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ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

PROPOSED 9600 SOW UNIT PIGGERY AND AN ABATTOIR TO BE ESTABLISHED 20 KM EAST OF AMERSFOORT, MPUMALANGA PROVINCE.

DRAFT BASIC ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Prepared for: MPUMALANGA PROVINCE DEPARTMENT OF ECONOMIC DEVELOPMENT, ENVIRONMENT AND TOURISM
MR. DINEO TSWAI
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On behalf of: weGROW FARMING ENTERPRISES (PTY) LTD.
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EXECUTIVE SUMMARY

REC Services (Pty) Ltd. (REC) was appointed by Mr. Dolf Bam of weGrow Farming Enterprises (Pty) Ltd., for the Environmental Impact Assessment and application process in terms of the National Environmental Management Act (Act 107 of 1998), pertaining to proposed construction of a 9600 sow unit in the region east of Amersfoort. In addition to this facility a 1000 Units per day abattoir is proposed associated with the piggery, as well as the capacity expansion of an existing dam. The dam on the farm Kleinfontein 3-HT will be enlarged by means of a bigger/higher dam wall.

PROJECT DESCRIPTION AND LOCALITY

The farm Zoetfontein 4-HT on which the piggery will be established is 22km east of the town Amersfoort:

- From the bridge on the Skulpspruit (Amersfoort's eastern boundary) travel 900m in an eastern direction where one will connect with a T-junction, entering from the right;
- Turn right here and travel for 14km where the road will fork. Keep left.
- Travel 7.1km on this road and the first proposed site will be on the right next to the road.

The locality plan is presented in Appendix 3A.

The project description and pig production for weGrow Farming Enterprises (Pty) Ltd. will be as follow:
All designs are based on the latest SARPO and the European Union's new pig regulations and legislation.

All the buildings and equipment are designed with the above objectives in mind. The pigs will be free at all times except during lactations. This is to prevent the sows from injuring the piglets when they are just born. Once these piglets are strong enough to fend for themselves the farrowing crates will be opened to give the sow more space. The pigs welfare is placed at all time as priority number one.

Each production centre has a special care centre for sick or injured animals. The hygiene in the units is paramount and will be administered to prevent any disease spread. All humans will be required to shower and be disinfected when entering and leaving the units.

The effluent from the units is all organic and will be sold or used as organic fertiliser and organic liquid. The effluent will be stored under the houses in slurry pits and flushed every 14 days to prevent any ammoniac developing. No water will be required to flush the organic effluent from the buildings. The effluent will be piped to an effluent separation sections to prevent any contact with soil, or the nearby surroundings.

This effluent separation section will be at the manure processing plant which contains a raw slurry basin/dam, clear water basin/dam, manure screw press and an area for the dry manure (slab). The organic solids will be separated from the liquid by means of a separation press. The following specifications are set out for the transporting of the slurry:

SLURRY PIPING INFRASTRUCTURE FROM PIG UNITS TO MANURE PROCESSING PLANT:

- All the piping will consist of a Class 6 PVC material, which is standard for the transportation of typically pig slurry.
- The combined length of slurry piping from all the pig units will be in the order of 14 860m
- The average diameter of these Clas 6 PVC pipes being used will be 315mm ø.
- The pipes will be placed in the least sensitive area under the ground. It will be transported through gravitation, therefore the depth at the start of the pipes at the pig units will be at 600mm and by the time it reaches the manure processing plant it will be at a depth of about 1000mm.
- The raw slurry dam/basin will be 200m^2 in surface area with the clean water basin/dam at 100m^2 in surface area.

Please see map and layouts in appendix 4A.

The organic solids will be separated from the liquid by means of a separation press. The dry matter will be stored for own use, or selling to the surrounding farms and the

organic liquid will be stored in a lined dam for fertigation through the nearby centre pivots. The above organic fertiliser will be used on 1600 ha of maize and soya fields, to fertilise two crops a year. Total ha 3200.

Water will be harvested from all the 45 000 m^2 roofs for use in the piggery. This will amount to ± 30 000 m^3 a year, which is about 40% of the requirement of the farm.

The farm will also make use of solar energy for the heating of all the water for washing purposes. We have also made provision for a biogas plant in the future when it became viable.

The production units (for site 1 & 2) are as follow:

Components 1	Breeding and Farrowing
Components 2	Weaner
Components 3	Finishers

The unit (for site 1 & 2) is designed considering the following norms.

Sows

- 2400 sows: 28/30 weaned piglets per sow a year.
- 114 days pregnant: 28 days in lactation: 150 day sow cycle = 2.4 farrowing are per year.
- Replacing 45/50% sows a year.
- AI with some natural services.

Gilt Development

Breeding stock will be selected at 28 days from the farrowing house and housed in the gilt development nursery. Breeding will take place every 2 weeks with 14/15 sows to supply 70 gilt weaners. This selected stock will be kept in 2 sections for 42 days and then moved to the development section. Breeding stock will be kept in groups of 18 up to 180 days or first heat. These gilts can be served by a V-Boar, or and moved to a gilt pen for 1 to 2 weeks before introduced to the ESF training section for 5/6 weeks. Two week before Insemination 50 gilts will be moved to the AI section to get used to AI crate. Provision is made for 88 gilt crates. By introducing the gilts earlier to the AI

crates will improve the conception rate. The gilts will only be kept in crates for insemination. The rest of the time the sow will be free to walk around

The Gilt training section is a part of the breeding house. This section will hold 50/60 gilts in different stages from 180 days to 220 days. Gilts will be kept in pens on arrival from the development section and then moved to a training section to be introduced to the ESF stations. Gilts will be exposed to a boar. The gilts will be in contact with the detection boar. As they come on heat the gilts will be marked with a colour so that you can identify them. This will assist your stockman as gilts are sometimes difficult to recognise when they come on heat the first time.
This system will then daily select all gilts that are on heat... From here they will be moved to the AI section to be served and introduced into the sow herd. We have made provision for the gilts to be moved to the AI section two week before insemination.

Breeding/ AI
Gilts will be kept in special Gilt AI crates and the sows in sow AI crates. Boar gates are fitted in front of every 7 sows. Sows will stay in AI section for 7 days and then moved to the early gestation for 35/40 days. In this section the sows can be kept in crates or as free sows by opening the gates.

After 35/40 days, and the sows are certified pregnant, they will move to the gestation house. The sows will be accommodated in an open house with ESF station with 2.3 m^2 space each. Each sow will be individually fed by the ESF station. The sows can eat at their own time when they are in need of feed. This is an advantage as the sow is protected during feeding and the feed can be altered for the individual sow.

Farrowing
The sows will be in the farrowing house for 26/28 days. The farrowing house will house 60 sows in 10 rooms on slats with anti-Crushing crates. These crates prevent the sows from crushing the piglets. In the design of the Plantkor sow stall, special attention was given to animal comfort with an optimum sanitation. This reduces the mortality to less than 6% below the norm.

Weaners

- Weaning on 28 days 7/8kg
- 49 days in weaning house with a daily average to reaching +/- 30kg
- 3 to 4 % mortality
- Required temperature is 27 degrees for the first two weeks and reducing by 1 degree per week

There are 8 rooms with 2800 pig spaces. Each room is divided in 72 pens of which 2 are divided to be used as special care pens. The Ventilation is our unique system that allows us to ventilate up to 70 cub meters of air per weaner in one hour without causing a draught. This is essential in South Africa's hot summer months.

Finishing Pigs

We have made provision for 1400 pigs per building up to a max of 100 kg live weight. There are 12 buildings with 80 pens of 17 pigs per pen. One pen is divided into two special care pens per building. We have allowed 0.882 m^2 per pig. We have made provision for 1 feed line. One silo will be used for the different feeds.

Abattoir

Dirty area:

- Pigs are coming to slaughterhouse by trucks 2 times/day
- 1 person work in stable and arr to there come 4-6 pigs into stunning area/ cyclus.
- Pigs are group animal and will go very stressless when they go in small group 4-6 pigs.

1) Stunning by Freund E512, Head/heart stunning with optimal stunning. No bloodspot in ham or broken bones. All stunnings will be stored on USB stick so you can store it on office computer for later doc to customer/wet. After stunning bring pig on bleeding chain on one leg. Up on slide-rail by el-hoist arr.
2) Bleeding area: stick pig and let it bleed for app 4 min. Pigs has same volume of blood inside as we people have = 7 litre in bleeding area we can get out app 2.5-3 ltr.
3) Bring pigs down in schalding/dehairing machine by el-hoist arr or 1 sow/cyclus. Water in machine = 63 degrease operate app 3 min. = higher temperature = less operate time.

You can go up to 69 degrease = operate time 2 min without scalding spot on hide. Pigs are coming out on table. Gamble on. Up to slide-rail and bring to flaming area. Flame pig so hide will be closed.

3) Whipping machine: 4 walze 4 KW/each with gummiwhipper make final treatment for hide. Pigs are brought though whipping machine by chain-conveyor.

Clean area:

4) Open pig by a knife.

5) Breastbone cut by axe.

6) Casing set out, bring to casing room by a shute

7) Plucks set out. Bring to rack and cut every part and bring each part to boxes. Bring to chill-room in boxes.

8) Splitting saw by Freund Sb 49-08, Band-saw model.

9) Weight scale.

10) Chill-room, max 7 degrease inside before cutting.

11) Cutting room. First take tenderloin, Cut in front, middle and ham

12) Cut middle part in loin-belly.

13) Packing area: pack product in customer need packing by vac Webomatic Duomat 850 or in boxes. Bring packing to customer or in chilling-room or freezing room for later despatch.

14) Casing room:

15) Stomach: cut free from casing set and nettfatt. Collect 10 stomach and clean stomach in centrifuge. Water temperature in casing room must be app 40-42 degrease.

16) Pork rectum cut and empty, uterus cut free, bladders empty, pancreas free, cut fat free, cut spleen free.

17) Set green runners in special tools via one running wheel to walze machine where we press manure out collect 5 pcs G. Runner = 10 kg.

18) Chitterling release take chitterlingfatt out and bring chitterling on turn/water pipe. Machine will clean chitterlings inside and outside. All casing product must just after operation bring in wemag trolley 200 ltr with ice flakes to all product come under 3 degrees before packing after packing to chill-room.

The proposed dam capacity expansion

The existing dam on the farm Kleinfontein 3-HT portion 3 is envisioned to be enlarged by extending and making the dam wall higher by 1m. The surface area for this dam when at capacity will be 12.5 Ha. A surface area increase of about 6ha. The dam volume will be at 434 350m^3.

ASSESSMENT AND CONSIDERING ALTERNATIVES

Feasible alternatives can be considered at this stage. The location is a pre-existing property owned by the applicant. This is also the only property available to the applicant at this stage. Alternatives that can be considered at this stage are mainly Activity (Chickens broiler facility) and Design (layout) only. This will determine where on the available area the development will have to be placed in the most effective way. Technology wise, only the most current state of the art technology in the industry will be used.

The current electrical power provision is through the normal Eskom network. As an alternative to this part of the technological layout of the facility, the provision of electricity through solar energy generation can be considered as an alternative. This can imply the installation of visible solar panels for partial or self-sustaining electricity provision to the facility.

No Go Option

A "DO NOTHING" alternative would be not to use the current property and let it stay as grazing and possible future cropland. This setting is not orientated for residential use; therefore no adequate services are in place to accommodate large volumes of sewage and domestic waste. On the other hand, no additional job opportunities will be created and no contribution will be made to the upliftment of the community and infrastructure development. Thus, if not developed this positive impact will not be seen.

PUBLIC PARTICIPATION PROCESS

The Public Participation Process was conducted from 10 April 2017 and is still in progress.

- Background Information Documents (BIDs) were distributed to adjacent landowners as well as other Interested and Affected Parties (I&APs) on the 10 April 2017 (please refer to Appendix 5A for a copy of the BID as well as proof of the distribution of the BIDs).
- Site notice was erected/placed at the T-junction right next to the property on 10 April 2017 (please refer to Appendix 5D for a copy of the Site Notice as well as proof of the erection of the Site Notice).
- A press advert was placed in the 'Volksrust Recorder' newspaper on the 7th of April 2017.
- The ward councillor (Ward 10), local municipality, Water Affairs and Sanitation and MPHRAG was informed by means of Background Information Document (written notification) and a telephone conversation which was done on 11 April 2017.
- One public open day was held on 25 April 2017 between 12:00 and 17:00 at Dolf Bam farm house. GPS Coordinates: -27.021862°, 30.155924°. The purpose of the public open days was to inform all I&AP's of the proposed development.
- The anticipated impacts and issues, positive and negative, were identified from I&APs, in order to determine their potential significance and the need for further assessment during the subsequent EIA process which is in progress.

THE BASIC EIA PROCESS

During the course of this EIA assignment the following actions and steps are required and will be followed in accordance with the NEMA Regulations in Government Notice No. 982 of 4 December 2014, as amended:

- An Application for Authorisation, signed by the Applicant, together with a Declaration of Independence, which was signed by the environmental assessment practitioner, will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land & Environmental Affairs (DARDLEA). This will coincide with the submission of the draft Basic Assessment Report (BAR).
- The Public Participation Process will inform the public about the proposed process and input, comments and suggestions will be requested.
- The draft BAR with an Environmental Management Program (EMPr) will be made available for comments to the DARDLEA registered I&APs, the local authorities

and all other applicable stakeholders. The draft BAR & EMPr will also be available to be viewed at the municipal library in Kinross.

- All issues from the will be addressed in the final BAR & EMPr, as well as issues and impacts identified by the Environmental Assessment Practitioner. The issues identified in the specialist studies will also be addressed in the final BAR & EMPr.
- The final BAR & EMPr will also be made available to the public for review.
- The final BAR & EMPr will be submitted to DARDLEA for review.
- Once the DARDLEA accepts the final BAR & EMPr, an Environmental Authorisation can be issued.

The BAR & EMPr was made available for comments to the registered I&AP's. Comments received from I&AP's on the contents of the draft BAR & EMPr will be incorporated into the final BAR & EMPr. By making the draft report available, ensures that all issues have been identified.

CONCLUSION

The purpose of this BAR has been:

- To provide a project description, and an overview of the proposed development activities on site.
- To provide a description of all the important environmental elements of the study terrain.
- To provide descriptions of all anticipated/identified biophysical and social-economic issues and impacts that could potentially occur as a result of the proposed development.

In summary it can be concluded that different parts of the proposed piggery will experience different effects or impacts on the environment. These are:

Environmental components to be affected negatively	Description of the anticipated environmental & socio-economic impacts / key issues
Properties	• Noise, Odour and safety impacts.

Possible Odour Impact	• Odour from the piggery, if not managed properly, could cause an irritation to adjacent land owners.
Traffic impact	• The development will also affect the local community in a possible negative way, during the construction phase, as traffic into and out of the farm may cause congestion.
Business areas	• Positive impact: This development will attract business to the areas and boost the local economy. Job creation is a great possibility.
Water provision	• A possible increase in water demands due to the proposed development on this piece of land.
Ground & Surface Water	• Abstraction of water could deplete the natural resource of the area. • Contamination from the slurry & abattoir treatment facility could pose a risk to ground water.
Habitat loss	• Loss of natural vegetation due to the proposed development, although the loss of habitat, proportionally to the wider region of similar natural vegetation, will be very small.

Anticipated and potential significant impacts that have been identified relating to the development were evaluated in terms of their significance.

The essence of any EIA process is aimed at ensuring informed decision-making and environmental accountability, as well as to assist in achieving environmentally sound and sustainable development. This is achieved by conducting an analysis of the potential impacts that a proposed development may have on the physical, environmental and social aspects of the concerned area. In order to minimise the potential impacts associated with the proposed development, an EMPr is to be compiled, which must be implemented in order to sufficiently mitigate the anticipated impacts to an acceptable level.

The draft BAR & EMPr gave an account of the environmental qualities and attributes of the study area and described the details of the proposed development in terms of the anticipated impacts/issues or interaction that the development may have with the different environmental components. The response to issues raised by members of the public is made available for comments for a period of thirty days. This is to determine whether all matters have been covered and addressed to their satisfaction.

The Environmental Assessment Practitioner (EAP) is of the independent opinion that the EIA process did conclusively determine if there are any fatal environmental flaws associated with the proposed development that would constitute the refusal of Authorisation of the project – bearing in mind that approval must be subject to strict implementation and monitoring of the EMPr to be compiled, and given that there should be room for improvement on the EMPr as the project progresses. It is trusted that this BAR & EMPr gives a balanced view of the anticipated environmental impacts or issues associated with a proposed development of this nature.

ENVIRONMENTAL APPLICATION

Adherence to Regulatory Requirements with NEMA Regulations in Government Notice No. 982 of 4 December 2014, as amended, Appendix 1, published in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended.

Contents of a Basic Assessment Report <u>as stipulated</u> in R. 982 (326) of 4 December 2014, as amended (7 April 2017) (Appendix 1, Point 3)		**Covered in Basic Assessment Report**
Appendix 1 Point 3	A basic environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include:	
(a)	Details of: (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Chapter 1 Appendix 6

(b)	The location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Chapter 4 Appendix 3A
(c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is: (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Chapter 4 Appendix 3A Appendix 4A
(d)	A description of the scope of the proposed activity, including: (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Chapter 4 & 5
(e)	A description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and	Chapter 3

	(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	
(f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Chapter 4
(g)	a motivation for the preferred site, activity and technology alternative;	Chapter 4
(h)	a full description of the process followed to reach the proposed development footprint within the approved site, including - (i) details of all the alternatives considered; (ii) details of the Public Participation Process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts:	Chapter 4, 5, 6 & 7 Appendix 5 a-f Chapter 8, Appendix 1 Chapter 9

	(aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives development locations for the activity were investigated, the motivation for not considering such; and (xi) a concluding statement indicating the preferred alternatives including preferred location of the activity;	
(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process;	Chapter 7 and 8 Appendix 1

	and (ii) an assessment of the significance of each 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;	
(j)	an assessment of each identified potentially significant impact and risk, including: (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Chapter 7
(k)	where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Chapter 7
(l)	An environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment: (ii) a map at an appropriate scale which superimposes the proposed activity and its	Chapter 9 Appendix 3B

	associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Chapter 7
(n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Chapter 10
(o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Chapter 8
(p)	A 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;	Chapter 10
(q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	Noted. N/A
(r)	An undertaking under oath or affirmation by the EAP in relation to-	Chapter 11

	(i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t)	Any specific information that may be required by the competent authority; and	Noted. None extra.
(u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	None.

Table of Contents

List of Figures

List of Tables

List of Appendices

1. INTRODUCTION

The purpose of this BAR is to broadly and collaboratively identify all possible issues and impacts from activities associated with the proposed 9600 sow unit piggery and abattoir with the addition of a dam capacity expansion (from here on known as the "development"). The secondary aim of this project is to identify alternatives in terms of site, design and layout of the proposed development.

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--
    a. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    b. degree to which these impacts-
        i. can be reversed;
        ii. may cause irreplaceable loss of resources, and
        iii. 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.

As part of the listed activities identified in the NEMA Regulations in Government Notice No. 982 of 4 December 2014, as amended, the planning, construction and operation of the proposed development represent the legal trigger for the Environmental Impact Assessment (EIA) process to be followed. The listed activities were identified in term of Sections 24(5) & 44 of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) as amended. The applicable listed activities identified are:

R. 983 (327) of 4 December 2014 (7 April 2017), as amended: Listing Notice 1- Basic assessment Activities	
Activity No	**Listed Activity Description:**
3	The development and related operation of facilities or infrastructure for the slaughter of animals with a - (ii) product throughput of reptiles, game and red meat exceeding 6 units per day;
4	The development and related operation of facilities or infrastructure for the concentration of animals in densities that exceed: ii) 8 square metres per small stock unit and; a) more than 1000 units per facility excluding pigs where (b) will apply; or b) more than 250 pigs per facility excluding piglets that is not yet weaned.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;
27	The clearance of an area of 1 ha or more but less than 20 ha of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for – i) the undertaking of a linear activity; or ii) maintenance purposes undertaken in accordance with a maintenance management plan.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;
48	The expansion of –

	(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- (a) within a watercourse;
R. 985 (324) of 4 December 2014 (7April 2017), as amended: Listing Notice 3 - Basic assessment Activities	
Activity No	**Listed Activity Description:**
12	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: f. Mpumalanga: i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;

1.1 Details of the EAP

The EAP appointed for this project is part of REC Services (Pty) Ltd t/a Rock Environmental Consulting.

Rock Environmental Consulting (Pty) Ltd 566 Rubenstein Drive, Moreleta Park 0044 P. O. Box 40541, Moreleta Park, 0044 Telephone: 012 997 4742 E-mail: rockec@lantic.net & rock.rowan@lantic.net	REC SERVICES (PTY) LTD T/A ROCK ENVIRONMENTAL CONSULTING
APPLICANT: weGrow Farming Enterprises (Pty) Ltd. Mr Dolf Bam PO Box 289 Amersfoort 2490 Tel: 017 753 1867	

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REC specializes in Environmental Impact Assessments and Management during the planning and development stages of a range of development projects. REC is a streamlined firm with an integrated approach to environmental impact assessments, networking with expertise where necessary, while always keeping a holistic view on assignments.

Our more than 25 year experience is across a broad range of development projects and clients involved in assignments in the urban and rural environments. Our main client base include road and transport authorities, private land developers, local authorities, farmers, industrial developers, and mining enterprises where we form part of the project team which usually consist of Civil Engineers, Land surveyors, Town and Regional Planners, Property Developers, and Architects etc. Our services include: Basic Environmental Assessments, Environmental Scoping Reports, Environmental Impact Assessment Reports, Environmental Management Programmes, and Environmental Monitoring Reports.

As part of the team at Rock Environmental Consulting (Pty) Ltd is **Mr. Rowan van Tonder**. He is the principle author of this report and works under the supervision of Mr. Pieter van der Merwe. Rowan undertook his studies at the University of Limpopo and obtained a M.Sc. degree in Botany (focus on Conservation Management) in 2007. Before this, he obtained his B. Hons degree in Physical Geography (focus on Environmental Management) at the University of Pretoria and B.Sc. in Environmental Science at the University of Pretoria. He has been part of Rock Environmental Consulting (Pty) Ltd. for 9 years (for extended details, See Appendix 6 – EAP CV).

Mr. Pieter van der Merwe is the managing director for Rock Environmental Consulting (Pty) Ltd. Pieter's responsibilities extends towards reviewing project reports, conducting liaison and participation exercises and using his experience to guide his project team. The coordination of projects and marketing of the company's services also falls within

his responsibilities. Pieter obtained his qualifications at the University of Pretoria and includes a BSc. in Botany and Geology, a BSc. Hons degree in Botany (UP) and a BA. Hons degree in Environmental Management (UP for CHE). Pieter has over 25 years of experience in the Environmental Management field and has operated his own company, Rock Environmental Consulting (Pty) Ltd, for more than 14 years.

