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REC SERVICES
ENVIRONMENTAL CONSULTANTS

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

PROPOSED ESTABLISHMENT OF NEW IRRIGATION AREAS, CROPLAND AND 2 NEW DAMS ON THE FARMS BROEDERSTROOM 48-HT, POR. 1, 2 & REM.; KLEINFONTEIN 3-HT, POR. 11 & 13; RIETSPRUIT 6-HT, POR. 1 & 2; WACHTEENBEETJE 5-HT, POR. 1 & REM., MPUMALANGA PROVINCE.

Reference No.: 1/3/1/16/1 G-201
NEAS No.: MPP/EIA/0000872/2021

DRAFT ENVIRONMENTAL IMPACT REPORT

Prepared for:
MR B. MODUKA
MPUMALANGA PROVINCIAL HERITAGE RESOURCES AUTHORITY
1ST & 2ND FLOOR, BUILDING 5
GOVERNMENT COMPLEX
7 GOVERNMENT BOULEVARD
RIVERSIDE PARK
NELSPRUIT
1200

On behalf of:
V.P. KHANYILE T/A AFRIKAN FARMS ENTERPRISES
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REC SERVICES (PTY) LTD

Date: 7 January 2022

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1. EXECUTIVE SUMMARY

REC Services (Pty) Ltd. (REC) was appointed by Mr. Vusi Khanyile of Afrikan Farms (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 establishment of new irrigation areas, cropland, and new dams.

1.1 BASIC PROJECT DESCRIPTION

Application for the establishment of a new pasture and vegetable production areas as part of the overall farming enterprise. As well as 2 new dams to be constructed. 202 Ha will be developed for this vegetable production and pasture fields. Both of the dams will have dam walls 5m or higher and the biggest dam, when full will, cover an area of about 170 Ha.

1.2 LOCALITY AND STUDY AREA

The farms on which two dams and 202 Ha of vegetable production and pastures will be established is 26.5km east of the town Amersfoort: Travel 2km south on the N11 from Amersfoort to the Wakkerstroom turnoff (left-hand side); Travel 17.8km and turn left onto another gravel road; from here travel for 6.9km and you will reach one of the sites on your left. GPS coordinates of first site (irrigation, cropland, and pastures on Kleinfontein): -27.049254°, 30.083801°. GPS coordinates of second site (large dam on Rietspruit): -27.042049°, 30.128058°. GPS coordinates of third site (dam and pastures on Broerderstroom): -27.089323°, 30.095879°.

The proposed sites are all situated in a grassland biome affected by agricultural practices ranging from crop production, planted pastures, sheep and cattle farming to game farming. Small streams and rivers crisscross the area with an occasional earth dam in it.

1.3 ASSESSMENT AND CONSIDERING ALTERNATIVE ROUTES

Right from the onset of the EIA process close examination was given to different alternative agricultural practices. Afrikan Farms has already invested in a piggery just north of the proposed areas and is also now focusing on poultry nearby. Crop production is an ongoing practice, and the applicant now wants to expand to new areas to produce more product on a commercial scale for the community and its livestock.

In this case, very little option is available to alternative sites/properties for most of the property of the applicant has already been earmarked for specific future agricultural practices. The building of the dam walls was placed at specific/strategic points to maximise the effect of damming up water in its respective rivers.

The design and technology alternatives are also very limited due to the fact that only a specific design and techniques will work for each dam. Planted pastures and cropland is very straight forward in its design and techniques used. There is only one way to plough a field and erect an irrigation system on it.

The only alternative to the planted pastures, cropland and irrigation field would be a different agricultural activity.

1.3.1 Activity Alternative

Cattle feedlot or a piggery.

1.3.2 No Go Option

A "DO NOTHING" alternative would be not to build this proposed development and keep all the current properties as it is. This could mean that there will be no additional crops and animal feed being produced and that job creation is not promoted, but it could also mean that the natural grassland ecosystem is not impacted upon by additional agricultural activities.

1.4 PUBLIC PARTICIPATION PROCESS

The Public Participation Process was conducted on 3-12 February 2021. It is still on-going.

- Background Information Documents (BIDs) were distributed/emailed to adjacent landowners as well as other Interested and Affected Parties (I&APs) on the 3rd of February 2021 (please refer to Appendix 5A for a copy of the BID as well as proof of the distribution of the BIDs).
- Site notices were erected/placed at several key locations on the 3rd of February 2021 (please refer to Appendix 3D for a copy of the Site Notice as well as proof of the erection of the Site Notices). Key locations:

1. Site 1 (Kleinfontein): Next to the site at access road/gate: -27.045184°, 30.088227°

2. Site 2 (Rietspruit): Next to site at access road/gate: -27.037399°, 30.115369°.

3. Site 3 (Broerderstroom): Next to the site at access road: -27.078218°, 30.102248°.

- A press advert was placed in the 'Volksrust Recorder' newspaper on the 12 February 2021.
- The ward councillor (Ward 10), local and district municipality, DWS, and the provincial heritage resources agency was informed by means of Background Information Documents (written notifications) via email.

1.5 THE EIA PROCESS

During the course of this EIA assignment the following actions and steps are required and was/will be followed in accordance with the Regulations, as amended, set out in Government Notice No. 326 of 7 April 2017 of the NEMA, as amended:

- An Application for Authorisation, signed by the Applicant, together with a Declaration of Independence, which was signed by the environmental assessment practitioner, was submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA). This coincided with the submission of the draft Scoping Report.
- The Public Participation Process did/will inform the public about the proposed development and application process and input, comments and suggestions were/will be requested.
- The draft Scoping Report was made available for comments to the DARDLEA, registered I&APs, the local authorities and all other applicable stakeholders. The draft Scoping Report was also available to be viewed at the Amersfoort Library.
- The final Scoping Report was submitted to DARDLEA for review.

- DARDLEA accepted the final Scoping Report, and an Environmental Impact Assessment Report with an attached Environmental Management Programme will now be compiled and completed. All issues from the Scoping Report will be addressed in the draft and final EIA Report, as well as issues and impacts identified by the Environmental Assessment Practitioner. Any relevant specialist studies will be included in the draft and final EIA Report. The issues identified in the specialist studies will also be addressed in the final EIA Report.

The draft EIA with attached Environmental Management Program (EMPr) report will be made available for comments to the registered I&AP's. Comments received from I&AP's on the contents of the draft EIA and EMPr report will be incorporated into the final EIA and EMPr reports. By making the draft report available, ensures that all issues have been identified.

1.6 CONCLUSION

The purpose of this Environmental Impact Report (EIR) 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 development 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 (Farms)	• Noise and safety impacts, as well as loss of natural grassland.

Access to farms.	• Accesses have to be made safer by creating safer access roads and larger gates for farming equipment.
Noise Impact	• Very little noise will be created from farming equipment during planting and harvesting seasons.
Business/Agricultural areas	• Possible increase of income due to more production areas being created.
Water provision	• An increase in water demands due to the proposed development being very water intensive.
Land-use	• An increase of future agricultural production areas, although the loss of natural grassland and impacts on adjacent wetlands/rivers.
Environmental Sensitive Areas	• Loss of natural vegetation, wetland and impacts upon streams and drainage lines due to the proposed development, although the loss of habitat, proportionally to the wider region of similar natural vegetation, will be small to moderate.

The second phase of the Environmental Impact Assessment (EIA) process for the proposed development will be in the form of an **EIR**. Anticipated and potential significant impacts that have been identified relating to the development will be 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 (as has been conducted during this environmental scoping process). In order to minimise the potential impacts associated with the proposed development, an Environmental Management Programme (EMPr) is to be compiled, which must be implemented in order to sufficiently mitigate the anticipated impacts to an acceptable level.

The draft environmental Scoping Report 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. **After the Scoping Report was submitted and accepted by the relevant authority, the draft EIA report will be now compiled with all issues raised and again be made available to members of the public to determine whether all matters have been covered and addressed to their satisfaction.**

The 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 to be compiled and given that there should be room for improvement on the EMPr as the project progresses. It is trusted that this EIR gives a balanced view of the anticipated environmental impacts or issues associated with a proposed development of this nature.

1.7 ENVIRONMENTAL APPLICATION

Adherence to Regulatory Requirements, Regulation No R. 326 of 7 April 2017, Appendix 2, as amended, published in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), as amended.

Contents of a Scoping Report <u>as stipulated</u> in R. 326, as amended (Appendix 2, Point 2)		**Covered in Scoping Report**
Appendix 2 Point 2	A Scoping Report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact	

	assessment process, and must include:	
(a)	Details of: the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae;	Chapter 2 Appendix 6
(b)	The location of the activity, including: the 21-digit Surveyor General code of each cadastral land parcel; where available, the physical address and farm name; where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Chapter 5 Appendix 3
(c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is: a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Chapter 5 Appendix 3 Appendix 4a
(d)	A description of the scope of the proposed activity, including: all listed and specified activities triggered; 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 an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development	Chapter 4

	planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	
(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 5
(h)	a full description of the process followed to reach the proposed preferred activity, site and location within the site, including: details of all the alternatives considered; details of the Public Participation Process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; 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; the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; 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: (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and	Chapter 5 Chapter 6 Chapter 7, Appendix 5 a-h Chapter 8, Appendix 1 Chapter 9

	(cc) can be avoided, managed or mitigated; 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; 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; the possible mitigation measures that could be applied and level of residual risk; the outcome of the site selection matrix; if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
(i)	A plan of study for undertaking the environmental impact assessment process to be undertaken, Including: a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; a description of the aspects to be assessed as part of the environmental impact assessment process; aspects to be assessed by specialists; a description of the proposed method of assessing the	Appendix 1

	environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists; a description of the proposed method of assessing duration and significance; an indication of the stages at which the competent authority will be consulted; particulars of the Public Participation Process that will be conducted during the environmental impact assessment process; and a description of the tasks that will be undertaken as part of the environmental impact assessment process; identify suitable measures to avoid, reverse, mitigate or manage identified impacts; and to determine the extent of the residual risks that need to be managed and monitored.	
(j)	An undertaking under oath or affirmation by the EAP in relation to: the correctness of the information provided in the report; the inclusion of comments and inputs from stakeholders and interested and affected parties; and 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;	Chapter 10
(k)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties	Appendix 1

	on the plan of study for undertaking the environmental impact assessment;	
(l)	Where applicable, any specific information required by the competent authority; and	Noted
(m)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	Chapter 8

2. INTRODUCTION

The purpose of this EIR is to broadly and collaboratively identify all possible issues and impacts from activities associated with the proposed establishment of new irrigation areas, cropland and 2 new dams on the farms Broederstroom 48-HT, Por. 1, 2 & Rem.; Kleinfontein 3-HT, Por. 11 & 13; Rietspruit 6-HT, Por. 1 & 2; Wachteenbeetje 5-HT, Por. 1 & Rem., Mpumalanga Province. 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 2017 EIA regulations promulgated on the 7 April 2017, as amended, the planning, construction and operation of the proposed development and associated infrastructure represent the legal trigger for the Environmental Impact Assessment (EIA) process to be followed. The listed activities were identified in term of Sections 24 & 24D of the National Environmental Management Act (Act No. 107 of 1998) (NEMA), as amended. The applicable listed activities identified are:

- Listing Notice 1, R. 327 Activity number 19.
- Listing Notice 2, R. 325 Activity number 15 & 16.
- Listing Notice 3, R. 324 Activity number 12.

2.1 DETAILS OF THE EAP

The EAP appointed for this project is part of REC Services (Pty) Ltd. (REC).

REC Services (Pty) Ltd. 566 Rubenstein Drive, Moreleta Park 0044 P. O. Box 40541, Moreleta Park, 0044 Telephone: 012 997 4742 E-mail: info@recservices.co.za & rowan@recservices.co.za	REC SERVICES ENVIRONMENTAL CONSULTANTS
APPLICANT: Afrikan Farms (Pty) Ltd. Mr Vusi P. Khanyile PO Box 144 Amersfoort 2490 Cell: 082 552 9203 E-Mail: vusi@afrikanfarms.co.za	AFRIKAN FARMS

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 30-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 REC Services (Pty) Ltd. is **Mr. Rowan van Tonder**. He is the principal 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 BSc. (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 REC Services (Pty) Ltd. for 13 years (for extended details, See Appendix 6 – EAP CV). SACNASP (Pri.Sci.Nat) Reg. No.: 119204.

Mr. Pieter van der Merwe is the managing director for REC Services (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 29 years of experience in the Environmental Management field and has operated his own company, REC Services (Pty) Ltd, for more than 20 years.

