



**Proposed clearance of vegetation for the purpose
of Macadamia Farming adjacent to Nkomazi Game
Reserve, Near Tjakastad, Mpumalanga Province**

Draft EIA Report

2 February 2021

CORE Environmental Services

Anne-Mari White (*Cert. Sci. Nat.*)

Professional Registration -

SACNASP: 300067/15

EAPASA: 2020/602

EXECUTIVE SUMMARY

Nkomazi Game Reserve (Pty) Ltd is proposing to clear vegetation to establish an agricultural area for the purpose of macadamia farming.

The project will include the following:

- Clearance of approximately 1823 hectares of indigenous vegetation.
- Construction of 3 dehusking plants

In accordance with the National Environmental Management Act 107 of 1998, GNR 983 of 2014 (as amended in 2017), an Environmental Authorisation (EA) is required before any clearance activities can take place.

Nkomazi Game Reserve (Pty) Ltd subsequently appointed **Core Environmental Services** to apply for the EA by means of conducting a Scoping and Environmental Impact Assessment process as regulated within General Notice Regulation 982, 2014 (as amended in 2017).

The establishment and operation of the agricultural area are likely to result in environmental and socio-economic impacts. The identified impacts are listed below and discussed thereafter:

- *Impact on biodiversity;*
- *Generation of dust;*
- *Impact on soil;*
- *Impact on water resources;*
- *Impact on heritage resources*
- *Impact on Palaeontological resources*
- *Socio-economic impact.*

The table below summarises the impacts identified and assessed for the establishment and operational phases of the project:

IMPACT	SIGNIFICANCE BEFORE MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION MEASURES
Establishment and Operational Impacts		
Loss of vegetation	High	Low
Loss of important species	Medium	Low
Loss and fragmentation of habitat	High	Low
Impact on riparian zones and wetlands	Medium	Low
Generation of dust	Low	Very Low
Erosion	Low	Very Low
Soil Pollution	Low	Very Low
Impact on water resources	High	Medium

Impact on heritage	Medium	Low
Impact on Palaeontology	Low	Very Low
Job opportunities	Low (+)	Medium (+)
Health and Safety	Low	Very Low
Operational Phase Impacts		
Biodiversity Impact (Alien invasive species)	High	Low
Loss of habitat for fauna	High	Low
Impact on ESA	High	Low
Erosion	Low	Very Low
Soil contamination	Medium	Low
Impact on water resource	High	Medium
Impact on Heritage	Medium	Low
Socio-economic Impact	Low	Medium (+)

The assessment of the possible impacts associated with the establishment and operational activities, concluded that the impact on the surrounding environment is of **medium significance**. Recommendations have however been made to address the impacts which could affect the biophysical and socio-economic environment. It is recommended that pro-active measures are taken to minimise the spread of alien invasive vegetation. Recommendations for the mitigation of impact are included within Section 6 and also the Draft Environmental Management Plan attached.

It is the opinion of the EAP that the EA for this project should be granted, and the proposed mitigation included as the conditions of the authorisation.

Contents

- EXECUTIVE SUMMARY.....2**
- 1. OVERVIEW OF THE PROJECT.....8**
 - 1.1 Introduction8
 - 1.2 Location8
 - 1.3 Details of the EAP12
 - 1.4 Policy, Legal and Administrative Framework.....12
 - 1.5 National Environmental Management Act 107 of 1998.....13
 - 1.6 EIA Phase:14
 - 1.7 Description of the project15
 - 1.8 Need and Desirability16
- 2. PUBLIC PARTICIPATION PROCESS17**
- 3. CONSIDERATION OF ALTERNATIVES20**
 - 3.1 Alternative Selection.....20
 - 3.1.1 Location alternatives.....20
 - 3.1.2 Layout alternatives.....20
 - 3.1.3 No-Go alternative20
- 4. DESCRIPTION OF THE AFFECTED ENVIRONMENT21**
 - 4.1 Topography21
 - 4.2 Climate.....23
 - 4.3 Ecology23
 - 4.4 Surface and Groundwater.....25
 - 4.5 Land use.....26
 - 4.6 Geology and Soils26
 - 4.8 Heritage32
 - 4.9 Paleontology34
 - 4.10 Socio-Economic Environment.....35
- 5. SPECIALIST ASSESSMENT REQUIREMENTS AS IDENTIFIED IN THE SCREENING REPORT36**
- 6. METHODOLOGY OF ASSESSING THE SIGNIFICANCE OF IMPACTS.....38**
- 7. ENVIRONMENTAL IMPACT ASSESSMENT41**
 - 7.1 Impacts during establishment of the agricultural area.....41
 - 7.1.1. Impact on biodiversity41
 - 7.1.2. Generation of dust.....43
 - 7.1.3 Impact on soil44
 - 7.1.4 Impact on water resources.....45
 - 7.1.5 Impact on heritage resources46
 - 7.1.6 Impact on paleontological resources47
 - 7.1.7 Socio-economic Impact48
 - 7.2 Operational Phase Impacts50
 - 7.2.1. Biodiversity Impact50
 - 7.2.2 Impact on soil52
 - 7.2.3 Impact on water resources.....53
 - 7.2.4 Impact on heritage resources54
 - 7.2.5 Employment opportunities.....55
 - 7.3 Environmental Impact Statement57

8. CONCLUSION AND WAY FORWARD58

8.1 Assumptions and Limitations58

8.2 Conclusion58

8.2 Way Forward58

10. REFERENCES59

LIST OF FIGURES

Figure 1: locality map – Site location..... 10

Figure 2: locality map – Proposed project areas 11

Figure 3: Portion 1 to 5 of Sterkspruit Contour Lines- 1m intervals21

Figure 4: Sterkspruit and Cambalala Contour Lines- 1m intervals22

Figure 5: Portion 10 to 14 of Sterkspruit Contour Lines- 1m intervals22

Figure 6: Vergelegen & Batavia Contour Lines- 1m intervals.....23

Figure 7: Terrestrial ecology map according to Mpumalanga Biodiversity Sector Plan, 201424

Figure 8: Freshwater ecology map according to Mpumalanga Biodiversity Sector Plan, 201425

Figure 9: Ground zones and soil classification map on portion 1 to 5 of Sterkspruit28

Figure 10: Ground zones and soil classification map of Sterkspruit and Cambalala29

Figure 11: Ground zones and soil classification map of portion 10 to 14 of Sterkspruit.....30

Figure 12: Ground zones and soil classification map of Vergelegen and Batavia31

Figure 13: Sterkspruit historically cultivated areas and features.....33

Figure 14: Cambalala historically cultivated areas and features.....33

Figure 15: Vergelegen and Batavia historically cultivated areas and features34

Figure 16: Palaeontological Sensitivity map.....35

LIST OF TABLES

Table 1: Legislation applicable to the project 12

Table 2: Assessment criteria for the evaluation of impacts..... 38

Table 3: Definition of significance ratings 39

Table 4: Definition of probability ratings..... 40

Table 5: Definition of confidence ratings..... 40

Table 6: Definition of reversibility ratings 40

Table 7: Significance of Biodiversity Impact.....42

Table 8: Dust Generation 44

Table 9: Impact on Soil 45

Table 10: Impact on water resources 46

Table 11: Heritage Resources..... 47

Table 12: Palaeontological Resources..... 48

Table 13: Socio-Economic Impact 49

Table 14: Impact on Biodiversity 51

Table 15: Impact on Soil..... 52

Table 16: Impact on water resources 54

Table 17: Heritage Resources..... 55

Table 18: Significant impact of the 'employment opportunities' 55

Table 19: Environmental Impact Statement 57

APPENDICES

Appendix A: Locality Map

Appendix B: Site Photos

Appendix C: Public Participation Process

Appendix D: Specialist Investigation

Appendix E: Environmental Management Plan

Appendix F: Water Rights

ABBREVIATIONS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
GNR	General Notice Regulation
I&AP	Interested and Affected Party
MDARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Administration
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
PPP	Public Participation Process
SACAA	South African Civil Aviation Authority

1. OVERVIEW OF THE PROJECT

1.1 Introduction

Nkomazi Game Reserve (Pty) Ltd is proposing to clear vegetation to establish an agricultural area for the purpose of macadamia farming.

The project will include the following:

- The clearance of approximately 2000 hectares of indigenous vegetation was investigated and after investigation it was found that approximately 1823 hectares is viable for agricultural purposes.
- Three dehusking plants will also be constructed

In accordance with the National Environmental Management Act 107 of 1998, GNR 982 of 2014 (as amended in 2017), an Environmental Authorisation (EA) is required before any clearance activities can take place. Nkomazi Game Reserve (Pty) Ltd subsequently appointed **Core Environmental Services** to apply for the EA by means of conducting a Scoping and Environmental Impact Assessment process as regulated within General Notice Regulation 982, 2014 (as amended in 2017).

1.2 Location

The proposed site is located along the R541 near Badplaas, Mpumalanga Province on the following farm names and portion numbers:

- Portion 2 and 4 of Vergelegen 728-JT
- Portion 7 of Batavia 151-JT
- Portion 0 of Cambalala 765-JT
- Portion 0 of Sterkspruit 709-JT
- Portion 1 of Sterkpsruit 709-JT
- Portion 3 of Sterkspruit 709-JT
- Portion 4 of Sterkspruit 709-JT
- Portion 5 of Sterkspruit 709-JT

21-digit Surveyor General codes:

- T0JT00000000072800002
- T0JT00000000072800004
- T0JT00000000015100007
- T0JT00000000076500000
- T0JT00000000070900000
- T0JT00000000070900001
- T0JT00000000070900003
- T0JT00000000070900004
- T0JT00000000070900005

Central coordinates of the site are:

25° 58'03.35"S

30° 40'24.39"E

Please refer to the locality map below of the areas investigated for agricultural purposes, Figure 1 and Figure 2.