2. EIA PROCESS FOLLOWED

This assessment will be undertaken in compliance with the National Environmental Management Act 107 of 1998 (NEMA) as amended, in accordance with NEMA Regulations in Government Notice No. 982 of 4 December 2014 (No. 326 of 7 April 2017), as amended.

The Environmental Impact Assessment process consists of two main components, namely (i) the technical/biophysical process and (ii) the Public Participation Process.

(i) The technical process includes, but is not limited to, the following aspects:

- Terrain investigations;
- Specialist Studies;
- The identification and assessment of biophysical elements within the study area;
- Compilation of a BAR with EMPr.

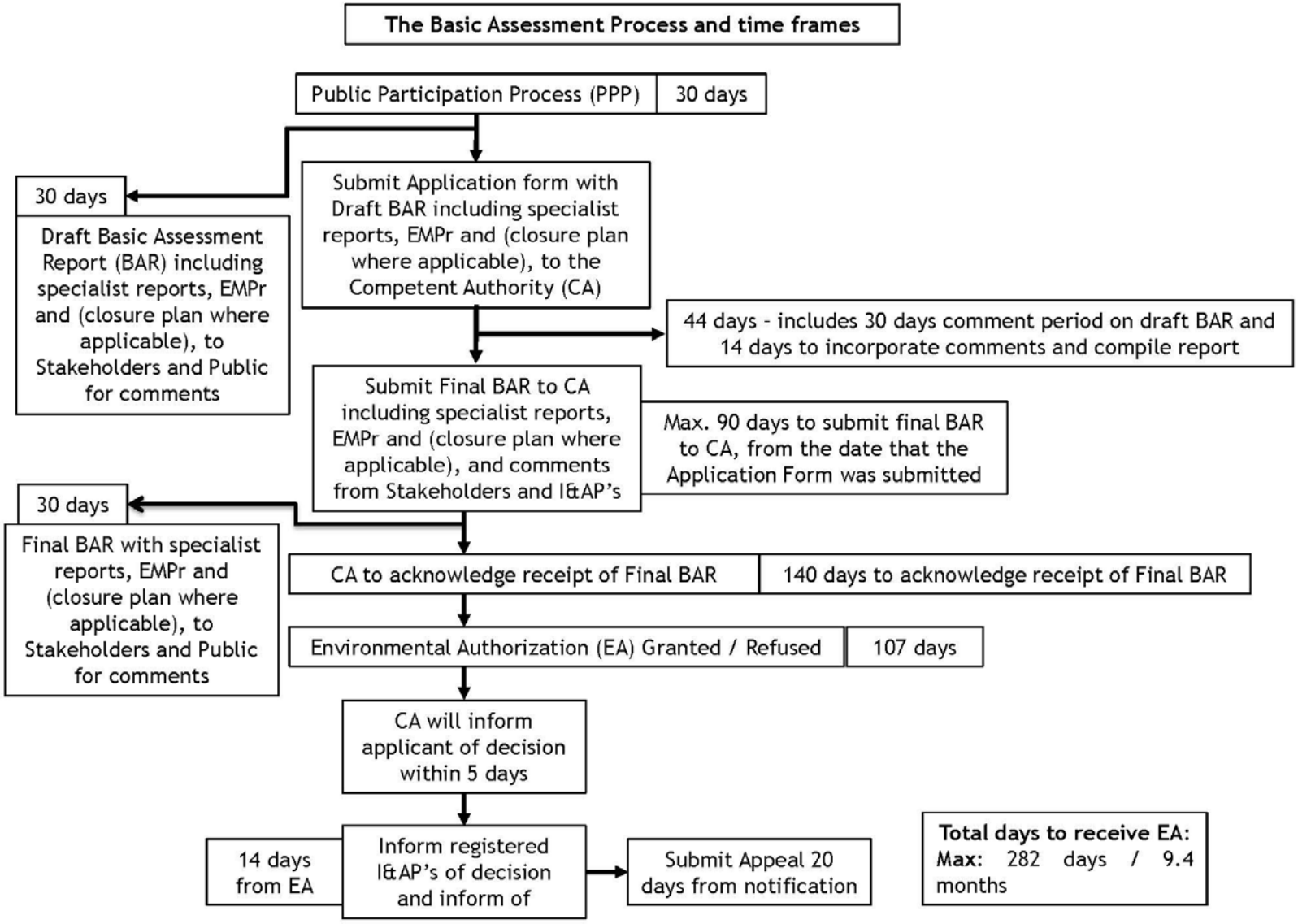
(ii) The Public Participation Process includes:

- Compilation of a database of stakeholders and Interested and Affected Parties;
- Legal notices of the environmental process (press advertisement and on-site);
- Dissemination of information to stakeholders and I&APs (meetings and open days, if needed);
- Identification of environmental, as well as social issues and concerns, as raised by I&APs or other relevant stakeholders, and
- Addressing all concerns raised by I&APs.

The Public Participation Process is conducted in parallel with the total Environmental Impact Assessment process (technical/biophysical process). The Public Participation

Process does not aim to promote agreement amongst I&APs or quell possible opposition against a project. The process is made open and transparent to all those involved. Additionally, it is considered important to involve I&APs as early in the Environmental Impact Assessment process as possible, to ensure informed decision-making and effective participation throughout the study.

The Basic Environmental Impact Assessment Process contains the following steps (Gazette notice no. 38282):



2.1 Basic Assessment Process

During the course of this study the following actions and steps were followed which are in accordance with NEMA Regulations in Government Notice No. 982 of 4 December 2014, as amended:

- A screening terrain assessment of the physical, historical and biological environmental components of the site was undertaken in order to determine which areas would be most suitable for the proposed development(i.e. would cause the least impact on the environment).
- An assessment was made of the ecological characteristics of the area which could potentially be affected by the proposed development.

The Public Participation Process was conducted from 10 April 2017 and is still in progress.

- Background Information Documents (BIDs) were distributed to adjacent landowners as well as other Interested and Affected Parties (I&APs) on the 10 April 2017 (please refer to Appendix 5A for a copy of the BID as well as proof of the distribution of the BIDs).
- Site notice was erected/placed at the T-junction right next to the property on 10 April 2017 (please refer to Appendix 5D for a copy of the Site Notice as well as proof of the erection of the Site Notice).
- A press advert was placed in the 'Volksrust Recorder' newspaper on the 7th of April 2017.
- The ward councillor (Ward 10), local municipality, Water Affairs and Sanitation and MPHRAG was informed by means of Background Information Document (written notification) and a telephone conversation which was done on 11 April 2017.
- One public open day was held on 25 April 2017 between 12:00 and 17:00 at Dolf Bam farm house. GPS Coordinates: -27.021862°, 30.155924°. The purpose of the public open days was to inform all I&AP's of the proposed development.
- The anticipated impacts and issues, positive and negative, were identified from I&APs, in order to determine their potential significance and the need for further assessment during the subsequent EIA process which is in progress.

During the course of this EIA assignment the following actions and steps are required and will be followed in accordance with NEMA Regulations in Government Notice No. 982 of 4 December 2014, as amended:

- An Application for Authorisation, signed by the Applicant, together with a Declaration of Independence, which was signed by the environmental assessment practitioner, will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land & Environmental Affairs (DARDLEA). This will coincide with the submission of the BAR.
- The Public Participation Process will inform the public about the proposed process and input, comments and suggestions will be requested.
- The draft BAR with an Environmental Management Program (EMPr) will be made available for comments to the DARDLEA registered I&APs, the local authorities and all other applicable stakeholders. The draft BAR & EMPr will also be available to be viewed at the municipal library in Kinross.
- All issues from the will be addressed in the final BAR & EMPr, as well as issues and impacts identified by the Environmental Assessment Practitioner. The issues identified in the specialist studies will also be addressed in the final BAR & EMPr.
- The final BAR & EMPr will also be made available to the public for review.
- The final BAR & EMPr will be submitted to DARDLEA for review.
  Once the DARDLEA accepts the final BAR & EMPr, an Environmental Authorisation can be issued.

The BAR & EMPr was made available for comments to the registered I&AP's. Comments received from I&AP's on the contents of the draft BAR & EMPr will be incorporated into the final BAR & EMPr. By making the draft report available, ensures that all issues have been identified.

The following specialist studies were conducted with a set out terms of reference and included into the draft EIA report, as well as key environmental issues identified during the draft phase and Public Participation Process. The Mpumalanga Biodiversity Conservation Plan (MP CBA Map) (see Appendix 3A for the MP C-Plan map) also formed a basis and tool used on which the biodiversity assessment was conducted:

- **Fauna & Flora Impact Assessment:** A description of the vegetation of the study area, including the identification and assessment of potential Red Data species compiled by **Enviflora (Flora & Avifauna Specialist).**
- **Aquatic Delineation Study:** A description of the wetland in and around the study site, compiled by **REC.**
- **Heritage Impact Assessment Report:** A description of the cultural and heritage elements in and around the study site compiled by **Leonie Marais-Botes (Heritage Practitioner).**
- **Storm Water Management plan:** A plan manage any water from hard surfaces around and away from the wetland, compiled by **IDS Consulting Engineers.**
- **Surface Water Recharge Classification and Engineering:** This study aims to establish a baseline reference of surface water data to form part of an IWULA (Integrated Water Use Licence Application). Compiled by **Sampie van Greunen.**

3. LEGISLATIVE FRAMEWORK

3.1 National Environmental Management Act 108 of 1998 as Amended

NEMA was promulgated on the 27th of November 1998. The intention of NEMA is to provide for:

- Co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- Institutions that will promote co-operative governance; and
- Procedures for coordinating environmental functions exercised by Organs of State;
- The prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment.

Section 28(1) of NEMA states: "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring". If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. Afgri Operations as the custodians of the site, along with the appointed specialists therefore have a responsibility, to ensure that the EIA process conform to the principles of NEMA and that the objective of the EIA

process is to identify and assess environmental impacts and to manage these impacts. The final objective is to ensure that this development remains environmentally sustainable.

Table 1: Listed activities triggered in the 2014 NEMA regulations, as amended.

R. 982 (327) of 4 December 2014 (7 April 2017), as amended: Listing Notice 1- Basic assessment Activities	
Activity No	**Listed Activity Description:**
3	The development and related operation of facilities or infrastructure for the slaughter of animals with a - (ii) product throughput of reptiles, game and red meat exceeding 6 units per day;
4	The development and related operation of facilities or infrastructure for the concentration of animals in densities that exceed: ii) 8 square metres per small stock unit and; a) more than 1000 units per facility excluding pigs where (b) will apply; or b) more than 250 pigs per facility excluding piglets that is not yet weaned.
12	The development of – (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; where such development occurs – (a) within a watercourse;
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;
27	The clearance of an area of 1 ha or more but less than 20 ha of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for – i) the undertaking of a linear activity; or ii) maintenance purposes undertaken in accordance with a maintenance management plan.
48	The expansion of – (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-

	(a) within a watercourse;
R. 985 (324), 4 December 2014 (7 April 2017), as amended: Listing Notice 3 - Basic assessment Activities	
Activity No	**Listed Activity Description:**
12	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: f. Mpumalanga: i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;

3.2 National Water Act, 1998 (Act No. 36 Of 1998)

The National Water Act, No 36 of 1998 (NWA) was promulgated on 20 August 1998. The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled.

In terms of Section 19 of the Act owners/ managers/ people occupying land on which any activity or process undertaken which causes, or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

This Act is relevant to the proposed project as both the construction and operational phases may impact negatively on water resources (for example, streams, rivers, wetlands and groundwater resources).

weGrow Farming Enterprises (Pty) Ltd. is therefore required to take all reasonable measures to prevent any pollution to water resources as a result of the proposed project. Should any pollution occur weGrow Farming Enterprises (Pty) Ltd. will be obliged to cease the activity that has caused the pollution and remediate any negative impacts resulting from the activity.

Notice is also herewith given in terms of section 21 of the National Water Act, 1998 (Act 36 of 1998) with regards to the application for a Water Use License and/or Registration of the water use activities associated with the proposed development, which includes:

- Section 21(a): taking water from a water resource;
- Section 21(b): storing water;
- Section 21(c): impeding or diverting the flow of water in a watercourse;
- Section 21(e): engaging in a controlled activity (irrigation);
- Section 21(g): disposing of waste in a manner which may detrimentally impact on a water resource; and
- Section 21(i): altering the bed, banks course or characteristics of a watercourse

3.3 National Heritage Resources Act, 1999(Act No. 25 of 1999)

The National Heritage Resources Act 25 of 1999 (NHRA) was promulgated in 1999 and aims to protect and manage the heritage resources of South Africa. The South African Heritage Resources Agency (SAHRA) is the enforcing authority of this Act and according to Section 38, a Heritage Impact Assessment (HIA) is required where certain activities are proposed.

The activities that apply to the project include:

- Section 38 (1) (c): any development or other activity which will change the character of a site-
    - exceeding 5 000m^2 in extent; or

3.4 National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

The National Environmental Management: Air Quality Act of 2004 was only fully implemented from 1 April 2010, replacing the Atmospheric Pollution Prevention Act No. 45 of 1965.

The Air Quality Management Act aims to:

- Shift focus to the receiving environment in order to protect and enhance the quality of air;

- Provide reasonable measures for preventing pollution and ecological degradation;
- Secure ecologically sustainable development while promoting justifiable economic and social development;
- Decentralize management by shifting responsibilities to provincial and local government;
- Provide baseline air quality characterization by identifying priority areas, pollutants and sources;
- Provide a range of emissions reduction measures through command and control measures as well as market incentives and disincentives;
- Standardize through routine monitoring, information management and reporting; and
- Promote public participation and access to information.

This act is relevant to the proposed project as it may result in higher or lower levels of air pollution (dust and vehicle emissions) in the area, through both the construction and operational phases.

3.5 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), abbreviated as NEMBA.

The objective of the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA), within the framework of NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bioprospecting;

The South African National Biodiversity Institute (SANBI), which was established as a result of the NEMBA, and has the key responsibility of monitoring and reporting on the country's biodiversity and conservation status in terms of threatened and protected species or ecosystems.

SANBI undertook a detailed mapping of South Africa's biodiversity and publish a list of threatened eco-systems. From that a biodiversity conservation plan was created for the

Mpumalanga Province. Presently, however, it is considered good practice to conduct Faunal and Floral Impact assessment studies where development projects are to be implemented in sensitive areas. The drainage courses (for example) to be affected by the project are indeed sensitive areas. Therefore, these studies will be conducted during the BAR process. If any negative impacts on biodiversity should be identified, weGrow Farming Enterprises (Pty) Ltd. will take all reasonable measures to limit the impacts.

4. PROJECT MOTIVATION & ALTERNATIVES

4.1 Need and Desirability (Appendix 7)

Information was provided by Plantkor of this proposed development.

4.1.1 Need

weGrow Farming Enterprises (Pty) Ltd. is a commercial crop farming enterprise located in the Amersfoort district of the Mpumalanga Province of South Africa. Producing maize and soya beans on 1600 hectares of high potential arable land as part of 6200 hectares of land owned by the shareholders of the company. The shareholders of weGrow Farming is SiyaMilisa Investment Holdings (Pty) Ltd. that holds 55% and BB Agri Farming Trust with 45% of the shares.

The establishment of weGrow Farming in 2013 was the initiative of the Khanyile and Bam families to combine the crop operations of Afrikan Farms (Pty) Ltd and BB Agri Farming Trust mainly to benefit from the economies of scale and access to greater technical expertise with great success.

In taking weGrow Farming to the next level we are seeking a partnership with the Danish Investment Fund for Developing Countries (IFU) to establish a 2400 sow unit and feed mill in phase 1 and expanding the Pig Operation to 4800 sows with a abattoir as part of phase 2 within the next 5 years. A strategic alliance with the IFU and new alternative farm business models will capture economies of scale, reduce costs, improve asset utilization, access greater technical expertise, access superior genetics and obtain market access.

Over the past decade, rising carcass weights and improved efficiency have been the main constituents of production growth, as opposed to increased sow numbers. While improving efficiency is no doubt positive, significant increases in production in the future will be dependent on continued improvements in efficiency as well as greater investment and expansion of the sow herd.

On top of this outlook the SA pork industry are losing 4000 to 6000 sows per year due to noncompliance to new environmental legislation, food security and animal welfare requirement from the processors and supermarkets as well as the pressure of economies of scale on the older and smaller pork producers. Taking this situation in account as well as a forecasted annual growth of 3% in domestic pork consumption over the next decade, the national pork herd must grow with 7000 to 9000 sows per annual up to 2025.

weGrow's Competitive Advantages would be our management team, BBBEE states, and the availability of natural resources within the group of shareholders.

Having duly examined the current situation, we are confident that our proposed partnership will effectively address the needs of all involved. Our goal is to optimise the utilisation of the existing cash crop produced by weGrow by getting involved in the value chain.

Our unique ability to manage farming operations and our successful track record makes us an invaluable partner. We look forward to forming a mutually rewarding relationship with the IFU.

4.1.2 Desirability

Strategy

weGrow is a commercial farming enterprise rooted in commercial farming practices and focused on unlocking economy of scale to the advantages of all stakeholders and the surrounding community; whilst being BBBEE compliant and aligning to the National Development Plan. This will be achieved through sound commercial farming practices and effective management. We believe we can be a model for successful farming into

the future by living the belief that "the Nation owns the land, now the Nation holds us worthy of working it"

Vision

weGrow is a successful commercial farming enterprise that will contribute to the stability of food security in South Africa for the benefit of the community and other stakeholders.

Mission

To achieve our mission weGrow strives to be a well-managed commercial farming enterprise that is community rooted and actively unlocks the economy of scale to the advantage of the stakeholders and the community as a whole; whilst contributing to food security in South Africa.

Values

1. Integrity

weGrow commits itself to:

1.1. integrity in all its farming and business practices;

1.2. honesty; and

1.3. the pursuit of goals through legal and ethical means.

Integrity will guide weGrow in all our actions.

2. Community development and participation

weGrow identifies itself closely with, and commits itself to contributing to food security and serving historically disadvantaged communities by:

2.1. Contributing to nation building through agricultural development.

2.2. Actively contributing to land reform programmes by having collaborative partnerships with government and/or emerging farmers.

2.3. Finding creative ways of using our resources and skills to contribute to commercial farming development.

2.4. Investigating how we can contribute to new emerging farmers becoming successful commercial farmers.

2.5. Committing ourselves to the social upliftment of the community as a whole, irrespective of their involvement in the project.

3. Sustainability

weGrow will be sustainable by:

3.1. Employing modern technology.

3.2. Employing sound and ethical management practices.

3.3. Remaining profitable through safety, protection and concern for environmental factors.

4. Skills development and skills transfer

weGrow commits itself to the ultimate skills development and transfer of skills to:

4.1. Our workers; and

4.2. the community on a non-racial basis.

5. Discipline

weGrow will be disciplined in our approach to:

5.1. The science and precision of farming.

5.2. Our workforce.

5.3. The precision of planning.

5.4. Addressing the backward practices in agriculture.

5.5. Human Resources

- Paying salaries into bank accounts.
- Enabling Provident funds.
- Providing Employee assistance programmes - funeral fund and retirement annuity.

6. Respect

weGrow will be respectful through our belief that:

6.1. All people should be treated with dignity and respect.

6.2. A happy family is more important that a huge salary.

6.3. Listening to and understanding the needs of our employees are key to weGrow.

4.2 Properties Affected

- Zoetfontein 4-HT Remainder (SG Code: T0HT00000000000400000);
- Zoetfontein 4-HT Portion 2 (SG Code: T0HT00000000000400002);
- Kleinfontein 3-HT Portion 3 (SG Code: T0HT00000000000300003);

4.3 Project Description

4.3.1 Locality and Study Area

Proposed development (see Fig. 1) will be on the:

- Zoetfontein 4-HT Remainder (SG Code: T0HT00000000000400000);
- Zoetfontein 4-HT Portion 2 (SG Code: T0HT00000000000400002);
- Kleinfontein 3-HT Portion 3 (SG Code: T0HT00000000000300003);

The area on which the piggery will be established is 22km east of the town Amersfoort:

- From the bridge on the Skulpspruit (Amersfoort's eastern boundary) travel 900m in an eastern direction where one will connect with a T-junction, entering from the right;
- Turn right here and travel for 14km where the road will fork. Keep left.
- Travel 7.1km on this road and the first proposed site will be on the right next to the road.
- GPS Coordinates: -27.025363° Latitude; 30.084762° Longitude

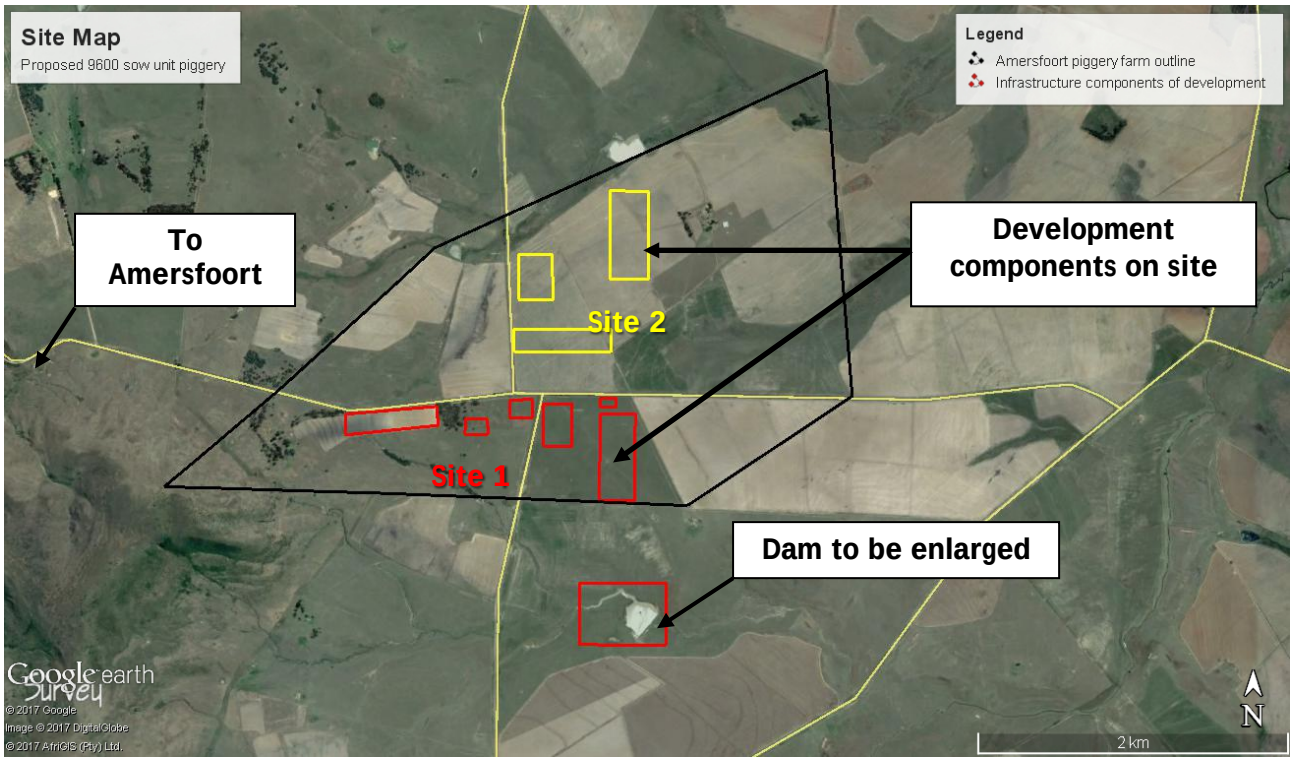


Figure 1: Overview of the study area (red line).