2.2 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 stipulations made in Government Notice R. 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:

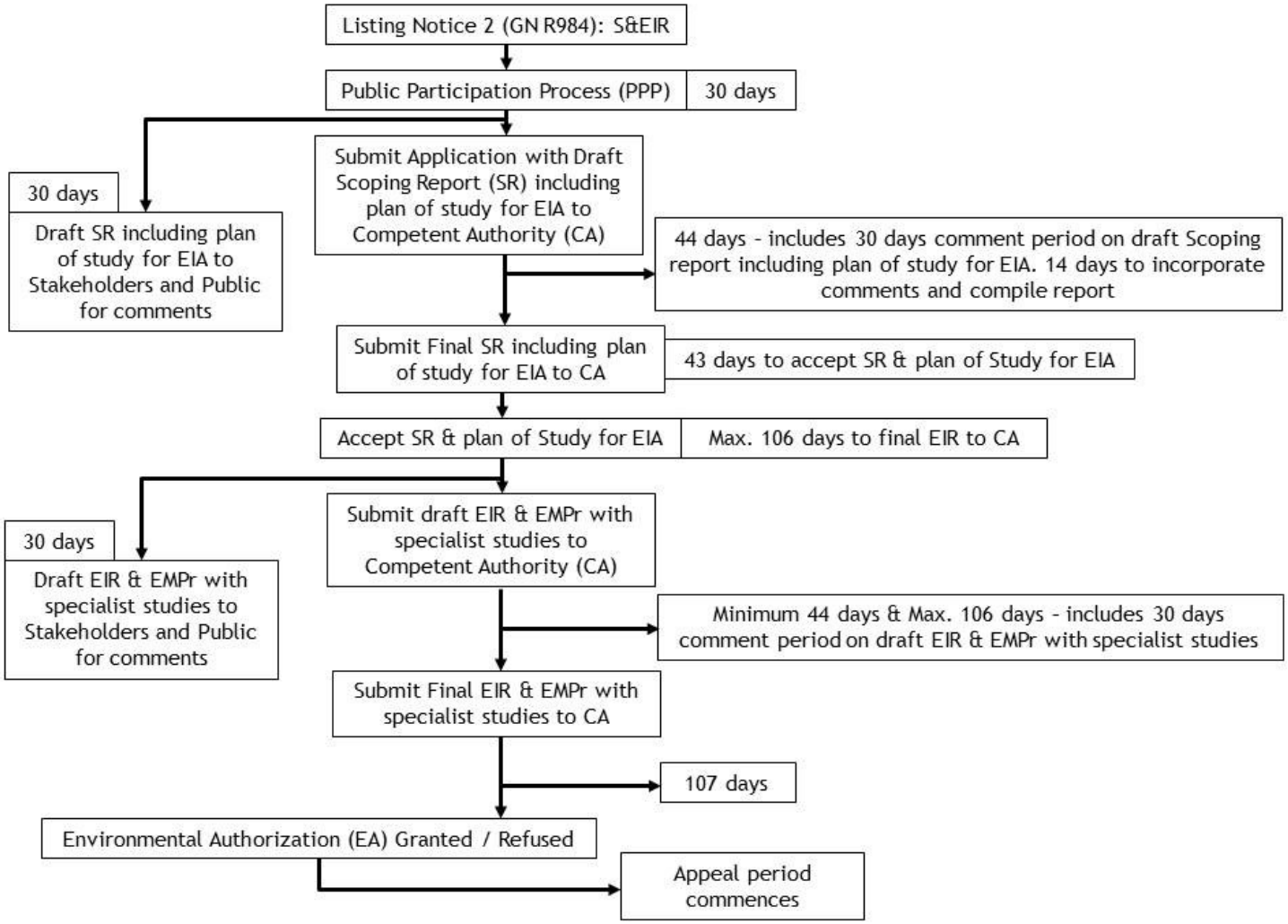
- Terrain investigations;
- Specialist Studies , including but not limited to:
    - An ecological study of the site, including functional biodiversity aspects on Threatened Ecosystems. A site rehabilitation plan to give effect to the recommendations of the biodiversity assessment in the report requested above, as the case may be;
    - The specialist studies must examine all cumulative impacts of the activity on the site and the surrounding environment;
- The identification and assessment of biophysical elements within the study area;
- Compilation of a Scoping and Environmental Impact Assessment Report with Environmental Management Programme.

(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;
- If needed, conduct an open day(s) or meetings where Interested and Affected Parties can view the lay-out plan and be informed of the functioning of the treatment process in basic terms;
- 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 EIA 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 EIA process as possible, to ensure informed decision-making and effective participation throughout the study.

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



2.2.1 Scoping Phase

During the course of this study the following actions and steps were followed which are in accordance with the Regulations set out in Government Notice No. 326 of 7 April 2017 of the NEMA, 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 road widening (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 on 3-12 February 2021. It is still on-going.

- Background Information Documents (BIDs) were distributed/emailed to adjacent landowners as well as other Interested and Affected Parties (I&APs) on the 3rd of February 2021 (please refer to Appendix 5A for a copy of the BID as well as proof of the distribution of the BIDs).
- Site notices were erected/placed at several key locations on the 3rd of February 2021 (please refer to Appendix 3D for a copy of the Site Notice as well as proof of the erection of the Site Notices). Key locations:
    1. Site 1 (Rietfontein).: Next to the site at access road/gate: -27.045184°, 30.088227°

2. Site 2 (Kleinfontein): Next to site at access road/gate: -27.037399°, 30.115369°.

3. Site 3 (Broerderstroom): Next to the site at access road: -27.078218°, 30.102248°.

- A press advert was placed in the 'Volksrust Recorder' newspaper on the 12 February 2021.
- The ward councillor (Ward 10), local and district municipality, DWS, and the provincial heritage resources agency was informed by means of Background Information Documents (written notifications) via email.

During the course of this EIA assignment the following actions and steps are required and will be followed in accordance with the Regulations, as amended, set out in Government Notice No. 326 of 7 April 2017 of the NEMA, 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 and Environmental Affairs (DARDLEA). This will coincide with the submission of the draft Scoping Report.
- The Public Participation Process will inform the public about the proposed development and application process and input, comments and suggestions will be requested.
- The draft Scoping Report will be made available for comments to the DARDLEA, registered I&APs, the local authorities and all other applicable stakeholders. The draft Scoping Report will also be available to be viewed at the Amersfoort Library.
- The final Scoping Report will be submitted to DARDLEA for review.
- Once DARDLEA accepts the final Scoping Report, an Environmental Impact Assessment Report with an attached Environmental Management Programme will be compiled and completed. All issues from the Scoping Report will be addressed in the draft and final EIA Report, as well as issues and impacts identified by the Environmental Assessment Practitioner. Any relevant specialist studies will be included in the draft and final EIA Report. The issues identified in the specialist studies will also be addressed in the final EIA Report.

2.2.2 EIA Report Phase

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

The following specialist studies will be conducted with a set out terms of reference and included into the draft EIA report. This is due to key environmental issues identified during the scoping phase and Public Participation Process. The Province's Conservation Plan (C-Plan) (see Appendix 3 for the C-Plan map) also formed a basis and tool used on which the

biodiversity assessment will be conducted:

- **Fauna & Flora Impact Assessments:** A description of the vegetation of the study area, as well as the avifauna, including the identification and assessment of potential Red Data species compiled by KEMS (Flora, Mammals, Herpetofauna, Avifauna, Arthropod Specialist).
- **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), part of KEMS.
- **Wetland delineation, EIS PES and risk assessment**, compiled by Steve Mitchell (Wetland Specialist), part of KEMS.

3. LEGISLATIVE FRAMEWORK

The following section includes a description of the policy and legislative context within which the development is proposed. The activity is taking place in the Gert Sibande District Municipality jurisdiction and in the Dr Pixley Ka Isaka Seme Local Municipality Local authority in whose jurisdiction the site falls.

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. Afrikan Farms as the custodians of this development, 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 proposed development remains environmentally sustainable.

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

R. 327, 7 April 2017 – Listing Notice 1: Basic assessment Activities	
Activity No	**Listed Activity Description:**
19	The infilling or depositing of any material of more than 10 cubic

R. 327, 7 April 2017 – Listing Notice 1: Basic assessment Activities	
	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;
R. 325, 7 April 2017 – Listing Notice 2: Full EIA Activities	
15	The clearance of an area of 20 hectares or more 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.
16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the highwater mark of the dam covers an area of 10 hectares or more.
R. 985 (324), 7 April 2017 – Listing Notice 3: Basic assessment Activities in Geographical areas	
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) In 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;

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).

The applicant 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, the applicant will be obliged to cease the activity that has caused the pollution and remediate any negative impacts resulting from the activity.

Notice was also given in terms 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. This notice was included in the site notices, the press advertisement and the Background Information Documents. The activities listed are:

Section 21-

- 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(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 proposed development include:

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

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 the proposed development 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 EIA process that will follow this scoping phase. If any negative impacts on biodiversity should be identified, Afrikan Farms (Pty) Ltd. will take all reasonable measures to limit the impacts.

4. PROJECT MOTIVATION & ALTERNATIVES

4.1 NEED AND DESIRABILITY

Please Appendix 7.

4.2 PROPERTIES AFFECTED

The following list of properties will be affected by the proposed development:

- T0HT00000000004800001: Broederstroom 48HT Por. 1
- T0HT00000000004800002: Broederstroom 48HT Por. 2
- T0HT00000000004800000: Broederstroom 48HT Remainder
- T0HT00000000000300011: Kleinfontein 3HT Por. 11
- T0HT00000000000300013: Kleinfontein 3HT Por. 13
- T0HT00000000000600001: Rietspruit 6HT Por. 1
- T0HT00000000000600002: Rietspruit 6HT Por. 2
- T0HT00000000000500001: Wachteenbeetje 5HT Por. 1
- T0HT00000000000500000: Wachteenbeetje 5HT Remainder

4.3 PROJECT DESCRIPTION

4.3.1 Locality and Study Area

The farms on which two dams and 202 Ha of vegetable production and pastures will be established is 26.5km east of the town Amersfoort: Travel 2km south on the N11 from Amersfoort to the Wakkerstroom turnoff (left-hand side); Travel 17.8km and turn left onto another gravel road; from here travel for 6.9km and you will reach one of the sites on your left. GPS coordinates of first site (irrigation, cropland and pastures on Kleinfontein): -27.049254°, 30.083801°. GPS coordinates of second site (large dam on Rietspruit): -27.042049°, 30.128058°. GPS coordinates of third site (dam and pastures on Broerderstroom): -27.089323°, 30.095879°.

The proposed sites are all situated in a grassland biome affected by agricultural practices ranging from crop production, planted pastures, sheep and cattle farming to game farming. Small streams and rivers crisscross the area with an occasional earth dam in it. The attached locality map (Appendix 3) indicates its locality (also refer to the detailed map in Appendix 4A).

A broad study area was created around the new proposed irrigation pasture areas, cropland and 2 new dams (from here-on known as the 'development'). Although details of a proposed development will be accumulated and made available as the EIA process develops.

The future land use surrounding the development is predominantly agricultural, undeveloped, and undetermined in the Gert Sibande Regional Spatial Development Framework (RSDF).

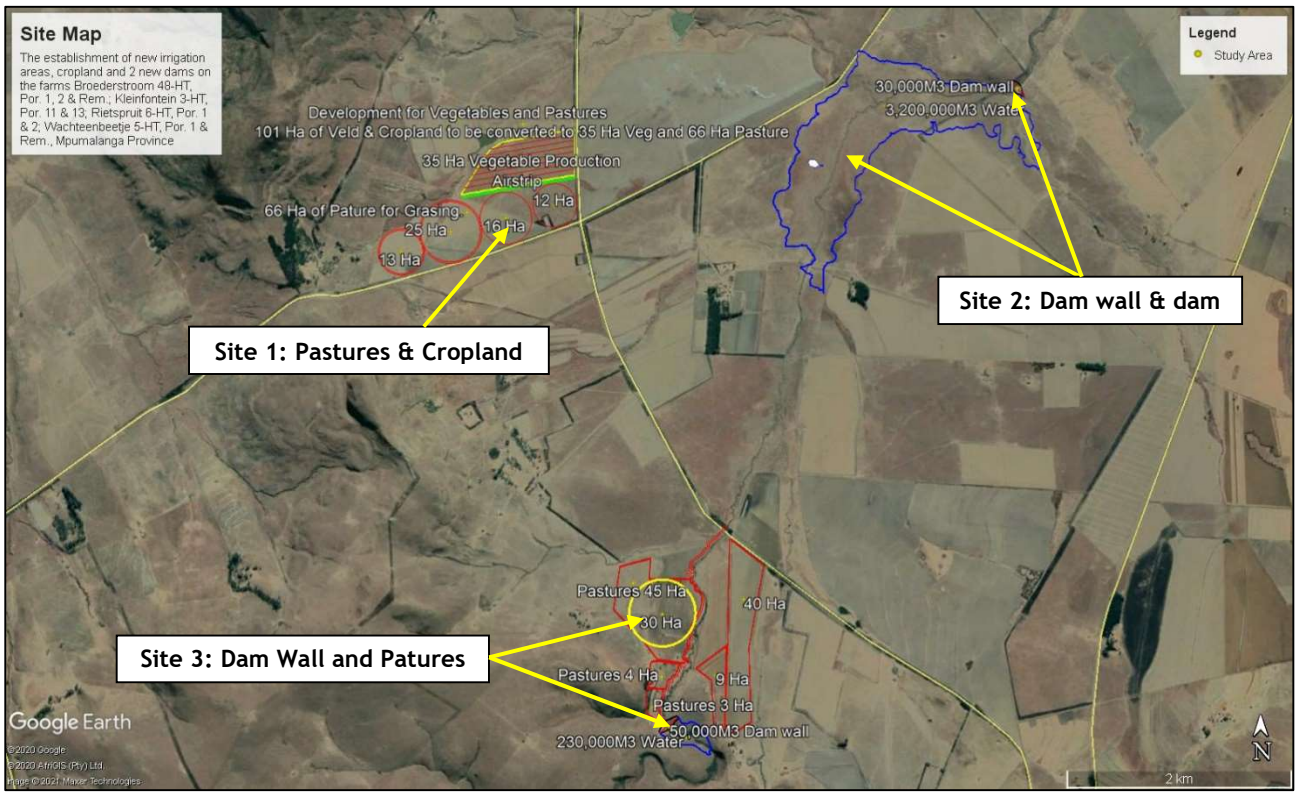


Figure 1: Overview of the study area.

4.3.2 Preferred Alternative (Proposed development)

The preferred alternative for the development (Fig. 2) is discussed:

Site 1:

Site 1 consist of approximately 55 Ha of grassland and 46 Ha of existing cropland. This area will be converted to:

- 35 Ha will be under vegetable production.
- 66 Ha will be under pasture irrigation.

The grassland section will have the vegetable production of 35 Ha and about 20 Ha under pasture irrigation. Where the existing cropland will have the remaining 46 Ha of pasture irrigation.

Site 1 falls within Portion 11 and 13 of the farm Kleinfontein 3HT. The site is bordered by a steam/drainage line with 2 small dams on its western side and a gravel road on its eastern and southern boundaries.