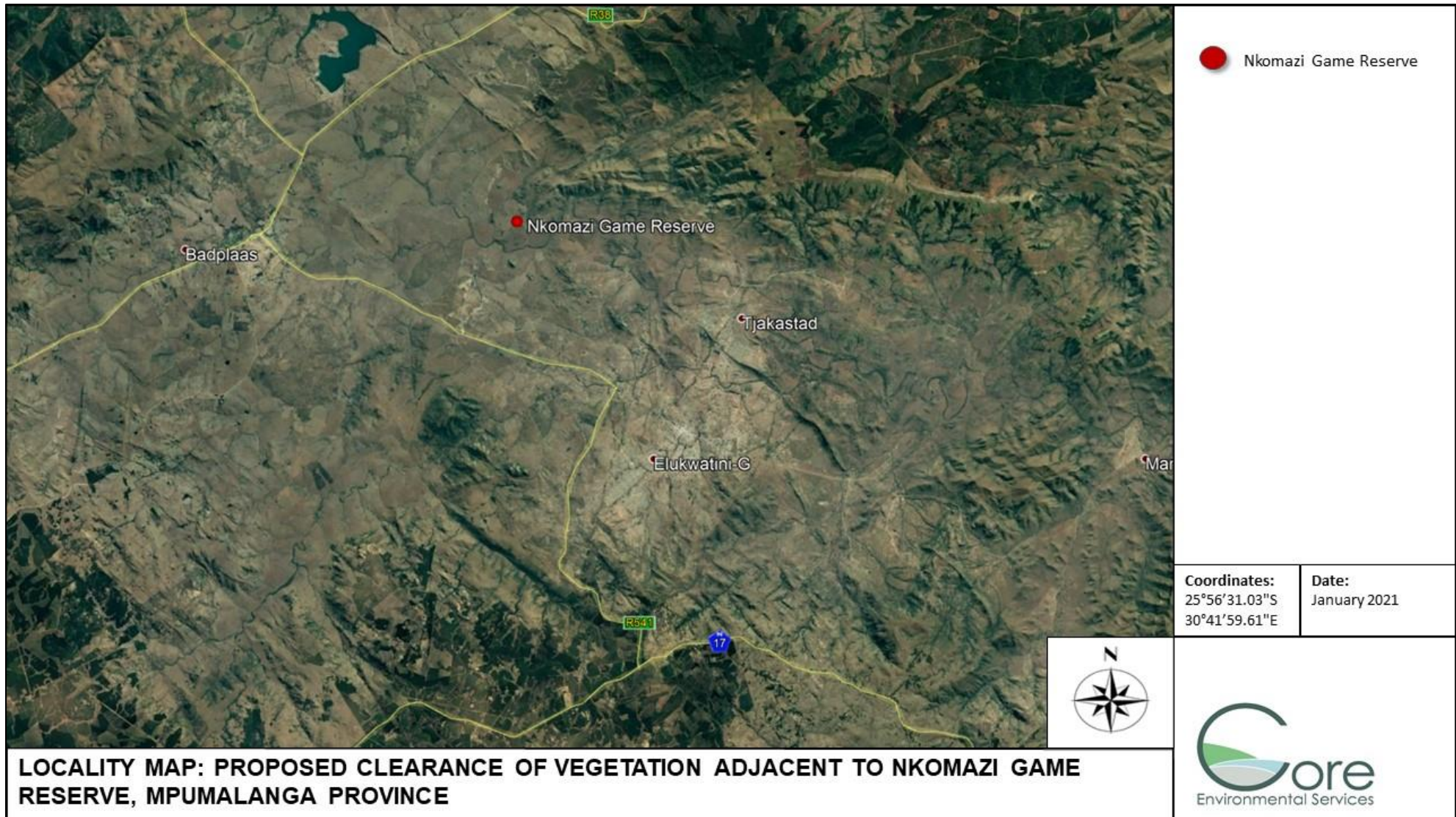


FIGURE 1: LOCALITY MAP – SITE LOCATION

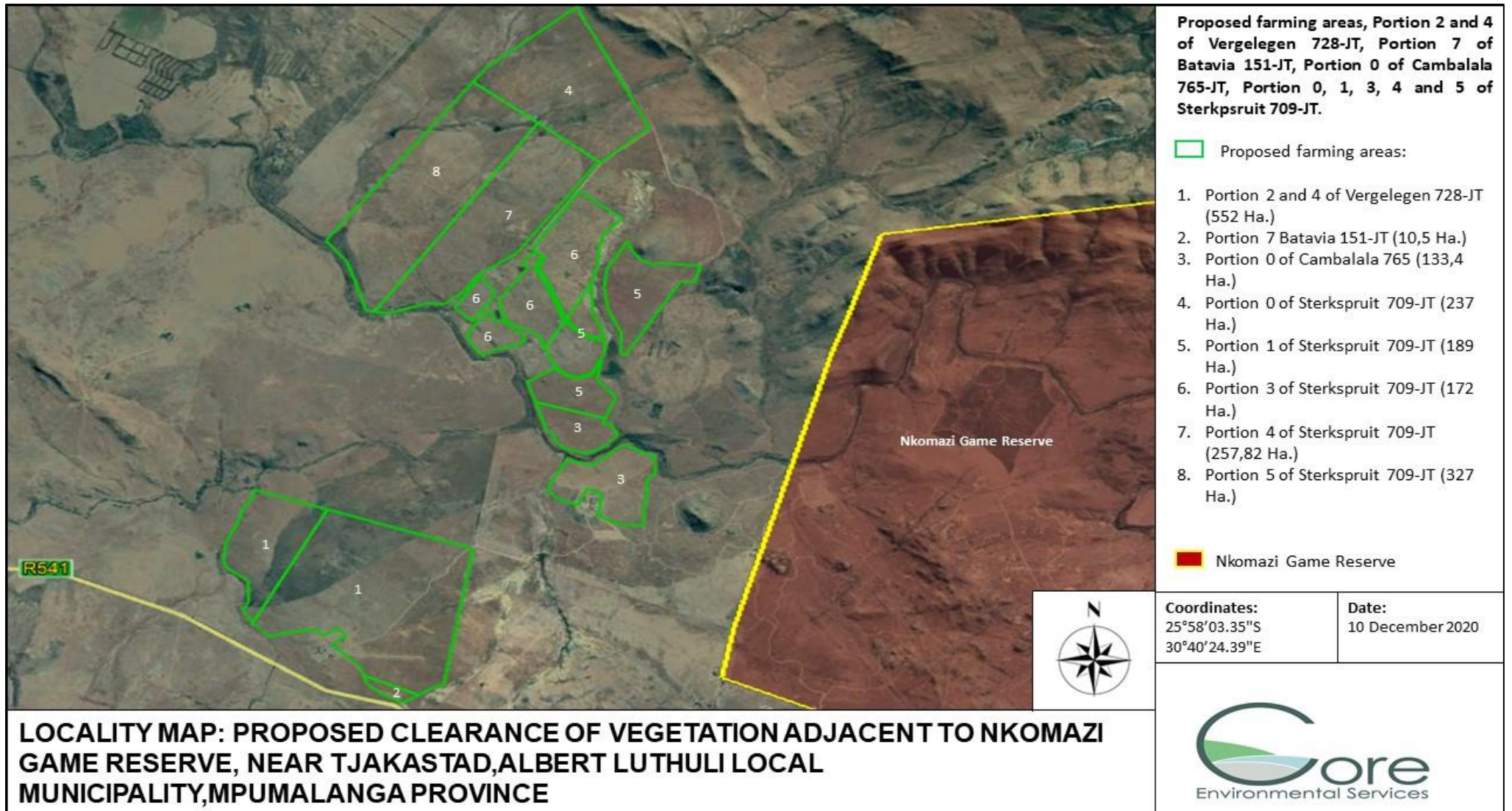


FIGURE 2: LOCALITY MAP – PROPOSED PROJECT AREAS

1.3 Details of the EAP

Ms. Anne-Mari White, is an Environmental Specialist, who started her studies at the North-West University (NWU) and completed her Bachelor of Science: Environmental Management at the University of South Africa (UNISA) in 2007. Ms. White is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA Reg No: 2020/602) as well as the South African Council for Natural Scientific Professionals as a Certificated Natural Scientist (Reg. No 300067/15). In addition to her qualification, she completed short courses in soil classification and wetland delineations (Terrasoil Science), Geographic Information Systems (University of KwaZulu-Natal), and Environmental Impact Assessments (NWU).

1.4 Policy, Legal and Administrative Framework

TABLE 1: LEGISLATION APPLICABLE TO THE PROJECT

Applicable legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments considered	Project application and type (permit / licence / authorisation / comment)
The Constitution of South Africa, Act No. 108 of 1996	<p>Nkomazi Game Reserve (Pty) Ltd will be required to adhere to the Environmental Management Programme (EMPr) requirements to ensure that social and environmental management considerations are considered and implemented.</p> <p>As per Section 25 the Constitution, a public participation process (PPP) was and will continue to be undertaken, as this is considered to be an essential mechanism for informing stakeholders of their rights and obligations in terms of the project.</p>
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Environmental Authorisation will subsequently be applied for by means of conducting a Scoping and Environmental Impact Assessment process as regulated within GNR982 of 2014 (as amended in 2017).
National Biodiversity Act, 2004 (Act No. 10 of 2004)	The act provides for the management and conservation of South Africa’s biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resource; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith.

	The National Biodiversity Act, 2004, must therefore be considered prior to the clearance of vegetation to minimise the impact on the terrestrial biodiversity.
Occupational Health and Safety Act, 1998 (Act No. 85 of 1998)	The Act provides for the health and safety of people at work and for the health and safety of people using plant and machinery. During establishment, work must be conducted with strict adherence to the Occupational Health and Safety Act 85 of 1998.
National Heritage Resources Act, 1999 (Act No 25 of 1999)	This legislation aims to promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations. Due to the proximity of the World Heritage Site, a Heritage Specialist will investigate the areas proposed for cultivation. The Heritage Impact Assessment Report will be submitted to SAHRA as well as the Department of Agriculture, Forestry and Fisheries for comment.
Albert Luthuli Local Municipality Integrated Development Plan (IDP) (2017 - 2022)	The primary objectives of the IDP are to foster economic growth that creates jobs and improve infrastructure within the Province. Job opportunities will be created by the proposed agricultural activities which supports economic growth within the area.

1.5 National Environmental Management Act 107 of 1998

The Scoping and Environmental Impact assessment process has been undertaken in accordance with the requirements of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), EIA Regulations, 2014 (as amended in 2017). Activities identified in terms of the Environmental Regulations 2014 (as amended in 2017), may not commence without obtaining Environmental Authorization from the competent authority, **DARDLEA**, and in respect of which the investigation, assessment and communication of activities must follow the EIA procedure as regulated. As per the National Environmental Management Act 107 of 1998 (NEMA 107, 1998), GNR 983, GNR 984 and GN 985 of 2014 (as amended in 2017), the following listed activities are being applied for:

GNR 984, Activity 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 Maintenance purposes undertaken in accordance with a maintenance management plan.

The applicant is proposing to clear approximately 2000 hectares of vegetation for cultivation purposes.

GNR 985, Activity 12(f):

The clearance of an area of 300 square meters or more of indigenous vegetation, except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (ii) Within critical biodiversity areas identified in bioregional plans.

While certain portions proposed for cultivation was previously cultivated, a small portion of the area proposed are identified to be within a Critical Biodiversity Area in accordance with the Mpumalanga Biodiversity Sector Plan, 2014 (MBCP, 2014).

Although the proposed agricultural areas indicates that these areas are included and classified as a Protect Area in accordance with the MBSP, 2014, it must be noted that these areas were not gazetted as a Protected Area and is therefore excluded from the Nkomazi Game Reserve.

According the triggered activities, the Applicant is required to conduct a Scoping and Environmental Impact Assessment (Scoping and EIA) for the activities proposed.

1.6 EIA Phase:

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 proposed 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 and cultural aspects of the environment;
- (d) Determine the –
 - i. Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives;
 - ii. Degree to which these impacts –
 1. can be reversed;
 2. may cause irreplaceable loss of resources, and
 3. 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 impact the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to avoid, manage or mitigate identified impact; and
- (h) identify residual risks that need to be managed and monitored.

1.7 Description of the project

Nkomazi Game Reserve (Pty) Ltd is proposing to clear approximately 2000 hectares of vegetation to establish an agricultural area for the purpose of macadamia farming. After the specialist investigations were conducted, it was concluded that approximately 1 823 hectares of the area investigated, is viable for agricultural purposes.

New structures proposed include the construction of three dehusking plants.

In terms of water use, the owner has water rights from the Inkomati Ushuthu Catchment Management Agency (IUCMA) for:

Property	Water rights
Portion 0 of Cambalala 765 JT	420 000m ³ per annum abstraction from the Komati River
Portion 0 of Nkomazi 772 JT	2 192 400m ³ per annum abstraction from the Komati River
Portion 1 and 4 of Sterkspruit 709 JT	660 000m ³ per annum from the Komati River 228 000m ³ per annum from Gladdespruit 240 000m ³ per annum from Sterkspruit
Portion 4 of Vergelegen 728 JT	501 600m ³ per annum from Lekkerloopspruit 102 100m ³ per annum from Seekooispruit
TOTAL	4 344 100m³

Approximately 250 trees will be planted per hectare on this portion of which approximately 1823 hectares would be cultivated. Each mature tree requires 0.18m³ of water per week, which totals a water requirement of 4 265 820m³ per annum. With 4 344 100m³ of water allocated per annum, the applicant has sufficient water for the proposed cultivation and will have a surplus of 78 280m³ per annum available.

1.8 Need and Desirability

- Macadamia nuts is a growing market in South Africa and is therefore an attractive and desirable investment opportunity. With a low labour requirement, macadamias are easy to grow, and farmers will therefore get a return on investment in approximately 5 to 7 years.
- China is South Africa's fastest growing market for macadamia nuts as China currently consumes 50% of South African macadamia production and although China is catching up on supplying to their need for macadamia nuts, the need for macadamia nuts remains and continues to grow.
- Macadamia trees covers an area of approximately 28 000 hectares and is growing by an estimated 3900 hectares per year. Mpumalanga is the main macadamia nut growing area in South Africa.
- A total of 12 500 full-time workers are estimated to be employed by the macadamia industry in South Africa with an additional 8100 workers during the peak season.

With the growing demand for macadamias, there is a definite need for more macadamia farms which would in turn provide job opportunities to the surrounding community members.

2. PUBLIC PARTICIPATION PROCESS

The purpose of this chapter is to provide an outline of the public participation process (PPP) to date and the way forward with respect to the Basic Assessment process.

Consultation with the public forms an integral component of the EA process. This process enables Interested and Affected Parties (I&APs) (e.g. directly affected landowners, national-, provincial- and local authorities, and local communities etc.) to raise their issues and concerns regarding the proposed activities, which they feel should be addressed in the BA process. The PPP has thus been structured such as to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues or concerns at various stages throughout the BA process.

I&APs were identified during the public participation phase of the project. All the parties identified as an I&AP (surrounding landowners, relevant departments, stakeholders, local and district authorities) have automatically been registered in the I&APs database for the project. The registered I&AP list is attached as **Annexure C.1**.

In effort to engage potential stakeholders, different communication methods were used to inform them about the project and how to get involved in the BA process. These methods include:

- Distributing English Background Information Documents (BIDs) to all registered I&APs, proof of which is attached in **Annexure C.2**;
- Placement of media advert in a local newspaper (The Lowvelder) on 23 July 2020 (see **Annexure C.3**).
- Placing of a notice at the proposed site took place on 24 July 2020 (see **Annexure C.4**);

The following comments have been received by I&AP's to date and is also attached as Appendix C:

Interested and Affected Party / Organ of State	Comment	Response
Mr. Thabo C. Rasiuba (Water Quality Management: Resource Protection & Waste)	Irrigation of macadamia plant requires water use authorisation. Kindly ensure that there is water use authorisation in place before starting to irrigate.	Thank you for your response, please note that you have been registered on the database to receive all further communication. The applicant recently obtained a Water Authorisation for the abstraction. I will request a copy and forward to your office.
	<u>Response to email dated 28/07/2020:</u> Hi Anne-Mari If that is the case, the IUCMA will not have any objection to the project, just make sure you forward me the copy of the permit to ensure that everything is in order, please.	

<p>Ms. Nokukhanya Khumalo</p> <p>SAHRA</p>	<p><u>Comment on the Draft Scoping Report:</u></p> <ul style="list-style-type: none"> In terms of the National Heritage Resources Act, no 25 of 1999 (NHRA), heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are generally protected. They may not be disturbed without a permit from the relevant heritage resources authority. In contexts of development applications, the developer must ensure that no heritage resources will be impacted by the proposed development, by lodging an application to SAHRA and submitting detailed development specifications as a notification of intent to develop. If the application is made in terms of s. 38 (8) of the NHRA then it is incumbent on the developer to ensure that a Heritage Impact Assessment (HIA) is undertaken, as s. 38(2)a does not apply. Such a study should follow the SAHRA 2007 Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports and section 38(3) of the NHRA The HIA must be undertaken by a suitably qualified archaeologist and it must comply with section 38(3) of the National Heritage Resources Act, Act 25 of 1999 (NHRA). This must be a complete HIA that provides a complete assessment including the results of the VIA, and potential impact to the significance of the geosites. In addition to the HIA report, SAHRA also requires a fossil finds procedure to be 	<p>Noted, a Heritage Impact Assessment will be completed and will form part of the Environmental Impact Assessment Report.</p>
---	---	--

	<p>developed by a suitably qualified palaeontologist. The HIA and the Palaeontology Fossil Finds Procedure must be provided to SAHRA in the EIA public review period. All these documents will be assessed by SAHRA and the comment issued must be included in the Final EIAR</p>	
<p>Mr. Khumbelo Malele MTPA</p>	<p><u>Comment on Draft Scoping Report:</u></p> <p>It is important to note that the remainder of portion 1, portions 3, 4, and 5 of Sterkspruit 709 JT and portion of Cambalala 765 JT are within the Nkomazi Wilderness Private Nature Reserve of Proclamation 750 of 2001 Notice 19. Clearing of vegetation within a protected area is a land-use that will compromise the biodiversity of the area and is therefore not permissible. Please note that this limitation must be taken into consideration during the next phase of the EIA process</p>	<p><u>Response from the EAP</u></p> <p><u>22/09/2020:</u></p> <p>Thank you for the comments received regarding the proposed agricultural area of Nkomazi Game Reserve, near Tjaka Stad.</p> <p>According to the Nkomazi Wilderness Private Nature Reserve of Proclamation 750 of 2001 Notice 19, the proclaimed Nature Reserve does not include the farm Sterkspruit according to the Proclamation 750 of 2001, Notice 19.</p> <p>Confirmation was also requested from Dr. Mervyn Lotter prior to commencing with the application, and it was confirmed that the Nkomazi Game Reserve was not correctly delineated on the MBSP, 2014. According to the Proclamation and delineation on the maps provided by MTPA, all proposed agricultural areas fall outside the proclaimed Nkomazi Game Reserve.</p>

3. CONSIDERATION OF ALTERNATIVES

The EIA process requires the developer to identify and investigate/assess feasible and reasonable alternatives. The project alternatives range from the location where the activity is proposed, type of activity to be undertaken, design of activity, technology to be used in the activity to the option of not implementing the activity (No-Go Alternative).

The assessment of the alternatives is a complicated and multi-faceted issue, which is essential to the success of this application and ultimately to the proper, responsible and sustainable operation of the proposed project.

3.1 Alternative Selection

3.1.1 Location alternatives

No other site alternative was considered for the establishment of this agricultural area as the applicant, Nkomazi Game Reserve (Pty) Ltd, has carefully selected the different portions of the properties proposed for cultivation. The selected properties were the least sensitive in terms of ecology as some of these areas proposed were previously cultivated.