All designs are based on the latest SARPO and the European Union's new pig regulations and legislation.

All the buildings and equipment are designed with the above objectives in mind. The pigs will be free at all times except during lactations. This is to prevent the sows from injuring the piglets when they are just born. Once these piglets are strong enough to fend for themselves the farrowing crates will be opened to give the sow more space. The pigs welfare is placed at all time as priority number one.

Each production centre has a special care centre for sick or injured animals. The hygiene in the units is paramount and will be administered to prevent any disease spread. All humans will be required to shower and be disinfected when entering and leaving the units.

The effluent from the units is all organic and will be sold or used as organic fertiliser and organic liquid. The effluent will be stored under the houses in slurry pits and flushed every 14 days to prevent any ammoniac developing. No water will be required to flush the organic effluent from the buildings. The effluent will be piped to an effluent

separation sections to prevent any contact with soil, or the nearby surroundings. The organic solids will be separated from the liquid by means of a separation press. The dry matter will be stored for own use, or selling to the surrounding farms and the organic liquid will be stored in a lined dam for fertigation through the nearby centre pivots. The above organic fertiliser will be used on 1600 ha of maize and soya fields, to fertilise two crops a year. Total ha 3200.

Water will be harvested from all the 45 000 m^2 roofs for use in the piggery. This will amount to ± 30 000 m^3 a year, which is about 40% of the requirement of the farm.

The farm will also make use of solar energy for the heating of all the water for washing purposes. We have also made provision for a biogas plant in the future when it became viable.

The production units (for site 1 & 2) are as follow:

Component 1	Breeding and Farrowing
Component 2	Weaner
Component 3	Finishers

The unit (for site 1 & 2) is designed considering the following norms.

Sows

- 2400 sows:28/30 weaned piglets per sow a year.
- 114 days pregnant: 28 days in lactation: 150 day sow cycle = 2.4 farrowing are per year.
- Replacing 45/50% sows a year
- AI with some natural services

Gilt Development

Breeding stock will be selected at 28 days from the farrowing house and housed in the gilt development nursery. Breeding will take place every 2 weeks with 14/15 sows to supply 70 gilt weaners. This selected stock will be kept in 2 sections for 42 days and then moved to the development section. Breeding stock will be kept in groups of 18 up to 180 days or first heat. These gilts can be served by a V-Boar, or and moved to a gilt

pen for 1 to 2 weeks before introduced to the ESF training section for 5/6 weeks. Two week before Insemination 50 gilts will be moved to the AI section to get used to AI crate. Provision is made for 88 gilt crates. By introducing the gilts earlier to the AI crates will improve the conception rate. The gilts will only be kept in crates for insemination. The rest of the time the sow will be free to walk around

The Gilt training section is a part of the breeding house. This section will hold 50/60 gilts in different stages from 180 days to 220 days. Gilts will be kept in pens on arrival from the development section and then moved to a training section to be introduced to the ESF stations. Gilts will be exposed to a boar. The gilts will be in contact with the detection boar. As they come on heat the gilts will be marked with a colour so that you can identify them. This will assist your stockman as gilts are sometimes difficult to recognise when they come on heat the first time.
This system will then daily select all gilts that are on heat... From here they will be moved to the AI section to be served and introduced into the sow herd. We have made provision for the gilts to be moved to the AI section two week before insemination.

Breeding/ AI
Gilts will be kept in special Gilt AI crates and the sows in sow AI crates. Boar gates are fitted in front of every 7 sows. Sows will stay in AI section for 7 days and then moved to the early gestation for 35/40 days. In this section the sows can be kept in crates or as free sows by opening the gates.

After 35/40 days, and the sows are certified pregnant, they will move to the gestation house. The sows will be accommodated in an open house with ESF station with 2.3 m^2 space each. Each sow will be individually fed by the ESF station. The sows can eat at their own time when they are in need of feed. This is an advantage as the sow is protected during feeding and the feed can be altered for the individual sow.

Farrowing
The sows will be in the farrowing house for 26/28 days. The farrowing house will house 60 sows in 10 rooms on slats with anti-Crushing crates. These crates prevent the sows from crushing the piglets. In the design of the Plantkor sow stall, special attention was

given to animal comfort with an optimum sanitation. This reduces the mortality to less than 6% below the norm.

Weaners

- Weaning on 28 days 7/8kg
- 49 days in weaning house with a daily average to reaching +/- 30kg
- 3 to 4 % mortality
- Required temperature is 27 degrees for the first two weeks and reducing by 1 degree per week

There are 8 rooms with 2800 pig spaces. Each room is divided in 72 pens of which 2 are divided to be used as special care pens. The Ventilation is our unique system that allows us to ventilate up to 70 cub meters of air per weaner in one hour without causing a draught. This is essential in South Africa's hot summer months.

Finishing Pigs

We have made provision for 1400 pigs per building up to a max of 100 kg live weight. There are 12 buildings with 80 pens of 17 pigs per pen. One pen is divided into two special care pens per building. We have allowed 0.882 m^2 per pig. We have made provision for 1 feed line. One silo will be used for the different feeds.

Abattoir

Dirty area:

- Pigs are coming to slaughterhouse by trucks 2 times/day
- 1 person work in stable and arr to there come 4-6 pigs into stunning area/ cyclus.
- Pigs are group animal and will go very stressless when they go in small group 4-6 pigs.

1) Stunning by Freund E512, Head/heart stunning with optimal stunning. No bloodspot in ham or broken bones. All stunnings will be stored on USB stick so you can store it on office computer for later doc to customer/wet. After stunning bring pig on bleeding chain on one leg. Up on slide-rail by el-hoist arr.

2) Bleeding area: stick pig and let it bleed for app 4 min. Pigs has same volume of blood inside as we people have = 7 litre in bleeding area we can get out app 2.5-3 ltr.
3) Bring pigs down in schalding/dehairing machine by el-hoist arr or 1 sow/cyclus. Water in machine = 63 degrease operate app 3 min. = higher temperature = less operate time. You can go up to 69 degrease = operate time 2 min without scalding spot on hide. Pigs are coming out on table. Gamble on. Up to slide-rail and bring to flaming area. Flame pig so hide will be closed.
3) Whipping machine: 4 walze 4 KW/each with gummiwhipper make final treatment for hide. Pigs are brought though whipping machine by chain-conveyor.

Clean area:
4) Open pig by a knife.
5) Breastbone cut by axe.
6) Casing set out, bring to casing room by a shute
7) Plucks set out. Bring to rack and cut every part and bring each part to boxes. Bring to chill-room in boxes.
8) Splitting saw by Freund Sb 49-08, Band-saw model.
9) Weight scale.
10) Chill-room, max 7 degrease inside before cutting.
11) Cutting room. First take tenderloin, Cut in front, middle and ham
12) Cut middle part in loin-belly.
13) Packing area: pack product in customer need packing by vac Webomatic Duomat 850 or in boxes. Bring packing to customer or in chilling-room or freezing room for later despatch.
14) Casing room:
15) Stomach: cut free from casing set and nettfatt. Collect 10 stomach and clean stomach in centrifuge. Water temperature in casing room must be app 40-42 degrease.
16) Pork rectum cut and empty, uterus cut free, bladders empty, pancreas free, cut fat free, cut spleen free.
17) Set green runners in special tools via one running wheel to walze machine where we press manure out collect 5 pcs G. Runner = 10 kg.
18) Chitterling release take chitterlingfatt out and bring chitterling on turn/water pipe. Machine will clean chitterlings inside and outside. All casing product must just after

operation bring in wemag trolley 200 ltr with ice flakes to all product come under 3 degrees before packing after packing to chill-room.

The proposed dam capacity expansion

The existing dam on the farm Kleinfontein 3-HT portion 3 is envisioned to be enlarged by extending and making the dam wall higher by 1m. The surface area for this dam when at capacity will be 12.5 Ha. A surface area increase of about 6ha. The dam volume will be at 434 350m^3. The dam wall will be 5.63m in height and will have a surface area of 12 631m^2.

Composting Swine Mortality

Composting is an attractive mortality management option because it is an effective, safe, and environmentally friendly method that utilizes the nutrients in the mortality. Since composting usually takes place on the farm as the mortality occurs, the bio-security concerns associated with storing and transporting carcasses are greatly reduced. When properly managed, composting will generate few if any objectionable odours. However, as with any management practice, an understanding of the underlying principles, proper design, and proper management are required for successful results. Working with information and professional assistance available can help producers design, and implement a composting facility that adequately addresses animal health, environmental, community relations, and farm management concerns. Please look at the full report of how the pig carcasses will be composted in Appendix

4.3.2 Proposed Alternative

Feasible alternatives can be considered at this stage. Alternatives that can be considered at this stage are mainly Activity (Chickens broiler facility) and Design (layout) only. The location is a pre-existing property. This is also the only property available to the applicant at this stage. Alternatives in terms of layout could be considered. This will be determined where on the available area the development will have to be placed in the most effective way. The technology to be used and in commercial farming with pigs to this extent and scale i.e. different pig units (climate controlled), manure removal, feeding and watering systems, etc. is of the latest used standards. As a rule this high

standards in pig farming technology must be implemented when farming with a 9600 sow unit, and in order to maintain a sustainable market share.

The current electrical power provision is through the normal Eskom network. As an alternative to this part of the technological layout of the facility, the provision of electricity through solar energy generation can be considered as an alternative. This can imply the installation of visible solar panels for partial or self-sustaining electricity provision to the facility.

Table 1 below provides a description based on land use and general environmental characteristics of the study area.

Table 2: Affected Areas of the proposed development.

Adjacent properties	Access	General comments	Key Environmental Issues
Recreational, government and agricultural properties all around.	Multiple accesses from the main gravel road exist.	The construction will be on the land portion earmarked for the proposed development. Natural to Disturbed grassland sections will be used for the proposed development.	• Vegetation removal. • Possible habitat loss. • Air pollution due to exhaust fumes and dust. • Possible Odour from the development. • Possible ground water contamination from Pig manure processing & Abattoir facility.

4.3.3 Assessment and Considering of Alternatives

Consideration of alternatives is one of the most critical elements of the environmental assessment process. It has its purpose to provide a framework for sound decision-making based on the principles of sustainable development. The search for alternatives should be well documented and should take into account the views of stakeholders. According to the Criteria for determining alternatives as part of the Integrated Environmental

Management Information Series, the key criteria for determining alternatives should be practical, feasible, relevant, reasonable and viable.

Right from the onset of the EIA process close examination was given to different activity alternatives. Due to the fact that this area is earmarked for agricultural purposes, only these types of entities can be considered. This was done in conjunction with the applicant & engineer as one has to acknowledge that not only environmental issues need to be taken into account but also to a large extent what will "work" from a business point of view. Layout alternative options, on the area, have very few additional flaws in terms of economic, social and environmental impacts.

In terms of the Public Participation Process, one activity alternative is suggested to the public to take into consideration. This activity alternative was assessed in terms of an environmental point of view as well as in a socio-economic point of view, as described below.

4.3.3.1 Activity Alternative (Chicken Broiler as appose to a Piggery)

The activity alternative, i.e. Chicken Broiler, will have to be in line with similar opportunities for creating jobs for the local community and needs of the local area. This Chicken Broiler should accommodate the same developmental aspects that the available land can provide.

Positives	• Job creation possibilities; • Economic upliftment for the local area;
Negatives	• Same footprint of habitat loss as the Piggery; • Influx of traffic may add to the traffic load of the surrounding road network; • Same possibility of waste generation (blood, effluent and domestic solid waste) to be processed and disposed of as the Piggery; • Crime could rise in the local area due to the influx of more people; and • Additional impact on the water resource of the area.

4.3.3.2 Design (Layout) Alternative

The positioning of the different pig components on-site could be moved to different areas on the same site. The current placing of all the pig components (feed mill, abattoir, finisher buildings, etc.) is strategically placed in terms of environmental sensitivities and quick access. Any change in layout will either move a component off current cropland or closer to a wetland or drainage line.

Positives	• None.
Negatives	• Will be inside the buffer-zone of a wetland or drainage line; • More natural vegetation will be impacted upon; • Less efficient/quick access will be available for commercial productivity. • Greater impact from stormwater on natural drainage ways.

4.3.4 No Go Option

A "DO NOTHING" alternative would be not to use the current property and let it stay as grazing and possible future cropland. This setting is not orientated for residential use; therefore no adequate services are in place to accommodate large volumes of sewage and domestic waste. On the other hand, no additional job opportunities will be created and no contribution will be made to the upliftment of the community and infrastructure development. Thus, if not developed this positive impact will not be seen.

5. BASELINE ENVIRONMENTAL DESCRIPTION

In order to determine the environmental impacts and to identify possible issues associated with the proposed development, it is necessary to provide baseline environmental information. Resulting from the site investigations and desk studies, as well as discussions with Interested and Affected Parties, the following section provides a description of the environmental conditions and important elements within the study area. A general assessment, at this stage, of ecological elements does require a bit more detailed floristic sampling and a wetland delineation study for the draft BAR. All the detailed specialist studies will be included in the draft BAR.

5.1 Land Use and Socio-Economics

The study area is characterized by agricultural land use entities. The proposed development falls within the Pixley Ka Seme Local Municipality and in ward 10. Land use will not be impacted upon by the proposed development due to the similar land use being implemented around the property.

The Pixley Ka Seme Local Municipality is situated on the eastern border between Mpumalanga and KwaZulu-Natal and is framed by the Mkhondo Municipality in the east, Msukaligwa Municipality to the north and Lekwa Municipality to the west. It comprises an area of approximately 5227.98km², which includes Amersfoort, Ezamokuhle, Perdekop, Siyanzenzeda, Volksrust, Vukuzakhe, Wakkerstroom, Esizameleni and Daggakraal. According to the Statistics South Africa's data from 2011 the Pixley Ka Seme Local Municipality and in particular the Amersfoort:

Key Statistics 2011: Amersfoort

Characteristics	
Total population	12,335
Young (0-14)	33,8%
Working Age (15-64)	61,8%
Elderly (65+)	4,4%
Dependency ratio	61,9
Sex ratio	94,2
Population density	722 persons/km^2
No schooling aged 20+	16,6%
Higher education aged 20+	6%
Matric aged 20+	24,9%
Number of households	3,625
Average household size	3,4
Female headed households	42,9%
Formal dwellings	92,6%
Housing owned/paying off	43,7%
Flush toilet connected to sewerage	94%
Weekly refuse removal	90,1%

Piped water inside dwelling	43,3%
Electricity for lighting	95,3%

5.2 Biophysical Environment

5.2.1 Regional climate

The study area is situated in pure grassland region, which is located in a warm temperate region typical of the Highveld at higher (1400 m.a.s.l.) altitudes.

5.2.2 Precipitation

The site falls within the summer rainfall area with dry winters. Mean Annual Precipitation (MAP) is between 801- 1250 mm. It is a cool-temperate climate with thermic continentality, which means high extremes between maximum summer and minimum winter temperatures with frequent occurrence of severe frost and large thermic diurnal differences. Frost will start to occur between 21 – 30 April (Mucina and Rutherford, 2006 and AGIS).

From October to March the precipitation is at its highest, contributing to 83% of the MAP. The driest month is June & July, with less than 5 mm of rain. The greatest amount of precipitation occurs in January, with an average of 104 mm.

See Fig. 2, for the MAP and temperature occurring in this area using the Agricultural Geo-Referenced Information System (AGIS).

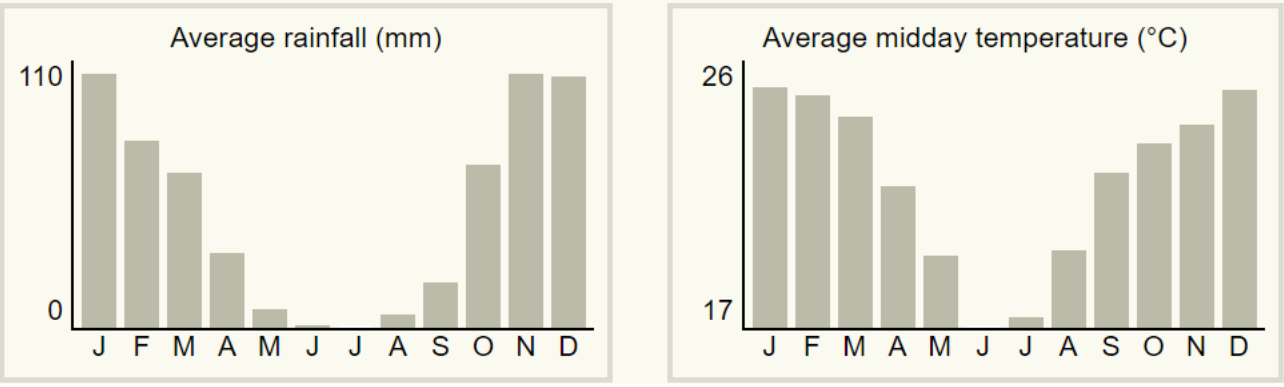


Figure 2: Average rainfall and temperature graph for the region weather station obtained by using the Agricultural Geo-Referenced Information System (AGIS, 2017).

5.2.3 Temperature

January is the warmest month of the year. The temperature in January averages 25.1 °C. The lowest average temperatures in the year occur in July, when it is around 0 °C. (See graphic illustration above for the long-term annual temperatures occurring in this area using the Agricultural Geo-referenced Information System (AGIS) (see Fig. 2).

5.2.4 Frost

Frost occurs over 5 months per year, starting in April and ending in October.

5.2.5 Mean Monthly Wind Direction and Speed

No data is available on the average wind speed for the study area. Wind data was obtained for Ermelo as variation in wind direction, occurrence and speed is expected to be very similar in the study area. The available wind data as obtained from the Meteoblue indicates that the average wind direction and speed are as graphically indicated below:

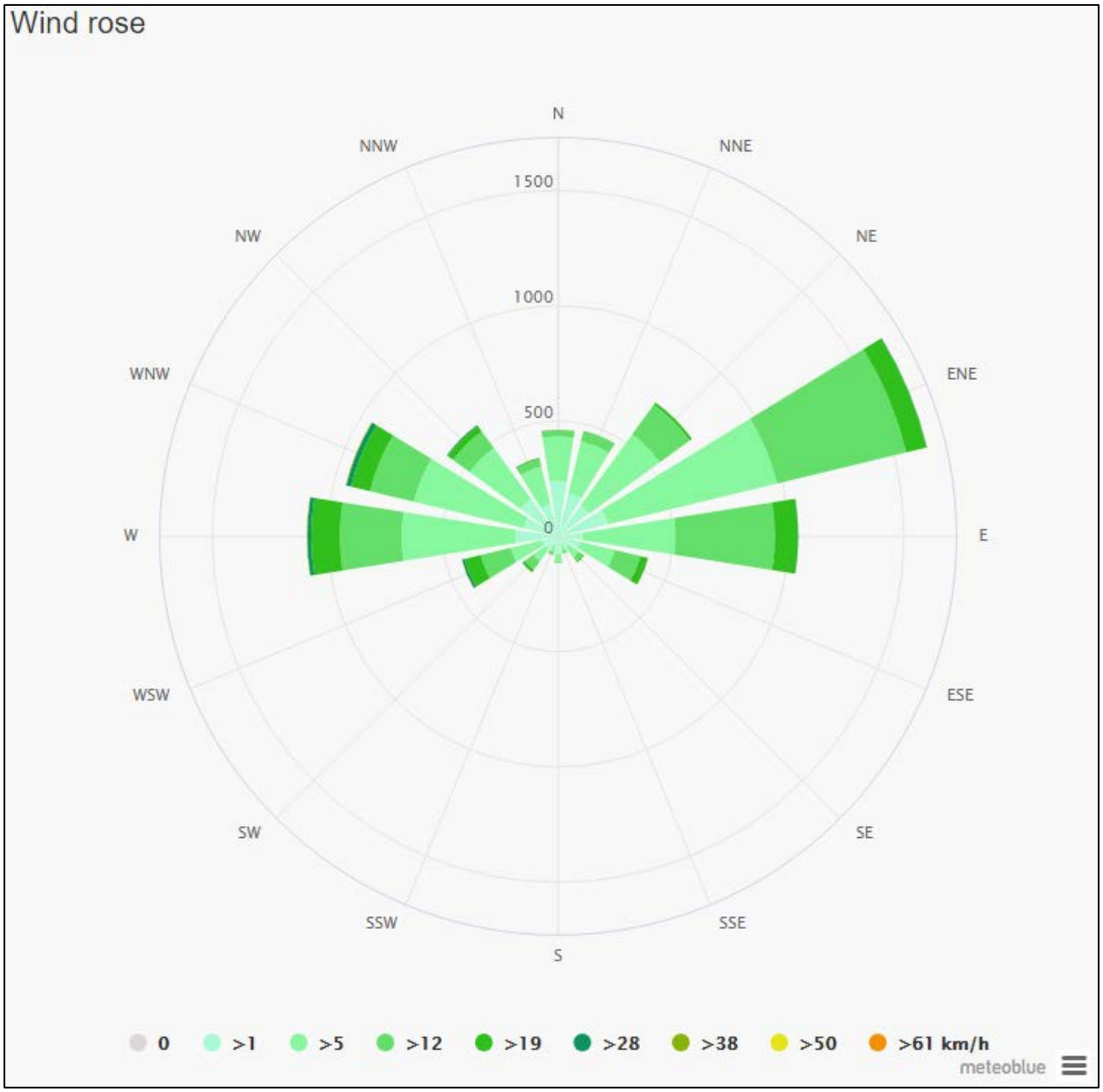


Figure 3: Prevailing wind of the wider region (Ermelo weather station).

The prevailing wind, on a regional basis, is predominantly east-northeast, east and west. Wind speed, on a regional basis, in the region is relatively moderate with an average of 12 km per hour compared to stronger winds of an average of 28 km per hour.

The prevailing wind directions for summer and winter morning and afternoons are as follows:

Summer: Northwest to East

Winter: West to Northwest

5.2.6 Topography and Surface Drainage

Sensitive features include the various wetlands, drainage lines and small dams around the site.

The 'terrain type' of the area is classified as level plains with some relief. The terrain contains some distinct topographical sections, namely:

- A wetland with an associated drainage line running through the north western part of the property;
- A small stream with a small dam running through the south western part of the property;
- There is a hill at the most western part of the property;
- There are farm structures in the north eastern part of the property.