Site 2:

Site 2 consist of a new dam wall that will be constructed in the Baberskuile river, just east of the confluence of the Baberskuile and Klein-barberskuile rivers. The Dam wall and dam will consist of:

- The dam wall will be higher than 5m and will be 30 000m^3.
- Infilling will take place in and around the dam wall area. GPS Coordinates:
    - 27°02'30.98"S, 30°07'41.09"E
- The area that this dam will occupy when full will be about 170 Ha and contain 3.2 million cubic meters of water.

Most of the area are under natural grassland that is currently used for grazing purposes.

Site 2 falls within Portion 1 and 2 of the farm Rietspruit 6HT, as well as within Portion 1 and the Remainder of the farm Wachteenbeetje 5HT. The area is bordered by grassland, cropland and hills.

Site 3:

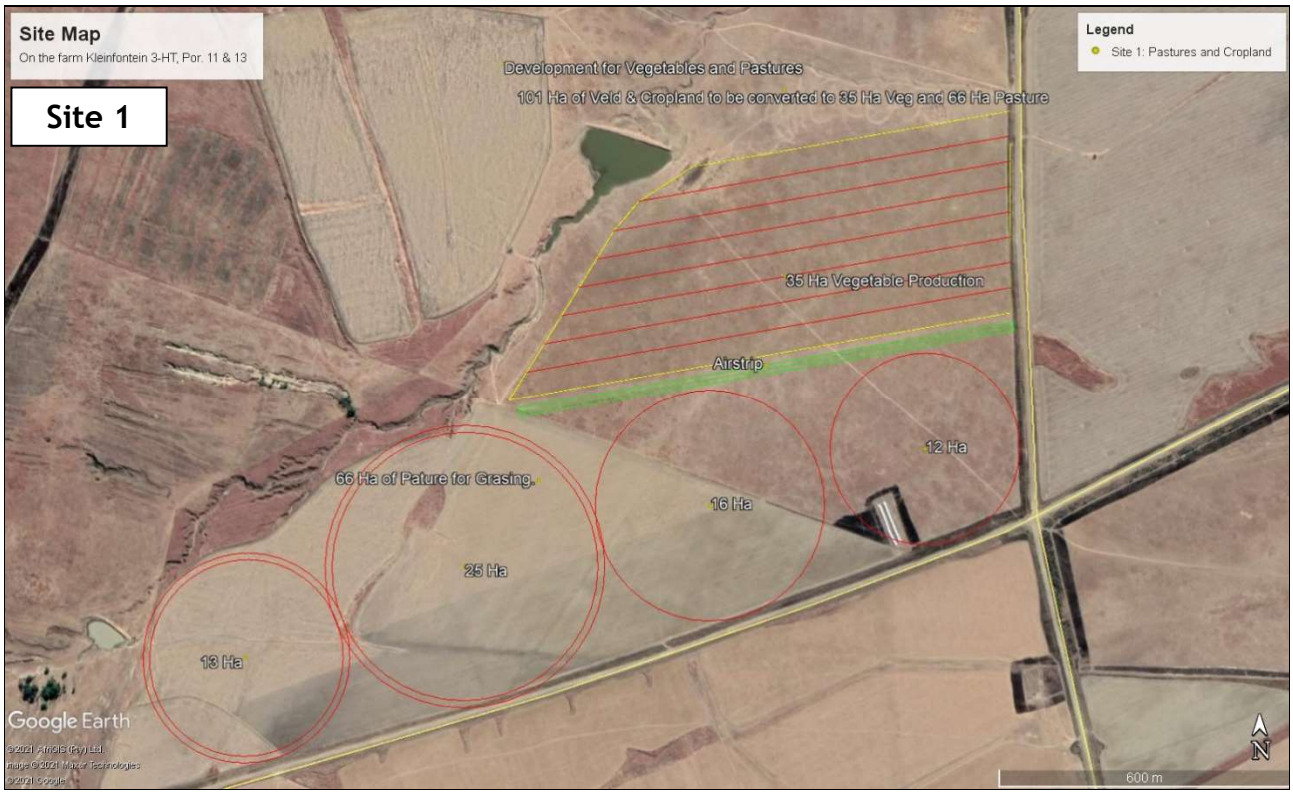
Site 3 consist of approximately 52 Ha of grassland and 49 Ha of existing cropland. A new dam wall that will be constructed in the stream/drainage line just west of the Barberskuile river. This area will be converted to:

- 49 Ha will be under vegetable production.
- 52 Ha will be under pasture irrigation.
- The dam wall will be higher than 5m and will be 50 000m^3.
- Infilling will take place in and around the dam wall area. GPS Coordinates:
    - 27°05'34.45"S, 30°05'46.98"E

- The area that this dam will occupy when full will be about 7.3 Ha and contain 230 000 cubic meters of water.

The grassland section will have the pasture irrigation of 52 Ha and about 49 Ha (of existing cropland) under vegetable production.

Site 3 falls within Portion 1, 2 and the Remainder of the farm Broerderstroom 48HT. The site is bordered by a small steam/drainage line on its northern side and and the Baberskuile River on its eastern boundary. There are hills and grassland on its western and southern boundaries.



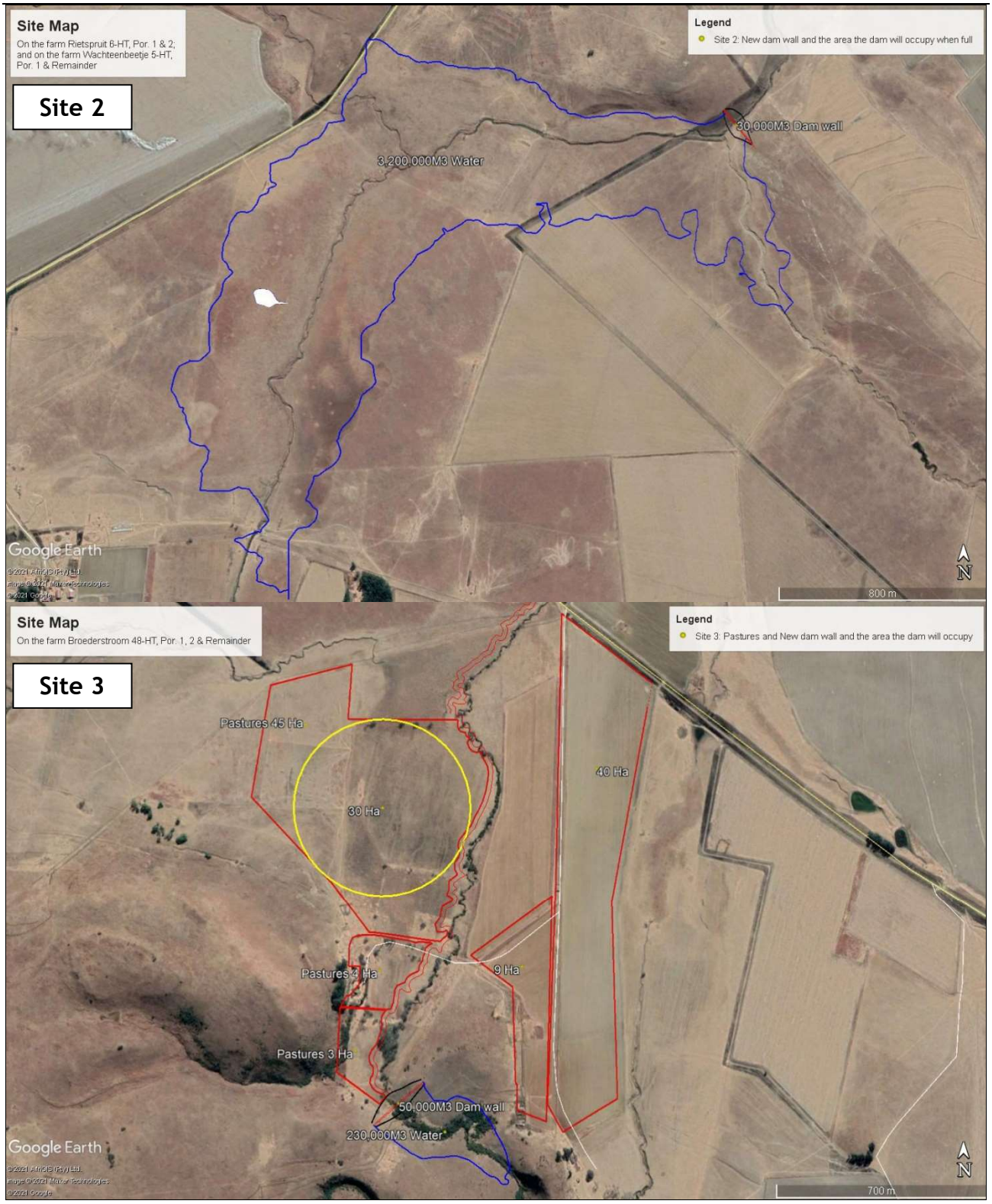


Figure 2: Preferred alternative of the proposed development.

Table 1 below provides a description based on land use and general environmental characteristics within which the project occurs.

Table 1: Affected Areas of the proposed development (Please refer to the layout plan attached).

Site	Adjacent property land uses	Access	General comments	Key Environmental Issues
1	• Agricultural land portions. • Natural veld.	• Site access will be from the gravel road on its eastern boundary.	• The construction/development will be on disturbed grassland and agricultural land.	• Vegetation removal. • Possible habitat loss. • Air pollution due to exhaust fumes or dust (construction phase). • Noise pollution will be low. • Possible water pollution from runoff into river /wetland/ drainage line.
2	• Agricultural land portions. • Natural veld.	• Site access will be from the gravel road on its north-western boundary.	• The construction/development will be on disturbed grassland and a small section of agricultural land. Also, with in a river.	• Vegetation removal. • Possible habitat loss. • Air pollution due to exhaust fumes or dust (construction phase). • Noise pollution will be low. • Possible water pollution from dam wall construction phase into river /wetland/ drainage line.
3	• Agricultural land portions. • Natural veld.	• Site access will be from the gravel road on its northern	• The construction/development will be on disturbed grassland and agricultural	• Vegetation removal. • Possible habitat loss.

		boundary.	land. Also, with in a river/stream.	• Air pollution due to exhaust fumes or dust (construction phase). • Noise pollution will be low. • Possible water pollution from runoff into river /wetland/ drainage line. • Possible water pollution from dam wall construction phase into river /wetland/ drainage line.

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 alternatives. This was done in conjunction with the agricultural 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 an engineering and agricultural design point of view. All the alternative options have various flaws in terms of economic, social and environmental impacts.

One main activity alternative was looked at and taken into consideration. This 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

The only considered activity alternative would be a livestock production entity, like a piggery, poultry farm or a feedlot. Very little else can be considered at this stage due to the area being utilised by the proposed application and the best possible engineering option being used for this application. Just for information's sake, the application is already busy with a livestock option in another application process.

Positives	• A smaller area of grassland would be impacted upon in terms of footprint. • More animal products could be added to the mainstream of the area.
Negatives	• No additional water will be collected for the farming enterprise. • Less job opportunities will be available. • High pollution probability to the ground water could be expected. • No additional plant products could be added to the mainstream of the area.

4.3.3.2 No Go Option

A "DO NOTHING" alternative would be not to build/develop this proposed development and keep all the current land portions as it is. This means that no additional job opportunities will be created. Also, no additional increase of infrastructure and farm products will be created in this section of the Gert Sibande District Municipality. The grassland biome will not be disturbed further by agricultural practices.

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. Strong emphasis was placed on the ecological assessment of floristic and faunal elements and wetlands, within the area of proposed development. This is done so that sensitive elements that might adversely be affected by the proposed development could be highlighted. A general assessment, at this stage, of ecological elements does not require detailed floristic and faunal sampling for the draft environmental Scoping Report. All the detailed specialist studies will be included in the draft EIA report.

5.1 LAND USE AND SOCIO-ECONOMICS

The study area is characterized by various land use entities. The proposed development falls within the Gert Sibande District Municipality (and in the Pixley ka Seme Local Municipality) and involve one municipal ward area. The ward involved include Ward 10.

The agricultural land use is characterised by livestock and the production of various crops along the farmhouses and their infrastructure, and also large sections of open grassland and shallow valleys and hillside.

Land use will be impacted by the proposed development, especially with regards to the additional agricultural land and natural veld that will be covered by the proposed development.

Other socio-economic implications are:

- Job creation.
- Social upliftment.
- Increase in farm expertise (Know-how, skills development).

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 5227.98km^2, 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 ENVIRONMENTAL DESCRIPTION

5.2.1 Regional climate

The study area is situated in pure grassland region, which is 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. 3, for the MAP and temperature occurring in this area using the Agricultural Geo-Referenced Information System (AGIS).

Figure 3: 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. 3).