3.1.2 Layout alternatives

An Ecological Impact Assessment, Soil Classification, Heritage Impact Assessment as well as a Palaeontological Impact Assessment was conducted as part of the Environmental Impact Assessment process, to identify any sensitivities within the proposed 2000-hectare project area. After the assessment was conducted, the layout of the proposed agricultural areas was adjusted to ensure that all sensitivities are excluded from the proposed agricultural areas. Of the 2000-hectare area investigated, it was found that 1823ha is viable for agricultural purposes.

3.1.3 No-Go alternative

The no-go alternative would be to not authorise the application for the clearance of vegetation for agricultural purposes. Should this alternative be favourable, the project area will not be cleared and used for agriculture, however, as various portions within the areas proposed were previously cultivated, no impact was identified to be so severe in order for the no-go alternative to be further investigated.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The description of the affected environment below draws on existing knowledge from published data, previous studies, specialist investigations, site visits to the area and is used to understand the possible effects of the proposed project on the environment.

The elevation ranges between to

4.1 Topography

The topography of the of the proposed project areas vary between approximately 945m a.s.l. in the valley bottom to 1100m a.s.l. on the northern watershed. A slightly elevated ridge line is located on the northern corner of the site as well as the southern corner of the site, however, this area is still arable. The project area slopes slightly from the north western side of the properties to the south eastern side but is mostly flat and fit for agricultural purposes.

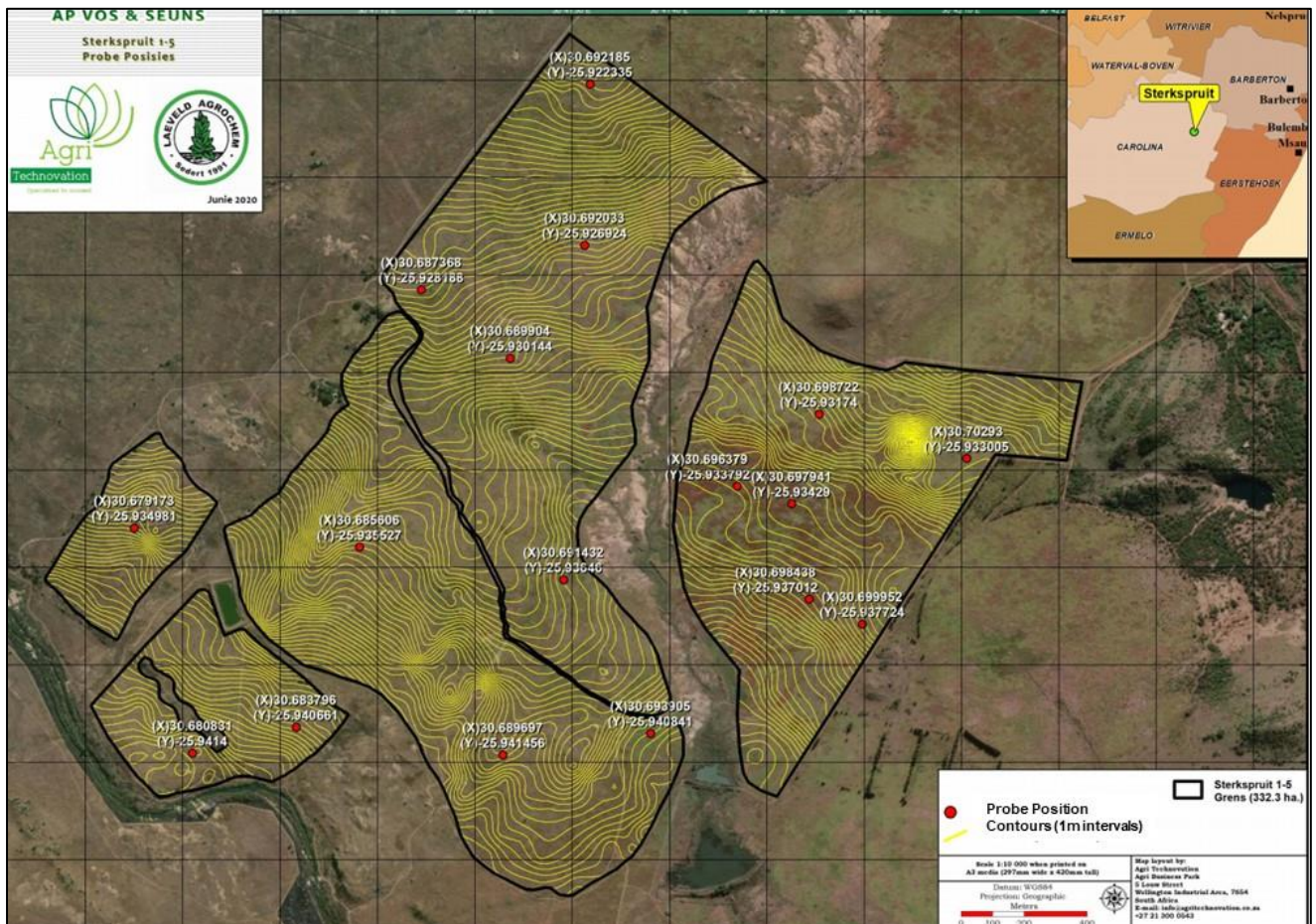


FIGURE 3: PORTION 1 TO 5 OF STERKSPRUIT CONTOUR LINES- 1M INTERVALS

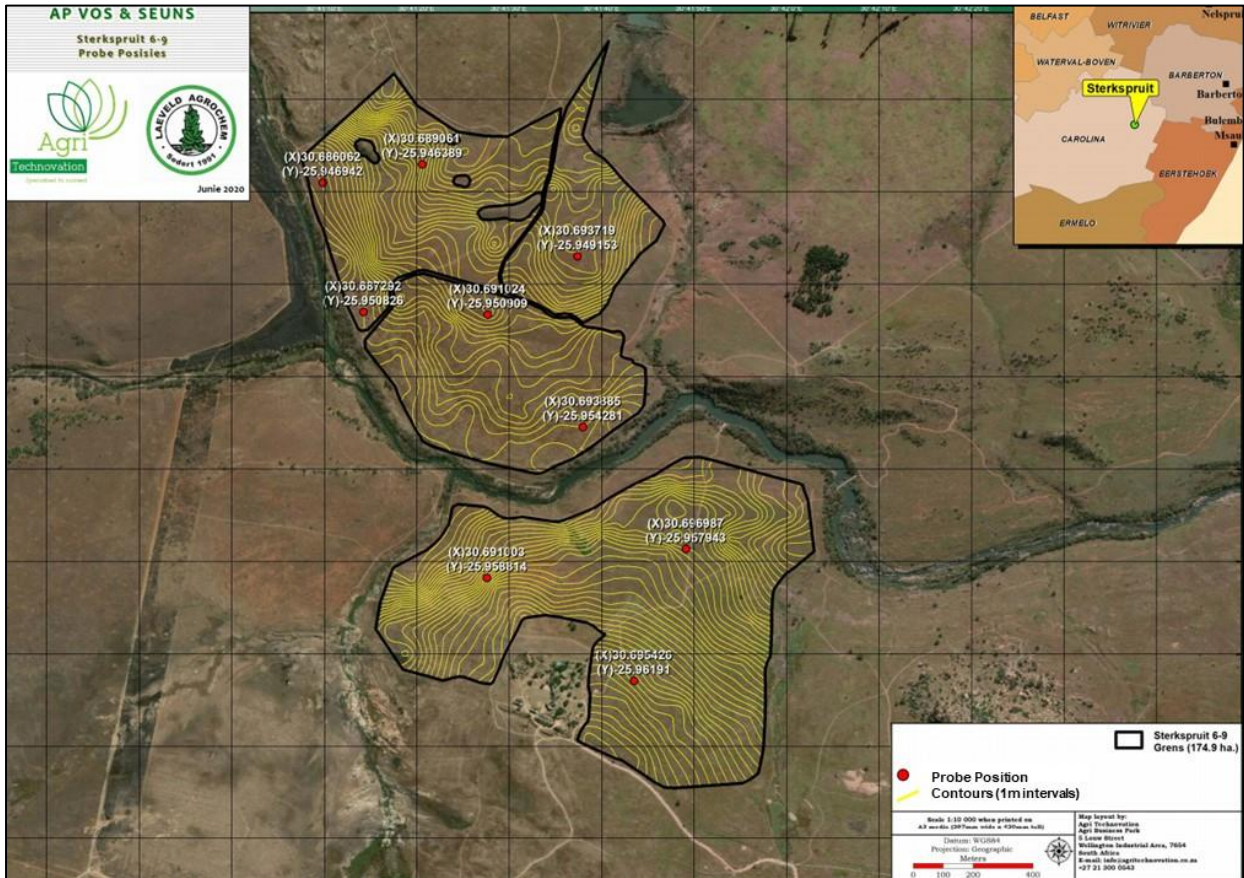


FIGURE 4: STERKSPRUIT AND CAMBALALA CONTOUR LINES- 1M INTERVALS

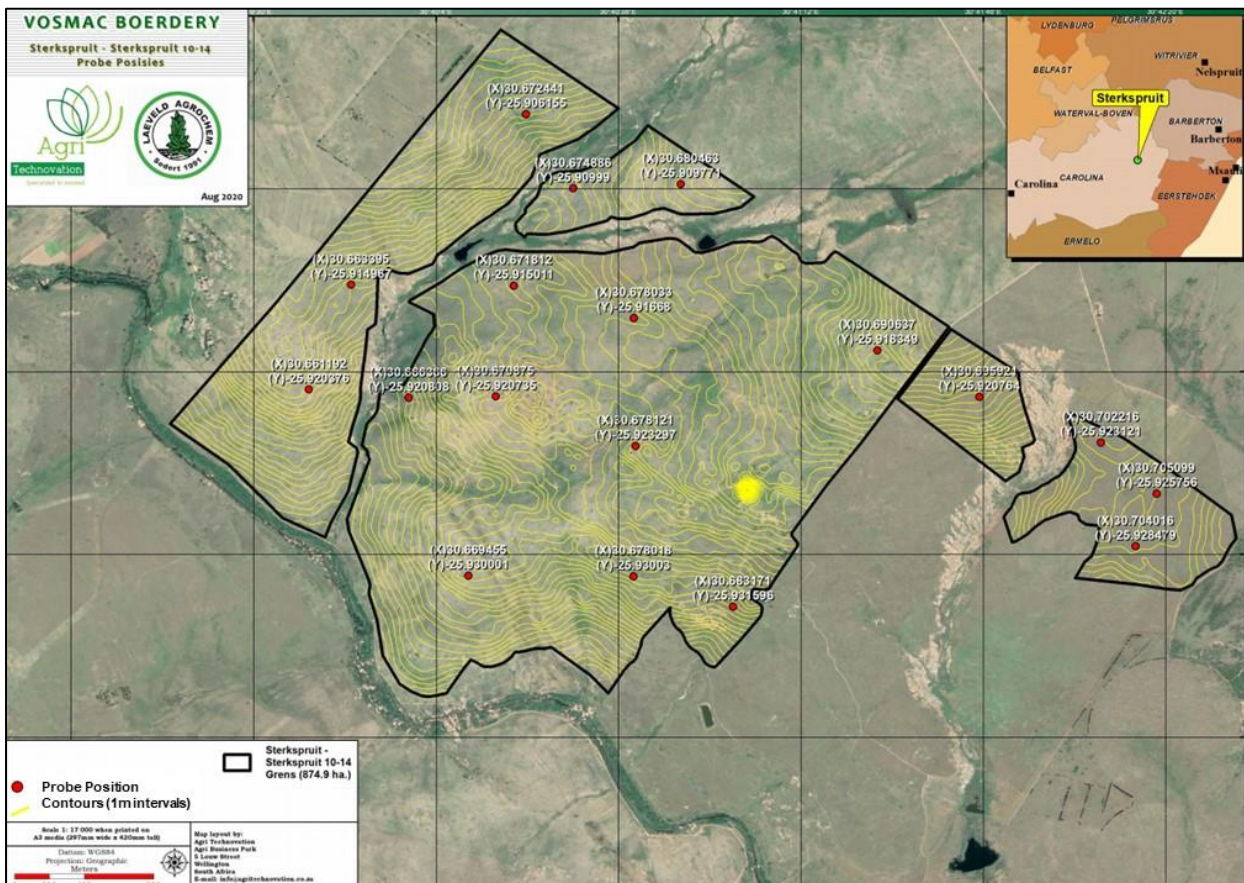


FIGURE 5: PORTION 10 TO 14 OF STERKSPRUIT CONTOUR LINES- 1M INTERVALS

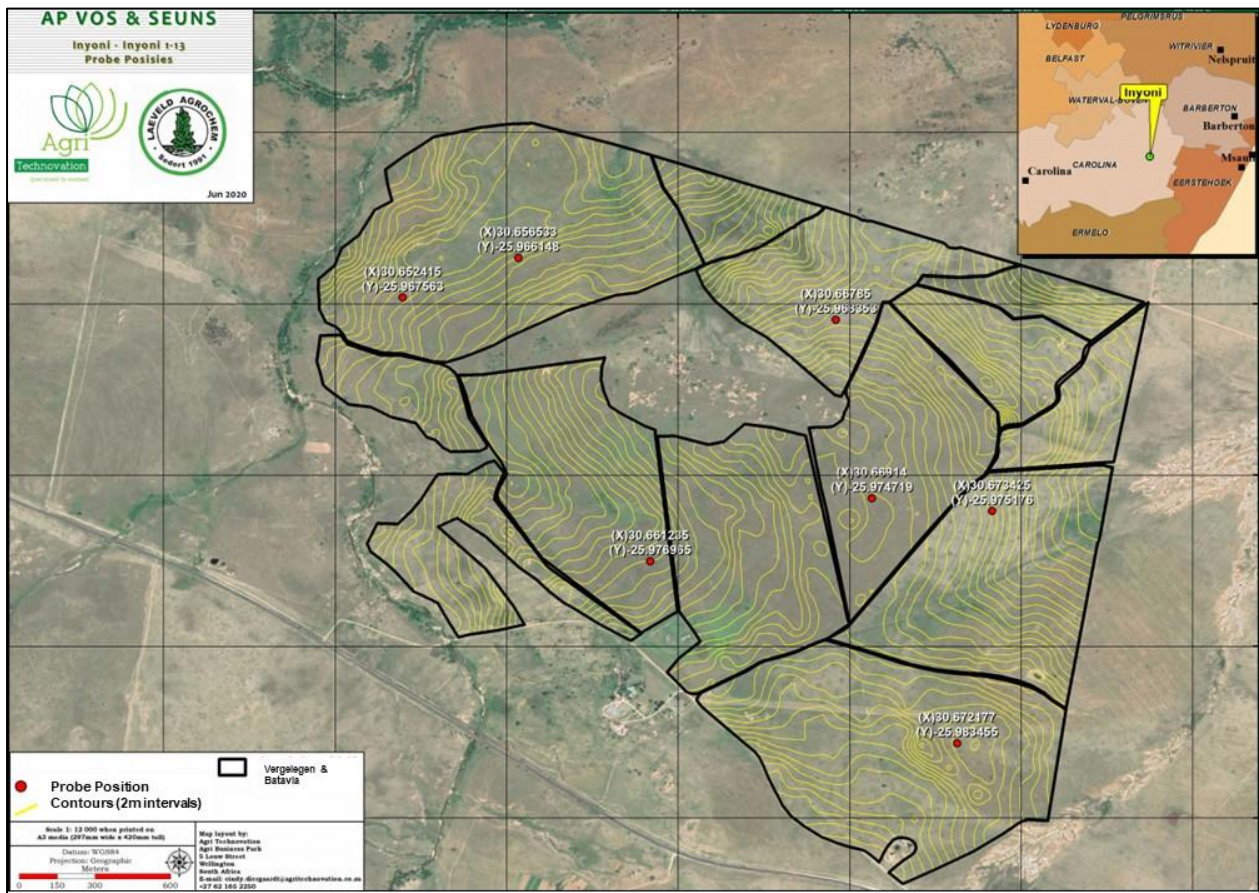


FIGURE 6: VERGELEGEN & BATAVIA CONTOUR LINES- 1M INTERVALS

4.2 Climate

Mpumalanga is a province where the climate varies due to its topography. Tjakastad is located on the Lowveld Region and has a tropical climate with warm sub-tropical temperatures and experiences high summer rainfalls.