The area has a very gentle slope. The site falls within the Klein Vaal Quaternary catchment area (C11C catchment).

5.2.7 Agricultural Potential of the Study Area

The land potential, and specifically the agricultural potential of a site, is determined by the combination of climate, soil conditions and slope prevailing in that region or site, resulting in the classification of areas with similar agricultural land potential. These land potential classes range from "Very High Potential" to "Very Low Potential". The Department of Agriculture has mapped the agricultural potential of South Africa. Using this mapping files, (Agricultural Geo-Referenced Information System [AGIS], as indicated in Fig. 4), it can be seen that the study area as well as surrounding the site, the agricultural potential is rated as moderate potential arable land.

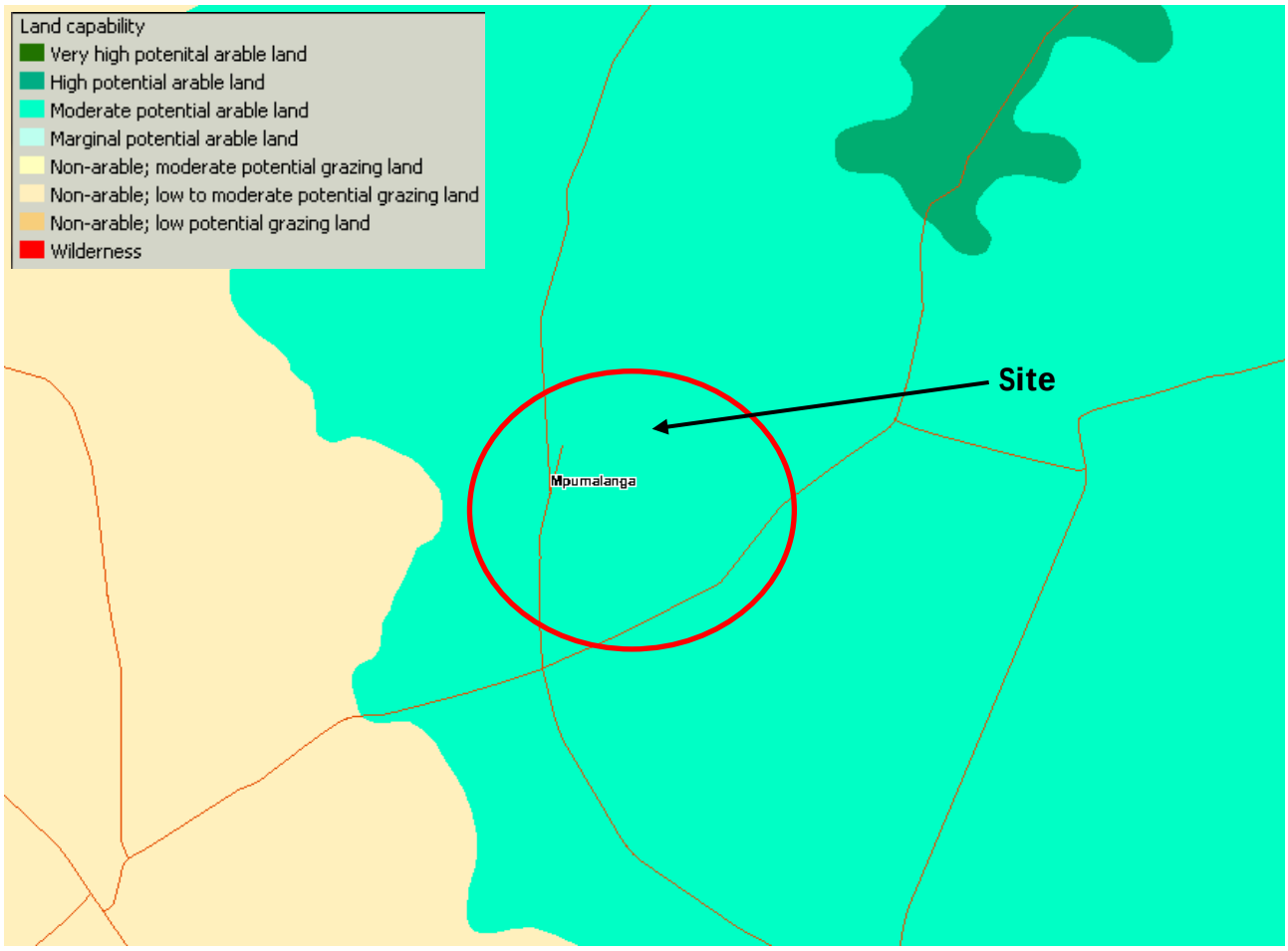


Figure 4: Agricultural potential for the study area (AGIS, 2017).

The agricultural activities practiced in the study area are:

- Grazing or cattle and sheep; and
- Large scale crop farming.

5.2.8 Flora of the Study Area

The study area is situated in the Wakkerstoom Montane Grassland (Gm 14), a threatened ecosystem. This unit is a less obvious continuation of the Escarpment that links the southern and northern Drakensberg escarpments. It straddles this divide and is comprised of low mountains and undulating plains. This vegetation type is characterized by grassland dominated by *Andropogon schirensis (d), Ctenium concinnum (d), Cymbopogon caesius (d), Digitaria tricholaenoides (d), Diheteropogon amplectens(d),* and *Eragrostis chloromelas (d)*. The vegetation types on site are further categorized by low shrubs like *Anthospermum rigidum* subs. *pumilum*, *Asparagus devenishii (d), Cliffortia linearifolia (d),* and *Helichrysum melanacme (d)*.

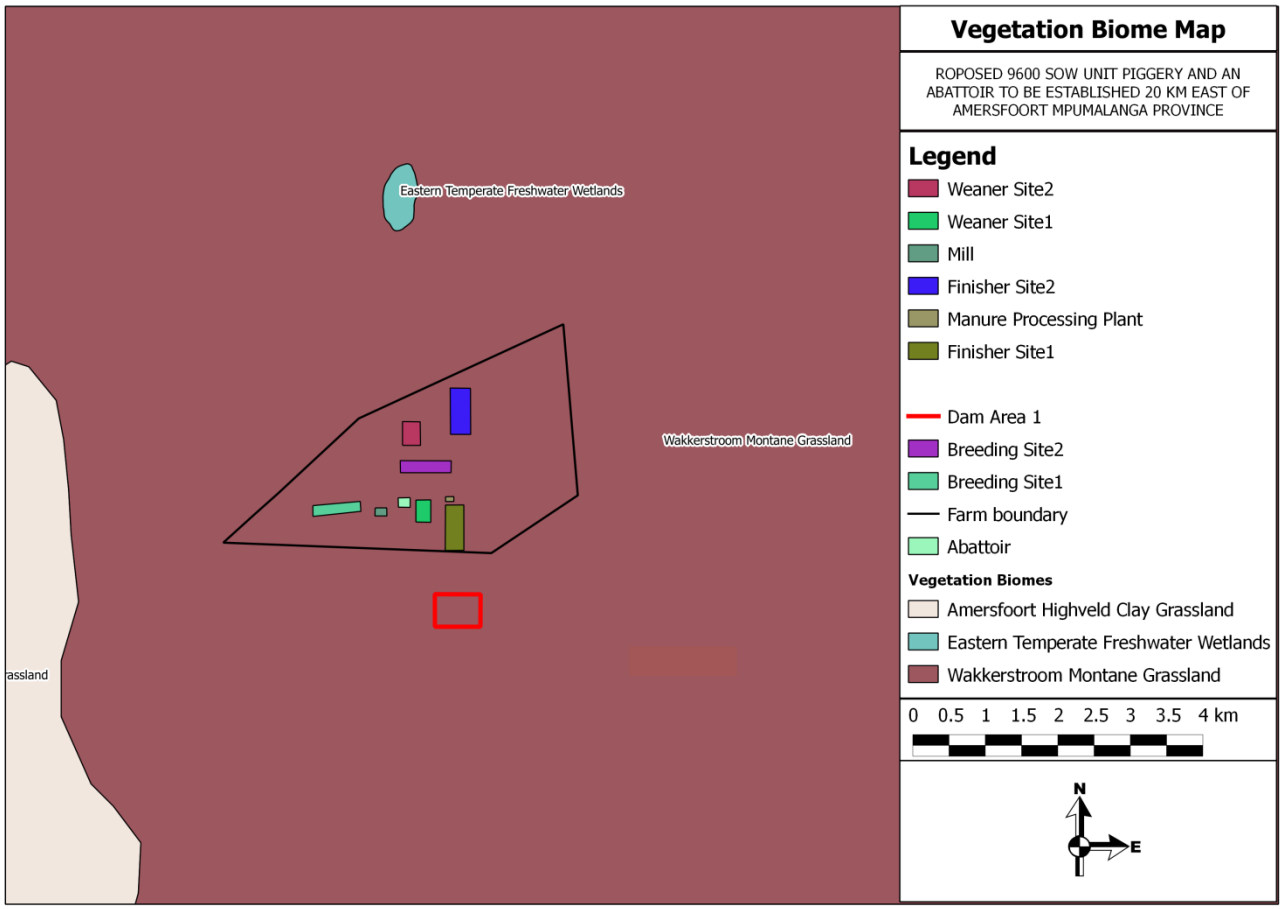


Figure 5: Vegetation type of the study area.

A Threatened species and Species of Conservation Concern list for the Grids 2730AA was obtained from the Plants of South Africa (POSA) database on the South African National Biodiversity Institute (SANBI) website. Threatened species are those that are *facing high risk of extinction, indicated by the categories Critically Endangered, Endangered and Vulnerable.* Species of Conservation Concern include the Threatened Species, but additionally contain the categories Near Threatened, Data Deficient, Critically Rare, Rare and Declining. This is in accordance with the new Red List for South African Plants (Raimondo *et al.* 2009). However, the POSA list is based on herbarium specimens housed in the National Herbarium of SANBI; therefore many plant species that do occur in the area are not listed.

The following possible red data plant species (by the categories Critically Endangered, Endangered and Vulnerable) could occur in the areas surrounding the study area:

- *None.*

5.2.9 Fauna of the Study Area

The study area is stretched over a relatively large area. No Red Data Book Species were encountered.

5.2.9.1 Mammals of the study area

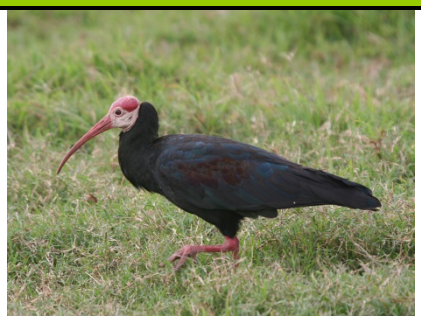
Possible red listed mammals that would commonly occur in the wider surrounding area are: *Raphicerus campestris* (Steenbok) (LC), *Caracal caracal* (Caracal) (LC), and *Cynictis penicillata* (Yellow Mongoose) (LC). No Red Data Book species were recorded. There are also no records of red data (Critically Endangered, Endangered and Vulnerable) mammals for the wider area (2730AA).

5.2.9.2 Avifauna

According to available literature, approximately 262 bird species occur in the Latemanek quarter degree grid cell (2730AA). No Red Data species were recorded on site. According to Taylor *et al.* (2014) and South African Bird Atlas Project 2, the following bird species are threatened in the wider area:

Table 3: List of possible red data (Critically Endangered, Endangered and Vulnerable) avifauna on or near the site.

SCIENTIFIC NAME	COMMON NAME	IMAGE
Mycteria ibis	Yellow-billed Stork	
Ciconia nigra	Black Stork	

SCIENTIFIC NAME	COMMON NAME	IMAGE
Geronticus calvus	Southern Bald Ibis	
Sagittarius serpentarius	Secretarybird	
Polemaetus bellicosus	Martial Eagle	
Circus ranivorus	African Marsh-Harrier	
Circus maurus	Black Harrier	

SCIENTIFIC NAME	COMMON NAME	IMAGE
Falco biarmicus	Lanner Falcon	
Grus carunculata	Wattled Crane	
Balearica regulorum	Grey crowned crane	
Neotis denhami	Denham's bustard	
Eupodotis senegalensis	White-bellied Korhaan	

SCIENTIFIC NAME	COMMON NAME	IMAGE
Rostratula benghalensis	Greater Painted-snipe	
Heteromirafra ruddi	Rudd's Lark	
Spizocorys fringillaris	Botha's Lark	
Lioptilus nigricapillus	Bush Blackcap	

SCIENTIFIC NAME	COMMON NAME	IMAGE
Anthus brachyurus	Short-tailed Pipit	
Anthus chloris	Yellow-breasted Pipit	

5.2.9.3 Herpetofauna

No Red Data species was recorded. And no amphibians or reptiles were encountered on site. This might be due to the lack of suitable or specialised searching techniques that is required, as well as the history of anthropogenic activities on site.

Table 4: List of red listed herpetofauna possibly on site or rather found in the wider area:

SCIENTIFIC NAME	COMMON NAME
Amietia delalandii	Delalande's River Frog
Sclerophrys capensis	Raucous Toad
Amietia fuscigula	Cape River Frog
Pseudocordylus melanotus Subs. melanotus	Common Crag Lizard
Psammophylax rhombeatus Subs. rhombeatus	Spotted Grass Snake
Trachylepis punctatissima	Speckled Rock Skink

5.2.10 Elements of Culture Historical Importance

During the site investigations for the draft BAR stage, focus was also placed on the presence of any stone built structure remnants, ruins, grave sites, monuments, complete

built structures and the presence of artefacts. Based on preliminary observations, stone shaped graves were found.

A phase 1 Heritage Impact Assessment, as part of the Environmental Impact Assessment stage of the application process, was conducted by a specialist in accordance with the National Heritage Resources Act (Act 25 of 1999):

Does the site/s contain a wide range of archaeological sites?

The proposed site does not contain any surface archaeological deposits, a possible reason is previous infrastructure development activities in the greater study area. The possibility of sub-surface findings always exists and should be taken into consideration in the Environmental Management Programme. If sub-surface archaeological material is discovered work must stop and a heritage practitioner preferably an archaeologist contacted to assess the find and make recommendations.

Does the site/s contain any marked graves and burial grounds?

Graves are situated near the site earmarked for development. The possibility of graves not visible to the human eye always exists and this should be taken into consideration in the Environmental Management Plan. It is important to note that all graves and cemeteries are of high significance and are protected by various laws. Legislation with regard to graves includes the National Heritage Resources Act (Act 25 of 1999) whenever graves are 60 years and older. Other legislation with regard to graves includes those when graves are exhumed and relocated, namely the Ordinance on Exhumations (no 12 of 1980) and the Human Tissues Act (Act 65 of 1983 as amended). If sub-surface graves are discovered work should stop and a professional preferably an archaeologist contacted to assess the age of the grave/graves and to advice on the way forward.

Recommendations

- There are no visible restrictions or negative impacts in terms of heritage associated with the site earmarked for development.
- If the layout of the proposed development is altered and the graves situated near the development site will be impacted on, suitable mitigation measures must be put in place.
- In terms of heritage this project can proceed.
- Graves close to the site must allow a 50m buffer from development and must be fenced off.
- The discovery of subsurface archaeological and/or historical material as well as graves must be taken into account in the Environmental Management Programme.

5.2.11 Elements of Visual and Aesthetic Importance

Visual and aesthetic elements of importance has been considered with respect to the proposed development, but will in general not be affected by the proposed activities of this project. No visual and aesthetic important elements are evident on site. This development is situated with in an agricultural setting.

5.2.12 Existing Services and Relocation thereof

None at this stage were identified.

6. PUBLIC PARTICIPATION

6.1 Introduction

A Public Participation Process was conducted as part of the Environmental Impact Assessment process. Stakeholders and I&AP's were given the opportunity to participate in this process and their comments, whether positive or negative, will have to be considered in the evaluation process by the Authorities.

The Public Participation Process aims to communicate to the public or community the potential positive and negative aspects that the proposed development will have on their immediate surroundings in an open and transparent way. The details of the project based on design elements available during the public participation exercise are

communicated to the Interested and Affected Parties. The applicant is compelled, to mitigate, where possible, the impacts of the project. Mitigation measures should be implemented considering the practical and feasible means within the framework of the applicant's mandate. Suitable alternatives as identified during the process should also be considered.

6.2 Objectives of the Public Participation Process

The Public Participation Process has the following objectives:

- To inform Interested and Affected parties of the proposed development;
- Provide an opportunity for I&AP's to raise environmental issues/concerns;
- To promote transparency and an understanding of the project and its consequences;
- To serve as a structure for liaison and communication with I&AP's;
- To serve as a data gathering mechanism (of local knowledge);
- To identify issues that can easily be overlooked in the initial stages of planning.

To summarise, the objective of the on-going Public Participation Process is to promote openness and transparency concerning the proposed development, during the life span of the project planning and construction stages. The process should by no means be regarded as a vehicle to temper opposition or objections. Any conclusions agreed upon must be socially, financially and technically acceptable and feasible in order to meet the requirements of both the NEMA and the vision and mandate or responsibility of the applicant, which is weGrow Farming Enterprises (Pty) Ltd. in this instance.

An important and further aim is to identify all I&AP's and remain in contact with them during the EIA process. The Public Participation Process does not terminate at the completion of the public participation phase, but proceeds up to the stage of submission of the draft and final BAR.

6.3 The Guidelines Followed for the Public Participation Process

The Public Participation Process (PPP) for this project was conducted by REC, and undertaken strictly according to the Regulations listed under Chapter 6 of the NEMA, as amended.

6.4 Public Participation Process Followed

The following PPP was conducted for the proposed development (in Summary):

- Identification of key Interested and Affected Parties;
- Compilation and distribution of the Background Information Document (BID) to adjacent property landowners. (Please refer to Appendixes for proof of the notifications or process followed for notifying I&AP's);
- Distributing the BIDs to the relevant Officials, such as the municipality and ward councillor;
- Compiling proof of delivery of the BIDs;
- Placement of a press notice informing the public of the proposed development in a local newspaper;
- Placement of a site notice;
- Public open day was held;
- Receiving written comments from I&AP's to address in this BAR;
- Correspondence with I&AP's, and addressing I & AP's comments;
- Set up a register of I&APs; and
- Compile a comments and response sheet.

6.4.1 Identification of key Interested and Affected Parties

I&AP's were identified progressively by means of a site visit and consultation with local residents and farmers who are familiar within the area and their neighbours. It is acknowledged that the list of registered I&AP's may be extended as the process proceeds through the EIA process.

I&AP's, and the relevant Authorities were given 30 days to register in response to the Background Information Documents, the site notices and the press advertisement. A register of I&APs have been compiled which can be extended during the EIA process.

I&AP's, and the relevant Authorities, will be given 30 days to comment on the Draft BAR. All the comments, concerns and issues raised by the I&AP's and the Authorities will be considered during this phase of the EIA process which is the BAR.

6.4.2 Compilation and distribution of the Background Information Documents (BID)

The aim of a BID is to provide all I&AP's with a brief description of the proposed development. The BID also contains the details of the proponent and the environmental consultant. Furthermore, it serves as an overview of the PPP. The BID invited the I&AP's to submit comments and to register. A comment sheet was attached to the BID, which the I&AP's were asked to complete and return to Rock Environmental Consulting if they had any suggestions or comments or issues regarding the project.

Please refer to Appendix 5A & B for copies of the BIDs and for the Acknowledgment of Receipt of the BIDs. Where the BIDs were emailed or faxed to I&AP's (as indicated on the Acknowledgement of Receipt pages), proof of such correspondence can be provided if required by any authority.

6.4.3 Placement of the press advertisement

Please refer to Appendix 5C for a copy of the press notice that appeared in a local newspaper namely The Volksrust Recorder dated 7/04/2017. Press notices are crucial to create awareness of the project and to reach a broader range of interested and affected parties. Research and enquiries by the EAP indicated that the distribution area of this particular newspaper covers comprehensively the project area / study area.

6.4.4 Placement of on-site notice(s)

The proposed area for development is situated mostly in an agricultural region. Therefore, to inform I&AP's; a site notice was placed at the entrance to the farm. The site notice also provided an opportunity to invite **any interested parties** to register. Please refer to Appendix 5D for copies of the site notice, as well as for the accompanying photographs that serve as proof of the placement of this at the study area.

6.4.5 Public Open Day

One public open day was held on 25 April 2017 between 12:00 and 17:00. The purpose of the public open days was to inform all I&AP's of the proposed development by means of an information session where members of the community or other I&AP's have the open

invitation to come and view the conceptual drawings. These person or persons have an opportunity during the open days to gain knowledge of the project, discuss the project and ask questions in an unhindered and transparent manner.

The open days was held at the applicant's farm house (see images below). I&AP's were invited to attend this open day according to the time frames that were given, to view the conceptual drawings, sign the attendance register as an I&AP as well as submit the Comment and Registration Sheet if ready, that was attached to the BID. The applicant was available to explain the technical details and information indicated on the conceptual drawings and to assist in the clarifications of typical issues such as odour control, ground water pollution and security.


6.4.6 Placement and Submission of the Draft BAR

The draft BAR could be submitted as follows (estimated dates):

Submission date	Receipt date	I&AP or Stakeholder Name	Response in writing
17/11/17	18/11/17	Pixley Ka Seme Local Municipality	7 January 2018
17/11/17	18/11/17	Pixley Ka Seme Local Municipality: Ward Councillor 10	7 January 2018
17/11/17	18/11/17	Public view: Amersfoort Public Library	7 January 2018
17/11/17	18/11/17	MPHRA	7 January 2018
17/11/17	18/11/17	DARDLEA	7 January 2018
17/11/17	18/11/17	Department of Water Affairs and Sanitation	7 January 2018
17/11/17	18/11/17	REC Website: www.rockeco.co.za	7 January 2018

6.4.7 Feedback from I&AP's throughout the EIA Process

The closing date for registration and comment delivery from I&AP's during the public participation phase was within 30 days from the date of publication of the advertisements, which was 7 April 2017, but public participation is still on-going. Comments were still accepted long after the date that was indicated in all notifications and REC will continue to do so throughout the duration of the project up to the submission of the final BAR. The challenge is to address comments, concerns and issues to the best practical means as most of the issues need special attention by the design engineers as well as all other parties that worked on the project.

The complete list of comments received from I&AP's can be viewed in **Appendix 5F.** The questions and comments received to date are addressed in Annexure 5F. REC ensured that copies of the draft BAR were available to all I&AP's and Authorities for more of their comments.

Notes were made of all the aspects and issues that were discussed during the public participation phase. All issues will be addressed and where technical matters arise it will be responded to by the engineer/specialist on this project. All comments and responses can be viewed in the comments and response sheet. It was however firmly communicated that only written comments or issues (as per the registration sheet) could be place on record and responded upon.

A summary of the main comments and concerns received can be viewed below:

- No comments from the public or any other stakeholder were received to date.

