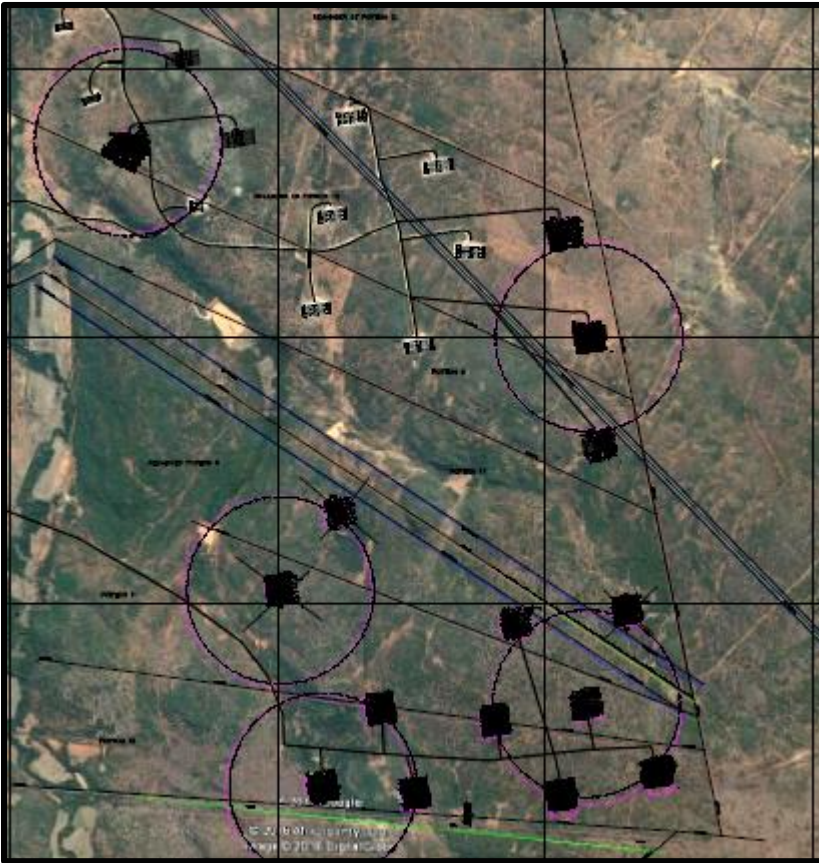


Figure 54: Sketch 2

- Please note that sites R1, R7 and R8 had to be moved (the light blue sites on Sketch 1) to move them out of the drainage line buffers.
- There are three unutilised sites on the farm, but they will make the roads and infrastructure complicated and add more risk in stripping out waste material (yellow encircled sites on Sketch 2).

The Biodiversity Unit of the North West Department of Rural, Environmental and Agricultural Development requested that the layout of the farm be changed to remove the two north-eastern laying farms (indicated in the red circle on *Figure 55* below), as they are situated within the CBA 2 (Critical Biodiversity Area 2) of the North West Biodiversity Sector Plan, 2015. The two laying farms have therefore been moved. One farm has been moved further south (shown in the blue circle on *Figure 56* below) and one farm has been moved to the southern part of the site (shown in the yellow circle on *Figure 56* below). The road-, electricity- and water infrastructure plans have also been amended to accommodate the new farm layouts.