The study area experiences a humid and hot weather during summer seasons. The climatic trends of the area suggest summer season precipitation and dryer periods during winter. The area receives a total of about 800-1000 mm of rain over 12 months increasing with altitude and frost is infrequent.

4.3 Ecology

Nationally, the site is situated within the Lowveld Sour Bushveld (A9) veld type according to Acocks (1988), or North-eastern Mountain Grassland (LR43) according to Low & Rebelo (1996) and Schmidt *et al* (2002). However, these classifications are very broad and may include several sub veld types of importance. The more detailed vegetation classification system of Mucina & Rutherford (2006) is used to classify the veld unit on a regional scale:

Swaziland Sour Bushveld: Mainly found in Mpumalanga, Swaziland from Badplaas eastwards to Piggs Peak and Manzini. Altitude 400-1100m. Open to closed tree layer with well developed (closed) grass layer. Very hilly with moderate to steep slopes. Grey soils, derived from Randian granites and Swazian granites and gneiss. Soils are dark, very clayey: Sterkspruit, Valsrivier and Swartland soil

forms. Summer rainfall with dry winters. MAP: 700-1350mm. Frost infrequent to occasional at higher altitudes. Approximately 21% transformed to cultivation and forestry. Conservation: Vulnerable.

Terrestrial Ecology: According to the Mpumalanga Biodiversity Sector Plan, 2014, the site falls within a Protected Area (National Parks and Nature Reserve). It must however be noted that the areas proposed for cultivation was never proclaimed as a Protected Area in terms of the Development Facilitation Act 67 of 1995 or the Mpumalanga Nature Conservation Act 10 of 1998. Some of the portions does however fall within areas classified as Critical Biodiversity Areas (CBA) in terms of the Mpumalanga Biodiversity Sector Plan, 2014.

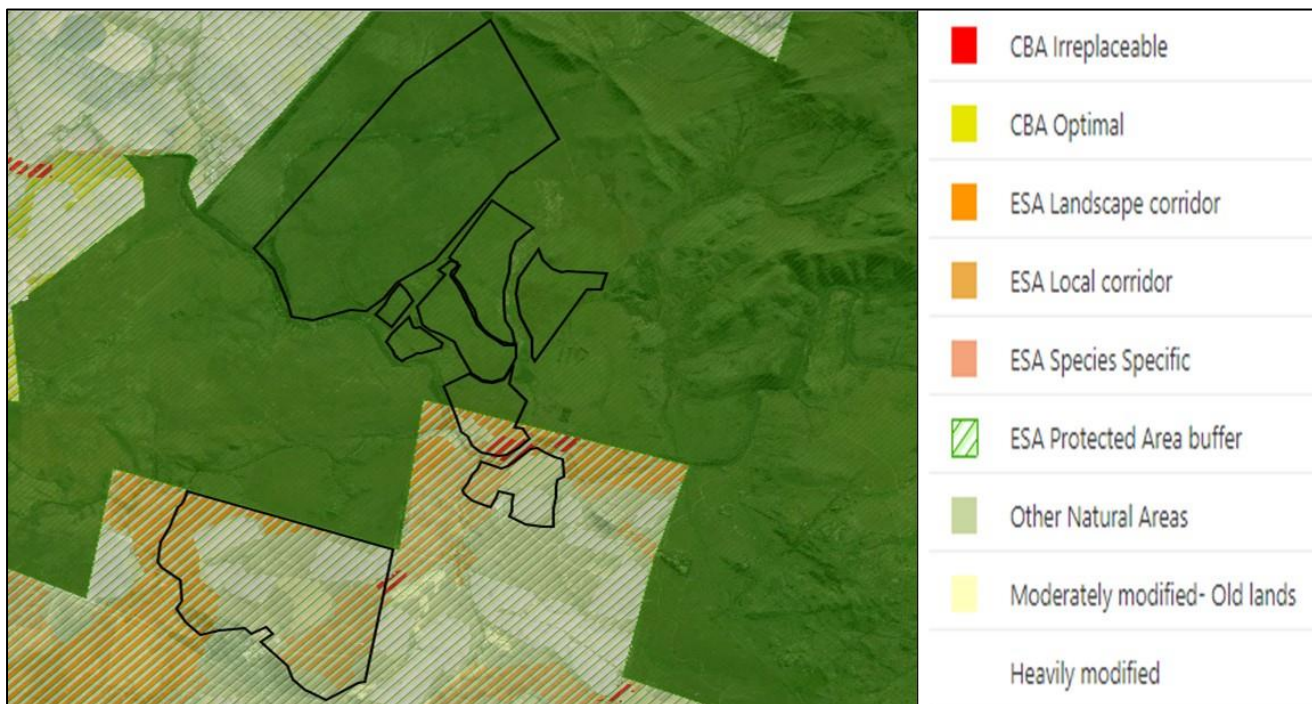


FIGURE 7: TERRESTRIAL ECOLOGY MAP ACCORDING TO MPUMALANGA BIODIVERSITY SECTOR PLAN, 2014

Freshwater Ecology: The area is classified as an Ecological Support Area (Important Sub catchment). The MTPA requirements for an Ecological Support Area (important sub catchment) are quoted as follows: This sub-category includes National Freshwater Ecosystems Priority Areas (NFEPA) sub-catchments and Fish Support Areas. A river NFEPA is the river reach that is required for meeting biodiversity targets for river ecosystems and threatened fish species. In managing the condition of a river FEPA, it is important to manage not only the river itself, but also the network of streams and wetlands as well as land-based activities in the sub-catchment that supports the river FEPA. A proportion of tributaries and wetlands need to remain healthy and functional in order for the river FEPA to be kept in a good ecological condition. This requires that management activities are focused on maintaining water quantity and quality and the integrity of natural habitat in the sub-catchment.

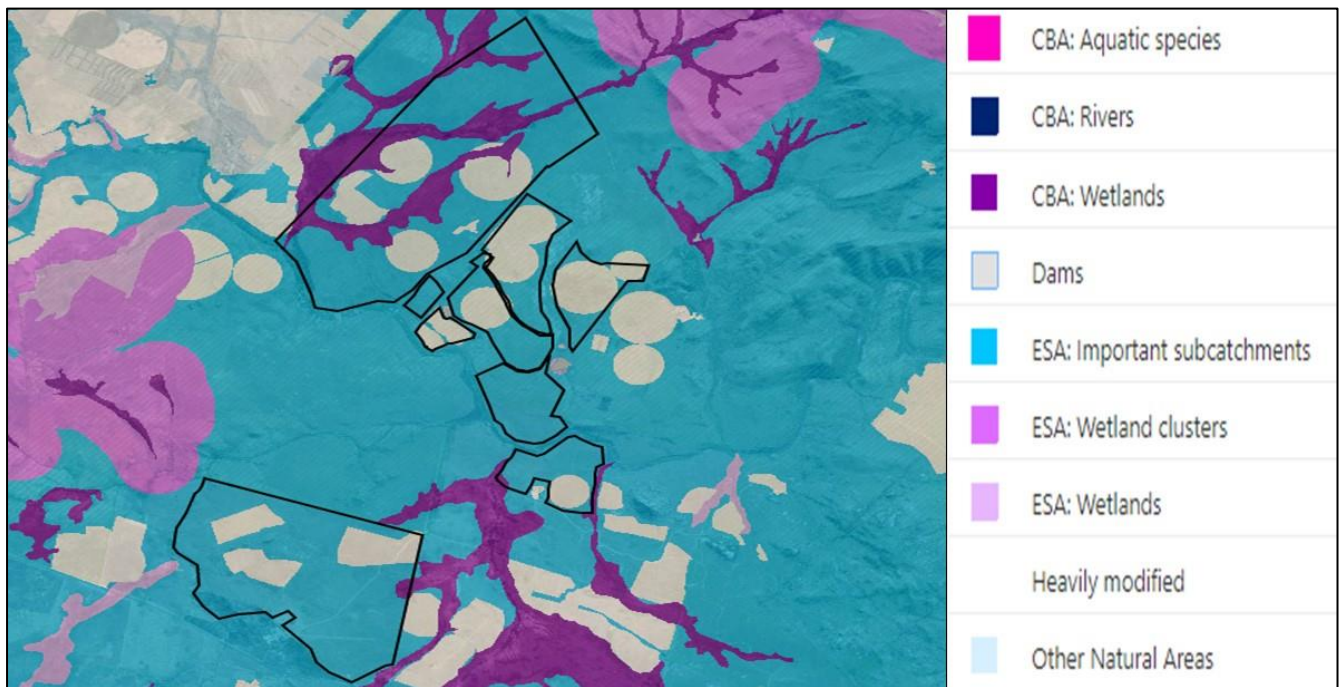


FIGURE 8: FRESHWATER ECOLOGY MAP ACCORDING TO MPUMALANGA BIODIVERSITY SECTOR PLAN, 2014

4.4 Surface and Groundwater

The Komati River flows from west to east through the central section and the Seekoiespruit tribute to the Komati River on the property. These watercourses have well-defined channels with smaller tributaries present from north to south. Other hydrological features include wetlands and severely eroded drainage channels. Several prominent rocky outcrops are present and these are largely in a natural state.

The riparian habitat is found in the valley bottoms alongside the Komati River and Seekoiespruit. These are perennial watercourses and as such the availability of water and fertile alluvial soils presents excellent conditions to maintain riparian vegetation

The marginal and lower, riparian zone is relatively intact and largely natural along the reaches that were investigated. The upper riparian and transitional zones are absent and have probably been destroyed in the past when agriculture lands were developed. The riparian zones provide an important refuge and corridor for fauna and flora and have a high ecological sensitivity rating. Buffer zones are recommended in order to protect the riparian zones

Several prominent valley bottom wetlands are present as well as associated seepage zones and artificial wetlands, these include NFEPA (National Freshwater Ecosystem Priority Areas) wetland. The wetlands were delineated by a combination of site assessments where the edges were plotted by GPS and refining by remote sensing on the aerial images. In order to simplify the mapwork, the wetland delineations projected projects the buffer zones around the wetlands. The buffer zones are mostly at least greater than 20m, however, the buffer varies and may be up to 200m and more where deemed necessary, in order to include maximum grassland habitat and to consider erosion prone areas.

4.5 Land use

The study area is located on the plains to the south of the foothills of the Makhonya Mountains in the north and the Skurweberg (Escarpment), approximately 10km to the east of Badplaas / eManzana. The Nkomazi Game Reserve is located directly to the east and several of the properties forming part of this project is fenced in with this Reserve. The main administrative buildings and staff quarters are located centrally.

Most arable land within the study area was previously cultivated, mainly with tobacco and fodder meadows, but presently, no agricultural activities are present and all agricultural lands have been fallowed for more than 10 years. The local land use varies from natural areas to cultivated fruit and nut orchards as well as forestry in the higher lying areas. The Komati River flows from west to east through the central section and the Zeekoeispruit tribute to the Komati River on the property.

According to the Mpumalanga Biodiversity Sector Plan of 2014, the proposed project area falls within an Informal Protected Area (NPAES). However, according to the farm and portion numbers proclaimed as a Protected Area in the Mpumalanga Provincial Gazette No 819, 817 and 750, the areas proposed for agricultural purposes does not form part of the proclaimed Protected Area. Although the areas proposed are not proclaimed as part of the Nature Reserve, the areas do currently form part of the fenced Nkomazi Game Reserve.

As mentioned, various sections within the areas proposed for agriculture, was previously used for cultivation.

The project area also forms part of the Barberton Makhonjwa Mountains World Heritage Site. The agricultural activities are however proposed on the most south-western corner of the World Heritage Site with the lowest altitude compared to the remainder of the area declared as a World Heritage Site. The locations of all geo-sites located within Nkomazi Game Reserve was received and from the information received, it is noted that one important location traverses the proposed agricultural area. This area will therefore be excluded and protected from the area proposed for agriculture.

Eskom power lines run through the proposed agricultural area. The applicant must ensure that access is provided to ESKOM and that a servitude for the powerline remains.

4.6 Geology and Soils

The mountains within the Nkomazi Game Reserve lie on the eastern edge of the Kaapvaal Craton. The range is best known for having some of the oldest exposed rocks on Earth, estimated to be between 3.2 and 3.6 billion years old. The range is also known for its gold deposits and a number of komatiites, an unusual type of ultramafic volcanic rock named after the Komati River.

The major soil types present within the project area are shallow soils with minimal development. These soil types include Mispah, Dresden and Glenrosa, which are less than 25cm deep before hitting an impervious layer that prevents further root growth

The study area is underlain predominantly by Swazian aged rocks of the Kaapvaal Craton and the site is underlain by granite and other igneous and metamorphic rocks that are part of the well-known Barberton Mountainland geological heritage site in South Africa

The Tjakastad Subgroup is undifferentiated in the northern part of the study area and consists mainly of metamorphic rocks such as schists, banded iron formation as well as komatiite, tholeiite and chemical sediment

The southern part of the study area is underlain by rocks of the Swazian aged Kaap Valley Granite (Zg) which is a biotite-trandjemite gneiss (Johnson et al, 2009). A differentiate of the Swazian aged Kaap Valley Granite (unit Zu) consists of serpentinitised dunite, harzburgite, orthopyroxinite and websterite, gabbro and anorthosite (Johnson et al, 2009).

Refer to figures 9 to 12 for the ground zones and soil classification for the proposed agricultural areas.