6.5 Addressing Written Comments & Questions from the I&AP's

At this stage, no comments have been received, although some people did register via email. The conclusion is made, for the time being, that the project is received relatively positive by the community in general.

A summary of some the responses from the EAP are shown below (see **Appendix 5F** for the up to date Comments and Response Report):

Comments: None yet received.

Response: N/A.

6.6 Conclusions of the Public Participation Exercise

The proposed development has generally been met with a positive attitude from the community at large. Various issues, if any, raised by the I&APs for this project in the Draft BAR stage will also be included in the Comments and Response Report (refer to Appendix 5F for all the issues raised).

The final BAR report will aim to clarify, consider and sustainably mitigate remaining and significant concerns that the participating I&AP's might have. In conclusion, the public participation exercise has provided, up to this stage, adequate information to enable an understanding of what the proposed development would entail and also to list and address the concerns and comments.

Through addressing all comments and questions received from the I&AP's, and through the compilation of a detailed BAR that was made available for comments, the consultant has attempted to promote a better understanding of the activities of the proposed development. The knowledge and understanding of potential impacts identified at this stage of the application process has been improved.

7. ACTIVITIES, IDENTIFIED IMPACTS AND IMPACT ASSESSMENT

7.1 Introduction and Methodology

This section of the BAR provides a list of the biophysical and social issues that can be expected as a result of the proposed development. Some of the issues are localised in their effects, whilst others could influence a more extensive area. A major aim of the BAR is to identify issues and impacts, with inputs from all the specialists on this project, and to assess the impacts identified.

The identification and descriptions of the relevant physical, biological, socio-economic and heritage issues were conducted under the following headings in Table 5:

- Environmental aspects: defined as those actions on site that may potentially have an environmental impact;

- Environmental component to be impacted upon;
- Locality / applicable zone of the impact; and
- Nature and description of the impact/issue before mitigation
- Nature of the impact/issue after mitigation

An impact significance rating and evaluation, for the listed aspects, forms part of the EIA process/report. Significant environmental issues have also been identified by means of the relevant environmental legislation, the opinions of specialist consultants and the views of interested and affected parties.

Most of the identified and anticipated negative impacts listed below will only take effect once the construction of the proposed development commences; the main period of positive impact occurrence is during the long term "operational" phase of the development when it is felt that the broader community will benefit from the project in terms of job creation. The long term negative operational impacts however will also be experienced by the close-by landowners in terms of noise, odour, possible water related issues and other traffic issues such as access to and from the area.

There are numerous assessment methodologies and approaches within the international sphere of assessing the potential impact of development activities on the environment.

When a particular method for environmental impact analysis is selected or used certain general principles must be kept in mind to avoid the mystique and pseudo-science, which cloud many planning procedures. In general terms an environmental assessment evaluation comprises four main tasks:

1. Collection of data;
2. Analysis and interpretation of this data;
3. Identification of significant environmental impacts;
4. Communication of the findings.

Further to the above the proposed mitigation and management options for the identified impacts must be provided. The selected impact evaluation method must enable these four tasks. Impact methodologies provide an organised approach for predicting and

assessing these impacts. Any one methodology and approach will have opportunities and constraints, as well as resource and skill demands, and no one method is appropriate for all South African circumstances. The selected methodologies proposed by this document are appropriate for most South African situations, taking the above criteria into account. Methods whose approach to considering environmental factors is systematic are desirable in an EIA.

Impact assessment methodology should comply with the following set of criteria:

a. *Be comprehensive:* The environment consists of intricate systems of biotic and abiotic factors, bound together by complex relationships. The methodology must consider the impact on these factors.
b. *Be flexible:* Flexibility must be contained in the methodology, as projects of different size and scale result in different types of impacts.
c. *Detect true impact:* The actual impact that institutes environmental change, as opposed to natural existing conditional changes. Long-term and short-term changes should be quantified.
d. *Be objective:* The methodology must be objective and unbiased, without interference from external decision-making.
e. *Ensure input of required expertise:* Sound, professional judgement must be assured by a methodology.
f. *Utilize the state of the art:* Draw upon the best available analytical techniques.
g. *Employ explicitly defined criteria:* Evaluation criteria used to assess the magnitude of environmental impacts should not be arbitrarily assigned. The methodology should provide explicitly defined criteria and explicitly stated procedures regarding the use of these criteria, including the documented rational.
h. *Assess actual magnitude of impacts:* A method must be provided for an assessment based on specific levels of impact for each environmental concern.
i. *Provide for overall assessment of total impact:* Aggregation of multiple individual impacts is necessary to provide an evaluation of overall total environmental impact.

j. *Pinpoint critical impacts:* The methodology must identify and emphasize particularly hazardous impacts.

The evaluation of the severity (or significance) of the identified impacts has been done according to a set and objective Significance Rating Methodology, which uses both **quantitative** and **subjective** measures. The framework of this methodology is listed below, which fully explains the rating procedure used and how the construction and operation values given in Table 5 were derived.

7.1.1 Impact Significance Methodology

The **Significance** of Environmental Impacts is to be assessed by means of the following method:

Significance is the product of probability and **severity. Probability** describes the likelihood of the impact actually occurring, and is rated as follows:

- Improbable - Low possibility of impact to occur either because of design or historic experience.
  Rating = 2
- Probable - Prominent possibility that impact will occur.
  Rating = 3
- Highly probable - Most likely that impact will occur.
  Rating = 4
- Definite - Impact will occur regardless of any prevention measures
  Rating = 5

The severity rating is calculated from the factors given to intensity and duration. Intensity and duration factors are awarded to each impact, as described below.

The **Intensity factor** is awarded to each impact according to the following method:

- Low intensity - Nature and/or man-made functions not affected and a minor impact may occur.
  Factor 1

- Moderate intensity - Environment affected but natural functions and processes can continue though often in a slightly altered manner.
  Factor 2
- High intensity - Environment affected to the extent that natural functions are altered to the extent that it will temporarily or permanently cease.
  Factor 3

Duration is assessed and a *factor* awarded in accordance with the following:

- Short term - ≤ 1 to 5 years
  Factor 2
- Moderate term - 5 – 15 years
  Factor 3
- Long term - Impact will only cease after the operational life of the activity, either because of natural process or by human intervention.
  Factor 4
- Permanent - Mitigation, either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient.
  Factor 5

The **severity rating** is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below, for example:

The Severity factor	Intensity factor X Duration factor
	2 X 3 = 6

A Severity factor of 6 (six) equals a Severity Rating of Moderate severity (Rating 3) as per table below:

Severity Ratings

FACTOR

Low Severity (Rating 2)	Calculated values 2 to 4
Moderate Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High Severity (Rating 5)	Calculated values 13 to 16 and mo

Severity factors below 3 indicate no impact

A Significance Rating is calculated by multiplying the Severity Rating with the Probability Rating:

The significance rating should influence the development project as described below:

- Low significance (calculated Significance Rating 4 to 6)
  - Positive impact and negative impacts of low significance should have no influence on the proposed development project
- Moderate significance (calculated Significance Rating ≥ 7 to 12)
  - Positive impact

    Should indicate that the proposed project should be approved

    Negative impact:

    Should be mitigated or mitigation measures should be formulated before the proposed project can be approved
- High significance (calculated Significance Rating ≥ 13 to 18)
  - Positive impact:

    Should points towards a decision for the project to be approved and should be enhanced in final design

    Negative impact:

    Should weigh towards a decision to terminate proposal, or mitigation should be formulated and performed to reduce significance to at least low significance rating.
- Very High significance (calculated Significance Rating ≥ 19 to 25 and more)

7.2 Activities and Impacts Identified, with Impact Assessment

The description and identification of anticipated impacts is based on the listing of **environmental aspects.** Environmental aspects, for the purposes of this document, is the term used to *describe the actions that may have an impact on one or more of the environmental components listed.* It is important to note that aspects that are clearly definable have been used in preference to those that are duplicative, redundant, difficult to measure, and/or obscure.

An impact is defined as *any change in the physical, chemical, biological, cultural, and/or socio-economic environmental system that can be attributed to human activities relative to alternatives under study for meeting a project need.* Therefore, the identified environmental aspects are said to have an impact on the components listed above if they result in change.

One of the most important objectives of conducting and Environmental Impact Assessment is to identify and evaluate these aspects and impacts. Consequently, the EMPr will consist of the preferred mitigation and management options for the identified impacts assessed as being significant. These will be described within the BAR (and EMPr to follow).

The environmental aspect and the resultant impact can become manifest during the **construction phase (C)** and/or the **operational phase (O)**, which is the stage when the proposed development is complete and fully functional.

The following table provides a list of activities (environmental aspects), for the proposed development, that will occur on site and it provides an outline of the potential impacts that these actions will have on the environment, the anticipated effects on the biophysical and social aspects. The identification of the aspects and impacts may be expanded as more information becomes available when the specialist studies are completed. At this stage, the table below provides a list of impacts and issues. Below is an impact assessment of the impacts identified in the Table 5.

The identified impacts are rated in terms of their significance during the construction phase and the operational phase of the proposed road. The identified impacts on the physical, ecological and social components of the site are discussed in terms of:

- Vegetation component of the site;
- Faunal component of the site;
- Possible impact on Red Data Fauna and Flora;
- Soil surface (stability);
- Topsoil layer (disturbance and compaction);
- Subsurface soil quality;
- Topography;
- Geology;
- Surface drainage and existing water bodies (wetland within the study area);
- Surface water run-off (quality);
- Groundwater resources (quality);
- Air quality (due to dust generation);
- Ambient noise levels;
- Cultural historical elements;
- Social environment (of adjacent landowners);
- Traffic safety aspects (safety of the community);
- Land use options and agricultural potential of the site;
- Visual and aesthetic quality;
- Local economy (due to job creation); and
- Impact on the community (due to provision of affordable electricity).

It should be noted that the impact significance rating is given presuming that no mitigation measures are to be implemented during the construction or operational phase of the project (this would imply a worst case scenario).

Table 5: List of activities (environmental aspects), for the proposed development, that will occur on site, the potential impacts that these activities may have on the environment and a description of the nature of the impact (c: construction stage; o: operational phase). The impacts rated, at this stage of high importance, are marked with a red triangle Δ; leaning towards high significance impact.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
Vegetation clearance for the footprint of the proposed development(C). Clearance of vegetation in the establishment of infrastructure (C)	Soil layers, soil surface, indigenous vegetation cover.	On-site.	The removal of vegetation cover, such that the soil surface is exposed, may lead to increased soil erosion in certain areas. The existing vegetation will be permanently removed to accommodate the footprint of the road. Where the removal of surface vegetation is of a temporary nature only, the establishment of weeds is a threat. The topsoil layer is required to rehabilitate the area (i.e. for landscaping the area). **Δ** **Probability = 4 (highly probable)** **Intensity = 4 (moderateintensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)**	It is advisable that only vegetation be removed where and when it is necessary. After removal of vegetation, landscaping needs to be incorporated by re-establishing natural grassland/vegetation where appropriate. No red data plant species were recorded during the site visits conducted. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Significance= 4x4=16 **This impact is of negative high significance before mitigation.**	
Stockpiling of excavated material (C)	Soil and vegetation cover.	Precise location still to be determined; the impacts on soil and vegetation will occur wherever stockpiles are established. Wherever possible, the stockpiles should be placed in non-sensitive areas.	Stockpiles cause compaction of the soil, which promotes the establishment of weed species. The establishment of weeds greatly reduces the pristine quality of the natural vegetation on site. Stockpiles should not be situated within 200 m from any water bodies or water courses, as sedimentation transport into such systems is undesirable. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative**	Stockpiles must not exceed 2 metres in height. Stockpiles must be used for filling material as the re use of stockpiles cannot be done on the road. By using the stockpiles as filling material for the sides, vegetation growth can be promoted by the seeds still contained in the topsoil layer. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			moderate significance	
Stockpiling building materials (C)	Soil and vegetation cover.	The impact is of a localized nature.	Stockpiles will need to be established for the storage of aggregate, bricks and cement. As mentioned, stockpiles cause compaction of the soil surface, which leads to the growth of unwanted weed species. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	Building material stockpiles must not be stockpiles within any of the riparian areas. Any alien vegetation that established itself because of disturbance need to be eradicated. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Water use for construction purposes of the road.	It is also anticipated that natural surface or ground water sources would be used. A WULA/GA is being	On-site.	The use of water as an important resource must be assessed carefully and a statement should be made on the impact once it has been established what the source of the	Possible significance assessment on ground water resources being used would be of low significance, because of the size of the available property with its groundwater

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
	conducted in this regard. WULA/GA will concentrate on this proposed development for the following associated activities: • Section 21(a): taking water from a water resource; • Section 21(b): storing water; • Section 21(c): impeding or diverting the flow of water in a watercourse; • Section 21(e): engaging in a controlled activity (irrigation); • Section 21(g): disposing of waste in a manner which may		water for construction purposes will be. The WULA/GA is also necessary because of the proposed development being built, which will be less than 500 metres from a wetland. Δ **Probability = 4 (highly probable)** **Intensity = 4 (moderateintensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	availability. This construction will use very little water for construction. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
	detrimentally impact on a water resource; and • Section 21(i): altering the bed, banks course or characteristics of a watercourse			
Installation and operation of temporary sewerage systems for construction workers.	Soil layers, vegetation cover and groundwater.	Very localised and of a temporary nature.	The placement of chemical toilet systems and the servicing thereof will not have an impact on the environment, if operated according to requirements. Temporary toilets left unmanaged can leak raw sewage and effluent into the soil, surface and even ground water sources. Δ **Probability = 4 (highly probable)** **Intensity = 4 (moderateintensity)** **Duration = 4 (long term)**	Temporary toilets need to be managed and serviced on a regular service schedule. This schedule has to be recorded and controlled by the contractor on site. Regular disposal of waste need to be done by a contracted disposal company. No temporary toilets will be allowed within 100 metres from any of the drainage lines. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Severity = 4x4=16 (rating 4) **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	**Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Provisions for storm water i.e. storm water drainage (C)	Soil surfaces, vegetation cover and drainage patterns.	Areas where surface water run-off is collected i.e. like from compacted surfaces, gutters and structures, as well as road surfaces.	Poorly implemented storm water outlets will result in increased surface run-off volume and speed, which could lead to the creation of erosion gullies. Storm water must be allowed to spread out gradually over a large surface area to protect the soil surface against erosion. Inadequate designed storm water outlets can lead to flooding of the road surface which is dangerous. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)**	Storm water outlet designs have to be done and construction undertaken within the correct design documents from the civil engineer. Vegetation cover needs to be established on bare soil areas to prevent erosion due to storm water. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Significance= 3x3=9 **This impact is of negative moderate significance**	
Maintenance of storm water management systems (O)	Soil surfaces, drainage patterns and surface water.	In all areas where storm water management systems have to be created.	Storm water management will particularly be important with careful design eminent at the crossing of any natural drainage ways. Storm water outlets can get blocked due to debris and other substances that are washed from the hard surfaces. This includes siltation due to soil erosion. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	Maintenance of storm water outlets is required to ensure that they don't get blocked (i.e. no longer fulfil their function) or result in erosion. The custodian of the development has to perform regular checks and maintenance. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Excavations in	Potential impact on	Localised if these may	No indication of such impacts. But	If any artefacts, graves or articles of

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
general	elements of cultural or heritage importance.	occur	this will be confirmed in the Heritage report. It is possible that historical important items or graves could be uncovered if construction commences. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	historical importance are found during construction, the construction activities have to be stopped and the area fenced off. A heritage consultant will have to be appointed to take any further related steps such as relocation. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Generation of construction waste (C)	Soil, vegetation, aesthetic quality of the site and surface water run-off, water and ground water resources.	All construction sites and directly adjacent areas within Residential Townships.	Waste, such as building rubble and empty cement bags can be a negative visual impact if not collected and disposed of correctly. Further to littering the site and adjacent areas, poor control and	Building rubble has to be collected at a centralized area and preferably in skip waste bins. No illegal dumping may be allowed in the construction phase and this will have to be checked and monitored

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			illegal dumping of construction waste can pollute surface water run-off, as well as lead to the promotion of weed species. Δ **Probability = 4 (highly probable)** **Intensity = 4 (moderateintensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	by the appointed Environmental Control Officer. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Site & Road maintenance (O)	Vegetation and soil surface conditions, as well as social well-being of the residents of the area.	The site need to be maintained.	Poorly maintained storm water drainage structure will cause abnormal soil erosion at outlets. Therefore, site & road maintenance is essential. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)**	Site & road maintenance is essential and is the responsibility of the property owner in the operational phase. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Severity = 2x4=8 (rating 3) **Significance= 3x3=9** **This impact is of negative moderate significance**	**Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Collection and disposal of solid construction waste (C)	Aesthetic quality, surface water run-off, subsurface and groundwater quality, vegetation and fauna.	The site and directly adjacent areas.	Poor waste collection and handling will pollute the environment (affecting fauna, groundwater, surface water and aesthetic environment). **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderatesignificance**	No illegal dumping of domestic and construction related waste should be tolerated. Domestic construction waste has to be collected into central waste skip disposal units. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Traffic movement (C)(O)	Noise levels around the development due to the movement of additional	Noise impact of a local nature along the development. Closer	The movement of traffic (during construction and operation) around the development will have an	Noise mitigation measures are required in order to keep the noise generated by construction activities

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
	traffic.	community.	impact on the ambient or prevailing noise levels. Δ **Probability = 4 (highly probable)** **Intensity = 4 (moderateintensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	as low as possible – given the site's relatively close proximity to some residential areas. This can be achieved by ensuring that only well-oiled, well maintained machinery is used, as such machinery will produce less noise than poorly serviced machinery. For example, poor maintenance of exhaust systems will produce unnecessary noise pollution. Furthermore, working hours for construction should be limited to between 07h00 and 17h00 on week days, as construction outside of these time frames will be a nuisance to adjacent dwellers. On operational phase the general business day noise will be the same as for the surrounding developments. **Probability = 3 (probable)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
				Intensity = 2 (low intensity) **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**
Temporary employment created during the construction phases of the proposed development(C)	Social aspects	All sites where construction related activities are to take place.	There will be **positive i**mpacts in terms of social upliftment and job creation within the broader region.	
Transportation of workers to and from the development site (C)	Air quality, soil surface and social aspects (including traffic and worker safety).	The road safety of the region. A local issue.	Vehicles used to transport workers can be overloaded; worker safety is of utmost importance. Vehicles used to transport workers which exceed the speed limit are dangerous. **Probability = 3 (probable)**	Traffic safety measures have to be implemented by the contractor. Correct signage and safety clothing needs to be in place. Construction workers need to be transported to and from the site on a safe manner. **Probability = 3 (improbable)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Intensity = 2 (low intensity) **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	**Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Construction camp establishment (C)	Aesthetic impacts, social aspects, subsurface and groundwater quality, generation of domestic waste, vegetation removal, soil surface compaction and faunal impacts.	Location still to be determined.	The generation of domestic waste, as well as the provision of sewage facilities, within the construction camp could potential impact on the aesthetics of the site as well as the quality of subsurface and groundwater if not properly managed and implemented. The removal of sections of natural vegetation would most likely be needed for the establishment of the camp, and soil surfaces would become compacted as a result of activities within the camp.	Proper management of any temporary toilets need to be undertaken on a strict schedule. The construction camp must be more than 100 metres away from any water bodies. Construction camps **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Probability = 3 (probable) **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	
Housing of workers during construction (C)	Aesthetic character, soil and vegetation, surface water quality and social aspects.	The possibility of housing construction workers on site.	The establishment of housing for workers will have a localised impact on the soil and vegetation cover of the chosen site, as well as potentially having a negative impact on the quality of surface water – as a result of domestic waste, and sanitation facilities for example, if these are not properly addressed. Safety is also a concern to residence and stay of workers on site should not be encouraged. **Probability = 3 (probable)**	Housing of workers on site, at the construction camp, is a possibility. Preferably only security should look after equipment at night time hours. If workers are housed near residential areas it could create a safety concern. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low</u>**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Intensity = 2 (low intensity) **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	**significance**
Sanitation provision to workers during the working day (C)	Subsurface soil, surface water and subsurface water quality.	Insufficient chemical toilets will have a health impact locally.	Insufficient chemical toilets will have a health impact. Subsurface soil contamination and contamination of surface/subsurface water quality could occur if the ablution facilities provided are not according to standard. A temporary impact is possible; however, it can easily be prevented. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)**	Sufficient chemical toilets should be provided for workers, in the range of 1 per every 8 workers, within walking distance of all construction activities. These toilets must be well maintained and inspected on a daily basis to ensure that they are clean and functioning properly. No washing of people and/or goods should take place on cleared surfaces, as this water should not be allowed to drain into any adjacent storm water canals or drainage lines.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Significance= 3x3=9 **This impact is of negative moderate significance**	**Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Movement of construction vehicles on site (C)	Air quality, soil and vegetation cover.	Potential impacts may be eminent over a wide area if not carefully managed and restricted.	Movement will cause limited or localised disturbances and temporary soil compaction, which promotes the establishment of weed species. Dust will be generated by vehicular movements on site. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative**	Alien plant species need to be controlled and it must be ensured that weeds are removed. Dust depression measures such as watering the bare surfaces need to be implemented. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			moderate significance	
Maintenance of construction vehicles (C)	Soil, vegetation and surface water.	Within the construction camp(s).	In the event of on-site repairs and servicing, soil surfaces, vegetation, and run-off may be locally contaminated. Spillage of fuel through faulty bowser is a possibility, if not controlled. It is anticipated that fuel storage facilities will occur on the site. If poorly installed or managed it will cause pollution. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	The construction camp has to be identified and communicated to the ECO as soon as its position is available. Any fuel depot areas have to be bunded and where fuel hoses will operate, absorbing gravel needs to be provided. This area can also be lined with a small piece of plastic below the gravel. As soon as any spillages occur, the gravel has to be collected and disposed of as hazardous waste. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
Traffic safety on the main roads (C and O)	Social aspects.	At all places where there will be interaction with the local traffic along existing routes as well as traffic moving through the area.	Motorists using the main roads and alternative roads may be negatively impacted on by slow moving construction vehicles.Δ **Probability = 4 (highly probable)** **Intensity = 4 (moderateintensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	Traffic safety measures have to be implemented to ensure that the general public is safe. Adequate traffic signage has to be implemented where any heavy vehicles will cross the main roads. Adequate clothing that is visible should be provided to the workers. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**
Noise generation by operating air compressors, excavators and other heavy	Impacts on faunal surrounding land owners.	Areas on and surrounding site at which construction activities take place.	Excessive noise levels on site may negatively impact upon the behaviour and movements of site fauna. Surrounding land owners may also potentially be negatively	Noise mitigation measures are required in order to keep the noise generated by construction activities as low as possible – given the site's relatively close proximity to some