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 remarkably 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:

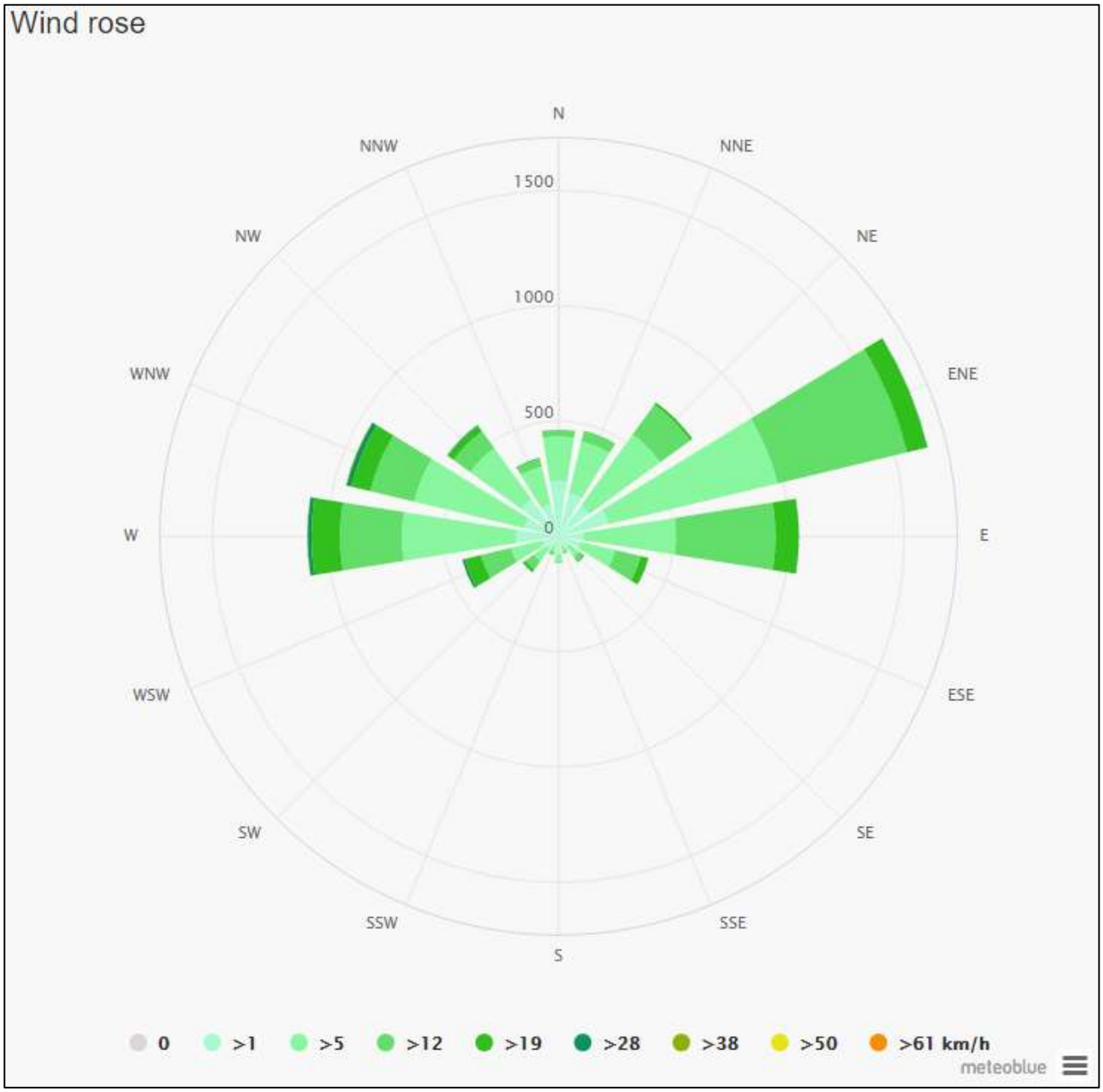


Figure 4: Prevailing wind of the wider region (Ermelo weather station).

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

At Site1:

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

- Sensitive features include a stream/drainage line and small wetlands west and northwest of the site (40m).
- Gravel roads just south and east of the proposed site.
- Cropland/planted pastures south and east the proposed site.
- Grassland north of the site.

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

At Site 2:

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

- Sensitive features include the Baberskuile – and Klein-baberskuile river/stream south and east in and next to the site.
- Cropland found south and northeast of the proposed site.
- The rest of the adjacent features are grassland and a hill directly north of the proposed dam wall.

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

At Site 3:

The 'terrain type' of the area is classified as level plains to valleys with some relief. The

terrain contains some distinct topographical sections, namely:

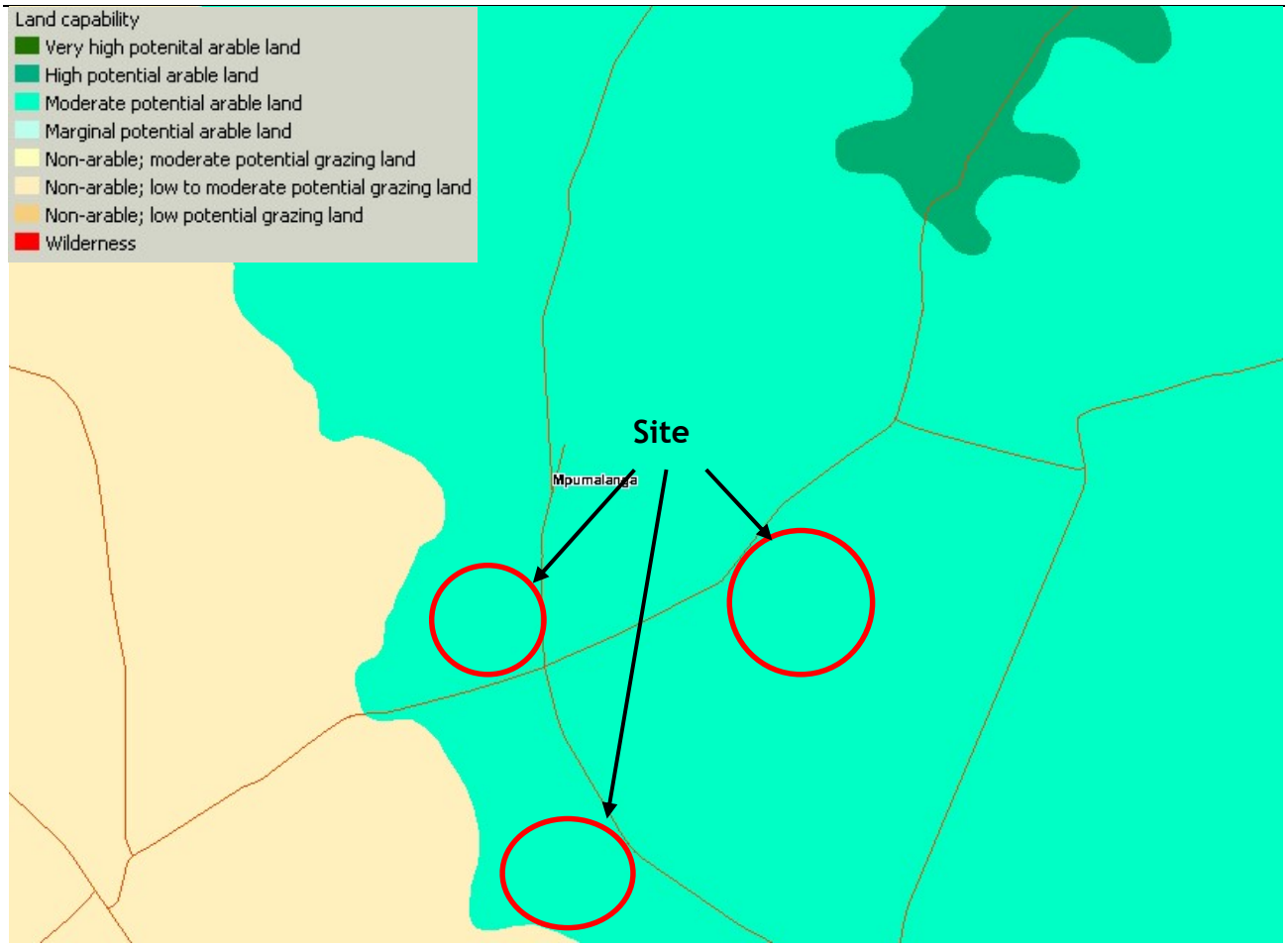
- Sensitive features include the Baberskuile river/stream east of the site.
- Cropland found on site and east of the proposed site.
- The rest of the adjacent areas are grassland and planted pastures and a hill directly west and south of the proposed dam wall.

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

Wetlands occur around of the study areas which is often associated with small dams and streams and drainage ways (perennial and non-perennial). The potential impact of construction activities during the proposed development is identified as a high significant impact, which needs a detailed impact assessment and mitigation measures for these areas. However, it should be noted that aerial imagery clearly indicates that the wetland areas have historically been impacted on by agricultural activities. This is to be expected as the regional area focusses on agriculture and the impact (or lack thereof) will be confirmed during the Specialist Studies to be undertaken. Furthermore, as indicated by the South African National Biodiversity Institute (SANBI) the study area falls within a low priority area in terms of River Freshwater Ecosystem Priority Areas (FEPAs), but sites 1 and 2 does fall within a top 50% strategic water source area.

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]), the study area as well as surrounding the site, the agricultural potential is rated as **moderate** potential arable land.



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)* (Mucina and Rutherford, 2006).

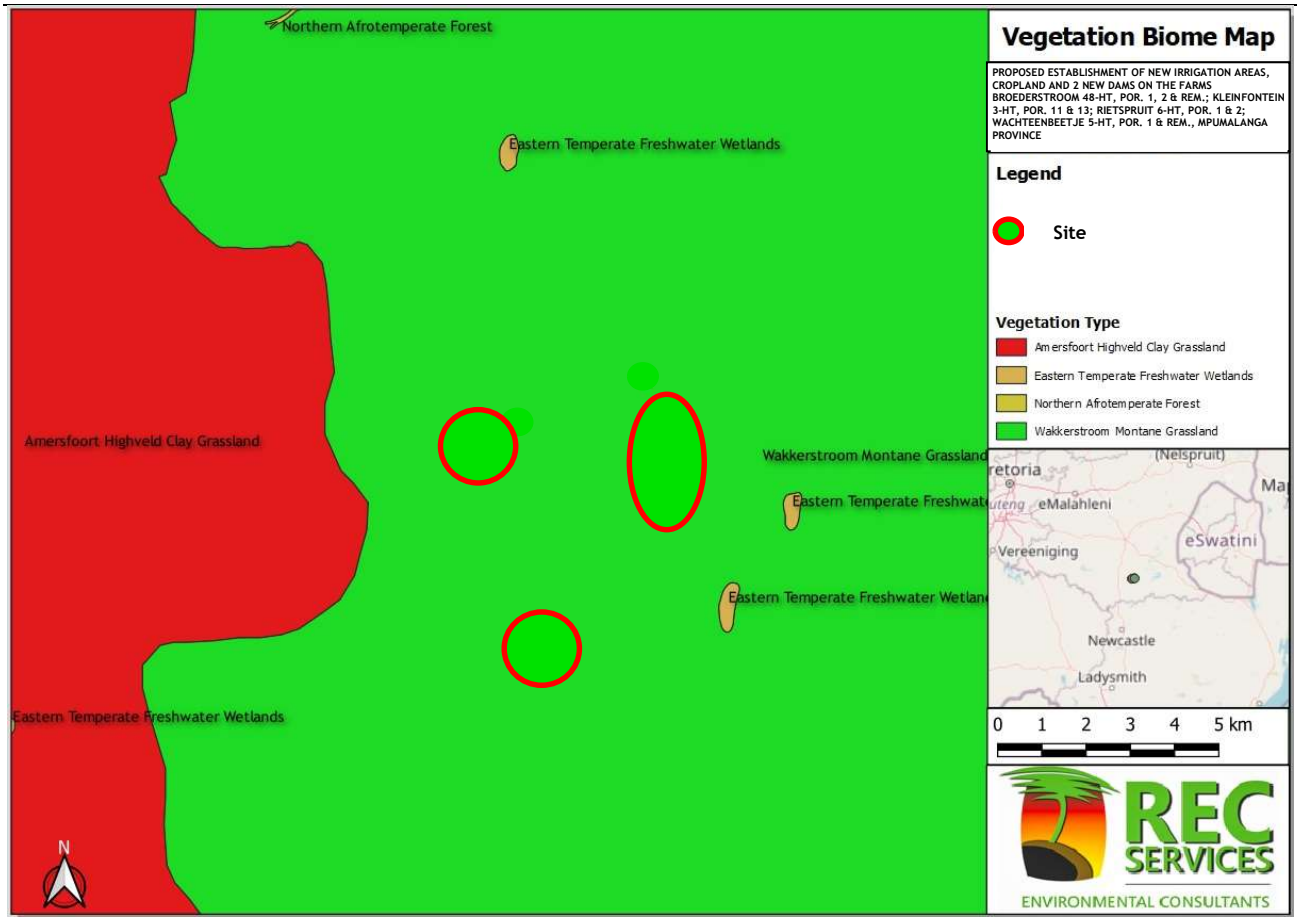


Figure 5: Vegetation type of the study area.

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:

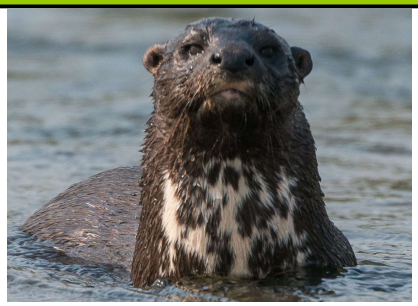
- *Aspidoglossum xanthosphaerum.*

5.2.9 Fauna of the Study Area

The study area is stretched over a 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. Possible red listed mammals falling under the Critically Endangered, Endangered and Vulnerable category that could occur in the wider surrounding area are:

SCIENTIFIC NAME	COMMON NAME	IMAGE
Hydrictis maculicollis	Spotted-necked Otter	
Chrysospalax villosus	Rough-haired Golden Mole	
Ourebia ourebi	Oribi	

5.2.9.2 Avifauna

According to available literature, approximately 274 bird species occur in the Endicott 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 2: List of possible red date (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	
Geronticus calvus	Southern Bald Ibis	
Sagittarius serpentarius	Secretarybird	
Polemaetus bellicosus	Martial Eagle	

Circus ranivorus	African Marsh-Harrier	
Circus maurus	Black Harrier	
Falco biarmicus	Lanner Falcon	
Grus carunculata	Wattled Crane	
Balearica regulorum	Grey crowned crane	

Neotis denhami	Denham's bustard	
Eupodotis senegalensis	White-bellied Korhaan	
Rostratula benghalensis	Greater Painted-snipe	
Heteromirafra ruddi	Rudd's Lark	
Spizocorys fringillaris	Botha's Lark	

Lioptilus nigricapillus	Bush Blackcap	
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 3: List of 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

SCIENTIFIC NAME	COMMON NAME
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, a grave site was found (see image below).


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).