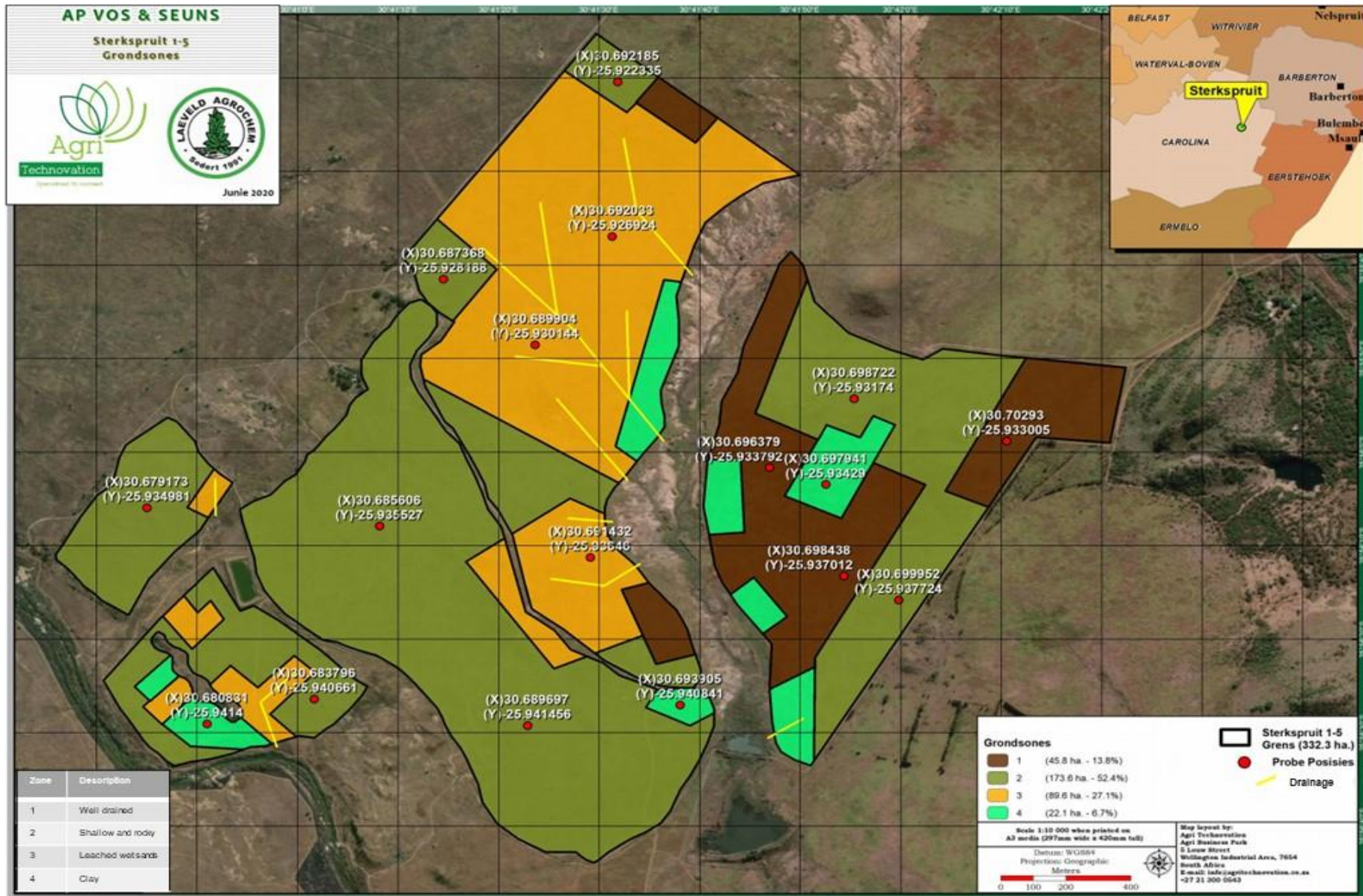


FIGURE 9: GROUND ZONES AND SOIL CLASSIFICATION MAP ON PORTION 1 TO 5 OF STERKSPRUIT

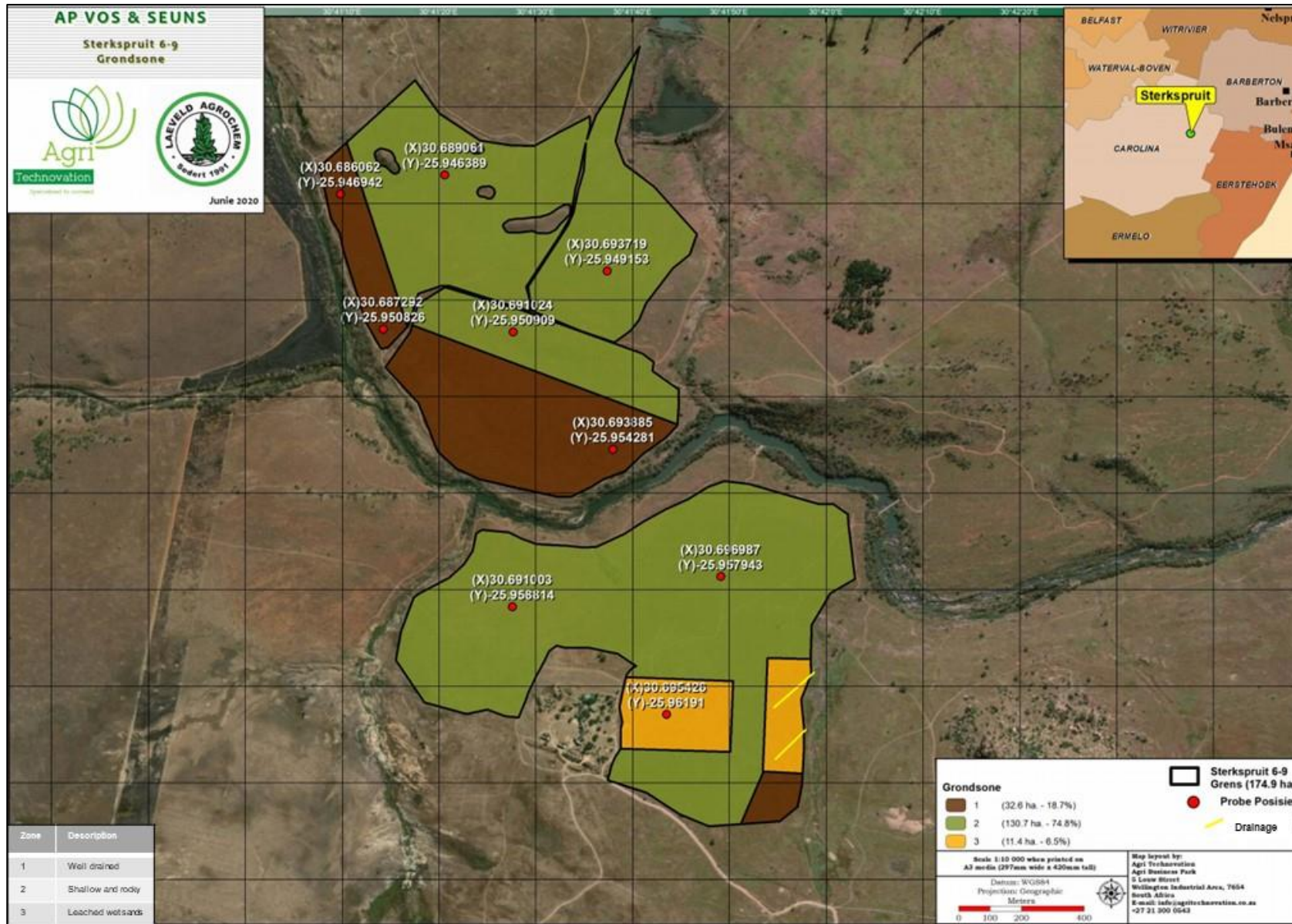


FIGURE 10: GROUND ZONES AND SOIL CLASSIFICATION MAP OF STERKSPRUIT AND CAMBALALA

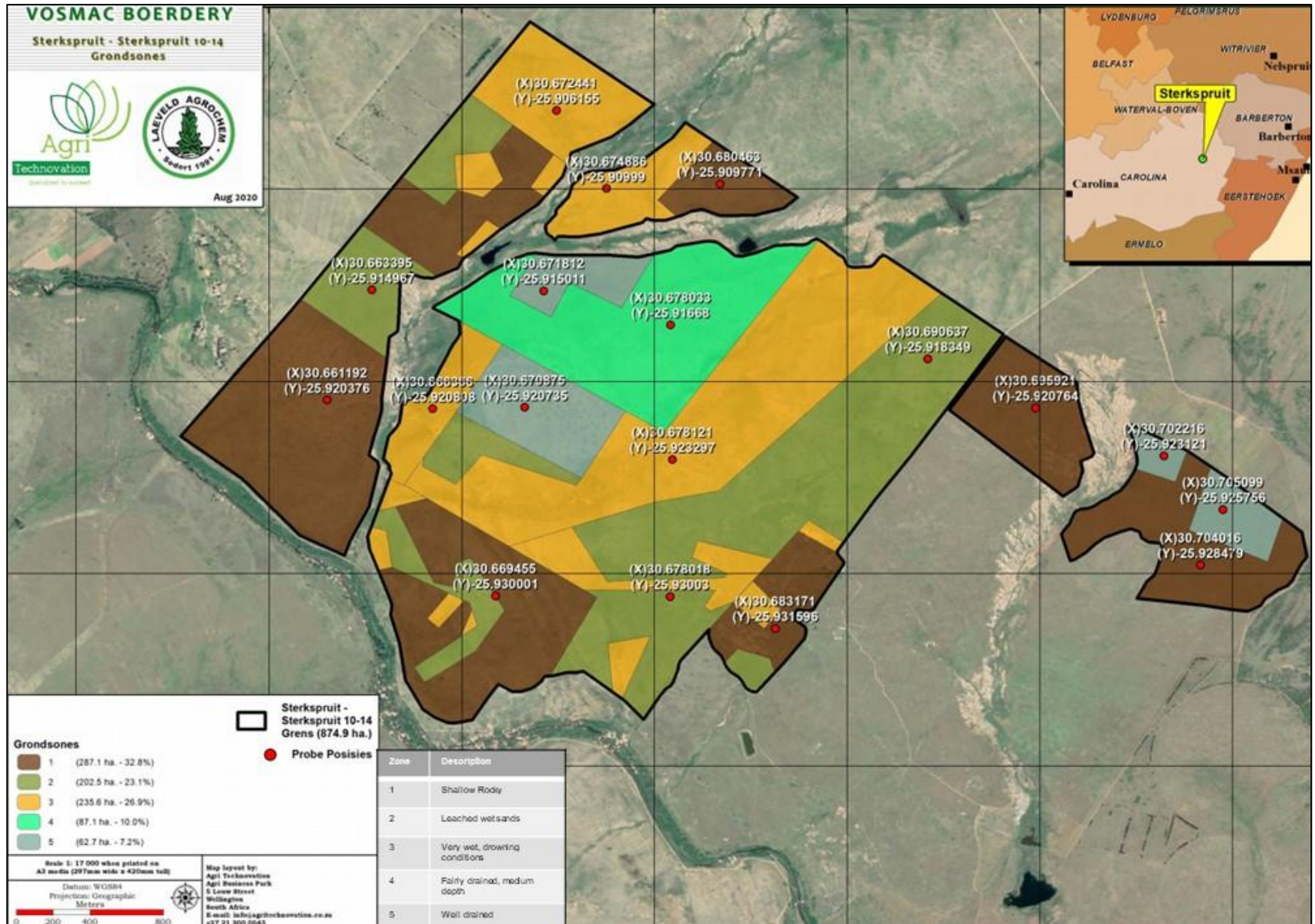


FIGURE 11: GROUND ZONES AND SOIL CLASSIFICATION MAP OF PORTION 10 TO 14 OF STERKSPRUIT

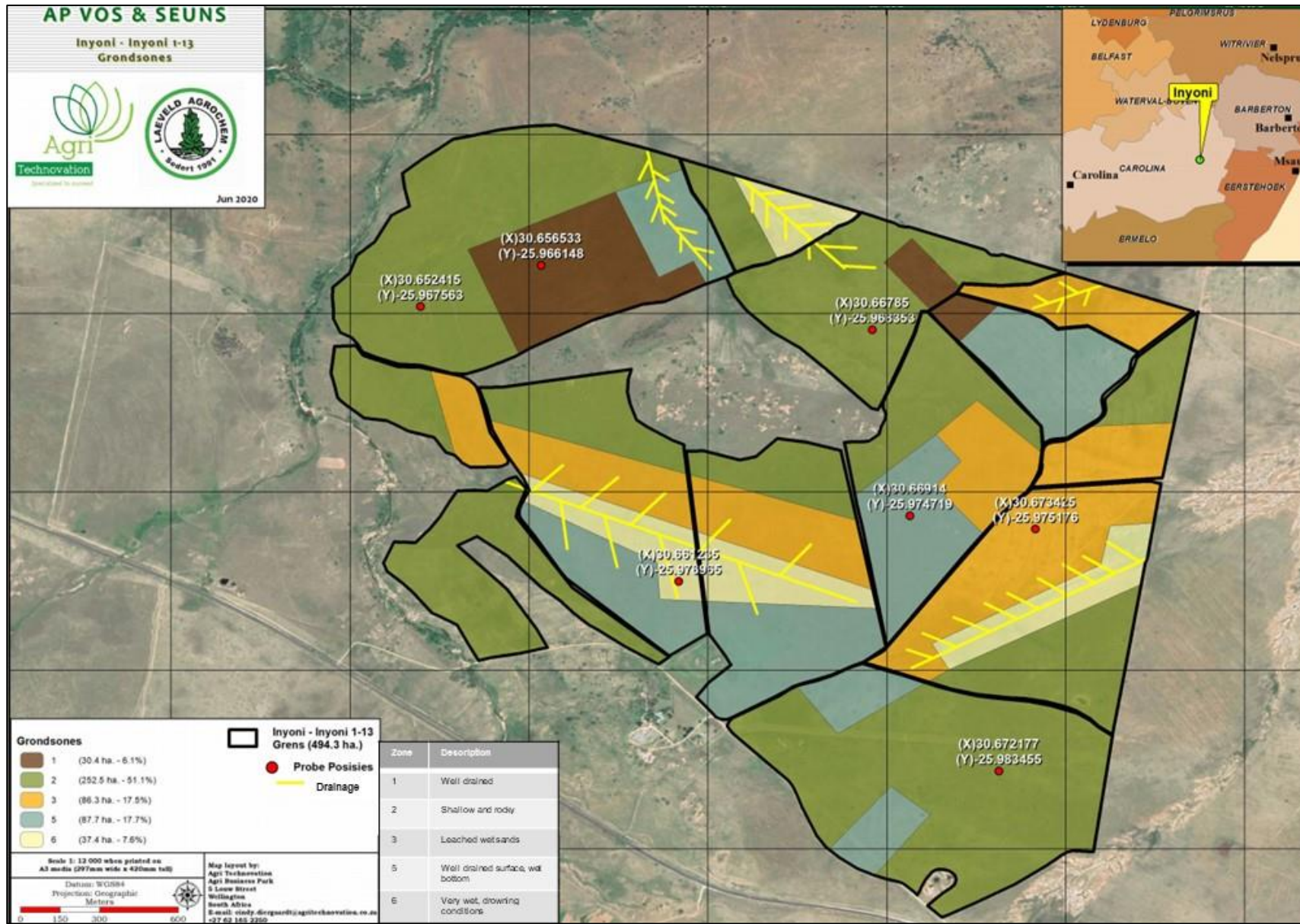


FIGURE 12: GROUND ZONES AND SOIL CLASSIFICATION MAP OF VERGELEGEN AND BATAVIA

4.8 Heritage

A Heritage Impact Assessment was conducted to determine whether the transformation of the proposed land will have any impact on heritage resources or artefacts.