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
machinery. Noise is also generated by the construction workers (C)			impacted upon by excessive noise levels on site during construction. Δ **Probability = 4 (highly probable)** **Intensity = 4 (moderateintensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	residential areas. This can be achieved by ensuring that only well-oiled, well maintained machinery is used, as such machinery will produce less noise than poorly serviced machinery. For example, poor maintenance of exhaust systems will produce unnecessary noise pollution. Furthermore, working hours for construction should be limited to between 07h00 and 17h00 on week days, as construction outside of these time frames will be a nuisance to adjacent dwellers. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
				moderate significance
Heritage (C)	**Heritage or historical components**	Historical features are present on site.	The proposed development is to be conducted near or on possible cultural historical elements. Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	If any areas of historical significance are discovered during construction, work should be stopped and a cultural specialist should investigate the site. The first contact can be made with the EAP on site. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Impact on the wetland (C) (O)	Water quality, and soil	In and around the wetland area.	Impacts on the wetland will be caused by the construction activities and possible siltation into	Please refer to section 8.3.1.1: Mitigation measures. This was formulated by the aquatic

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			the wetland. Δ **Probability = 4 (highly probable)** **Intensity = 4 (moderate intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	specialist. **Probability = 4 (highly probable)** **Intensity = 4 (moderate intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative moderate significance after mitigation.**
Movement and survival of Animal species	Fauna of the site	Within the site	The construction will have an effect on the animals present within the site. These impacts will include habitat destruction. It will also limit movement of species through the site. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9**	Specialist studies will determine an overview of the habitat present on-site. No red data fauna and flora have been recorded during the EAP's site visit. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			This impact is of negative moderate significance	**moderate significance**
Construction of the proposed development on red data animals	Animals	On-site	The construction of the proposed development will influence animal life and habitat. No red data species were recorded during the site visits. Δ **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	Although habitat will be lost, proper rehabilitation of the site, not used, could lessen the severity of the impact. **Probability = 3 (probable)** **Intensity = 2 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**

8.2.1 Summary of the Significance Rating of the Anticipated Impacts

ENVIRONMENTAL AND OTHER COMPONENTS TO BE AFFECTED **BM = before mitigation** **AM = after mitigation**	**Probability value**	**Intensity value**	**Duration value**	**Severity value**	**Significance rating**
Impact on the vegetation component of the site	BM: 5 AM: 3	2 2	4 2	3 2	15: High (negative) 6: Low (negative)
Impact on the faunal component of the site	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on Red Data Fauna and Flora	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on soil (surface stability)	BM: 3 AM: 2	2 1	2 4	2 2	6: Low (negative) 4: Low (negative)
Impact on soil (topsoil layer - disturbance and compaction)	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on subsurface soil quality	BM: 2 AM: 2	2 2	2 4	2 3	4: Low (negative) 6: Low (negative)
Impact on topography	BM: 2 AM: 0	2 0	2 0	2 0	4: Low (negative) 0
Impact on geology	BM: 2 AM: 0	2 0	2 0	2 0	4: Low (negative) 0
Impact on surface drainage and existing water bodies	BM: 4 AM: 4	2 2	4 2	3 2	12: Moderate (negative) 8: Moderate (negative)
Impact on surface water run-off quality	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on groundwater & surface water resources	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on air quality	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on ambient noise levels	BM: 4 AM: 2	4 2	4 2	4 2	16: High (negative) 4: Low (negative)
Impact on cultural historical & archaeological elements	BM: 4 AM: 3	4 2	4 4	4 3	16: High (negative) 9: Moderate (negative)
Impact on the social environment of the adjacent landowners	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on traffic safety aspects	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)

ENVIRONMENTAL AND OTHER COMPONENTS TO BE AFFECTED **BM = before mitigation** **AM = after mitigation**	**Probability value**	**Intensity value**	**Duration value**	**Severity value**	**Significance rating**
Impact on land use & agricultural potential	BM: 2 AM: 2	2 2	2 2	2 2	4: Low (negative) 4: Low (negative)
Impact on visual and aesthetic quality	BM: 2 AM: 2	2 2	2 2	2 2	4: Low (negative) 4: Low (negative)
Impact on local economy (due to job creation)	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (positive) 4: low (positive)
Impact on community (due to job creation)	BM: 2 AM: 2	1 1	2 2	2 2	4: Low (positive) 4: Low (positive)

8.3 Cumulative Impacts

According to the definition in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Cumulative impact on other physical components such as natural vegetation and animal life, air quality and visual impact is regarded at this stage as of moderate significance, due to the out stretched and spacious nature of the landscape and the proposed development will tie in to the current infrastructure and natural lay of the land of the area; possible secondary waste or pollution is predicted.

The possible cumulative impacts foreseen will be the loss of natural habitat, possible pollution into the natural environment. All impacts from the construction phase of the development should be continually mitigated. Thus potentially no high significant cumulative impacts are predicted.

Table 4: The possible cumulative impacts from the similar developments connecting to this development.

ENVIRONMENTAL ASPECT AND PROJECT STAGE C: construction stage O: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	NATURE AND DESCRIPTION OF THE POTENTIAL CUMULATIVE IMPACT IN ASSOCIATION WITH THE SURROUNDING AREA
Vegetation clearance for the footprint of the road (C).	Soil layers, soil surface.	Seen at a wider scale the additional development and secondary developments are physically connected, but the removal of vegetation cover, such that the soil surface is exposed, may lead to increased soil erosion in the area. Where the removal of natural vegetation is small in percentage to the whole activity it may add to a bigger combined loss of natural vegetation in the local area.
Excavations for the foundations of the development (C).	Soil layers and faunal habitat.	The existing natural vegetation will be permanently removed to accommodate the foundations of the necessary structures. Very little faunal habitat will also be affected in combination with the surrounding developments. Soil layers affected will be a localised impact and not cumulative.
Stockpiling of excavated material (C)	Soil and vegetation cover.	Stockpiles cause compaction of the soil, which promotes the establishment of weed species.

ENVIRONMENTAL ASPECT AND PROJECT STAGE C: construction stage O: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	NATURE AND DESCRIPTION OF THE POTENTIAL CUMULATIVE IMPACT IN ASSOCIATION WITH THE SURROUNDING AREA
		This impact is of a temporary nature and not cumulative.
Stockpiling building materials (C)	Soil and vegetation cover.	Stockpiles will need to be established for the storage of aggregate, concrete infrastructure and cement, etc. As mentioned, stockpiles cause compaction of the soil surface, which leads to the growth of unwanted weed species. This impact is of a temporary nature and not cumulative.
Provisions for storm water i.e. storm water drainage (C)	Soil surfaces, vegetation cover and drainage patterns.	Correct and efficient storm water drainage systems must be installed. Poorly designed storm water outlets will result in increased surface run-off volume and speed, which could lead to the creation of erosion gullies. All hard surfaces generate storm water, which should be controlled by preventing the storm water from crossing the road. Storm water must be allowed to spread out gradually over a large surface area to protect the soil surface against erosion. The surrounding developments may contribute to more erosion due to more cleared and open surfaces found at these

ENVIRONMENTAL ASPECT AND PROJECT STAGE C: construction stage O: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	NATURE AND DESCRIPTION OF THE POTENTIAL CUMULATIVE IMPACT IN ASSOCIATION WITH THE SURROUNDING AREA
		developments.
Generation of construction waste (C)	Soil, vegetation, aesthetic quality of the site and surface water run-off, water and ground water resources.	Waste, such as building rubble and empty cement bags can be a greater negative visual impact, with the additional construction waste of the staff courters, if not collected and disposed of correctly. Further to littering the site and adjacent areas, poor control and illegal dumping of construction waste can pollute surface water run-off, as well as lead to the promulgation of weed species.
General maintenance (O)	Visual quality, also surface water quality and vegetation cover.	The design and nature of the proposed development will determine the impact of the proposed development on the visual quality of the study area. Maintenance as a whole will prevent a further negative impact on the visual quality of the study area. The disposal of general solid waste and construction rubble (both during construction and maintenance of the development and staff courters) causes impacts on the natural environment (including faunal ecology, surface water and

ENVIRONMENTAL ASPECT AND PROJECT STAGE C: construction stage O: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	NATURE AND DESCRIPTION OF THE POTENTIAL CUMULATIVE IMPACT IN ASSOCIATION WITH THE SURROUNDING AREA
		vegetation) if disposed of illegally. Compaction of soil surfaces and the propagation of weeds are typical impacts, but temporary.
Collection and disposal of solid domestic waste (O)(C)	Aesthetic quality, surface water run-off, subsurface and groundwater quality, vegetation and fauna.	Poor waste collection and handling on all the developments in and around the proposed development will pollute the environment (affecting fauna, groundwater, surface water and aesthetic environment). No illegal dumping of domestic waste will be tolerated. Untidy collection points and windblown refuse can cause human / animal conflicts, as foul odours from such areas will attract wild animals and cause other problems (pests / diseases), as well as water pollution.
Collection and disposal of construction waste (C)	Aesthetic quality, subsurface and ground water quality, vegetation and fauna.	No construction waste may be illegally dumped into the surrounding areas, as the effects of illegal dumping on the environment are devastating. Poor waste collection and handling on all the developments in and around the proposed development will have a negative impact on several

ENVIRONMENTAL ASPECT AND PROJECT STAGE C: construction stage O: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	NATURE AND DESCRIPTION OF THE POTENTIAL CUMULATIVE IMPACT IN ASSOCIATION WITH THE SURROUNDING AREA
		environmental aspects. A waste collection agreement between the applicant and the local authority will be essential.
Long term employment opportunities and wealth to be generated by the proposed development (O)	Social aspects	There will be a positive impact in terms of social upliftment and job creation within the broader region.
Transportation of workers to and from the development site (C)	Air quality, soil surface and social aspects (including traffic and worker safety).	Poorly maintained vehicles will have a negative impact on air quality in terms of dust and emission. The tipper trucks from the nearby quarry will also add to the negative impact on air quality, but only during the construction phase.
Construction camp establishment (c)	Aesthetic impacts, social aspects, subsurface and groundwater quality, generation of domestic waste, vegetation removal, soil surface compaction and faunal impacts.	The generation of domestic waste, as well as the provision of sewage facilities, within the construction camp could potential impact on the aesthetics of the site as well as the quality of subsurface and groundwater if not properly managed and implemented. Soil surfaces would become compacted as a result of activities within the camp. These impacts will also add to the negative impact other close by developments has on the local area,

ENVIRONMENTAL ASPECT AND PROJECT STAGE C: construction stage O: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	NATURE AND DESCRIPTION OF THE POTENTIAL CUMULATIVE IMPACT IN ASSOCIATION WITH THE SURROUNDING AREA
		but only during the construction phase.
Movement of construction vehicles on site (C)	Air quality, soil.	Movement will cause limited or localised disturbances and temporary soil compaction, which promotes the establishment of weed species. Dust will be generated by vehicular movements on site. The tipper trucks from the nearby towns will also add to the negative impact on air quality, but only during the construction phase.
Traffic safety on the main road (C and O)	Social aspects.	The access point to the site; therefore motorists using the main road may be negatively impacted on by slow moving construction vehicles. The tipper trucks from the nearby town will also add to traffic impact, but only during the construction phase.
Noise generation by operating air compressors, excavators and other heavy machinery. Noise is also generated by the construction workers (C)	Impacts on faunal species and surrounding land owners.	Excessive noise levels on site may negatively impact upon the behaviour and movements of site fauna. Surrounding land owners may also potentially be negatively impacted upon by excessive noise levels on site during construction. The tipper trucks and excavators

ENVIRONMENTAL ASPECT AND PROJECT STAGE C: construction stage O: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	NATURE AND DESCRIPTION OF THE POTENTIAL CUMULATIVE IMPACT IN ASSOCIATION WITH THE SURROUNDING AREA
		from the nearby towns will also add to the noise impact, but only during the construction phase.

8.3 Ecological Specialists' Impact Assessment & Recommendations (see Appendix 8 for the for all the Ecological Studies)

8.3.1 Impact Rating for the Site in Terms of Aquatic Ecosystems

The aquatic ecosystems study for the study area was done in terms of:

- Delineation of aquatic ecosystems,
- Determine where possible the present ecological score (PES) of the aquatic systems,
- Assessment of the impacts ratings,
- Recommend mitigation measures

Ecological Status

With reference to Table 6-8, in the Bio-monitoring Report, it is found that the ecological status of the Klein-Vaal tributaries for the We Grow Piggery has an overall status of fair (heavily used or impacted) and the Ecological Importance and Sensitivity is considered as low/marginal. The EcoStatus of the streams associated with We Grow Piggery has been classified using the water quality results, the Habitat Integrity and SASS5 data obtained during the aquatic assessment done in April 2017.

Table 6-8: Overall EcoStatus of the study area

Water Quality	SASS5	IHAS	Health Class
			Good (Moderate)
Fair	Class C	Class C	

To see how the classification and impact assessment was done and calculated please refer to the Aquatic Delineation Report in Appendix 8A.

Recommendations

The primary surface water impacts associated with the proposed development are the potential impacts on water quality degradation due to incidental waste discharges and storm water management at the project site, especially during the construction phase as well as habitat loss due to construction within the riparian area.

The impact on the wetland area could be seen as moderate to high without the implementation of mitigation measures. With the implementation of mitigation management measures the impact of the development on the wetland is ranked as a low significance.

In terms of findings related to the overall surface water environment relevant to the study site the following conclusions are made:

- The study area, inclusive of all three relevant properties, is situated within Quaternary Catchment C11C of the Upper Vaal Sub-WMA which in turn forms part of the larger Vaal Water Management Area.
- Five main aquatic features have been identified within the site. These include the drainage lines to the north and south of the study site, its tributaries and associated wetlands areas.
- According to NFEPA the study area is situated within a Freshwater Ecosystem Priority Area. Although FEPA status applies to the actual river reach within such a sub-quaternary catchment, in this case the Klein-Vaal River, the surrounding land and smaller stream network need to be managed in a way that maintains the good condition (A or B ecological category) of the river reach.
- It is however noted that the rivers and streams within the sub-catchment does not meet the A or B Category set for the sub-catchment.
- Furthermore, certain wetlands occurring on site has been categorised by SANBI as FEPA wetlands. Wetland FEPAs currently in a condition lower than good should be rehabilitated to the best attainable ecological condition.

- Soils within the area are highly erodible which shows within the drainage lines. The easily erodible soils have caused the drainage lines to develop numerous erosion branches, both upstream and downstream.
- Within the study site itself, cultivation have encroached the majority of drainage lines and grazing sheep and cattle further contributes to bank destabilisation and overall degradation of land cover. Further impacts to the drainage lines include road crossings and numerous impoundments. Thirteen artificial instream dams were counted.
- The drainage lines on site are indicated to fall within a Class C PES indicating a Moderately Modified system.
- It was found that the ecological status of the Klein-Vaal tributaries for the proposed Piggery has an overall status of fair (heavily used or impacted) and the Ecological Importance and Sensitivity is considered as low/marginal.
- The seep wetland found on site is characterised to fall within a Class E Category which indicates a seriously modified wetland. The EIS of the seep wetland found on site is categorised as Low/Marginal.
- The natural channelled valley bottom wetland found on site falls within a Class C Category. This means that the wetland has been moderately modified with some loss of natural habitats. The EIS of the natural channelled valley bottom wetland found on RE and Portion 2 of the Farm Zoetfontein 4 HT is categorised as Moderate.
- Although artificial, the channelled valley bottom wetland found on Portion 3 of the Farm Kleinfontein 3 HT is considered to support water loving biodiversity and is categorised to maintain a Moderate Ecological Importance and Sensitivity.

8.3.1.1 Mitigation Measures

Wetland related mitigation measures as taken from the Aquatic Delineation report:

'Table 5-5: Identification and quantification of identified impacts on the surface water environment'

No	Phase	Impact	WOM	WM	Mitigation/Management Measures
1	C	Exposed surfaces could result in increased erosion and associated runoff which in turn may result in increased siltation of surface streams.	Moderate	Low	Silt screens/sandbags could be employed on exposed areas. The construction contractor must monitor the formation of erosion channels and must repair these as required. All erosion channels which develop during construction should be backfilled and consolidated as required. Construction should take place during the dry season. Grass and vegetation removal should be limited to the footprint of the proposed project. Construction should preferably take place outside of all buffer zones.
2	C	Exposed surfaces together with increased traffic on-site could result in increased siltation of surface water streams by excessive dust generation.	Moderate	Low	Watering and compacting of exposed surfaces where dust is generated must be conducted and strictly monitored. Vegetation removal should be limited to the footprint of the proposed project. A speed limit of 20 km/h must be imposed on construction vehicles.
3	C	Inadequate maintenance of mobile sanitary facilities could result in spillage of sewage waste which could contaminate runoff to drainage lines.	Moderate	Low	Mobile sanitary facilities must be inspected regularly and adequately maintained by an approved contractor to prevent any spills/leaks from occurring. Mobile sanitary facilities must be located outside the applicable buffer zones. Ensure that an adequate amount of mobile toilets are available for workers on site.
4	C,O	Unrestricted movement of personnel could impact on the riparian integrity within the riparian and buffer	High	Low	Demarcate the buffer zone area to prevent any unlawful access into sensitive areas during construction. Continue demarcation into operational phase if practicable. Restrict all movement to designated

No	Phase	Impact	WOM	WM	Mitigation/Management Measures
		zones.			areas. In the event that construction personnel will live on the site, these living conditions must be kept to demarcated areas sufficiently away from riparian areas. Harvesting of plants and animals from the buffer zones by personnel must be prevented. Fines could be implemented to prevent harvesting of plants and animals.
5	C,O	An increase in traffic and the additional logistics may result in hydrocarbon spillages which could in turn result in contaminated runoff reaching drainage lines.	High	Low	Spills resulting from vehicle maintenance or as result of the storage of hydrocarbon materials must immediately be cleaned and properly disposed of. Petroleum (and other hazardous materials) storage areas should be effectively bunded and applicable safety standards must be adhered to. Hazardous materials and chemicals must be stored on solid concrete surfaces. Storage containers must be inspected regularly for leaks and repaired as needed. Maintain parking areas and roads in good conditions for the duration of operations. No unauthorised washing of vehicles should be allowed on the premises.
6	C,O	Invasive and/or alien species will further deplete natural vegetation and indigenous species and due to their hardy nature penetrate riparian buffer zone areas.	Moderate	Low	Implement an appropriate alien invasive and eradication programme. Alien plant species must be removed when discovered. When transporting and stockpiling topsoil removed, do so responsibly and keep topsoil stockpiles outside of wetland and river buffer zones to prevent unwanted seeds from establishing in these areas.
7	O	Untreated animal sludge potentially reaching surface water features.	High	Low	Design waste water containing structures according to applicable standards. Immediate action must be taken to contain spillage and prevent

No	Phase	Impact	WOM	WM	Mitigation/Management Measures
					it from migrating to streams or riparian areas. Ensure that the waste treatment dams are suitably lined and that lining is maintained during operation. The dams must be inspected regularly for early detection of leaks.
8	C,O	Solid waste could reach drainage lines if not correctly disposed of.	Moderate	Low	Uncontrolled disposal of waste near any construction site must be communicated to all contractors as unacceptable. All waste should be placed in a central collection point and removed from the site. Encourage and implement the separation and recycling of general waste. Place refuse bins on strategic places to encourage the disposal of litter to these bins. Erect notices to inspire the staff to keep their environment clean and hazardous free. Inspect all on-site disposal sites regularly to ensure adherence to all legal requirements. Inspect all contractors and disposal agents, premises and sites regularly to ensure that all environmental and legal requirements are adhered to.
9	C,O	Decrease in catchment yield and water supply to downstream surface water users.	Moderate	Low	Implement surface water control measures upstream of the piggery activities to maximise the return of clean runoff to drainage lines. Contain all dirty storm water generated on the operational site. Adherence to the Storm Water Management Plan is crucial.
10	C	Stockpiles for storage of building materials will lead to compaction of the soil surface which in turn could promote the growth of unwanted weeds.	Moderate	Low	Building material stockpiles should be kept sufficiently outside of riparian/wetland areas. Any alien/invasive plant species which established itself as result of disturbance must be eradicated in accordance with the Rehabilitation

No	Phase	Impact	WOM	WM	Mitigation/Management Measures
					Plan.
11	C	Disturbance and disruption of the natural flow regime as result of construction over surface water features.	High	Low	Installation of the required river crossings should be done in accordance with the Rehabilitation Plan. Topsoil must not be placed on exotic plants that can propagate when the topsoil is replaced. The infrastructure must be placed into the excavation as soon as possible to avoid the trench becoming a death trap to small animals. Soil must be replaced in the order it was removed. The top soil must be compacted to prevent erosion, but only to pre-construction levels. Once rehabilitation is complete the site must be monitored to detect any areas where soil stabilising or settling has taken place. Areas where settling takes place must be filled to pre-construction level.
12	C,O	Permanent disruption of existing riparian/wetland areas may lead to the overall depletion of ecological conditions of water resource.	High	Low	Faunal species found during the removal of vegetation should preferably be moved to a similar site nearby. Habitat provision to aquatic fauna, post development, should be managed to ensure the habitat provision is guaranteed. Habitat conditions following construction should resemble pre-construction conditions to ensure natural systems of flooding and sediment deportation and conveyance.

8.3.2 Impact rating for the proposed development in terms of flora

The flora study for the study area was done in terms of potential issues relevant to potential impacts on the ecology of the study area. This includes the following:

- Impacts on biodiversity: this includes any impacts on populations of individual species of concern (flora and fauna), including protected species, and on overall species richness. This includes impacts on genetic variability, population

dynamics, overall species existence or health and on habitats important for species of concern.

- Impacts on sensitive habitats: this includes impacts on any sensitive or protected habitats, including indigenous forest, fynbos and wetland vegetation that leads to direct or indirect loss of such habitat.
- Impacts on ecosystem function: this includes impacts on any processes or factors that maintain ecosystem health and character.

Potential impact identified:

- Impact 1: Loss or fragmentation of indigenous natural vegetation;
- Impact 2: Loss of individuals of threatened plants; and
- Impact 3: Establishment and spread of declared weeds and alien invader plants.

Information obtained from South African National Biodiversity Institute (www.sanbi.org) indicated that no red and orange data plants species were historically recorded within the quarter degree grid cell. For the site visits conducted, no orange or red data species were encountered on the study site and 200m buffer area.

A medium to low sensitivity was awarded for the study site based on the methodology described.

A total of 8 plants were identified on and around the site that is listed in the Alien and Invasive Species Regulations of 2014 (NEMBA) which is in need of management.

- 4 NEMBA Category 1b plants were identified and must be controlled.
- 4 NEMBA Category 2 plants were identified and must be controlled and if not eradicated, require a permit to carry out a restricted activity within an area, as specified in the act / regulations.

Gladiolus species observed on site is protected in terms of Schedule 11 of the Mpumalanga Nature Conservation Act 10 of 1998, and must be handled in terms of provisions of the Act.

Mitigation measures are also proposed to ensure that the rating of significance could be reduced into a more acceptable rating. The following table describes the impact assessment rating before mitigation.