The aim of the full HIA investigation will be to identify and assess, if any, heritage features and to recommend heritage management mitigation measures and monitoring programmes aimed at reducing the risks of adverse impacts. This input to be evaluated by Provincial Heritage Resources Authority (PHRA) will be included in the EIA stage to follow.

Findings from the HIA are:
SPECIFIC CATEGORIES INVESTIGATED AS PER SECTION 3 (1) AND (2) OF THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT NO. 25 OF 1999)

1. Does the site/s provide the context for a wider number of places, buildings, structures and equipment of cultural significance?

The study area does not provide context for a wider number of places, buildings, structures and equipment of cultural significance. The reason being the low density of

heritage items in the study area.

2. Does the site/s contain places to which oral traditions are attached or which are associated with living heritage?

Places to which oral traditions are attached or associated with living heritage are usually found in conjunction with traditional settlements and villages which still practise age old traditions. None of these are evident near or on the proposed site.

3. Does the site/s contain historical settlements?

No historical settlements are located on or near the proposed site.

4. Does the site/s contain landscapes and natural features of cultural significance?

Due to previous agricultural activities the original character of the landscape has been altered significantly in the study area. The site does not contain natural features of cultural significance.

5. Does the site/s contain geological sites of cultural importance?

Geological sites of cultural importance include meteorite sites (Tswaing Crater and Vredefort Dome), fossil sites (Karoo and Krugersdorp area), important mountain ranges or ridges (Magaliesburg, Drakensberg etc.). The proposed site is not located in an area known for sites of this importance.

6. 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 agricultural and infrastructure development.

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.

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

The site does contain marked graves or burial grounds.

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.

8. Does the site/s contain aspects that relate to the history of slavery?

No evidence of the above evident on the site earmarked for development.

9. Can the place be considered as a place that is important to the community or in the pattern of South African history?

In primary and secondary sources the proposed site is not described as important to the community or in the pattern of South African history.

10. Does the site/s embody the quality of a place possessing uncommon or rare endangered aspects of South Africa's natural and cultural heritage?

The proposed site does not possess uncommon, rare or endangered aspects of South Africa's natural and cultural heritage. These sites are usually regarded as Grade 1 or World Heritage Sites.

11. Does the site/s demonstrate the principal characteristics of South Africa's natural or cultural places?

The proposed site does not demonstrate the principal characteristics of South Africa's natural or cultural places. These characteristics are usually associated with aesthetic significance.

12. Does the site/s exhibit particular aesthetic characteristics valued by the community or cultural groups?

This part of the greater study area does not exhibit particular aesthetic characteristics valued by the community or cultural groups. The reason being the low density of heritage buildings and structures located in the greater study area.

13. Does the site/s contain elements, which are important in demonstrating a high degree of creative technical achievement?

The site does not contain elements which are important in demonstrating a high degree of creative technical achievement. Reason being none of the above are evident on site.

14. Does the site/s have strong and special associations with particular communities and cultural groups for social, cultural and spiritual reasons?

The proposed site does not have a strong or special association with particular communities and cultural groups for social, cultural and spiritual reasons. No comment in this regard was received during the Public Participation Process (PPP).

15. Does the site/s have a strong and special association with the life or work of a person, group or organisation?

No indication of the above could be found in primary and secondary research sources.

5.2.11 Elements of Visual and Aesthetic Importance

Visual and aesthetic elements of importance have been considered with respect to the proposed development but will in general not be affected by the proposed activities of this development. This due to the fact that surrounding area is also visual disturbed by anthropogenic elements and is all part of a farming set up:

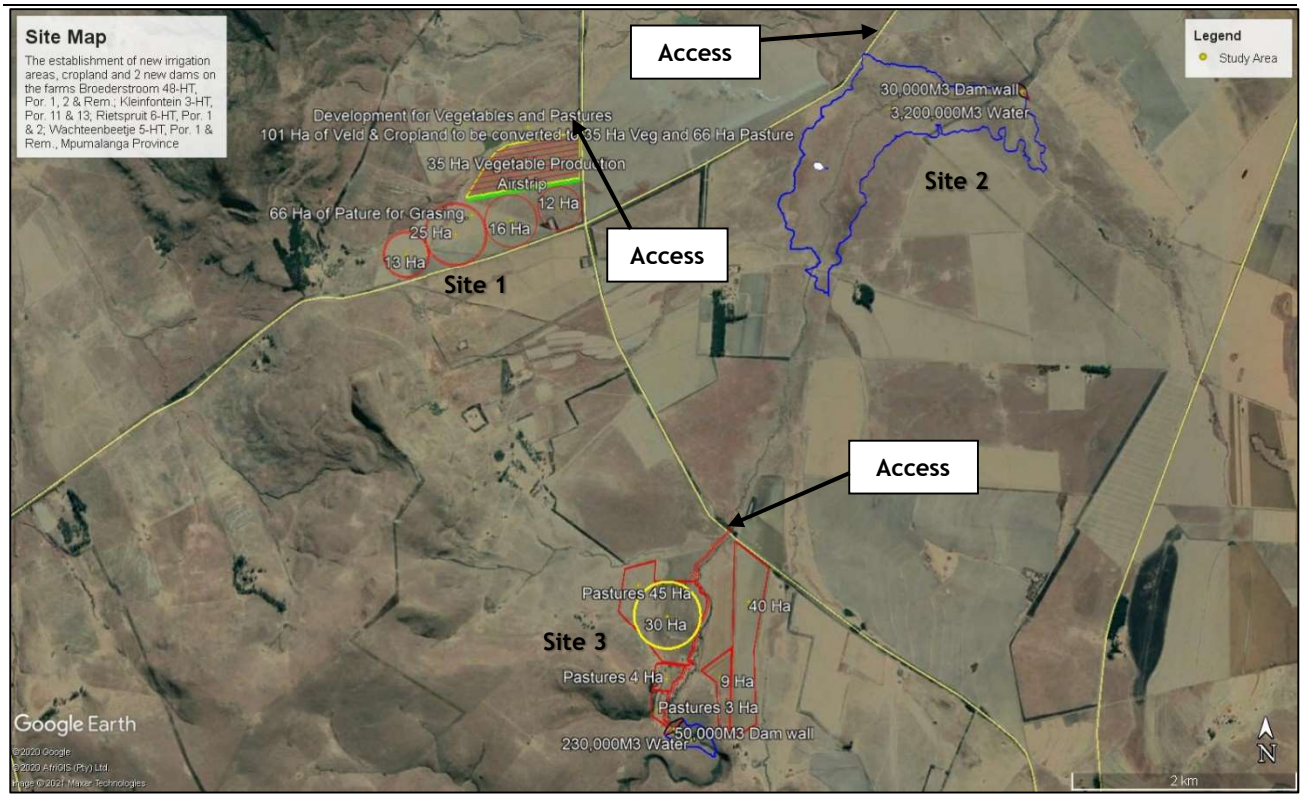
- Agricultural practices;
- Eskom powerline structures;
- Other roads, whether provincial or municipal; and
- Exotic and invasive plants seen on the fringes of the site.

5.2.12 Existing Services and Relocation thereof

No relocation of services at this stage were identified.

Site is in a rural area with no accessible municipal structures.

- **Electricity:** Supplied by Eskom from a 150-200 kVa transformer for the planted pastures and vegetable gardens.
- **Water supply:** Water for this application will be sourced out of the two new dams to be constructed. The volume of water needed for all the planted pastures and vegetable gardens will be around 785 583m^3.
- **Sewage:** The only sewage will be from the current farmhouses. A septic tank system is used for this.
- **Domestic Waste Removal:** Waste is removed once a week by the applicant and burned on one of the farms that belong to the applicant. Approximately 5m^2 of waste is produces in a week. Application: The National Environmental Management: Air Quality Act, 2004 (Act No. 39 Of 2004) RN 248 states that "Facilities with an incinerator capacity of 10 kg of waste processed per hour or larger capacity", requires an Air Emission Licence. Therefore, the sites capacity is under the threshold and will not require an Air emission Licence.
- **Access to the site:** The sites have access to the site from an existing road please see figure bellow (red lines).


Site Map
The establishment of new irrigation areas, cropland and 2 new dams on the farms Broederstroom 48-HT, Por. 1, 2 & Rem.; Kleinfontein 3-HT, Por. 11 & 13; Rietspruit 6-HT, Por. 1 & 2; Wachteenbeetje 5-HT, Por. 1 & Rem., Mpumalanga Province
Legend
Study Area
Access
Access
Access
Development for Vegetables and Pastures
101 Ha of Veld & Cropland to be converted to 35 Ha Veg and 66 Ha Pasture
35 Ha Vegetable Production
Airstrip
12 Ha
66 Ha of Pature for Grasing
25 Ha
16 Ha
13 Ha
Site 1
30,000M3 Dam wall
3,200,000M3 Water
Site 2
Site 3
Pastures 45 Ha
30 Ha
40 Ha
Pastures 4 Ha
9 Ha
Pastures 3 Ha
50,000M3 Dam wall
230,000M3 Water
Google Earth
2 km
N

6. PUBLIC PARTICIPATION

6.1 INTRODUCTION

A Public Participation Process was conducted as part of the Environmental Scoping 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 Afrikan Farms (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 Scoping Report but proceeds up to the stage of submission of the draft and final EIA report.

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, as amended, listed under Chapter 6 of NEMA, as amended.

6.4 PUBLIC PARTICIPATION PROCESS FOLLOWED

The following Public Participation Process 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 site notices.
- Receiving written comments from I&AP's to address in this Scoping Report.
- Correspondence with I&AP's and addressing I & AP's comments.
- Set up a register of I&APs.
- Compile a comments and response report.

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 with 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 has been compiled which can be extended during the EIA process.

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

I&AP's, and the relevant Authorities, were given 30 days to comment on the Draft EIA Report. All the comments, concerns and issues raised by the I&AP's and the Authorities will be addressed in the Comments and Response Report.

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 Public Participation Process. 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 REC if they had any suggestions or comments or issues regarding the project.

Please refer to Appendix 5A & 5B 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 (but far reaching) newspaper namely Volksrust Recorder dated 12/02/2021. 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 a rural and agricultural region. Therefore, to inform as broad a range of I&AP's as possible, several locations were strategically chosen to place the site notices at the entrance to the farms. The site notices 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 Placement and Submission of the Draft Scoping Report

The draft Scoping Report was submitted as follow and the EIR will be submitted to the same entities:

Submission date	Receipt date	I&AP or Stakeholder Name	Response in writing
05/01/22	07/01/22	Gert Sibande District: Environmental Impact Management	ASAP
05/01/22	07/01/22	Pixley Ka Seme local Municipality	ASAP
05/01/22	07/01/22	Pixley Ka Seme local Municipality: Ward Councillor 10	ASAP
05/01/22	07/01/22	Public view: Amersfoort Public Library	ASAP
05/01/22	07/01/22	MPHRA	ASAP
05/01/22	07/01/22	DARDLEA	ASAP
05/01/22	07/01/22	Department of Water Affairs and Sanitation	ASAP
05/01/22	07/01/22	Mpumalanga Tourism and Parks Agency (MTPA)	ASAP

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

The closing date for registration and comment delivery from I&AP's during the first public participation phase was within 30 days from the date of publication of the advertisements, which was the 12 March 2021, 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 EIR. 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 Scoping Report 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 engineers / specialist / applicant. 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 were received to date.

6.5 ADDRESSING WRITTEN COMMENTS & QUESTIONS FROM THE I&AP'S

At this stage, comments have been received from the CA and MTPA. 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):

6.6 CONCLUSIONS OF THE PUBLIC PARTICIPATION EXERCISE

The proposed development has generally been met with a positive attitude from the community at large. No issues have been identified by the I&APs for this project in the Draft Scoping stage (refer to Appendix 3F for all the issues raised).

The EIR will also 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 Scoping Report and EIR to be 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 PRELIMINARY ASSESSMENT

7.1 INTRODUCTION AND METHODOLOGY

This section of the EIR 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 EIR is to identify issues and impacts.

The identification and brief 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 or issue

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 produce and job opportunities. The long term negative operational impacts however will also be experienced by the close-by residence in terms of noise, habitat loss, possible groundwater reduction and pollution.

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 4 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*

1.1.1.1 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 more	
	Severity factors below 3 indicate no impact		

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

1.1.1.3 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 EIA (and EMPr) report 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) 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 a preliminary assessment of the impact identified for only the preferred activity alternative in the Table 4.

The identified impacts are rated in terms of their significance during the construction phase and the operational phase of the proposed development. 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;
- 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 (streams 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).

The following Table 4 is focused on the preferred alternative A:

Table 4: List of activities (environmental aspects) 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.	At natural grassland sites, next to the streams/rivers, and where the construction camp and stockpile areas are to be established.	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 (moderate 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, an offset needs to be incorporated by re-establishing natural vegetation/grassland along the road shoulder. 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**
Stockpiling of excavated	Soil and vegetation cover.	Precise location still to be	Stockpiles cause compaction of the	Stockpiles must not exceed 2 metres

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
material (C)		determined; the impacts on soil and vegetation will occur wherever stockpiles are established. Wherever possible, the stockpiles should be placed in non-sensitive areas.	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 moderate significance**	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 low 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.	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.