Large sections on the proposed study areas were historically disturbed with agricultural activities.

A number of recent features and structures which are associated with previous farming activities were identified in the southern section of farms Vergelegen and Batavia. A quarry and an airstrip are also visible in this section. None of these features have any historical significance, and development may therefore continue within the most southern section.

Some Late Iron Age (LIA) stone walls are located in the northern section of the farm Vergelegen (within the study area on the northern boundary as well as outside of the study area). LIA stone walls were also observed on the farm Vergelegen, and portion 1 and 3 of the farm Sterkspruit as well as on portion 0 of the farm Cambalala. These stone walls should be preserved in situ. Should the client wish to incorporate these as a tourist attraction or if any activities will take place in these sections, mitigation measures will be required.

No archaeological or historical features were observed on portions 0, 1, 3, 4 and 5 of the farm Sterkspruit (which were previously cultivated lands). An earth water furrow, was observed on the southern perimeter of portion 4 of the farm Sterkspruit, and cuts through portion 3 of the farm Sterkspruit. It continues parallel with the access roads between portions 1 and 3 of Sterkspruit as well as portion 0 of Cambalala towards a dam. This earth water furrow is recent and of no significance.

Most of the LIA stone walls have been impacted upon by road infrastructure and historical agricultural activities. The LIA stone walls on portion 0 of Cambalala, are fairly intact although the walls are not in a good condition. The area forms part of the Nkomazi Game Reserve where game (animals) has free access to the sites.

The survey revealed a number of Late Iron Age stonewalls within the study area, A number of structures associated with recent farming activities were also observed, but are of no significance. No graves were identified within the study area.

Co-ordinates of all the Late Iron Age stone walls that are of Heritage importance (Refer to Layout Maps- Appendix A):

LIA	Co-ordinate
Sterkspruit	
1	25° 56' 33.02" S 30° 41' 16.33" E
2	25° 56' 34.65" S 30° 41' 18.88" E
3	25° 56' 44.05" S 30° 41' 16.61" E
4	25° 56' 49.60" S 30° 41' 25.02" E
5	25° 56' 41.61" S 30° 41' 29.00" E
6	25° 56' 40.35" S 30° 41' 34.18" E
Cambalala	
7	25° 57' 37.03" S 30° 41' 35.54" E
Vergelegen & Batavia	
8	25° 57' 51.20" S 30° 40' 00.55" E
9	25° 57' 56.04" S 30° 40' 13.7" E

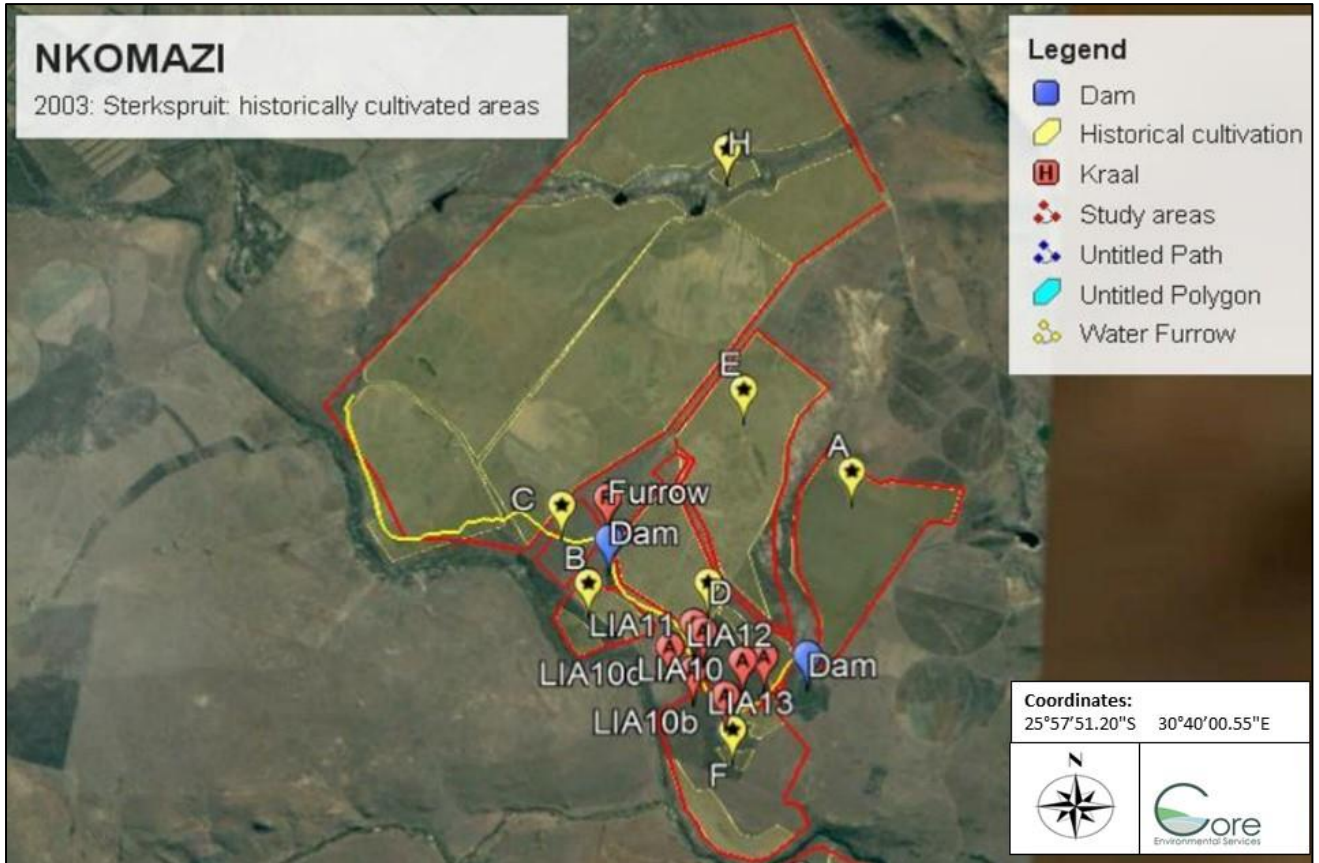


FIGURE 13: STERKSPRUIT HISTORICALLY CULTIVATED AREAS AND FEATURES



FIGURE 14: CAMBALALA HISTORICALLY CULTIVATED AREAS AND FEATURES



FIGURE 15: VERGELEGEN AND BATAVIA HISTORICALLY CULTIVATED AREAS AND FEATURES

4.9 Paleontology

A Palaeontological Impact Assessment was conducted to determine whether the transformation of the proposed land will have any impact on palaeontological resources. The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews as well as information gathered during the desktop investigation

Paleontology is contained in rocks and examined with electron microscopes. The fossils are of great international importance but too small to see with the naked eye. No outcrops of the moderately sensitive Fig Tree Group are present on the farms, but it is of importance to note these recordings for future reference if any excavations do expose rocks with indications of preserved stromatolites.

The palaeontological sensitivity of the Nkomazi Game Reserve (Pty) Ltd agricultural project is limited to areas with low and very low impact values. The survey revealed no paleontological resources that are of significance within the study area. The chance find of fossils is low to very low, however the developer must have knowledge about the possibility of fossils within the study area, but does not have to do anything to preserve these fossils as this project will not entail breaking of any stones.

Co-ordinates of all the Geological sites that are of Paleontological importance (Refer to Layout Maps- Appendix A):

Geological Sites	Co-ordinates
	Sterkspruit
1	25° 53' 45.98" S 30° 41' 36.84" E
2	25° 53' 49.34" S 30° 41' 31.08" E

Cambalala	
3	25° 57' 39.92" S 30° 41' 12.85" E
Vergelegen & Batavia	
4	25° 57' 30.89" S 30° 38' 40.51" E
5	25° 57' 58.28" S 30° 39' 25.02" E
6	25° 58' 15.24" S 30° 39' 01.17" E
7	25° 58' 41.66" S 30° 39' 07.38" E

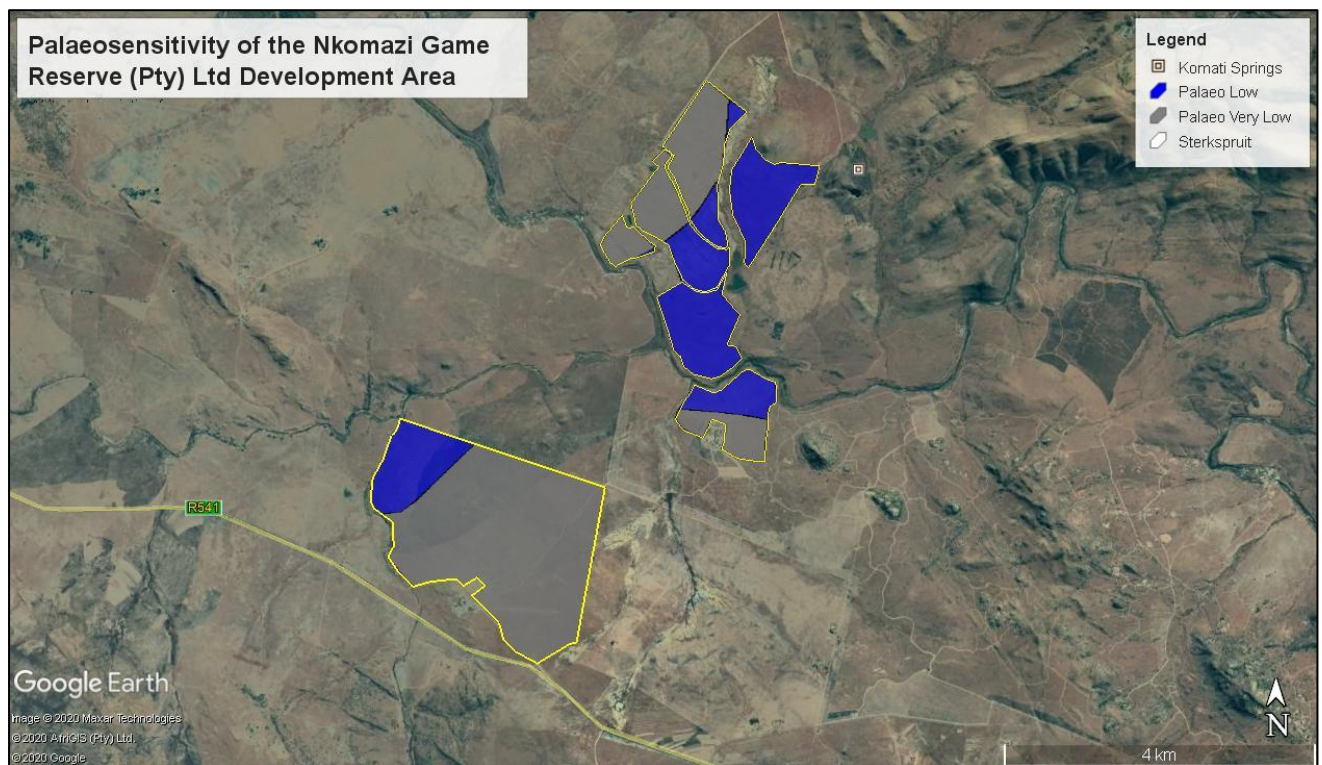


FIGURE 16: PALAEONTOLOGICAL SENSITIVITY MAP

4.10 Socio-Economic Environment

Tjakastad is located within the Gert Sibande District. The population consist of 12711 individuals that live in peri-urban and rural areas.

Gert Sibande District currently has an unemployment rate of 29.7% with 45.1% of the people living below the poverty line. The levels of skill and qualifications of the population is also fairly low which is problematic for future economic development. The socio-economic context of the surrounding environment can therefore be described as a community with a low percentage of education and high unemployment rate.

5. SPECIALIST ASSESSMENT REQUIREMENTS AS IDENTIFIED IN THE SCREENING REPORT

The following specialist assessments were identified within the Department of Environmental Affairs Screening Report to be conducted as part of the Basic Environmental Impact Assessment:

- Visual Impact Assessment

The proposed area is currently zoned for agricultural purposes. The project area also forms part of the Barberton Makhonjwa Mountains World Heritage Site which is a popular tourist attraction. The agricultural activities are however proposed on the most south-western corner of the World Heritage Site. The cultivation of approximately 2000 hectares will not have a significant visual impact. For this reason, no visual impact assessment was conducted.

- Heritage Impact Assessment

A Heritage Impact Assessment was conducted on the approximately 2000-hectare property to identify any possible artefacts or structures which could be of heritage or cultural significance. The findings of the investigation are discussed in Section 4.8 above and the Heritage Impact Assessment is attached as Appendix D.

- Paleontological Assessment

A Paleontological Impact Assessment was conducted. A Palaeontological Impact Assessment was conducted on the approximately 2000-hectare property to determine whether the transformation of the proposed land will have any impact on palaeontological resources. The survey revealed no paleontological resources that are of significance within the study area as all activities are surface based. The findings of the investigation are discussed in Section 4.9 above and the Paleontological Impact Assessment is attached as Appendix D

- Terrestrial Biodiversity Assessment / Plant and Animal Species Assessment

An Ecological Impact Assessment was conducted on the approximately 2000-hectare property to identify any ecological sensitive areas within the project area. The specialist delineated the project area so that it is best fit for agricultural activities. However, important natural communities remain intact (riparian habitats). It is recommended that these natural areas should be conserved to ensure that the present state of biodiversity is not affected and that the operational plan be designed to conserve these areas within a buffer zone. Please refer to Appendix D for more detail on the findings made by the Biodiversity Specialist.

- Avian Impact Assessment

As part of the Terrestrial Biodiversity Assessment conducted, the impact on bird and bird species were also assessed. (Please refer to Section 5.3 of the Ecological Assessment conducted). For this reason, significant and sensitive grassland areas were excluded from the proposed agricultural area.

- Socio-economic Assessment

The proposed project will not have any negative impact on the socio-economic environment. Contrary to this, additional job opportunities will be created during the operational phase of the project, which will impact the surrounding community positively.