Impact	Severity	Duration	Extent	Consequence (S + D + E / 3)	Frequency	Probability	Likelihood (F + P / 2)	Significance (C*L)
Impact on Indigenous Natural Vegetation	4	4	2	3.33	5	4	4.5	14.85 **Medium**
Loss of individual or threatened plants	4	4	2	3	4	1	2.5	7.5 **Low**
Establishment and spread of declared weeds and alien invader plants	5	5	2	4	5	5	5	20 **High**

The following table describes the impact assessment rating after mitigation.

Impact	Severity	Duration	Extent	Consequence (S + D + E / 3)	Frequency	Probability	Likelihood (F + P / 2)	Significance (C*L)
Impact on Indigenous Natural Vegetation	3	4	1	2.66	5	2	3.5	9.81 **Low**
Loss of individual or threatened plants	4	4	2	3	4	1	2.5	7.5 **Low**
Establishment and spread of declared weeds and alien invader plants	3	3	2	2.66	5	5	5	13.3 **Medium**

8.3.2.1 Mitigation Measures

All impacts of the development were rated as low to moderate significance. The same level of rating was awarded towards the sensitivity of the site.

Mitigation measures were proposed for the following:

Mitigation measures for Impact on Natural vegetation:

- Unnecessary impacts on surrounding natural vegetation must be avoided.

- The construction impacts must be contained within the footprint of the infrastructure.
- Disturbed areas beyond the footprint of the infrastructure must be rehabilitated as quickly as possible.

Mitigation measures for Loss of individual or threatened plants:

- Unnecessary impacts on surrounding natural vegetation must be avoided.
- The construction impacts must be contained within the footprint of the infrastructure. Disturbed areas beyond the footprint of the infrastructure must be rehabilitated as quickly as possible.

Mitigation measures for establishment and spread of declared weeds and alien invader plants:

- Disturbance of indigenous vegetation must be kept to a minimum. Where disturbance is unavoidable, disturbed areas should be rehabilitated as quickly as possible once construction is completed.
- Soil stockpiles should not be translocated from areas with alien plants into the site and within the site alien plants on stockpiles must be controlled so as to avoid the development of a soil seed bank of alien plants within the stock-piled soil.
- Any alien plants must be immediately controlled.
- An on-going monitoring programme should be implemented to detect and quantify any aliens that may become established and provide information for the management of aliens.

8.3.3 Sensitivity rating for the proposed development in terms of fauna

Mammals and Herpetofauna

Without any mitigation, the proposed establishment of a piggery and the associated dam enlargement is expected to have a Moderate to High impact on fauna habitat. However, with the implementation of the mitigation measures recommended in this report IN

Section 4.3, the impact will be reduced to a Low significance. It is therefore of utmost importance that all mitigation measures be implemented.

The study area has regions with varying degrees of sensitivity ranging from Low to High. Following the site investigation, it was evident that the majority of the study area had historically been altered by agricultural activities. The community in the region is predominantly agricultural in nature. These transformed areas are deemed to have a Low sensitivity.

The tributaries and wetland areas are deemed to have a High to Moderate Sensitivity. The wetland areas should be excluded from development as, and if development needs to take place within the regulated area of wetlands and rivers, the applicable License Applications should be conducted. During expansion of the Dam Wall, construction phase rehabilitation should take place in accordance with a formal Rehabilitation Plan. The expansion of the Dam Wall is not deemed a negative impact, in fact it will enlarge the habitat of aquatic mammals, reptiles, amphibians, mollusks and insects. The end product will have a positive impact.

The Environmental Management Plan (EMP) should make adequate provision to protect local fauna species and habitat and to control the impacting activities of the proposed development on the site. An Environmental Control Officer (ECO) must be appointed prior to construction to oversee mitigation measures during construction and whom will be responsible for the monitoring and auditing of the Contractor's compliance.

8.3.3.1 Mitigation Measures (Mammals and Herpetofauna)

The following mitigation measures are proposed by the specialist:

- The construction areas should be well demarcated and construction workers should not enter into adjacent areas.
- Only areas targeted for the proposed development should be cleared of vegetation, no other areas.
- Mixing of concrete and storage of building material must be restricted to the transformed, already disturbed, areas or must be kept on lined/bunded areas to minimise the potential for pollution.

- Oil, diesel, petroleum or any other harmful spillages must be cleaned immediately. Oil trays must be placed under construction vehicles likely to leak substances.
- Access to the site must only be through existing roads or temporary roads approved by the engineer and the Environmental Control Officer (ECO).
- Adequate storm water management should be implemented during construction and operation to prevent any dirty runoff from entering any of the unnamed tributaries transecting the study area as well as to prevent increased siltation as result of erosion.
- Continuous rehabilitation and maintenance of the construction site should occur during construction. The Contractor must ensure that the site is kept clean and tidy and free from litter that could attract rodents and other animal species.
- Animals may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-contractors' employees. This includes foraging, food and wood collecting outside of the construction site.
- Conservation orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- Measures must be taken to ensure that workers are aware of laws and restrictions governing the hunting, capturing or trapping of animals and should be advised on the penalties associated with the needless destruction of wildlife.
- The surface infrastructure site should be well demarcated and workers (both Construction and
- Operational) should not enter into adjacent areas.
- No construction activities may take place within any delineated wetland areas.
- No burning of material will be allowed on site.
- If animals become trapped in trenches and foundation diggings, a specialist must be contacted to adequately and safely remove these and relocate them to the adjacent habitat.
- The establishment of alien invasive plant species should be prevented and dealt with as indicated in Vegetation Specialist Study.
- The expansion of the Dam Wall must be conducted as per the Rehabilitation Plan to minimize the potential impact as far as possible.

Avifauna

Most of the site has evidence of disturbance by present or historical human activities, although sections to the southeast as well as around the dam areas do have natural vegetation. The habitat on the study site will not favour (breeding or roosting) any Red Data avifaunal species, although some species may forage on the natural vegetation form time to time. Most of the habitats on the proposed development sites are impacted upon by livestock (cattle or sheep) and crop farming. The disturbed habitats may in turn suite a variety of typical grassland bird species. Development will result in habitat loss for many of these representative species but it is expected that the habitat-specific species will move out of the area into more suitable areas further afield, while the commoner species will remain despite the developments, provided enough natural vegetation remains.

8.3.3.3 Mitigation Measures (Avifauna)

The following mitigation measures are proposed by the specialist:

- Where possible, work should be restricted to one area at a time, as this will give the birds a chance to endure the disturbance in an undisturbed zone close to their natural territories.
- As much as possible of the natural vegetation that occurs on site should be retained as part of the landscaping.
- The contractor must ensure that no fauna is disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- During the construction phases, noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site.
- As far as possible all alien and invasive plants must be removed from the site.
- All areas designated as highly sensitive; a sensitivity mapping exercise should be incorporated into the design and planning phase. Development should be restricted to the areas of lowest sensitivity.
- An appropriate management authority (e.g. the owner) that is contractually bound to implement the Environmental Management Program (EMPr) and Environmental

Authorisation (EA) during the construction and operational phase of the development should be identified.

- The sensitivity map (Fig. 11, in the avifaunal report) indicates the most important avifauna habitats, within the proposed development site that should be considered during the construction phase. The highest sensitivity areas (red shaded areas) should be avoided.

8.3.4 Surface Water Recharge Results (Water Availability)

CATCHMENT CALCULATION

RSA_MAR_	543
MAR	76.8
CURVE	7
HYDROZ	D
CATNUM	C11C

DAM CATCHMENT	10.8	Km^2
	1080	Ha
	10800000	m^2

Mean Annual Runoff	829440	m^3

Required Final Storage for Proposed dam		
Daily	850	m^3
Per Year	310250	m^3
Safety factor	1.4	
Proposed Storage	434 350	m^3
% of Runoff	52.4%	

The existing dam on the farm Kleinfontein 3-HT portion 3 is envisioned to be enlarged by extending and making the dam wall higher by 1m. The surface area for this dam when at capacity will be 12.5 Ha. A surface area increase of about 6ha. The dam volume will be at 434 350m^3.

8.3.5 Heritage Impact Assessment

According to the heritage specialist:

Historical value:

No historical value associated with the site could be found in primary and secondary sources.

Social value:

Social value is attributed to sites that are used by the community for recreation and formal and informal meetings regarding matters that are important to the community. These sites include parks, community halls, sport fields etc. None of the said is evident in the immediate study area.

Does the site/s contain a wide range of archaeological sites?

The proposed site does not contain any surface archaeological deposits; a possible reason is previous infra-structure development and farming activities in the greater study area. The possibility of sub-surface findings always exists and should be taken into consideration in the Environmental Management Programme. If sub-surface archaeological material is discovered work must stop and a heritage practitioner preferably an archaeologist contacted to assess the find and make recommendations.

Does the site/s contain any marked graves and burial grounds?

Graves are situated near the site earmarked for development.

The possibility of graves not visible to the human eye always exists and this should be taken into consideration in the Environmental Management Plan.

It is important to note that all graves and cemeteries are of high significance and are protected by various laws. Legislation with regard to graves includes the National Heritage Resources Act (Act 25 of 1999) whenever graves are 60 years and older. Other legislation with regard to graves includes those when graves are exhumed and relocated, namely the Ordinance on Exhumations (no 12 of 1980) and the Human Tissues Act (Act 65 of 1983 as amended).

If sub-surface graves are discovered work should stop and a professional preferably an archaeologist contacted to assess the age of the grave/graves and to advice on the way forward.

Recommendations:

- There are no visible restrictions or negative impacts in terms of heritage associated with the site earmarked for development.
- If the layout of the proposed development is altered and the graves situated near the development site will be impacted on, suitable mitigation measures must be put in place.
- In terms of heritage this project can proceed.
- Graves close to the site must allow a 50m buffer from development and must be fenced off.
- The discovery of subsurface archaeological and/or historical material as well as graves must be taken into account in the Environmental Management Programme.

8.4 Feasibility and Comparison of Alternatives

8.4.1 Activity Alternative (Chicken Broiler Facility)

Most of the same impacts will occur as with the proposed development. Although, possible higher developmental densities that will increase the overall impact on the environment on this local area.

Table 6: List of activities (environmental aspects), for the activity alternative, that will occur on site, the potential impacts that these activities may have on the environment and a description of the nature of the impact.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
Vegetation clearance for the footprint of the proposed development (C). Clearance of vegetation in the establishment of infrastructure (C)	Soil layers, soil surface, indigenous vegetation cover.	On-site.	The removal of vegetation cover, such that the soil surface is exposed, may lead to increased soil erosion in certain areas. The existing vegetation will be permanently removed to accommodate the footprint of the development. Where the removal of surface vegetation is of a temporary nature only, the establishment of weeds is a threat. The topsoil layer is required to rehabilitate the area (i.e. for landscaping the area). Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	It is advisable that only vegetation be removed where and when it is necessary. After removal of vegetation, landscaping needs to be incorporated by re-establishing natural grassland/vegetation where appropriate. No red data plant species were recorded during the site visits conducted. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
Stockpiling of excavated material (C)	Soil and vegetation cover.	Precise location still to be determined; the impacts on soil and vegetation will occur wherever stockpiles are established. Wherever possible, the stockpiles should be placed in non-sensitive areas.	Stockpiles cause compaction of the soil, which promotes the establishment of weed species. The establishment of weeds greatly reduces the pristine quality of the natural vegetation on site. Stockpiles should not be situated within 200 m from any water bodies or water courses, as sedimentation transport into such systems is undesirable. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	Stockpiles must not exceed 2 metres in height. Stockpiles must be used for filling material as the re-use of stockpiles cannot be done on the access road. By using the stockpiles as filling material for the sides, vegetation growth can be promoted by the seeds still contained in the topsoil layer. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Stockpiling building materials (C)	Soil and vegetation cover.	The impact is of a localized nature.	Stockpiles will need to be established for the storage of aggregate, bricks and cement. As mentioned, stockpiles cause compaction of the soil surface, which	Building material stockpiles must not be stockpiles within any of the riparian areas. Any alien vegetation that established itself because of disturbance

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			leads to the growth of unwanted weed species. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	need to be eradicated. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Water use for construction purposes of the development.	It is anticipated that natural surface water sources would be used. A WULA is being conducted in this regard. WULA will concentrate on this proposed development due to: • Section 21(a): taking water from a water resource;	On-site.	The use of water as an important resource must be assessed carefully and a statement should be made on the impact once it has been established what the source of the water for construction purposes will be. The WULA is also necessary as mentioned. Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)**	Possible significance assessment on ground water resources being used would be of low significance, because of the size of the available property with its groundwater availability. This construction will use very little water for construction. **Probability = 4 (highly probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
	• Section 21(b): storing water; • Section 21(c): impeding or diverting the flow of water in a watercourse; • Section 21(e): engaging in a controlled activity (irrigation); • Section 21(g): disposing of waste in a manner which may detrimentally impact on a water resource; and • Section 21(i): altering the bed, banks course or characteristics of a watercourse		**Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	**Severity = 2x4=8 (rating 3)** **Significance= 4x3=12** **This impact is of negative <u>moderate significance</u>**
Installation and operation	Soil layers, vegetation	Very localised and of a	The placement of chemical toilet systems	Temporary toilets need to be managed

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
of temporary sewerage systems for construction workers.	cover and groundwater.	temporary nature.	and the servicing thereof will not have an impact on the environment, if operated according to requirements. Temporary toilets left unmanaged can leak raw sewage and effluent into the soil, surface and even ground water sources. Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	and serviced on a regular service schedule. This schedule has to be recorded and controlled by the contractor on site. Regular disposal of waste need to be done by a contracted disposal company. No temporary toilets will be allowed within 100 metres from any of the drainage lines. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Provisions for storm water i.e. storm water drainage (C)	Soil surfaces, vegetation cover and drainage patterns.	Areas where surface water run-off is collected i.e. like from compacted surfaces, gutters and structures, as well as	Poorly implemented storm water system will result in increased surface run-off volume and speed, which could lead to the creation of erosion gullies. Storm water must be allowed to spread out	Storm water outlet designs have to be done and construction undertaken within the correct design documents from the civil engineer. Vegetation cover needs to be established on bare soil areas to

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
		road surfaces.	gradually over a large surface area to protect the soil surface against erosion. Inadequate designed storm water outlets can lead to flooding of the road surface, adding unnecessary volume to effluent dams which is dangerous. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	prevent erosion due to storm water. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Maintenance of storm water management systems (O)	Soil surfaces, drainage patterns and surface water.	In all areas where storm water management systems have to be created.	Storm water management will particularly be important with careful design eminent at the crossing of any natural drainage ways. Storm water outlets can get blocked due to debris and other substances that are washed from the hard surfaces. This includes siltation	Maintenance of storm water outlets is required to ensure that they don't get blocked (i.e. no longer fulfil their function) or result in erosion. The custodian of the development has to perform regular checks and maintenance.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			due to soil erosion. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	**Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Excavations in general	Potential impact on elements of cultural or heritage importance.	Localised if these may occur	Possible archaeological impacts are confirmed in the Heritage report. It is possible that historical important items or graves could be uncovered if construction commences. Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high**	If any artefacts, graves or articles of historical importance are found during construction, the construction activities have to be stopped and the area fenced off. A heritage consultant will have to be appointed to take any further related steps such as relocation. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			significance before mitigation.	**Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Generation of construction waste (C)	Soil, vegetation, aesthetic quality of the site and surface water run-off, water and ground water resources.	All construction sites and directly adjacent areas within the development.	Waste, such as building rubble and empty cement bags can be a negative visual impact if not collected and disposed of correctly. Further to littering the site and adjacent areas, poor control and illegal dumping of construction waste can pollute surface water run-off, as well as lead to the promotion of weed species. Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	Building rubble has to be collected at a centralized area and preferably in skip waste bins. No illegal dumping may be allowed in the construction phase and this will have to be checked and monitored by the appointed Environmental Control Officer. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Site maintenance (O)	Vegetation and soil surface conditions, as	The site need to be maintained.	Poorly maintained storm water drainage structure will cause abnormal soil erosion	Site & road maintenance is essential and is the responsibility of the property owner

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
	well as social well-being of the residents of the area.		at outlets. Therefore, site & road maintenance is essential. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	in the operational phase. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Collection and disposal of solid construction waste (C)	Aesthetic quality, surface water run-off, subsurface and groundwater quality, vegetation and fauna.	The site and directly adjacent areas.	Poor waste collection and handling will pollute the environment (affecting fauna, groundwater, surface water and aesthetic environment). **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate**	No illegal dumping of domestic and construction related waste should be tolerated. Domestic construction waste has to be collected into central waste skip disposal units. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			significance	**This impact is of negative <u>low significance</u>**
Traffic movement (C)(O)	Noise levels around the development due to the movement of additional traffic.	Noise impact of a local nature along the developments. Closer community.	The movement of traffic (during construction and operation) around the development will have an impact on the ambient or prevailing noise levels. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance.**	Noise mitigation measures are required in order to keep the noise generated by construction activities as low as possible. This can be achieved by ensuring that only well-oiled, well maintained machinery is used, as such machinery will produce less noise than poorly serviced machinery. For example, poor maintenance of exhaust systems will produce unnecessary noise pollution. Furthermore, working hours for construction should be limited to between 07h00 and 17h00 on week days, as construction outside of these time frames will be a nuisance to adjacent dwellers. On operational phase the general business day noise will be the same as for the surrounding properties.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
				Probability = 3 (probable) **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**
Temporary employment created during the construction phases of the proposed development(C)	Social aspects	All sites where construction related activities are to take place.	There will be **positive i**mpacts in terms of social upliftment and job creation within the broader region.	
Transportation of workers to and from the development site (C)	Air quality, soil surface and social aspects (including traffic and worker safety).	The road safety of the region. A local issue.	Vehicles used to transport workers can be overloaded; worker safety is of utmost importance. Vehicles used to transport workers which exceed the speed limit are dangerous. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)**	Traffic safety measures have to be implemented by the contractor. Correct signage and safety clothing needs to be in place. Construction workers need to be transported to and from the site on a safe manner. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Severity = 2x4=8 (rating 3) **Significance= 3x3=9** **This impact is of negative moderate significance**	**Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Construction camp establishment (C)	Aesthetic impacts, social aspects, subsurface and groundwater quality, generation of domestic waste, vegetation removal, soil surface compaction and faunal impacts.	Location still to be determined.	The generation of domestic waste, as well as the provision of sewage facilities, within the construction camp could potential impact on the aesthetics of the site as well as the quality of subsurface and groundwater if not properly managed and implemented. The removal of sections of natural vegetation would most likely be needed for the establishment of the camp, and soil surfaces would become compacted as a result of activities within the camp. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)**	Proper management of any temporary toilets need to be undertaken on a strict schedule. The construction camp must be more than 100 metres away from any water bodies. Construction camps **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Severity = 2x4=8 (rating 3) **Significance= 3x3=9** **This impact is of negative moderate significance**	
Housing of workers during construction (C)	Aesthetic character, soil and vegetation, surface water quality and social aspects.	The possibility of housing construction workers on site.	The establishment of housing for workers will have a localised impact on the soil and vegetation cover of the chosen site, as well as potentially having a negative impact on the quality of surface water – as a result of domestic waste, and sanitation facilities for example, if these are not properly addressed. Safety is also a concern to residence and stay of workers on site should not be encouraged. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9**	Housing of workers on site, at the construction camp, is a possibility. Preferably only security should look after equipment at night time hours. If workers are housed near residential areas it could create a safety concern. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			This impact is of negative moderate significance	
Sanitation provision to workers during the working day (C)	Subsurface soil, surface water and subsurface water quality.	Insufficient chemical toilets will have a health impact locally.	Insufficient chemical toilets will have a health impact. Subsurface soil contamination and contamination of surface / subsurface water quality could occur if the ablution facilities provided are not according to standard. A temporary impact is possible; however, it can easily be prevented. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	Sufficient chemical toilets should be provided for workers, in the range of 1 per every 8 workers, within walking distance of all construction activities. These toilets must be well maintained and inspected on a daily basis to ensure that they are clean and functioning properly. No washing of people and/or goods should take place on cleared surfaces, as this water should not be allowed to drain into any adjacent storm water canals or drainage lines. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low</u>**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
				significance
Movement of construction vehicles on site (C)	Air quality, soil and vegetation cover.	Potential impacts may be eminent over a wide area if not carefully managed and restricted.	Movement will cause limited or localised disturbances and temporary soil compaction, which promotes the establishment of weed species. Dust will be generated by vehicular movements on site. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	Alien plant species need to be controlled and it must be ensured that weeds are removed. Dust depression measures such as watering the bare surfaces need to be implemented. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Maintenance of construction vehicles (C)	Soil, vegetation and surface water.	Within the construction camp(s).	In the event of on-site repairs and servicing, soil surfaces, vegetation, and run-off may be locally contaminated. Spillage of fuel through faulty bowser is a possibility, if not controlled. It is anticipated that fuel storage facilities	The construction camp has to be identified and communicated to the ECO as soon as its position is available. Any fuel depot areas have to be bunded and where fuel hoses will operate, absorbing gravel needs to be provided. This area

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			will occur on the site. If poorly installed or managed it will cause pollution. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	can also be lined with a small piece of plastic below the gravel. As soon as any spillages occur, the gravel has to be collected and disposed of as hazardous waste. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative low significance**
Traffic safety on the main roads (C and O)	Social aspects.	At all places where there will be interaction with the local traffic along existing routes as well as traffic moving through the area.	Motorists using the main roads and alternative roads may be negatively impacted on by slow moving construction vehicles.Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)**	Traffic safety measures have to be implemented to ensure that the general public is safe. Adequate traffic signage has to be implemented where any heavy vehicles will cross the main roads. Adequate clothing that is visible should be provided to the workers.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Severity = 4x4=16 (rating 4) **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	**Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**
Noise generation by operating air compressors, excavators and other heavy machinery. Noise is also generated by the construction workers (C)	Impacts on faunal surrounding land owners.	Areas on and surrounding site at which construction activities take place.	Excessive noise levels on site may negatively impact upon the behaviour and movements of site fauna. Surrounding land owners may also potentially be negatively impacted upon by excessive noise levels on site during construction. Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	Noise mitigation measures are required in order to keep the noise generated by construction activities as low as possible – given the site's relatively close proximity to some residential areas. This can be achieved by ensuring that only well-oiled, well maintained machinery is used, as such machinery will produce less noise than poorly serviced machinery. For example, poor maintenance of exhaust systems will produce unnecessary noise pollution. Furthermore, working hours for construction should be limited to between 07h00 and 17h00 on week days,

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
				as construction outside of these time frames will be a nuisance to adjacent dwellers. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**
Heritage (C)	**Heritage or historical components**	Historical features are present on site.	The proposed development is to be conducted near or on possible cultural historical elements. **Δ** **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high**	If any areas of historical significance are discovered during construction, work should be stopped and a cultural specialist should investigate the site. The first contact can be made with the EAP on site. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)**