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**	**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**
Water use for construction purposes.	Use of ground water resources is possible but is it anticipated that natural surface water sources would be used. A **water license application** is being conducted in this regard. WULA will concentrate on: • Section 21(a): taking water from a water resource. • Section 21(b): storing water.	Local ground water and future dams.	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 Water use licence is also necessary because of the dams being built, which will influence the riverbanks and will be less than 500 metres from a wetland. If water is used for the construction from groundwater sources, it is possible that the development can influence the ground water level. If water from	If water is used for the road construction from groundwater sources, then a WULA will have to be issued in this regard, which is in process for this project. Possible significance assessment on ground water resources would be of moderate significance, because it will most likely come from boreholes that already have an established daily limit. **Probability = 3 (improbable)** **Intensity = 2 (low intensity)** **Duration = 2 (short 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(c): impeding or diverting the flow of water in a watercourse. • Section 21(i): altering the bed, banks course or characteristics of a watercourse.		the river is used, damage to the riverbanks can occur. 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.**	**Severity = 2x2=4 (rating 2)** **Significance = 3x2=6** **This impact is of negative low significance**
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 (moderate intensity)** **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 needs 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)**

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.**	**Intensity = 2 (low 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, 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)** **Significance = 3x3=9**	Storm water outlet designs have to be done and construction undertaken within the correct design. 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 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
			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 road 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 low significance**
Excavations in general	Potential impact on elements of cultural or heritage importance.	Localised if these may occur	No indication of such impacts. But this will be confirmed in the Heritage report. It is possible that historically important structures, items or graves	If any artefacts, graves or articles of historical importance are found during construction, the construction activities have to be stopped and the

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
			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**	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 low significance**
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.	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)**	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 (low intensity)** **Duration = 2 (short 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
			Intensity = 4 (moderateintensity) **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)** **Significance = 4x4=16** **This impact is of negative high significance before mitigation.**	**Severity = 2x2=4 (rating 2)** **Significance = 3x2=6** **This impact is of negative low significance**
Access road and internal road maintenance (O)	Vegetation and soil surface conditions, as well as social well-being of the residents of the area.	The entire road will need to be maintained.	Poorly maintained storm water drainage structure will cause abnormal soil erosion at outlets. Therefore, road maintenance is essential. **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**	Road maintenance is essential and is the responsibility of the road custodian in the operational phase. **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**
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).	No illegal dumping of domestic and construction related waste should be tolerated. Domestic construction waste has to be collected into central

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**	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 low significance**
Temporary employment created during the construction phases of the proposed road development(C)	Social aspects	All sites where construction related activities are to take place.	There will be **positive** impacts in terms of social upliftment and job creation within the broader region.	
Transportation of workers to and from the road 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 (low intensity)**	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
			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 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 potentially 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 (low 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 (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
			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 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance = 3x3=9** **This impact is of negative moderate**	Housing of workers on site, at the construction camp, is a possibility. Preferably only security should look after equipment at nighttime 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 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	
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)** **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 (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
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 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 (low 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 will occur on the site. If poorly installed or managed it will cause pollution.	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,

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**	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 low significance**
Traffic safety on the main roads in the area (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 routes and alternative roads may be negatively impacted on by slow moving construction vehicles. 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.**	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)**

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**
Noise generation by operating air compressors, excavators and other heavy machinery. Noise is also generated by the construction workers (C)	Impacts on faunal surrounding landowners.	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 landowners may also potentially be negatively impacted upon by excessive noise levels on site during construction. **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.**	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 farmsteads. 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 weekdays, as construction outside of these time frames will be a nuisance to adjacent dwellers. **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 moderate significance**
Heritage (C)	**Heritage or historical components**	No currently historical features identified are present on site. Still to be confirmed by a HIA specialist.	The proposed development is to be conducted on new sections not affected by previous road infrastructure. The interchanges are not situated on any historical landmarks. **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**	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 river and wetlands	Water quality, soil, and the riverbeds	In and around the wetland and river areas.	Impacts on the riverbeds and wetlands will be caused by the construction of	Impacts in the river and wetland areas will have to be determining by an

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
			dam walls and box culverts. Possible siltation into rivers and wetlands is highly likely. **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.**	aquatic/wetland specialist. This will be conducted as part of the process after the EIA has been conducted and will most likely be a request from the Department of Water Affairs. Activities undertaken within the river area has to be limited as far as possible and rehabilitation has to be undertaken during and after construction. **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 agricultural zone/dam wall and dam area where grassland will be removed/disappear.	The construction will have an effect on the animals present within the development sites. These impacts will include habitat destruction.	Specialist studies will determine an overview of the habitat present in the proposed sites. Red data fauna have been recorded during the EAP's site

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**	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 moderate significance**
Construction of the development on red data animals	Animals	Within the agricultural zone/dam wall and dam area where grassland will be removed/disappear.	The construction of the development will influence animal life and habitat. Red data species were recorded during the site visits. **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.**	Although habitat will be lost, proper rehabilitation of the affected grassland and dam wall areas 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**

7.2.1 Summary of the Significance Rating of the Anticipated Impacts

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

7.3 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 outstretched and spacious nature of the landscape and the proposed development will tie into 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, surface water flow impediment and possible agricultural chemical 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.

The possible cumulative impacts from the similar developments connecting to this road will be assessed in the table below.

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 development (C).	Soil layers, soil surface.	Seen at a wider scale the additional 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 moderate in percentage to the whole activity it may add to a bigger combined loss of natural vegetation/habitat for 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
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. 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. 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

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
		volume and speed, which could lead to the creation of erosion gullies. All road and ploughed 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 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 development will determine the impact of the development on the visual quality of the study area. Maintenance

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
		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 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 (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	Aesthetic quality, subsurface and	No construction waste may be illegally dumped into the surrounding areas, as

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
(C)	ground water quality, vegetation and fauna.	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 aspects. A waste collection agreement between the applicant and the local authority will be essential.
Long term employment opportunities and wealth to be generated (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.
Construction camp establishment (C)	Aesthetic impacts, social aspects, subsurface and groundwater quality, generation of domestic waste, vegetation removal, soil	The generation of domestic waste, as well as the provision of sewage facilities, within the construction camp could potentially 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

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
	surface compaction and faunal impacts.	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, 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 farm access points 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 towns will also add to traffic impact, but only during the construction phase.
Noise generation by operating air compressors, excavators and other heavy machinery.	Impacts on faunal species and surrounding landowners.	Excessive noise levels on site may negatively impact upon the behaviour and movements of site fauna. Surrounding landowners may also potentially be negatively impacted

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
Noise is also generated by the construction workers (C)		upon by excessive noise levels on site during construction. The tipper trucks and excavators from the nearby towns will also add to the noise impact, but only during the construction phase.

7.4 ECOLOGICAL SPECIALISTS' IMPACT ASSESSMENT & RECOMMENDATIONS

(SEE APPENDIX 8 FOR THE FOR ALL THE ECOLOGICAL STUDIES)

7.4.1 Impact rating in terms of Flora

Table 4: Impact Assessment before mitigation:

Impact	Description	Severity	Duration	Extent	Consequence (S + D + E / 3)	Frequency	Probability	Likelihood (F + P / 2)	Significance (C*L)
Site A									
Site A include 4 new pivot circles (of which 1,5 is in untransformed vegetation), a 35-ha vegetable production area and pastures for grazing. The pastures will not require transformation of vegetation but must be managed. The pivot circles will be situated within current cultivated areas except for 1.5 of them. The 35ha vegetable production site will require transformation of indigenous vegetation.									
Impact on Indigenous Natural Vegetation	Impacts of the 35ha vegetable production area and 1.5 pivot circles will require transformation of secondary grassland vegetation. The Mpumalanga C-Plan indicate the area as "other natural areas". Activity: Transformation of secondary vegetation within an area marked as "other natural area on the Conservation plan.	4	4	2	3.33	5	4	4.5	14.85 Medium
Impact on Indigenous Natural Vegetation	The pasture for grazing areas is situated within the Endangered Wakkerstroom Montane Grassland. Transformation will not be required but overgrazing may lead to transformation and erosion	4	4	2	3.33	5	4	4.5	14.85 Medium
Loss of individual or threatened plants	Vegetation clearance leading to loss of red or orange data plants. No red or orange data plants were recorded on site with the 3 site visits undertaken.	4	4	2	3	4	1	2.5	7.5 Low
Establishment and spread of declared weeds and alien invader plants	Transformed sites are vulnerable to alien invasive plant establishment.	5	5	2	4	5	5	5	20 High

Site B

Site B consists of a new dam wall and a dam area that will flood around 160-170 ha of land. This includes a partial area of Ecological Supported Area and other natural areas. The river area is lined with bushes of *Leucosidea sericea*.

Impact on Indigenous Natural Vegetation	Impacts of the dam flooding will transform indigenous vegetation. The Wakkerstroom Montane Grassland vegetation is endangered in terms of GN 1002. Activity: Transformation of endangered vegetation within an area marked as "other natural area" and partially in "ESA" on the Conservation plan.	5	5	2	4	5	5	5	20 High
Loss of individual or threatened plants	Vegetation clearance leading to loss of red or orange data plants. No red or orange data plants were recorded on site with the 3 site visits undertaken.	4	4	2	3	4	1	2.5	7.5 Low
Establishment and spread of declared weeds and alien invader plants	Transformed sites are vulnerable to alien invasive plant establishment. The river areas are lined with *Leucosidea sericea*.	5	5	2	4	5	5	5	20 High

Site C									
Site C is located within an area mostly transformed in terms of the Mpumalanga C-Plan . Some parts are located within CBA area. The dam is located within an area identified as ESA area. The dam area is located within the river area overrun by *Leucosidea sericea*.									
Impact on Indigenous Natural Vegetation	Impacts of the dam flooding will transform indigenous vegetation. The Wakkerstroom Montane Grassland vegetation is endangered in terms of GN1002. Activity: Transformation of endangered vegetation within an area marked as "heavily modified" on the Conservation plan.	4	4	2	3	4	1	2.5	7.5 Low
Impact on Indigenous Natural Vegetation	Impacts of the planned pivot area will transform areas indicated as optimal CBA in the Mpumalanga C-Plan.	5	5	2	4	5	5	5	20 High
Loss of individual or threatened plants	Vegetation clearance leading to loss of red or orange data plants. No red or orange data plants were recorded on site with the 3 site visits undertaken.	4	4	2	3	4	1	2.5	7.5 Low
Establishment and spread of declared weeds and alien invader plants	Transformed sites are vulnerable to alien invasive plant establishment. The river areas are lined with *Leucosidea sericea*.	5	5	2	4	5	5	5	20 High

7.4.2 Impact rating in terms of Fauna

Phase	Impact	Extent	Duration	Intensity	Reversibility	Probability	Significance Pre-Mitigation	Mitigation Potential	Significance Post-Mitigation	Confidence Rating	Cumulative Impact
C	Inadequate planning not taking layout, sensitive receptors and legislation into account.	4	4	4	2	5	70	0.2	14	Certain	High
C, O	Disturbance of site due to increased traffic, vehicles & machinery and personnel & residents.	3	5	3	1	5	60	0.4	24	Certain	Medium

Phase	Impact	Extent	Duration	Intensity	Reversibility	Probability	Significance Pre-Mitigation	Mitigation Potential	Significance Post-Mitigation	Confidence Rating	Cumulative Impact
C, O	Site clearing and destruction of faunal habitat leading to increased habitat loss, disturbance of sensitive species and alteration of natural food webs.	3	2	4	2	5	55	0.6	33	Certain	Medium
C, O	Increased erosion risk due to land clearing and increased runoff to the aquatic features.	4	4	3	1	4	48	0.6	28.8	Certain	High
C, O	Invasion of alien plants and weeds in disturbed area. These might migrate to adjacent areas which will reduce the natural faunal habitat.	3	4	4	2	4	52	0.4	20.8	Certain	High
C, O	Pollution of adjacent watercourse areas due to inadequate waste management practices.	4	4	4	4	4	64	0.4	25.6	Certain	High
C, O	Fire hazards as result of cooking by either construction or operational personnel will lead to loss in habitat, especially if an overnight construction	4	2	4	2	3	36	0.2	7.2	Certain	Medium

Phase	Impact	Extent	Duration	Intensity	Reversibility	Probability	Significance Pre-Mitigation	Mitigation Potential	Significance Post-Mitigation	Confidence Rating	Cumulative Impact
	camp will be located on the site and also if security is allowed to make fires during night patrols.										
C, O	Inadequate solid waste management could attract scavenging animals into the footprint area.	2	4	4	1	4	44	0.4	17.6	Certain	Medium
C, O	Continuous added human activity over a long period may further impact on faunal communities as result of increased noise, the smell of humans, lighting etc. may lead to ever declining populations.	2	4	3	2	5	55	0.6	33	Certain	Medium
C	Reduction in natural migratory and faunal dispersal routes (corridors) and associated fragmentation of species and habitats.	3	4	3	2	5	60	0.2	12	Certain	High
O	Eutrophication due to inadequate management of newly constructed instream dams and due to	4	4	4	3	4	60	0.6	36	Certain	High

Phase	Impact	Extent	Duration	Intensity	Reversibility	Probability	Significance Pre-Mitigation	Mitigation Potential	Significance Post-Mitigation	Confidence Rating	Cumulative Impact
	fertilizer runoff from crop areas										
O	Positive impact due to increased habitat size and integrity favouring water-loving species, but also increasing food source for more terrestrial species.	Positive Impact								Certain	High
O	If the dams are managed well, water quality within the system could improve as species and food-webs diversity increases.	Positive Impact								Certain	High

7.4.3 Impact rating in terms of Avifauna

Aspect	Nature of Impact	Phase	Impact Status	Extent	Duration	Intensity	Reversibility	Probability	Irreplaceability	Significance Pre-Mitigation	Mitigation Potential	Significance Post- Mitigation	Confidence Rating	Cumulative Impact
Avifauna	Displacement and disturbance of avifauna	C & O	Additional human activity, structures, and agricultural activity.	3	2	3	2	3	30	**Low**	Medium (0.6)	**18 Very low**	Sure	**Medium**
	Loss of avifaunal habitat	C & O	Additional human activity, structures, and agricultural activity.	2	4	4	3	4	52	**Medium**	Medium (0.6)	**31.2 Low**	Sure	**High**

7.4.4 Impact rating in terms of the Wetlands

35 ha crop production site

There is a single temporary water course that arises on this site and flows in a North-Easterly direction into the stream flowing just outside the boundary of this area (Figure 12-14). The stream into which it flows has two small impoundments on it which are both registered as NFEPA wetlands.

The watercourse arises on the site. At the upstream end, the stream bed is protected by vegetation (Figure 12-15B), showing wetland characteristics. But at the downstream end the stream bed is deeply incised, showing evidence of severe erosion.