As no negative socio-economic impact is expected with the proposed project, it is the opinion of the EAP that no Socio-Economic Impact Assessment is required

6. METHODOLOGY OF ASSESSING THE SIGNIFICANCE OF IMPACTS

This section outlines the method used for assessing the significance of the potential environmental impacts during the construction/establishment, operational and decommissioning phases.

For each impact, the **EXTENT** (spatial scale), **MAGNITUDE** and **DURATION** (time scale) would be described, as shown in **Table 2**. These criteria are then used to determine the **SIGNIFICANCE** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The mitigation described in the Report represents the full range of plausible and pragmatic measures but does not necessarily imply that they would be implemented.

The following tables show the scale used to assess these variables and defines each of the rating categories.

TABLE 2: ASSESSMENT CRITERIA FOR THE EVALUATION OF IMPACTS

Criteria	Category	Description
Extent or spatial influence of impact	Regional	Beyond a 30km radius of the candidate site.
	Local	Within a 30km radius of the candidate site.
	Site-specific	On site or within 100 m of the candidate site.
Magnitude of impact (at the indicated spatial scale)	High	Natural and/ or social functions and/ or processes are <i>severely</i> altered
	Medium	Natural and/ or social functions and/ or processes are <i>notably</i> altered
	Low	Natural and/ or social functions and/ or processes are <i>slightly</i> altered
	Very low	Natural and/ or social functions and/ or processes are <i>negligibly</i> altered
	Zero	Natural and/ or social functions and/ or processes remain <i>unaltered</i>
Duration of impact	Long-term	More than 10 years after construction
	Medium-term	Up to 5 years after construction
	Construction-term	Up to 3 years

The **SIGNIFICANCE** of an impact is derived by taking into account magnitude, duration and extent of each impact. The criteria employed in arriving at the different significance ratings is shown in Table 3.

TABLE 3: DEFINITION OF SIGNIFICANCE RATINGS

Significance ratings	Level of criteria required
High	<ul style="list-style-type: none"> • High magnitude with a regional extent and long-term duration • High magnitude with either a regional extent and medium-term duration or a local extent and long-term duration • Medium magnitude with a regional extent and long-term duration
Medium	<ul style="list-style-type: none"> • High magnitude with a local extent and medium-term duration • High magnitude with a regional extent and construction period or a site-specific extent and long-term duration • High magnitude with either a local extent and construction period duration or a site-specific extent and medium-term duration • Medium magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Low magnitude with a regional extent and long-term duration
Low	<ul style="list-style-type: none"> • High magnitude with a site-specific extent and construction period duration • Medium magnitude with a site-specific extent and construction period duration • Low magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Very low magnitude with a regional extent and long-term duration
Very low	<ul style="list-style-type: none"> • Low magnitude with a site-specific extent and construction period duration • Very low magnitude with any combination of extent and duration except regional and long term
Neutral	<ul style="list-style-type: none"> • Zero magnitude with any combination of extent and duration

Once the significance of an impact has been determined, the **PROBABILITY** and **CONFIDENCE** of this impact are determined using the rating systems outlined in **Table 4** and **Table 5**. The significance of an impact should always be considered in concert with the probability of that impact

occurring. Lastly, the **REVERSIBILITY** of the impact is estimated using the rating system outlined in **Table 6**.

TABLE 4: DEFINITION OF PROBABILITY RATINGS

Probability ratings	Criteria
Definite	Estimated greater than 95 % chance of the impact occurring.
Probable	Estimated 5 to 95 % chance of the impact occurring.
Unlikely	Estimated less than 5 % chance of the impact occurring.

TABLE 5: DEFINITION OF CONFIDENCE RATINGS

Confidence ratings	Criteria
Certain	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

TABLE 6: DEFINITION OF REVERSIBILITY RATINGS

Reversibility ratings	Criteria
Irreversible	The activity will lead to an impact that is in all practical terms permanent.
Reversible	The impact is reversible within 2 years after the cause of the impact is removed.

7. ENVIRONMENTAL IMPACT ASSESSMENT

The biophysical and social environment will be impacted during the establishment and operational phases of the agricultural activities. For this reason, the impacts below are assessed for both phases.

7.1 Impacts during establishment of the agricultural area

The establishment of the agricultural area is likely to result in environmental and socio-economic impacts. The identified impacts are listed below and discussed thereafter:

- *Impact on biodiversity;*
- *Generation of dust;*
- *Impact on soil;*
- *Impact on water resources;*
- *Impact on heritage resources*
- *Impact on paleontological resources*
- *Socio-economic impact.*

7.1.1. Impact on biodiversity

Description of the potential impact

During the establishment of the agricultural area, vegetation within the footprint of the site must be cleared and the single most important impact on biodiversity as consequence of transforming virgin land to agriculture is the loss of vegetation and loss and fragmentation of natural habitats and consequently the loss of fauna.

According to the Mpumalanga Biodiversity Sector Plan, 2014, the site falls within a Protected Area (National Parks and Nature Reserve). It must however be noted that the areas proposed for cultivation was never proclaimed as a Protected Area in terms of the Development Facilitation Act 67 of 1995 or the Mpumalanga Nature Conservation Act 10 of 1998. Some of the portions does however fall within areas classified as Critical Biodiversity Areas (CBA) in terms of the Mpumalanga Biodiversity Sector Plan, 2014.

Significance of the impact

The biodiversity assessment concludes that significant areas on the site are of **high** biological and ecological sensitivity. However, specific areas may be considered for development where potential impacts on the natural environment can be managed to an acceptable level. Alien invasive vegetation control will be a crucial part of mitigation during the entire lifespan of the project.

If the recommendations are followed and alien invasive vegetation can be effectively controlled, it is not anticipated that the proposed activity will have major negative consequences on the local natural environment.

A variety of frogs will utilize the aquatic and terrestrial habitats on the property for several reasons, including breeding purposes.

According to the South African Reptile Conservation Assessment (SARCA), approximately 70 species of reptiles can potentially occur in the larger study area. The terrestrial and arboreal habitats present in the larger study area will provide habitat for a diverse group of reptiles. No ultra-endemic species are expected on site. One Red Data Listed species, Nile Crocodile is present but is limited to the official fenced section of the Game Reserve (Refer to Appendix F, Terrestrial Ecological Report, Page 19).

The literature review indicates that a diverse group of birds may utilize the area. Almost 200 species' range of distribution falls within the study area and are supported by the available habitats in the larger local area. Due to the topography and habitat types present in the study area, the expected birds will be diverse and largely limited to bushveld savannah species. A total of 15 Red Data Listed species are expected in the larger study area (Refer to Appendix F, Terrestrial Ecological Report, Page 20).

The following larger mammals are confirmed to be present on the larger Game Reserve: Blesbok; Bushbuck; Cheetah; Common Duiker; Eland; African Elephant; Gemsbok; Giraffe; Hippopotamus; Brown Hyena; Impala; Klipspringer; Kudu; Lion; Nyala; Oribi; Red Hartebeest; Reedbuck; Mountain Reedbuck; White Rhinoceros; Springbuck; Steenbok; Warthog; Waterbuck; Blue Wildebeest; Burchell Zebra. Several of these have been re-introduced to the Game Reserve and require special fencing as these are classified as being dangerous (Elephant, White Rhinoceros and Lion) and cannot be allowed to roam free on the total area of the Game Reserve (Refer to Appendix F, Terrestrial Ecological Report, Page 21- 23).

Although none is expected to be negatively affected, the impact prior to the implementation of mitigation measures is therefore of high significance.

TABLE 7: SIGNIFICANCE OF BIODIVERSITY IMPACT

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Loss of Vegetation [NEGATIVE]	High	Definite	Sure	Reversible	High	Low
Loss of important species [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Medium	Low

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Loss and fragmentation of habitat [NEGATIVE]	High	Definite	Sure	Reversible	High	Low
Impact on riparian zones and wetlands [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Medium	Low

Mitigation measures

- Conserve solitary large indigenous trees where possible within the development land
- Implement an alien invader vegetation control program;
- Spoil material may not be pushed into natural habitats.
- Relocate important species (Aloe marlothii; Crinum macowanii) before clearance activities and construction commences.
- Conserve all the natural habitats with High sensitivity.
- Protect the high sensitivity habitat by applying the calculated buffer lines as delineated.
- Conserve all the watercourses, riparian habitat and natural habitats with High sensitivity.
- Eroded areas should be rehabilitated in order to prevent siltation and erosion.
- Storm water discharge points / lead-offs must be designed to reduce the energy of discharged water.
- Stipulations of the Environmental Management Program (EMPr) should be adhered to during the establishment and operational phases of the project.

7.1.2. Generation of dust

Description of the potential impact

Vegetation will be removed, and soil will be disturbed during the establishment of the agricultural area. Heavy moving vehicles used for the clearance of vegetation on site, could generate dust affecting adjacent owners and road users.

Significance of the impact

The impacts associated with the generation of dust is of short duration and surrounding land owners live far from the area proposed for development, therefore the significance of the impact is low. Mitigation measures must however be implemented to minimise the possibility of the impact occurring.

TABLE 8: DUST GENERATION

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Dust generation [NEGATIVE]	Low	Probable	Sure	Reversible	Low	Very Low

Mitigation measures

- Areas may not be disturbed and left for unattended for long periods of time.
- Heavy moving vehicles and other vehicles must adhere to a speed limit of 40km/h.
- Clearance of vegetation must be done in phases as per the construction programme

7.1.3 Impact on soil

Description of the potential impact

Removal of vegetation will disturb the soil surface and increase the possibility of soil erosion. The topography of the site is however relatively flat and therefore the possibility of erosion occurring during the establishment phase is relatively low. Mitigation measures to minimise the possibility of erosion is however imperative.

Other activities which could have an impact on soil, include the uncontrolled use of hazardous substances and/or heavy machinery. Hazardous substances such as oil, diesel etc., could be spilled while refuelling or using machinery, leading to the pollution of soil which can alter microbial processes and be toxic to soil organisms.

Significance of the impact

During establishment, soil could be impacted by the following:

- Erosion; and
- Contamination with the use and possible spillage of hazardous substances.

The slope of the proposed project area is relatively flat and for this reason the possibility of erosion occurring is low. The impact is subsequently classified to be of low significance prior to the implementation of mitigation measures.

Another factor impacting soil would be the possible spillage of hazardous substances. This impact is of medium magnitude, site specific and short duration and for this reason the impact is also of low significance prior to the implementation of mitigation measures.

TABLE 9: IMPACT ON SOIL

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Erosion [NEGATIVE]	Medium	Likely	Sure	Reversible	Low	Very Low
Soil pollution [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Low	Very Low

Mitigation measures

- To minimise the possibility of erosion, it is recommended that no disturbed areas be left unattended. Disturbance and clearance of vegetative cover must be restricted to the proposed footprint.
- Measures to reduce the velocity of water, must be taken on areas prone to erosion.
- Should there be any spillage of hazardous substances during the establishment phase, soil must be removed up to a depth of 300mm and be disposed of at a registered hazardous waste disposal facility. Proof of such disposal must be kept on file.
- Eroded areas should be rehabilitated in order to prevent siltation and erosion.

7.1.4 Impact on water resources

Description of the potential impact

In terms of the freshwater ecological classification, the project area falls within an Ecological Support Area (important sub catchment) and sub-categories includes National Freshwater Ecosystems Priority Areas (NFEPA) as well as Fish Support Areas. This requires that management activities be focused on maintaining water quantity and quality and the integrity of natural habitat in the sub-catchment.

The Nkomazi River (Komati) forms the southern boundary of the farm Sterkspruit, and is roughly situated in the middle of the entire study area. The farms Vergelegen and Batavia, is situated to the south of the River. Various wetland areas are also located within the perimeter of the proposed site.

Water resources could be impacted by the following during the establishment phase:

- Removal of riparian vegetation;
- Activities within the identified seepage wetland area; and
- Pollution of water resources.

Significance of the impact

If any activities were to take place within the river and the delineated wetland areas, water resources would be impacted negatively. Buffer zones that vary between 20m and 200m and more, were deemed necessary in order to include maximum grassland habitat and to consider erosion prone areas. These buffer zones will be implemented to protect the river and wetland areas within the project area. The possibility of impacting the water resource during the proposed clearance activities are of high significance prior to the implementation of mitigation measures.

TABLE 10: IMPACT ON WATER RESOURCES

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Impact on water resources [NEGATIVE]	Medium	Unlikely	Sure	Reversible	High	Medium

Mitigation measures

- No activities may take place within the allocated buffer of the riparian and/or wetland area.
- Conserve all the watercourses, riparian habitat and natural habitats with High sensitivity.
- Water use must be monitored and used sparingly.
- The use of pesticides and herbicides must be managed to prevent any substances from entering the watercourse.
- Protect the high sensitivity habitat by applying the calculated buffer lines as delineated.
- The recommended footprints are indicated in the layout maps
- Management activities be focused on maintaining water quantity and quality and the integrity of natural habitat in the sub-catchment.

7.1.5 Impact on heritage resources

Description of the potential impact

A Heritage Impact Assessment was conducted and the survey revealed a number of Late Iron Age stonewalls within the study area. Most of the LIA stone walls have been impacted upon by road infrastructure and historical agricultural activities. The LIA are fairly intact although the walls are not in a good condition. A number of structures associated with recent farming activities were also observed, but are of no significance. No graves were identified within the study area

An earth water furrow, was observed on the southern perimeter of portion 4 of the farm Sterkspruit, and cuts through portion 3 of the farm Sterkspruit. This earth water furrow is recent and of no cultural or historical significance.

Significance of the impact

The indistinct LIA stone walls may have significance in terms of section 3(3) of the NHRA, and has importance to a certain community in the history of South Africa. The LIA stone wall has the potential to yield information that will contribute to the understanding of South Africa's natural or cultural heritage or have a strong association with a particular community or cultural group for social, cultural or spiritual reasons. For this reason, the significance of the impact on heritage resources is of medium significance.

TABLE 11: HERITAGE RESOURCES

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Impact on heritage resources [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Medium	Low

Mitigation Measures

- Distinct archaeological material or human remains may only be revealed during the development of the proposed agricultural operations. In such instance, a qualified archaeologist must be contacted to monitor the activities and make recommendations.
- Should the farm owner wish to remove the LIA stone wall, a Phase 2 heritage investigation must be conducted, which will include a full documentation and research project with the scientific (archaeological) excavations of the stone walled area. After such investigation, the landowner may apply for a destruction permit from SAHRA (at the cost of the Land owner);
- Should the section of the stone wall be excluded from the proposed development, a buffer zone must be established around the site to ensure the preservation of the site and any possible future research, if required.

7.1.6 Impact on paleontological resources

Description of the potential impact

A Palaeontological Impact Assessment was conducted to determine whether the transformation of the proposed land will have any impact on palaeontological resources.