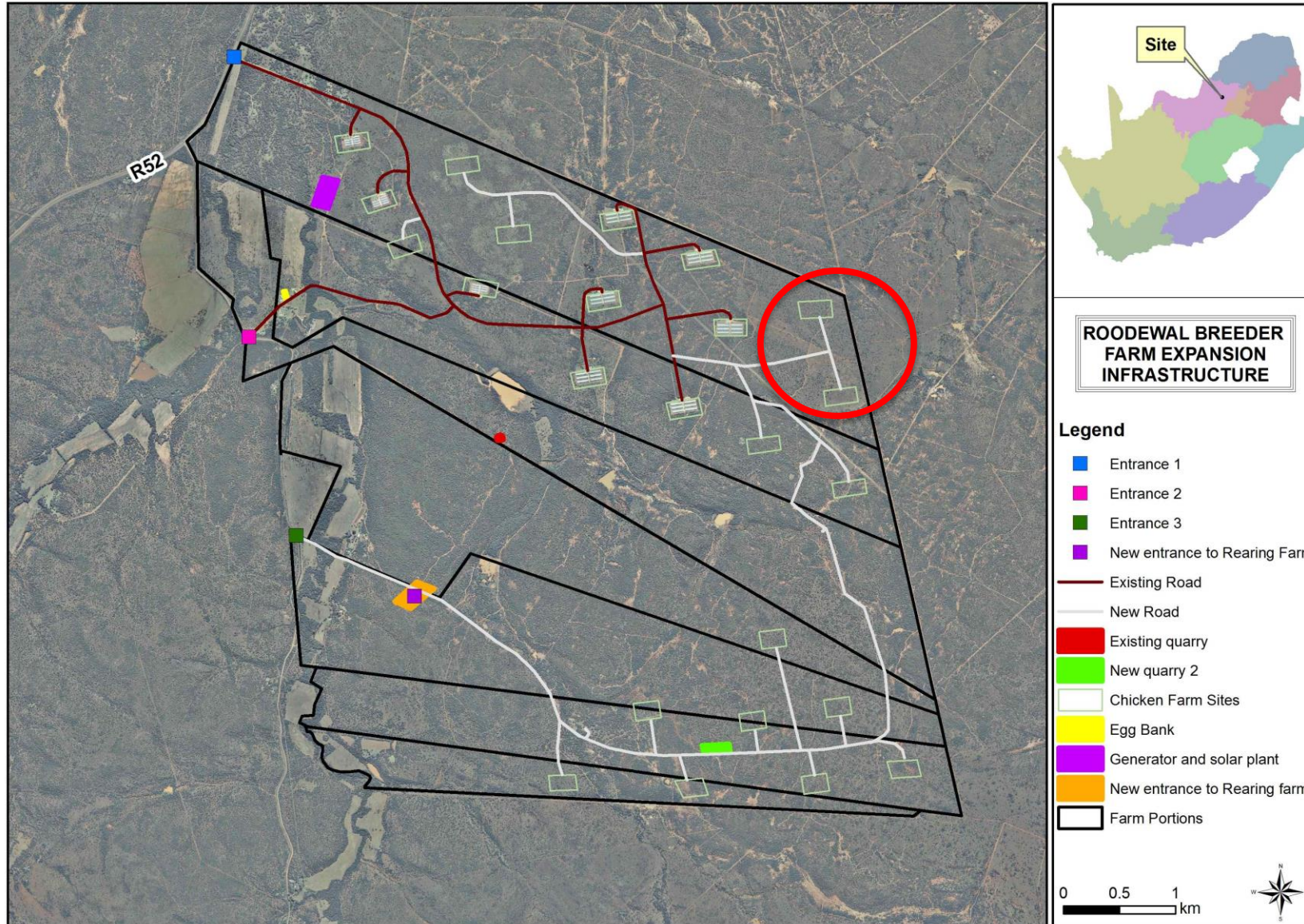


Figure 55: Layout proposed in the Scoping Report

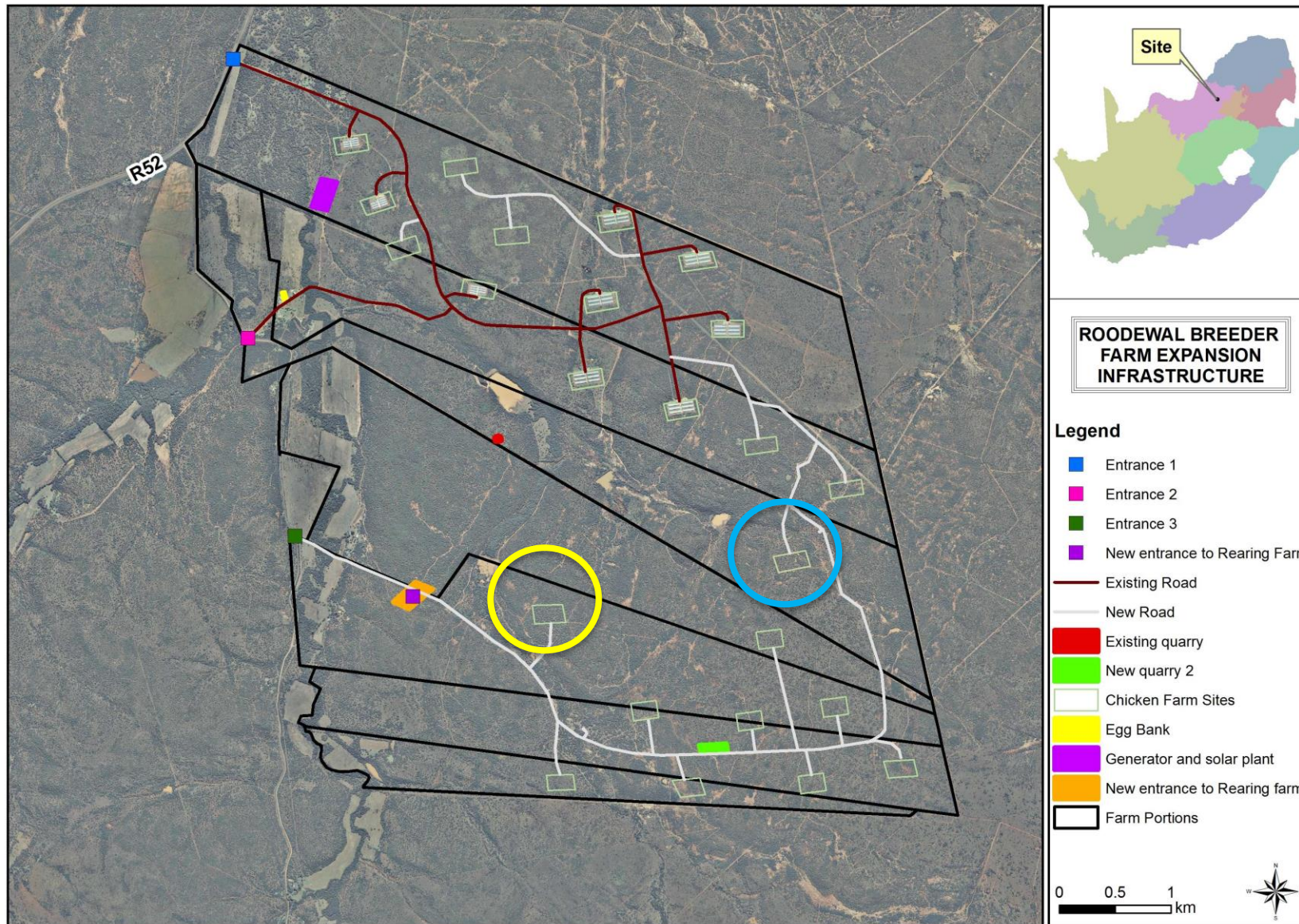


Figure 56: Final Infrastructure/Development Plan

## **15. OTHER MATTERS REQUIRED IN TERMS OF SECTION 24(4)(A) AND (B) OF NEMA**

At this stage, no other matters to address have been identified or required.