Table 11-1: Measure of the severity of the impact at a site (Kleynhans et al., 2008).

IMPACT/SEVERITY CLASS	DESCRIPTION	RATING
None: reference	No discernible impact or the modification is located in such a way that it has no impact on habitat quality, diversity, size and variability.	0
Small	The modification is limited to very few localities and the impact on habitat quality, diversity, size and variability are very small.	0.5-1.0
Moderate	The modifications are present at a small number of localities and the impact on habitat quality, diversity, size and variability are limited.	1.5-2.0
Large	The modification is generally present with a clearly detrimental impact on habitat quality, diversity, size and variability. Large areas are not influenced.	2.5-3.0
Serious	The modification is frequently present and the habitat quality, diversity, size and variability in almost the whole of the defined area are affected. Only small areas are not influenced.	3.5-4.0
Critical	The modification is present overall with a high intensity. The habitat quality, diversity, size and variability in almost the whole of the defined section are influenced detrimentally.	4.5-5.0

Hydrology:

This watercourse houses a temporary stream. There is severe erosion in the streambed. Severity of impact (Table 11-1) – 2.7

Geomorphology:

The upper end, where the gradient is steeper, is in fair condition, but the lower end is severely eroded, and this is set of continue unless remedial action is taken. Severity of impact (Table 11-1) – 2.5

Physico-Chemical changes:

The only physico-chemical changes that have occurred are the infux of sediment and fertilizer from the surrounding cultivation. Severity of impact (Table 11-1) – 2

Other factors:

Severity of impact (Table 11-1) –

Overall assessment of the PES (from Tables 10-1 & 10-2):

The PES of this stream is rated as E (Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive).

Wetland Unit identification (from Section 9-1)

The wetland is a channeled valley bottom wetland.

Ecosystem services delivered by wetlands on the site.

The ecosystem services delivered by this wetland are minimal.

Ecological health assessment

This wetland in in a poor state, with the downstream part being in a poorer condition that the upstream part.

Impact assessment discussion

This wetland will continue to degrade unless remediation steps are taken. Risk assessment for the proposed broiler production facilities.

Afrikan Farms Broiler Site

Table 12-2: Key to the wetlands numbered in Figure 12-8

Number (Fig 12-1)	Description
1	Site
2	Perennial stream
3	N-W (NFEPA) wetland
4	Eastern wetland
5	3 small wetlands
6	Small wetland – N-W of the site

The small wetland N-W of the site (6 in Figure 12-8) is assessed with the north-western

wetland (3 in Fig. 12-8).

The severity of impacts (from Table 11-1) is estimated at 0.75 for the eastern wetland (4 in Fig. 12-8) and 3 for the north-western wetland (3 in Fig. 12-8). The severity of impact for the 3 small upstream wetlands (5 in Figure 12-8) is assessed at 1.0.

Description of wetland type:
Wetland 3, the NFEPA wetland, site is a channelled valley bottom wetland until within 500m of the site when it becomes an unchanneled valley bottom wetland (Figure 12-10B). It is at this point that the drainage ditches start. These ditches continue to the stream. The wetland to the East of the site is an unchanneled valley bottom wetland, becoming channelled just upstream of the dam (Figure 12-10A). The three small wetlands (5 in Figure 12-8) are flats, that are adjacent to the stream.

Hydrology:
Wetland 3 has drainage ditches running its length while on the site. Wetlands 4 and 5 are in better condition. Severity of impact (Table 11-1) – (3) – D; (4 & 5) – C;

Geomorphology:
Wetland 3 has drainage ditches running its length while on the site. Wetlands 4 and 5 are in better condition. Severity of impact (Table 11-1) – (3) – D; (4 & 5) – C;

Physico-Chemical changes:
Physico-chemical changes resulting from the growing and harvesting of fodder on the site would be limited fertilizer and sediment runoff. The site is in good condition so sediment runoff would be minimal.

But this is likely to change with the construction and management of the broiler housing units. Severity of impact (Table 11-1) – Current – B.

Other factors:
See the Risk Assessment for the assessed risk during the construction and running phases of the broiler unit. Severity of impact (Table 11-1) – ? 1

Overall assessment of the PES (from Tables 10-1 & 10-2):
Overall assessment of the PES – C (Moderately modified)

Wetland Unit identification (From Section 9-1):
Wetlands 3 and 4 are unchanneled valley bottom wetlands, although wetland 3 upstream of the site is a channeled valley bottom wetland (see Figure 12-8). The 3 wetlands (5) are flats.

Ecosystem services delivered by wetlands on the site:
In the following Radar (Spider) diagrams the score of 0 means the service is not provided by the wetland and a score of 4 is the maximum attainable.

The wetland to the North-West (the NFEPA wetland) is estimated to provide the ecosystem services as shown in Figure 12-11. The services provided within the 500m buffer are reduced by the trenches which have been dug along the wetland to enhance the drainage. The eastern wetland is in better condition and so offers a better suite of services. The 3 small upstream wetlands are in generally better condition, but the small size limits the services which they can offer.

Ecological health assessment:
The eastern wetland provides grazing for livestock but is otherwise relatively undisturbed. The North-Western wetland has drainage ditches running down its entire length, so its integrity has been compromised.

The three small wetlands (#5 in Figure 12-8) are in minimally disturbed although there are roads and fences crossing them. There is generally dense natural vegetation (Figure 12-9B) with little evidence of invasive vegetation apart from the trees planted along the road and around the house.

Impact assessment discussion:
The wetlands on this site show a range of impacts. The most severe is the trenches draining the North-West Wetland. All the wetlands support livestock grazing. There are cattle feeding station at the downstream end of Wetland 4 which increases the grazing pressure in this area.

During the site visit there were livestock on the small wetlands (5) although there was a lot of surface water, so the areas were not easily accessible to the livestock.

7.4.5 Assessment and recommendations from Heritage Specialist

- There are no visible restrictions or negative impacts in terms of heritage associated with the site;
- In terms of heritage the proposed project may continue; and
- The discovery of subsurface archaeological and/or historical material as well as graves must be taken into account in the Environmental Management Programme. See 3.2.6 and 3.2.7; and
- Submit this report as a Section 38 application to the relevant heritage authority for approval/comment.

7.5 FEASIBILITY AND COMPARISON OF ALTERNATIVES

7.5.1 Alternative Livestock Activity

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.	At natural grassland sites, next to the streams/rivers, and where the construction camp and stockpile areas are to be established.	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 (moderate 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, an offset needs to be incorporated by re-establishing natural vegetation/grassland along the road shoulder. 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**
Stockpiling of excavated material (C)	Soil and vegetation cover.	Precise location still to be determined; the impacts on soil and vegetation will	Stockpiles cause compaction of the soil, which promotes the establishment of weed species. The	Stockpiles must not exceed 2 metres in height. Stockpiles must be used for filling material as the re use 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
		occur wherever stockpiles are established. Wherever possible, the stockpiles should be placed in non-sensitive areas.	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 moderate significance**	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 low 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)**	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)**

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**	**Duration = 2 (short term)** **Severity = 2x2=4 (rating 2)** **Significance = 3x2=6** **This impact is of negative low significance**
Water use for construction purposes.	Use of ground water resources is possible but is it anticipated that natural surface water sources would be used. A **water license application** is being conducted in this regard. WULA will concentrate on: • Section 21(a): taking water from a water resource. • Section 21(b): storing water. • Section 21(c): impeding or diverting	Local ground water and future dams.	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 Water use licence is also necessary because of the dams being built, which will influence the riverbanks and will be less than 500 metres from a wetland. If water is used for the construction from groundwater sources, it is possible that the development can influence the ground water level. If water from the river is used, damage to the	If water is used for the road construction from groundwater sources, then a WULA will have to be issued in this regard, which is in process for this project. Possible significance assessment on ground water resources would be of moderate significance, because it will most likely come from boreholes that already have an established daily limit. **Probability = 3 (improbable)** **Intensity = 2 (low 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
	the flow of water in a watercourse. • Section 21(i): altering the bed, banks course or characteristics of a watercourse.		riverbanks can occur. **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.**	**This impact is of negative low significance**
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 (moderate intensity)** **Duration = 4 (long term)** **Severity = 4x4=16 (rating 4)**	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 needs 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
			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 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, 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)** **Significance = 3x3=9** **This impact is of negative moderate**	Storm water outlet designs have to be done and construction undertaken within the correct design. 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 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	
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 road 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 low significance**
Excavations in general	Potential impact on elements of cultural or heritage importance.	Localised if these may occur	No indication of such impacts. But this will be confirmed in the Heritage report. It is possible that historically important structures, items or graves could be uncovered if construction	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

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
			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**	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 low significance**
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.	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 (moderateintensity)**	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 (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
			Duration = 4 (long term) **Severity = 4x4=16 (rating 4)** **Significance = 4x4=16** **This impact is of negative high significance before mitigation.**	**Significance = 3x2=6** **This impact is of negative low significance**
Access road and internal road maintenance (O)	Vegetation and soil surface conditions, as well as social well-being of the residents of the area.	The entire road will need to be maintained.	Poorly maintained storm water drainage structure will cause abnormal soil erosion at outlets. Therefore, road maintenance is essential. **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**	Road maintenance is essential and is the responsibility of the road custodian in the operational phase. **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**
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).	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.

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**	**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**
Temporary employment created during the construction phases of the proposed road development(C)	Social aspects	All sites where construction related activities are to take place.	There will be **positive** impacts in terms of social upliftment and job creation within the broader region.	
Transportation of workers to and from the road 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 (low 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 (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 = 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 potentially 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 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)**	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 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 = 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 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance = 3x3=9** **This impact is of negative moderate significance**	Housing of workers on site, at the construction camp, is a possibility. Preferably only security should look after equipment at nighttime 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 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
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)** **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 (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	Movement will cause limited or localised disturbances and temporary	Alien plant species need to be controlled and it must be ensured that

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
		if not carefully managed and restricted.	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 moderate significance**	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**
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)**	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.

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			Intensity = 2 (low 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 (low 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 in the area (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 routes and alternative roads may be negatively impacted on by slow moving construction vehicles. 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.**	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**

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
Noise generation by operating air compressors, excavators and other heavy machinery. Noise is also generated by the construction workers (C)	Impacts on faunal surrounding landowners.	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 landowners may also potentially be negatively impacted upon by excessive noise levels on site during construction. **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.**	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 farmsteads. 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 weekdays, 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)**

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**
Heritage (C)	**Heritage or historical components**	No currently historical features identified are present on site. Still to be confirmed by a HIA specialist.	The proposed development is to be conducted on new sections not affected by previous road infrastructure. The interchanges are not situated on any historical landmarks. **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**	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 river and wetlands	Water quality, soil, and the riverbeds	In and around the wetland and river areas.	Impacts on the riverbeds and wetlands will be caused by the construction of dam walls and box culverts. Possible siltation into rivers and wetlands is	Impacts in the river and wetland areas will have to be determining by an aquatic/wetland specialist. This will be conducted as part of the process

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
			highly likely. **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.**	after the EIA has been conducted and will most likely be a request from the Department of Water Affairs. Activities undertaken within the river area has to be limited as far as possible and rehabilitation has to be undertaken during and after construction. **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 agricultural zone/dam wall and dam area where grassland will be removed/disappear.	The construction will have an effect on the animals present within the development sites. These impacts will include habitat destruction. **Probability = 3 (probable)**	Specialist studies will determine an overview of the habitat present in the proposed sites. Red data fauna 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
			Intensity = 2 (low 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 (low intensity)** **Duration = 4 (long term)** **Severity = 2x4=8 (rating 3)** **Significance = 3x3=9** **This impact is of negative moderate significance**
Construction of the development on red data animals	Animals	Within the agricultural zone/dam wall and dam area where grassland will be removed/disappear.	The construction of the development will influence animal life and habitat. Red data species were recorded during the site visits. **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.**	Although habitat will be lost, proper rehabilitation of the affected grassland and dam wall areas 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**

7.5.1.1 Summary of the Significance Rating of the Anticipated Impacts

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

8. KNOWLEDGE GAPS, UNCERTAINTIES AND ASSUMPTIONS

There were 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 applicant's responsibility.

9.2 BIOPHYSICAL- AND SOCIO-ECONOMIC ENVIRONMENTS

9.2.1 Flora

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.

(ii) All areas deemed of High sensitivity must be avoided as far as possible and any activity within these areas needs to be restricted within measures applied within an approved EMPr and only as authorized as part of the EIA process.

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

(iv) No construction camps should be allowed within any areas marked as High sensitive in the Sensitivity map.

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

(vi) Mitigation measures for Impact on Natural vegetation:

- Unnecessary impacts on surrounding natural vegetation must be avoided.
- No un-authorized roads may be constructed within the river or wetland areas.
- Any spillages of hydrocarbon materials must be prevented from reaching drainage ways and the wetland vegetation.
- Areas within Site C where a pivot is planned is situated in CBA area and it is recommended that this portion rather be used for grazing and not be transformed.

(vii) 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 development.
- Disturbed areas beyond the footprint of the development must be rehabilitated as quickly as possible.
- Any onsite recordings of plants with distinctive character should first be confirmed before trampling or removal of such plants. Most red o orange data plants are distinctive from normal vegetation.

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

- 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.
- All disturbed areas must be monitored for the establishment of invasive plant species.

9.2.2 Fauna

As proved by the Red List literature review for this assessment, numerous faunal species of conservation concern does/could potentially occur within the vicinity of the study area.

Without any mitigation, the proposed development is expected to have a Moderate to High impact on faunal habitat and species. However, with the implementation of the mitigation measures recommended in this report, the impact will be reduced to a Low to Very Low significance and will be limited to the development footprint area as far as possible.