The project area forms part of the Barberton Makhonjwa Mountains World Heritage Site. The agricultural activities are proposed on the most south-western corner of the World Heritage site with the lowest altitude compared to the remainder of the area declared as a World Heritage Site. The locations of all geo-sites located within Nkomazi Game Reserve was received and from the

information received, it is noted that one important location transverses the proposed agricultural area. This area will be excluded and protected from the areas proposed for agriculture.

The survey revealed no paleontological resources that are of significance within the study area. The developer must have knowledge about the possibility of fossils within the study area, but does not have to do anything to preserve these fossils for this project does not break stones.

Significance of the impact

The significance of the impact on paleontological resources is of low significance.

TABLE 12: PALAEOLOGICAL RESOURCES

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Impact on heritage resources [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Low	Very Low

Mitigation Measures

- The EAP and ECO must be informed of the fact that a low and very low palaeontological sensitivity is allocated to the study area.
- Important geo-site locations will be excluded from the proposed agricultural area
- No further mitigation for Palaeontological Heritage is recommended. If, however any observations of possible fossils are made, the developer must appoint a suitably qualified palaeontologist to implement the Chance Find Protocol

7.1.7 Socio-economic Impact

Description of the potential impact

During establishment, various temporary job opportunities will be created for the clearance and preparation of the agricultural area.

In terms of safety and security, there is always risk associated when working with machinery and therefore it is essential that all workers comply with the Health and Safety Act 85 of 1993.

Significance of the impacts

Based on the methodology detailed in **Section 5**, the following ratings have been assigned to the 'employment opportunities' and impact associated with health and safety of employees respectively.

The job opportunities during the establishment are short-lived and therefore the impact is only of medium (+) significance. In terms of the health and safety aspects of workforce, the significance of the impact has been rated to be of low significance due to the short construction timeframe. Mitigation measures must however be adhered to.

TABLE 13: SOCIO-ECONOMIC IMPACT

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Job opportunities [POSITIVE]	Medium	Definite	Sure	Reversible	Low	Medium (+)
Health and Safety [NEGATIVE]	Medium	Probable	Sure	Reversible	Low	Very Low

Mitigation measures

The applicant and/or farm manager must ensure that local residents receive preference for job opportunities where local labour might be required.

It is imperative that all personnel adhere to the Occupational Health and Safety Act 85 of 1998 and that no personnel enter any other surrounding properties.

7.2 Operational Phase Impacts

During operation, the agricultural activities are likely to result in the following environmental and socio-economic impacts:

- *Impact on biodiversity;*
- *Impact on soil;*
- *Impact on water resources;*
- *Impact on heritage resources; and*
- *Socio-economic*

7.2.1. Biodiversity Impact

Description of the potential impact

During operation, vegetation will be permanently lost and fragmented.

The spread of alien invasive species must be managed and mitigated. Invasive plant species within the perimeter will impact the biodiversity of the surrounding areas.

Significance of the impacts

Invasion of alien invasive species and use of pesticides and herbicides:

When natural vegetation is removed and activities are undertaken, the opportunity for invasive plant species within the perimeter of the site will increase and will be problematic if not adequately removed or managed. Alien vegetation is normally removed mechanically or chemically. Using harmful chemicals would kill all pest and alien vegetation but also affect other insects and mammals which must be protected. Mechanical removal or removal of alien vegetation by hand is therefore preferred above the chemical treatment thereof.

Stinkbugs are a major challenge for the South African macadamia industry, but recent research findings show that natural pest control using bats could save the South African macadamia nut industry millions of Rands. Studies have shown that crop damage is increased when birds and bats are excluded from orchards. Efforts to retain bat populations through using safe pesticides or retaining natural vegetation corridors and bat houses, is therefore encouraged. Biological pest control is therefore also preferred above chemical pest control.

The impact of alien vegetation and the control thereof is therefore of medium significance prior to the implementation of mitigation measures.

Loss of habitat for fauna:

The loss of habitat for fauna can to some extent be mitigated by making use of bees to pollinate the macadamia trees and also encouraging biological pest control by using bats and birds. At least two colonies of bees are required to pollinate one hectare of macadamia trees. Thus, by adding beehives to the macadamia orchards, the farmer will be attracting bee-eating birds, mammals, reptiles and

other insects, while preserving and aiding in saving the bee population which has been declining rapidly.

Using bees as pollinators, plays an important part in every aspect of the ecosystem. They support the growth of trees, flowers, and other plants which serve as food and shelter for creatures large and small and therefore the surrounding natural environment would benefit from the implementation of beehives. The farmer would to some extent be mitigating for the loss of natural vegetation.

Taking into consideration the sensitivity of the site in accordance with the MBCP, 2014, the impact associated with the loss of fauna is of high significance prior to the implementation of mitigation measures.

TABLE 14: IMPACT ON BIODIVERSITY

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Impact on biodiversity (Alien invasive species) [NEGATIVE]	Medium	Definite	Sure	Reversible	High	Low
Loss of habitat for fauna [NEGATIVE]	Medium	Definite	sure	Reversible	High	Low
Impact on ESA [NEGATIVE]	Medium	Definite	sure	Reversible	High	Low

Mitigation measures

- An Invasive Species Management Programme must be compiled and complied with during the operational phase of the project;
- Stipulations of the Environmental Management Program (EMPr) should be adhered to during the establishment and operational phases of the project.
- Introducing beehives into the orchards are recommended and would be beneficial to both the farmer and surrounding area;
- Biological pest control must receive preference over chemical pest control. Attracting bats and birds by introducing fragrant flowers, herbs and night blooming plants;

7.2.2 Impact on soil

Description of the potential impact

Due to the topography of the site, the possibility of erosion occurring on site is relatively low. Mitigation measures to minimise the possibility of erosion is however imperative.

During operation, pesticides and herbicides are applied to agricultural land to control pests that disrupt crop production. Soil become contaminated when pesticides persist and accumulate in soils, which can alter microbial processes and are toxic to soil organisms.

Significance of the impact

During operation, soil could be impacted by the following:

- Erosion; and
- Contamination by means of the use of pesticides.

The slope of the area on which cultivation is proposed is relatively flat within the project area, the magnitude of erosion is of low magnitude. For this reason, the impact is classified to be of low significance prior to the implementation of mitigation measures.

Another factor impacting soil would be the use of pesticides and herbicides which could accumulate in soil, altering the microbial process. This impact is however of medium magnitude, local extent and long duration and for this reason the impact is of medium significance prior to the implementation of mitigation measures.

TABLE 15: IMPACT ON SOIL

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Erosion [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Low	Very Low
Soil contamination [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Medium	Low

Mitigation measures

- It is recommended that alternatives for the management of pests are investigated. Only approved pesticides and herbicides may be used for the management of pests.
- Permanent measures must be taken on areas prone to erosion. These measures can include gabions or revegetation with indigenous plant species.

7.2.3 Impact on water resources

Description of the potential impact

In terms of water use, the owner has water rights from the Inkomati Ushuthu Catchment Management Agency (IUCMA). No activities are proposed within the adjacent watercourse and wetland areas delineated; however, water will be required for irrigation purposes and will be abstracted from the Komati River, Lekkerloopspruit, Seekoespruit, Gladdespruit and Kopje Alleen Spruit.

According to the documentation obtained, the applicant has a total of 4 344 100m³ of water rights per annum. Approximately 250 trees will be planted per hectare on this portion of which approximately 1823 hectares would be cultivated. Each mature tree requires 0.18m³ of water per week, which totals a water requirement of 4 265 820m³ per annum. With 4 344 100m³ of water allocated per annum, the applicant has sufficient water for the proposed cultivation and will have a surplus of 78 280m³ per annum available.

Although no activities are planned within any watercourse or wetland area, water resources could be impacted by the following:

- Excessive water use;
- Removal of riparian vegetation;
- Activities within the delineated wetland area; and
- Pollution of water resources if pesticides accumulate in soil and enters the watercourse.

Significance of the impact

Water is a scarce resource in South Africa and therefore unsustainable abstraction from rivers can change the natural flow regime which will result in lower flows and reduced water table levels. The applicant does however not intend on extracting more than what is required and approved as per the Water Authorisation issued. As water is a scarce commodity, the impact is however of medium significance and appropriate measures must be adhered to ensure proper management of water use.

The wetland and watercourse could also be affected negatively if activities were to take place within these areas (i.e removal of wetland or riparian vegetation). The impact is therefore of medium significance if the recommended buffer zones are not adhered to.

Pesticides could enter the watercourses and wetlands located within the study area. This could lead to surface water being polluted if not mitigated properly.

TABLE 16: IMPACT ON WATER RESOURCES

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Water resource use [NEGATIVE]	High	Definite	Sure	Reversible	High	Medium

Mitigation Measures

- Water abstraction must be regulated and monitored
- No activities may take place within delineated buffer zones
- The use of pesticides and herbicides must be managed to prevent any substances from entering the watercourse.
- It is recommended that alternatives for the management of pests are investigated. Only approved pesticides and herbicides may be used for the management of pests.

7.2.4 Impact on heritage resources

Description of the potential impact

Most of the LIA stone walls have been impacted upon by road infrastructure and historical agricultural activities. The LIA are fairly intact although the walls are not in a good condition. A number of structures associated with recent farming activities were also observed, but are of no significance.

During operation, the LIA stone walls will be protected.

Significance of the impact

The LIA stone wall has the potential to yield information that will contribute to the understanding of South Africa's natural or cultural heritage or have a strong association with a particular community or cultural group for social, cultural or spiritual reasons. For this reason, the significance of the impact on heritage resources is of medium significance.

TABLE 17: HERITAGE RESOURCES

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Impact on heritage resources [NEGATIVE]	Medium	Unlikely	Sure	Reversible	Medium	Low

Mitigation Measures

- Should the farm owner wish to remove the LIA stone wall, a Phase 2 heritage investigation must be conducted, which will include a full documentation and research project with the scientific (archaeological) excavations of the stone walled area. After such investigation, the landowner may apply for a destruction permit from SAHRA (at the cost of the Land owner);
- Should the section of the stone wall be excluded from the proposed development, a buffer zone must be established around the site to ensure the preservation of the site and any possible future research, if required.

7.2.5 Employment opportunities

Description of the potential impact

Although the agricultural activities will not have a significant socio-economic impact on the local community, the agricultural activities will however provide additional permanent job opportunities for previously disadvantaged individuals and seasonally, the farming activities will be providing even more job opportunities on a temporary basis.

Significance of the impacts

Based on the methodology detailed in **Section 5**, the following ratings have been assigned to the 'employment opportunities' impact before and after mitigation. As job opportunities are limited, the impact is of medium (+) significance.

TABLE 18: SIGNIFICANT IMPACT OF THE 'EMPLOYMENT OPPORTUNITIES'

IMPACT	BEFORE MITIGATION					AFTER MITIGATION
	Significance	Probability	Confidence	Reversibility	Impact Rating	Impact Rating
Job opportunities [POSITIVE]	Medium	Definite	Sure	Reversible	Low	Medium (+)

Mitigation measures

Creating jobs and business opportunities for the local community will have a positive impact. No mitigation measures would be required to further enhance this impact; however, the applicant must ensure that local residents receive preference for job opportunities.

7.3 Environmental Impact Statement

The table below summarises the impacts identified and assessed for the establishment and operational phases of the project:

TABLE 19: ENVIRONMENTAL IMPACT STATEMENT

IMPACT	SIGNIFICANCE BEFORE MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION MEASURES
Establishment and Operational Impacts		
Loss of vegetation	High	Low
Loss of important species	Medium	Low
Loss and fragmentation of habitat	High	Low
Impact on riparian zones and wetlands	Medium	Low
Generation of dust	Low	Very Low
Erosion	Low	Very Low
Soil Pollution	Low	Very Low
Impact on water resources	High	Medium
Impact on heritage	Medium	Low
Impact on Palaeontology	Low	Very Low
Job opportunities	Low (+)	Medium (+)
Health and Safety	Low	Very Low
Operational Phase Impacts		
Biodiversity Impact (Alien invasive species)	High	Low
Loss of habitat for fauna	High	Low
Impact on ESA	High	Low
Erosion	Low	Very Low
Soil contamination	Medium	Low
Impact on water resource	High	Medium
Impact on Heritage	Medium	Low
Socio-economic Impact	Low	Medium (+)

8. CONCLUSION AND WAY FORWARD

8.1 Assumptions and Limitations

In undertaking this investigation and compiling the Draft Environmental Impact Assessment Report, the following has been assumed:

- The information provided by the proponent is accurate and unbiased, and no information that could change the outcome of the Environmental Authorisation process has been withheld.
- The scope of this investigation is limited to assessing the environmental impacts associated with the establishment and operation of the agricultural area.
- The conclusion and recommendations proposed are based solely on the information, scope of works as agreed with the proponent.

8.2 Conclusion

The essence of all environmental assessment processes is aimed at ensuring informed decision-making and environmental accountability. Furthermore, it assists in achieving environmentally sound and sustainable development. The impact assessment for this project has been undertaken in line with the requirements prescribed in the NEMA regulations.

The assessment of the possible impacts associated with the establishment and operational activities, concluded that the impact on the surrounding environment is of **medium to low significance**, after the implementation of mitigation measures. Recommendations have however been made to address the impacts which could affect the biophysical and socio-economic environment. It is recommended that pro-active measures are taken to minimise the spread of alien invasive vegetation. Pro-active measures are also required to ensure that water resources are not affected by the proposed activities. Recommendations for the mitigation of impact are included within Section 6 and also the Draft Environmental Management Plan attached.

The significance of the potential environmental (biophysical and social) impacts associated with the proposed project are discussed in detail under **Section 6**.

It is the opinion of the EAP that the EA for this project should be granted, and the proposed mitigation included as the conditions of the authorisation.

8.2 Way Forward

The next steps for the Environmental Impact Assessment process will be to distribute the Draft Environmental Impact Assessment Report and make it available to the public (including the registered I&APs) and Organs of State for a period of 30 days, during which the Competent Authority (DARDLEA) will also be given the opportunity to provide comments on the report. After the 30-day comment period, all comments will be addressed by the EAP and incorporated within the Final Environmental Impact Assessment Report to be submitted to the DARDLEA for decision making. All registered I&APs will be notified of the decision and will be given an opportunity to appeal as per the NEMA requirements.

10. REFERENCES

Desktop Palaeontological Assessment and Chance Find Protocol for the Proposed Nkomazi Game Reserve, December 2020, Dr. Gideon Groenewald

General Biodiversity and Habitat Report for Nkomazi Game Reserve, December 2020, D van der Walt

General Notice Regulation 982, 983, 984 and 985 of 2014 (as amended in 2017)

IUCN World Heritage Evaluations, 2018

Mpumalanga Biodiversity Conservation Plan, 2014

National Environmental Management Act 107 of 1998 (NEMA 107, 1998)

National Water Act 36, 1998

Phase 1 Archaeological / Heritage Impact Assessment Nkomazi Game Reserve, December 2020, C van Wyk Rowe