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			significance before mitigation.	**Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**
Impact on the wetlands (C) (O)	Water quality, and soil	In and around the wetland areas.	Impacts on the wetland could be caused by the construction activities and possible siltation into the wetland, although no construction will occur in any wetlands. Δ **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**	Please refer to Pg. 108 under section 8.3.1.1: Mitigation measures. This was formulated by the aquatic specialist. **Probability = 3 (improbable)** **Intensity = 2 (moderate intensity)** **Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance= 3x2=6** **This impact is of negative <u>low significance</u>**
Movement and survival of Animal species	Fauna of the site	Within the site	The construction will have an effect on the animals present within the site. These impacts will include habitat destruction. It will also limit movement of species through the site.	Specialist studies have determined an overview of the habitat present on-site. Red data avifauna have been recorded during the EAP's site visit.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT/ISSUE BEFORE MITIGATION	NATURE OF THE IMPACT/ISSUE AFTER MITIGATION
			Probability = 3 (probable) **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative moderate significance**	**Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**
Construction of the proposed development on red data animals	Animals	On-site	The construction of the proposed development will influence animal life and habitat. Red data avifauna species were recorded during the site visits. Δ **Probability = 4 (highly probable)** **Intensity = 4 (high intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance= 4x4=16** **This impact is of negative high significance before mitigation.**	Although habitat will be lost, proper rehabilitation of the site, not used, could lessen the severity of the impact. **Probability = 3 (probable)** **Intensity = 2 (moderate intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance= 3x3=9** **This impact is of negative <u>moderate significance</u>**

8.4.1.1 Summary of the Significance Rating of the Anticipated Impacts

ENVIRONMENTAL AND OTHER COMPONENTS TO BE AFFECTED **BM = before mitigation** **AM = after mitigation**	**Probability value**	**Intensity value**	**Duration value**	**Severity value**	**Significance rating**
Impact on the vegetation component of the site	BM: 4 AM: 3	4 2	4 2	4 2	16: High (negative) 6: Low (negative)
Impact on the faunal component of the site	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on Red Data Fauna and Flora	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on soil (surface stability)	BM: 3 AM: 2	2 1	2 4	2 2	6: Low (negative) 4: Low (negative)
Impact on soil (topsoil layer - disturbance and compaction)	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on subsurface soil quality	BM: 2 AM: 2	2 2	2 4	2 3	4: Low (negative) 6: Low (negative)
Impact on topography	BM: 2 AM: 0	2 0	2 0	2 0	4: Low (negative) 0
Impact on geology	BM: 2 AM: 0	2 0	2 0	2 0	4: Low (negative) 0
Impact on surface drainage and existing water bodies	BM: 4 AM: 4	2 2	4 2	3 2	12: Moderate (negative) 8: Moderate (negative)
Impact on surface water run-off quality	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on groundwater resources	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on air quality	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on ambient noise levels	BM: 4 AM: 2	4 2	4 2	4 2	16: High (negative) 4: Low (negative)
Impact on cultural historical & archaeological elements	BM: 4 AM: 3	4 2	4 4	4 3	16: High (negative) 9: Moderate (negative)
Impact on the social environment of the adjacent landowners	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on traffic safety aspects	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (negative) 4: Low (negative)
Impact on land use & agricultural potential	BM: 2 AM: 2	2 2	2 2	2 2	4: Low (negative) 4: Low (negative)
Impact on visual and aesthetic quality	BM: 2 AM: 2	2 2	2 2	2 2	4: Low (negative) 4: Low (negative)
Impact on local economy (due to job creation)	BM: 4 AM: 2	2 2	2 2	2 2	8: Moderate (positive) 4: low (positive)
Impact on community (due to job creation)	BM: 2 AM: 2	1 1	2 2	2 2	4: Low (positive) 4: Low (positive)

8.4.2 Design Alternative (Different Layout)

The design alternative in term of the placing and orientation of the pig structure components can only be moved from its current positions to less favourable sites than it currently occupies. This would be for instance to move a unit/structure from existing

cropland to natural veld or closer to existing wetlands and drainage lines. It is therefore logical that the current impact rating, across the board, for the proposed layout design will increase in significance (negatively).

8. KNOWLEDGE GAPS, UNCERTAINTIES AND ASSUMPTIONS

There was no knowledge gaps identified due to the fact that all relevant parties (I & APs and Specialists) were consulted and valuable information was received and recommendations made.

No assumptions were made also because the necessary studies were conducted and the information was made available to relevant stakeholders and these studies were incorporated into the planning and design of this development.

Uncertainties will always be part of any development when it comes to the actual degree of impact it will have on the immediate environment, because no project is identical. Any and real results can only be recorded after the development has started and finished.

9. ENVIRONMENTAL IMPACT STATEMENT

9.1 Development Upkeep.

All services and maintenance to this proposed development will also be part of the developer/individual/municipality responsibility.

9.2 Biophysical- and Socio-Economic Environment

9.2.1 Flora

All impacts of the development were rated as low to moderate significance. The same level of rating was awarded towards the sensitivity of the site.

Mitigation measures were proposed for the following:

Mitigation measures for Impact on Natural vegetation:

- Unnecessary impacts on surrounding natural vegetation must be avoided.

- The construction impacts must be contained within the footprint of the infrastructure.
- Disturbed areas beyond the footprint of the infrastructure must be rehabilitated as quickly as possible.

Mitigation measures for Loss of individual or threatened plants:

- Unnecessary impacts on surrounding natural vegetation must be avoided.
- The construction impacts must be contained within the footprint of the infrastructure. Disturbed areas beyond the footprint of the infrastructure must be rehabilitated as quickly as possible.

Mitigation measures for establishment and spread of declared weeds and alien invader plants:

- Disturbance of indigenous vegetation must be kept to a minimum. Where disturbance is unavoidable, disturbed areas should be rehabilitated as quickly as possible once construction is completed.
- Soil stockpiles should not be translocated from areas with alien plants into the site and within the site alien plants on stockpiles must be controlled so as to avoid the development of a soil seed bank of alien plants within the stock-piled soil.
- Any alien plants must be immediately controlled.
- An on-going monitoring programme should be implemented to detect and quantify any aliens that may become established and provide information for the management of aliens.

The following recommendations are made with regards to the proposed development:

(i) An Environmental Control Officer must be appointed to oversee mitigation measures during construction and will be responsible for the monitoring and auditing of the contractor's compliance with the conditions of the Environmental Impact Management Plan/ Programme.

(ii) Areas deemed of medium significance must be mitigated as far as possible by implementing the measures indicated in this report.

(iii) Areas to be disturbed by construction activity as well as areas for ancillary activities such as stock piles, storage yards or site offices must be clearly demarcated in already disturbed areas or areas where they will cause minimal disturbance.

(iv) The extent of the areas must be minimised and demarcated by preferably using steel droppers and nylon rope between the markers. Construction activities and materials must at all times be contained within the demarcated sites.

(v) Alien invasive species have to be controlled before and after construction commences for the 8 recorded alien and invasive plant species recorded on site.

(vi) All mitigation measures described in this report has to be adopted into a legal Environmental Management Programme to be used during construction of the planned project.

(vii) Gladiolus species observed on site is protected in terms of Schedule 11 of the Mpumalanga Nature Conservation Act 10 of 1998 and measures as per the act must be implemented.

A medium to low sensitivity was awarded for the study site based on the methodology described.

A total of 8 plants were identified on and around the site that is listed in the Alien and Invasive Species Regulations of 2014 (NEMBA) which is in need of management.

- 4 NEMBA Category 1b plants were identified and must be controlled.
- 4 NEMBA Category 2 plants were identified and must be controlled and if not eradicated, require a permit to carry out a restricted activity within an area, as specified in the act / regulations.

Gladiolus species observed on site is protected in terms of Schedule 11 of the Mpumalanga Nature Conservation Act 10 of 1998, and must be handled in terms of provisions of the Act.

9.2.2 Fauna

Without any mitigation, the proposed establishment of a piggery and the associated dam enlargement is expected to have a Moderate to High impact on fauna habitat. However, with the implementation of the mitigation measures recommended, the impact will be reduced to a Low significance. It is therefore of utmost importance that all mitigation measures be implemented.

The study area has regions with varying degrees of sensitivity ranging from Low to High. Following the site investigation, it was evident that the majority of the study area had historically been altered by agricultural activities. The community in the region is predominantly agricultural in nature. These transformed areas are deemed to have a Low sensitivity.

The tributaries and wetland areas are deemed to have a High to Moderate Sensitivity. The wetland areas should be excluded from development as, and if development needs to take place within the regulated area of wetlands and rivers, the applicable License Applications should be conducted. During expansion of the Dam Wall, construction phase rehabilitation should take place in accordance with a formal Rehabilitation Plan. The expansion of the Dam Wall is not deemed a negative impact; in fact it will enlarge the habitat of aquatic mammals, reptiles, amphibians, mollusks and insects. The end product will have a positive impact.

The Environmental Management Plan (EMP) should make adequate provision to protect local fauna species and habitat and to control the impacting activities of the proposed development on the site. An Environmental Control Officer (ECO) must be appointed prior to construction to oversee mitigation measures during construction and who will be responsible for the monitoring and auditing of the Contractor's compliance.

9.2.3 Historical Value

According to the heritage specialist:

Historical value:

No historical value associated with the site could be found in primary and secondary sources.

Social value:

Social value is attributed to sites that are used by the community for recreation and formal and informal meetings regarding matters that are important to the community. These sites include parks, community halls, sport fields etc. None of the said is evident in the immediate study area.

Does the site/s contain a wide range of archaeological sites?

The proposed site does not contain any surface archaeological deposits; a possible reason is previous infra-structure development and farming activities in the greater study area. The possibility of sub-surface findings always exists and should be taken into consideration in the Environmental Management Programme. If sub-surface archaeological material is discovered work must stop and a heritage practitioner preferably an archaeologist contacted to assess the find and make recommendations.

Does the site/s contain any marked graves and burial grounds?

Graves are situated near the site earmarked for development.

The possibility of graves not visible to the human eye always exists and this should be taken into consideration in the Environmental Management Plan.

It is important to note that all graves and cemeteries are of high significance and are protected by various laws. Legislation with regard to graves includes the National Heritage Resources Act (Act 25 of 1999) whenever graves are 60 years and older. Other legislation with regard to graves includes those when graves are exhumed and relocated, namely the Ordinance on Exhumations (no 12 of 1980) and the Human Tissues Act (Act 65 of 1983 as amended).

If sub-surface graves are discovered work should stop and a professional preferably an archaeologist contacted to assess the age of the grave/graves and to advice on the way forward.

Recommendations:

- There are no visible restrictions or negative impacts in terms of heritage associated with the site earmarked for development.
- If the layout of the proposed development is altered and the graves situated near the development site will be impacted on, suitable mitigation measures must be put in place.
- In terms of heritage this project can proceed.
- Graves close to the site must allow a 50m buffer from development and must be fenced off.
- The discovery of subsurface archaeological and/or historical material as well as graves must be taken into account in the Environmental Management Programme.

9.2.4 Aquatic Ecosystem

The primary surface water impacts associated with the proposed development are the potential impacts on water quality degradation due to incidental waste discharges and storm water management at the project site, especially during the construction phase as well as habitat loss due to construction within the riparian area.

The impact on the wetland area could be seen as moderate to high without the implementation of mitigation measures. With the implementation of mitigation management measures the impact of the development on the wetland is ranked as a low significance.

In terms of findings related to the overall surface water environment relevant to the study site the following conclusions are made:

- The study area, inclusive of all three relevant properties, is situated within Quaternary Catchment C11C of the Upper Vaal Sub-WMA which in turn forms part of the larger Vaal Water Management Area.
- Five main aquatic features have been identified within the site. These include the drainage lines to the north and south of the study site, its tributaries and associated wetlands areas.
- According to NFEPA the study area is situated within a Freshwater Ecosystem Priority Area. Although FEPA status applies to the actual river reach within such a

sub-quaternary catchment, in this case the Klein-Vaal River, the surrounding land and smaller stream network need to be managed in a way that maintains the good condition (A or B ecological category) of the river reach.

- It is however noted that the rivers and streams within the sub-catchment does not meet the A or B Category set for the sub-catchment.
- Furthermore, certain wetlands occurring on site has been categorised by SANBI as FEPA wetlands. Wetland FEPAs currently in a condition lower than good should be rehabilitated to the best attainable ecological condition.
- Soils within the area are highly erodible which shows within the drainage lines. The easily erodible soils have caused the drainage lines to develop numerous erosion branches, both upstream and downstream.
- Within the study site itself, cultivation have encroached the majority of drainage lines and grazing sheep and cattle further contributes to bank destabilisation and overall degradation of land cover. Further impacts to the drainage lines include road crossings and numerous impoundments. Thirteen artificial instream dams were counted.
- The drainage lines on site are indicated to fall within a Class C PES indicating a Moderately Modified system.
- It was found that the ecological status of the Klein-Vaal tributaries for the proposed Piggery has an overall status of fair (heavily used or impacted) and the Ecological Importance and Sensitivity is considered as low/marginal.
- The seep wetland found on site is characterised to fall within a Class E Category which indicates a seriously modified wetland. The EIS of the seep wetland found on site is categorised as Low/Marginal.
- The natural channelled valley bottom wetland found on site falls within a Class C Category. This means that the wetland has been moderately modified with some loss of natural habitats. The EIS of the natural channelled valley bottom wetland found on RE and Portion 2 of the Farm Zoetfontein 4 HT is categorised as Moderate.
- Although artificial, the channelled valley bottom wetland found on Portion 3 of the Farm Kleinfontein 3 HT is considered to support water loving biodiversity and is categorised to maintain a Moderate Ecological Importance and Sensitivity.

9.3 Comparative Summary Assessment between the Alternatives

Table 7: Comparative assessment between the Alternatives.

Environmental Aspects	Proposed Development	Proposed Chicken Broiler Facility Alternative	No – Go
Geology	No impact. Area too small and there is no detrimental geological feature on site.	No impact. Area too small and there is no detrimental geological feature on site.	No impact.
Topography	No impact.	No impact.	No impact.
Soil, Land Capability and Land Use	Soil compaction. Possible soil erosion due to removed vegetation. Surface disturbance and topsoil removal.	Greater soil compaction impact. Possible soil erosion due to removed vegetation. Larger surface disturbance and topsoil removal.	Possible dumping on vacant and derelict land.
Flora	Stripping of surface vegetation during construction. Possible sensitive flora on site and around the wetland.	Stripping of surface vegetation during construction. Possible sensitive flora on site and around the wetland.	No impact.
Fauna	Removal of surface vegetation thereby depleting food sources.	Removal of surface vegetation thereby depleting food sources.	No impact.

Environmental Aspects	Proposed Development	Proposed Chicken Broiler Facility Alternative	No – Go
	Human presence resulting in emigration of animals. The disturbances of the vegetation cover and natural habitat will have a limited impact on the wildlife. However, it should be viewed against the background of the disturbances by human movement and activities through the area.	Human presence resulting in emigration of animals. The disturbances of the vegetation cover and natural habitat will have a limited impact on the wildlife. However, it should be viewed against the background of the disturbances by human movement and activities through the area.	
Surface Water	Impacts on the wetlands and streams could be caused by the construction and operational phase. Drainage line or stream could be altered or blocked by construction activities. Possible contamination of ground water from faulty or unmanaged effluent dam	Impacts on the wetlands and stream could be caused by the construction and operational phase. Drainage line or stream could be altered or blocked by construction activities.	No additional impact.
Ground Water	Low potential environmental impact predicted.	Low potential environmental impact predicted.	No impact.

Environmental Aspects	Proposed Development	Proposed Chicken Broiler Facility Alternative	No – Go
	Temporary toilets (chemical) left unmanaged can leak raw sewage and effluent into the soil, surface and even ground water sources, during the construction phase. Possible contamination of ground water from faulty or unmanaged effluent dams.	Temporary toilets (chemical) left unmanaged can leak raw sewage and effluent into the soil, surface and even ground water sources, during the construction phase. .	
Air Quality	Low potential environmental impact. During the construction phase; dust could cause problems for nearby human settlements. During the operational phase the air quality will be the same as it currently is.	Low potential environmental impact. During the construction phase; dust could cause problems for nearby human settlements. During the operational phase the air quality will be the same as it currently is.	The air quality will be the same as it currently is.
Noise	Moderate potential environmental impact. Noise from the farm traffic will be an inconvenience to a certain extent for some existing properties adjacent to the site.	Moderate potential environmental impact. Noise from the farm traffic will be an inconvenience to a certain extent for some existing properties adjacent to the site.	No impact additional impact.

Environmental Aspects	Proposed Development	Proposed Chicken Broiler Facility Alternative	No – Go
Visual	No significant impact. This is all agricultural land and the proposed development is also agricultural. Waste, such as building rubble and empty cement bags can be a negative visual impact if not collected and disposed of correctly.	No significant impact. This is all agricultural land and the proposed development is also agricultural. Waste, such as building rubble and empty cement bags can be a negative visual impact if not collected and disposed of correctly.	No impact.
Sensitive Landscapes	Sensitive landscapes identified will include the surrounding wetland, streams and drainage lines. According to the Aquatic Ecosystem study a Low potential impact is predicted before any mitigation measures is employed. • Removal of surface vegetation thereby depleting food sources. • Human presence resulting in emigration of animals.	Sensitive landscapes identified will include the surrounding wetland, streams and drainage lines. According to the Aquatic Ecosystem study a Low potential impact is predicted before any mitigation measures is employed. • Removal of surface vegetation thereby depleting food sources. • Human presence resulting in emigration of animals.	No new or additional impact.

Environmental Aspects	Proposed Development	Proposed Chicken Broiler Facility Alternative	No – Go
	• The disturbances of the vegetation cover and natural habitat will have a limited impact on the wildlife. However, it should be viewed against the background of the disturbances by human movement and activities through the area. • The movement of water into the wetland will be altered by construction activities.	• The disturbances of the vegetation cover and natural habitat will have a limited impact on the wildlife. However, it should be viewed against the background of the disturbances by human movement and activities through the area. • The movement of water into the wetland will be altered by construction activities.	
Sites of Archaeological and Cultural Interest	Possible significant impact. The study area does contain marked graves and burial grounds.	Possible significant impact. The study area does contain marked graves and burial grounds.	No impact.
Socio-economic	Positive impact on the regional socio-economic structure through its support to the community, like: ⅄ Job opportunities during the construction phase. ⅄ Local economic boost. ⅄ Housing.	Positive impact on the regional socio-economic structure through its support to the community, like: ⅄ Job opportunities during the construction phase. ⅄ Local economic boost. ⅄ Housing.	Negative Impact due to no additional job opportunities created.

Environmental Aspects	Proposed Development	Proposed Chicken Broiler Facility Alternative	No – Go
Interested and Affected Parties	None.	None.	No impact.
Cumulative	The cumulative impact of the development on the social environment is positive. More job creation opportunities. Seen at a wider scale the additional developments are not physically connected, but the removal of vegetation cover, such that the soil surface is exposed, may lead to increased soil erosion in the area and loss of habitat.	The cumulative impact of the development on the social environment is positive. Housing. Seen at a wider scale the additional developments are not physically connected, but the removal of vegetation cover, such that the soil surface is exposed, may lead to increased soil erosion in the area and loss of habitat.	No impact. Status Quo.

10. CONCLUSION AND RECOMMENDATIONS

The EIA Process for the proposed development has been undertaken in accordance with the EIA Regulations published in Government Notice R 982 of 4 December 2014, as amended, in terms of the National Environmental Management Act (Act No. 107 of 1998), as amended.

The essence of any EIA process is aimed at ensuring informed decision-making and environmental accountability, as well as to assist in achieving environmentally sound and sustainable development. This is achieved by conducting an analysis of the potential impacts that a proposed development may have on the physical, environmental and social aspects of the concerned area. In order to minimise the potential impacts associated with the proposed development, an EMPr is compiled, which must be implemented in order to sufficiently mitigate the anticipated impacts to an acceptable level.

In summary, it can be concluded that the proposed development will experience impacts on the environment, social and economic aspects.

These are:

Environmental components to be affected negatively	Description of the anticipated environmental & socio-economic impacts / key issues
Properties	• Noise, Odour and safety impacts.
Possible Odour Impact	• Odour from the piggery, if not managed properly, could cause an irritation to adjacent land owners.
Traffic impact	• The development will also affect the local community in a possible negative way, during the construction phase, as traffic into and out of the farm may cause congestion.

Business areas	• Positive impact: This development will attract business to the areas and boost the local economy. Job creation is a great possibility.
Water provision	• A possible increase in water demands due to the proposed development on this piece of land.
Ground & Surface Water	• Abstraction of water could deplete the natural resource of the area. • Contamination from the slurry & abattoir treatment facility could pose a risk to ground water.
Habitat loss	• Loss of natural vegetation due to the proposed development, although the loss of habitat, proportionally to the wider region of similar natural vegetation, will be very small.

10.1 Authorisation of Project

The identification and description of the potential or anticipated impacts (herein referred to as environmental aspects) was the result of an assessment of the relevant environmental conditions and the issues identified during the public participation exercise, terrain assessments, specialist studies and desktop research. An objective rating of the SIGNIFICANCE of the potential impacts resultant of the proposed road development revealed that impacts were predominantly LOW to MODERATE (negative) during the construction phase, but if mitigated correctly the significance of the impact drops to LOW. There are also two moderate (positive) impact anticipated (Local economy and social impact) during the operational phases respectively. This means that it is possible for the project to proceed, providing that the impact mitigation measures provided are strictly implemented in the design, construction and operational phases of the road development.

The EIA process revealed that no fatal environmental flaws were identified that should prevent the approval of the proposed development. In summary, the main environmental aspects that need to be addressed during project implementation are:

- Design stage: The proposed development position layout should be well thought out, in terms of the proposed site and consequently is matter of fact so.

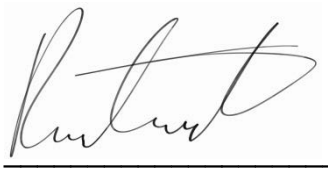
- Construction stage: Addressing general social and traffic safety, air quality, noise generated, waste management, construction activities and restoration/landscaping of the site.
- Operational stage: Maintaining all infrastructure on a regular basis and promoting jobs.

The ultimate approval of this project lies with the ruling of Mpumalanga DEDET. However, this Environmental Assessment Practitioner (REC) is of the independent opinion that the EIA process will conclusively determine if there are any fatal environmental flaws associated with the proposed development that would constitute the refusal of Authorisation of the project – bearing in mind that approval must be subject to strict implementation and monitoring of the EMPr compiled, and given that there should be room for improving the EMPr as the project progresses. It is trusted that this Basic Environmental Assessment Report gives a balanced view of the anticipated environmental impacts associated with a proposed development of this nature.

11. UNDERTAKING UNDER OATH BY THE EAP

An undertaking under oath by the EAP in relation to:

(i) the correctness of the information provided in the report;
(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties;
(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and
(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.



Rowan van Tonder
REC Services (Pty) Ltd.