All aquatic features and delineated wetland areas and its associated calculated protection buffer zones is regarded as having a high sensitivity rating due to its importance for faunal diversity and survival, either as suitable habitat or acting as important dispersal corridors through the landscape. At the time of this Faunal investigation no specific buffer zones associated with the watercourse delineation (non-wetland) and its present ecological state was available. It is noted that should a specific buffer zone be allocated to the watercourse area this should be regarded as a high sensitivity zone. A formal delineation

of all watercourse boundaries should be conducted by an adequately qualified professional.

The future increased surface water area due to dam construction at Sites 2 and 3 will benefit conservation worthy aquatic faunal species by increasing their habitat footprint and food source. Impacts will be localised and temporary during dam construction with gradual footprint increase following construction which should allow for sufficient relocation by more terrestrial grassland species.

The ridge areas and its associated slope woodland/thickets, together with woodland/thicket areas adjacent to wetland/aquatic habitats are furthermore seen as having a high sensitivity rating and should be protected from development.

The following factors warrants a moderate sensitivity rating for the grassland areas:

- The scale to which planned agriculture will influence natural grassland areas within the study area compared to grassland habitat availability within the extended 500 m study area and the greater regional surroundings;
- Sensitivity and adaptability and/or tolerance of grassland species potentially occurring within the study area;

Further to the above, the already disturbed/transformed areas, including agriculture, gravel roads and its disturbed areas such as firebreaks, areas where land clearance has taken place, houses and structures are regarded as having a low sensitivity.

The Environmental Management Plan (EMPr) should make adequate provision to protect local faunal species and habitat. This will be ensured by taking all mitigation measures listed in this report into account to control the impacting activities of the proposed development on the site. An Environmental Control Offer (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. Since the potential exists for sensitive and/or data deficient faunal species to reside on site, the appointed ECO must conduct a thorough pre-construction site investigation of the areas to be affected to limit impacts to species potentially residing in these areas at the time

of construction.

Taking all information contained within this study into account, the Specialist is of the opinion that the project should be authorised with the implementation of the recommended mitigation measures.

9.2.3 Avifauna

The following mitigation measures are proposed by the specialist:

- No development should be allowed within 50 m from the edge of any wetland or stream around the proposed sites.
- 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.
- No vehicles should be allowed to move in or across the wet areas or drainage lines and possibly get stuck. This leaves visible scars and destroys habitat, and it is important to conserve areas where there is tall grass, or areas where there is short grass and mud. Thus, stick to the existing routes.
- As much as possible of the natural vegetation that occurs on site A, should be retained.
- The contractor must ensure that no fauna is disturbed, trapped, hunted or killed during the construction & operational phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- During the construction & operational 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.
- All wetland delineated areas should be avoided as far as possible, or an off-set should be considered.

- 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 should be identified.
- The sensitivity map (Fig. 11) indicates the most important avifauna habitats, within the proposed and existing development sites that should be considered during the construction and operating phase. The highest sensitivity areas (red shaded areas) should be avoided.
- If and when the activity reaches a closure phase, it is recommended that a new study be conducted to assess all the impacts incurred as well as to determine where and how to rehabilitate the affected area for avifaunal habitat requirements.

Although most of the site A has a factor of disturbance, by present or historical human activities, some red data species such as the Southern Bald Ibis & Secretarybird do utilize these grasslands to forage upon. The habitat on study site A, B, and C where cropland exist will not favour (breeding or roosting) of any red data avifaunal species, although some species may forage on ploughed fields from time to time. Most of the habitats on the proposed development site A, B, and C are impacted upon by livestock (cattle or sheep) farming. The river, stream and wetland sections in and around all the study sites could have breeding, foraging and roosting potential for instants African Grass-Owl. This is unlikely due to frequent disturbance of agricultural activities and humans hunting practices in the area. 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.

It should also be noted that although red data species may not be present at the site, a network of suitable habitat like proper grassland, streams and wetlands exist in the wider area and that most of the red data species, in all likelihood, may be recorded at any site at any given time, depending on the availability of food and breeding opportunity.

It is the opinion of the specialist that development may take place with the provision that the owner and contractor adhere to the recommendations made in section 9 of the Avifaunal Report.

9.2.4 Historical Value

The following recommendations are proposed by the specialist:

- There are no visible restrictions or negative impacts in terms of heritage associated with the site;
- In terms of heritage the proposed project may continue; and
- The discovery of subsurface archaeological and/or historical material as well as graves must be taken into account in the Environmental Management Programme. See 3.2.6 and 3.2.7; and
- Submit this report as a Section 38 application to the relevant heritage authority for approval/comment.

9.2.5 Wetland Assessment and Delineation

Conclusions and recommendations:

General

Four sites were examined. There is little invasive vegetation at any of the sites. Although there was livestock on the sites there was little evidence of the paths caused by the movement of cattle or sheep. These paths can start erosion gullies if not contained.

Poultry will be kept on three of the sites. This has the potential to cause pollution and erosion of the sites. Spillage and wastes should be disposed of in an environmentally responsible manner. In addition, the increased traffic on the sites may increase the likelihood of the introduction of invasive vegetation. Where this is noted, the invasives should be removed.

The ecosystem services currently delivered by these wetlands reflect the rural nature of the area. Cultural services are seen as being absent from the services delivered at present. Supporting, regulating, and provisioning services are those provided by the wetlands in the area (MEA, 2005).

Specific observations of the sites are covered below.

35 ha site

The PES rated as E – (Seriously modified).

There is a temporary stream on this site which is in poor condition. The PES of this stream is rated as E (seriously modified) as the lower end is eroded and the erosion will get worse unless remedial steps are taken.

Afrikan Farms Broilers site

The PES is rated at C – (Moderately modified)

The site itself is in good condition. There are two large wetlands on site. To the North-West is an unchanneled valley bottom wetland which is registered on the NFEPA database as a channeled valley bottom wetland. The integrity of this wetland has been compromised by the excavation of trenches along the wetland within the 500m buffer. The wetland on the Eastern side of the site is in fair condition.

Vusi Eggs production site

PES is rated as – B (Largely natural with few modifications)

The wetlands, as well as the grassland, on this site are in good condition. The site is on a slope. Construction of the planned facility with the associated infrastructure needs to be undertaken with the prevention of erosion on site in mind.

9.3 COMPARATIVE SUMMARY ASSESSMENT BETWEEN THE ALTERNATIVES

Table 5: Comparative assessment between the Alternatives.

Environmental Aspects	Preferred Alternative (Proposed Development)	Alternative Livestock Activity	No-Go Option
Geology	No impact. Will not change.	No impact. Will not change.	No additional impact.
Topography	No impact. Will not change.	No impact. Will not change.	No additional impact.
Soil, Land Capability and Land Use	Soil compaction. Possible soil erosion due to removed vegetation. Surface distu rbance and topsoil removal. Moderate impact on natural vegetation.	Soil compaction. Possible soil erosion due to removed vegetation. Surface disturbance and topsoil removal. Low impact on natural vegetation.	No additional impact.
Flora	Stripping of surface vegetation during construction. Moderate impact on sensitive flora around river and wetland sections.	Stripping of surface vegetation during construction. Moderate to low impact on sensitive flora around river and wetland sections.	No additional impact.
Fauna	Removal of surface vegetation thereby depleting food sources. Human presence resulting in emigration of animals. The disturbances of the vegetation cover and natural habitat will have an impact on the wildlife. However, it should be viewed against the background of the disturbances by human movement and activities through the area	Removal of surface vegetation thereby depleting food sources. Human presence resulting in emigration of animals. The disturbances of the vegetation cover and natural habitat will have an impact on the wildlife. However, it	No additional impact.

	already.	should be viewed against the background of the disturbances by human movement and activities through the area already.	
Surface Water	Impacts on the riverbeds and wetlands will be caused by the construction of dam walls and possible siltation into rivers and wetlands. Drainage line could be altered or blocked by construction activities. A cumulative impact is anticipated due to additional activities occurring in the Baberskuile River system.	Impacts on the riverbeds and wetlands will be caused by the construction of bridges and possible siltation into rivers and wetlands. Drainage line could be altered or blocked by construction activities. A cumulative impact is anticipated due to additional activities occurring in the Baberskuile River system.	No additional impact, but there are impacts due to the wash-off occurring from the current road network into stormwater drainage systems.
Ground Water	Low potential environmental impact predicted. Temporary toilets (chemical) left unmanaged can leak raw sewage and effluent into the soil, surface and even ground water sources, during the construction phase.	Low potential environmental impact predicted. Temporary toilets (chemical) left unmanaged can leak raw sewage and effluent into the soil, surface and even ground water sources, during the construction phase.	No additional impact.
Air Quality	Low-to-moderate 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-to-moderate potential environmental impact. During the construction phase; dust could cause problems for nearby human settlements.	The air quality will be the same as it currently is.

		During the operational phase the air quality will be the same as it currently is.	
Noise	Low-to-moderate potential environmental impact. Noise from the traffic will be an inconvenience to a certain extent for some existing farm properties adjacent to the road.	Low-to-moderate potential environmental impact. Noise from the traffic will be an inconvenience to a certain extent for some existing farm properties adjacent to the road.	No impact additional impact.
Visual	Low significant impact. Waste, such as building rubble and empty cement bags can be a negative visual impact if not collected and disposed of correctly. New pivot systems can be a negative visual impact, although there are plenty of these structures existing in the same area already.	Low significant impact. Waste, such as building rubble and empty cement bags can be a negative visual impact if not collected and disposed of correctly. New livestock structures can be a negative visual impact, although there are plenty of these structures existing in the same area already.	No additional impact.
Sensitive Landscapes	Sensitive landscapes identified will include all the drainage lines, Baberskuile River and wetlands affected by the development. According to the wetland study a high potential impact is predicted before any mitigation measures is employed. • Removal of surface vegetation thereby	Sensitive landscapes identified will include all the drainage lines, Baberskuile River and wetlands affected by the development. According to the wetland study a high potential impact is predicted before any	No new or additional impact.

	depleting food sources. • 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. • The movement of water into wetlands could be altered by construction activities. • Erosion of the riverbank due to vegetation removal. • Increased runoff due to removal of vegetation and increased soil compaction can lead to siltation of the riverbed downstream.	mitigation measures is employed. • Removal of surface vegetation thereby depleting food sources. • 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. • The movement of water into wetlands could be altered by construction activities. • Erosion of the riverbank due to vegetation removal. • Increased runoff due to removal of vegetation and increased soil compaction can lead to siltation of the riverbed downstream.	
Sites of Archaeological and Cultural	No significant impact predicted.	No significant impact predicted.	No additional impact.

Interest			
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.	Positive impact on the regional socio-economic structure through its support to the community, like: • Job opportunities during the construction phase. • Local economic boost.	Negative Impact due to no additional job opportunities created.
Interested and Affected Parties	Please see comment and response report in appendix 5F.	Please see comment and response report in appendix 5F.	No additional impact.
Cumulative	The cumulative impact of the development on the social environment is the upliftment in their daily livelihood due to new job opportunities. Seen at a wider scale the additional development is 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. Where the removal of natural vegetation/habitat may add to a bigger combined loss of natural vegetation/habitat in local area.	The cumulative impact of the development on the social environment is the upliftment in their daily livelihood due to new job opportunities. Seen at a wider scale the additional development is 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. Where the removal of natural vegetation/habitat may add to a bigger combined loss of natural vegetation/habitat in local area.	No additional impact. Status Quo.

9.4 Summary of the Positive and Negative Impacts/Risks of the Proposed Activity and Identified Alternatives

The identified alternative for this development has very similar overall impacts as the preferred alternative. Here follows a summary of the positive and negative impacts for this alternative including the preferred alternative.

Table 6: Summary of the positive and negative impacts of the proposed activity and identified alternatives.

PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES.	POSITIVES	NEGATIVES
Preferred Alternative	• Needed economic injection and social upliftment for the area. • It is an added food security development. • Most of the sites are already under an agricultural use.	• Loss of natural vegetation/habitat due to grassland section being used for agriculture. • Impacts upon the sensitive environments (wetlands, drainage lines, stream, and river) during the construction phase. • Water intensive exercise. Water resources will be under pressure.
Alternative Activity	• Needed economic injection and social upliftment for the area. • It is an added food security development. • Most of the sites are already under an agricultural use	• Loss of natural vegetation/habitat due to grassland section being used for agriculture. • Impacts upon the sensitive environments (wetlands, drainage lines, stream, and river) during the construction phase. • Water intensive exercise. Water resources will be under pressure.

		• Odour developing from an intensive livestock development. • Contamination from the slurry / abattoir treatment facility could pose a risk to ground water.

10. CONCLUSION AND RECOMMENDATIONS

The Environmental Impact Assessment (EIA) Process for the proposed establishment of new irrigation areas, cropland and 2 new dams on the farms Broederstroom 48-HT, Por. 1, 2 & Rem.; Kleinfontein 3-HT, Por. 11 & 13; Rietspruit 6-HT, Por. 1 & 2; Wachteenbeetje 5-HT, Por. 1 & Rem. has been undertaken in accordance with the EIA Regulations published in Government Notice R 982 (326) of 4 December 2014 (7 April 2017), as amended, in terms of the National Environmental Management Act (Act No. 107 of 1998).

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 Environmental Management Programme (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 different parts of the proposed development concept will experience different 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 (Farms)	• Noise and safety impacts, as well as loss of natural grassland.
Access to farms.	• Accesses have to be made safer by creating safer access roads and larger gates for farming equipment.
Noise Impact	• Very little noise will be created from farming equipment during planting and harvesting seasons.

Business/Agricultural areas	• Possible increase of income due to more production areas being created.
Water provision	• An increase in water demands due to the proposed development being very water intensive.
Land-use	• An increase of future agricultural production areas, although the loss of natural grassland and impacts on adjacent wetlands/rivers.
Environmental Sensitive Areas	• Loss of natural vegetation, wetland and impacts upon streams and drainage lines due to the proposed development, although the loss of habitat, proportionally to the wider region of similar natural vegetation, will be small to moderate.

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 development revealed that impacts were predominantly 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 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 DARDLEA. 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 EIR 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; and

(iii) 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