Agricultural Agro-Ecosystem Specialist Assessment for the proposed Bulk water supply system in Blikana, Sterkspruit, Eastern Cape

DATE: April 2026

Prepared by: Zimbini Scott
Prepared for: Abantu Environmental Services (Pty) Ltd

DECLARATION

I, Zimbini Scott, as the Agricultural specialist hereby confirm my independence and declare that -

- I act as an independent specialist in the field of Agricultural science for the Agricultural Agro-Ecosystem Specialist Assessment for the proposed Bulk water supply system in Sterkspruit town, at Senqu Local Municipality, Eastern Cape.
- I will comply with the relevant Acts, regulations, and all other applicable legislation.
- I do not have and will not have any financial interest in the undertaking of the activity, other than the remuneration for the work performed in terms of the Environmental Impact Assessment Regulations, 2006;
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I undertake to disclose to the owner and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority and the objectivity of any report, plan, or document to be prepared by myself for submission to the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006;
- I understand that a false declaration in as offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.
- have no, and will not engage in, conflicting interests in the undertaking of the activity;
- the results and conclusions presented in this report are based on the information provided to me by the project proponent and information sourced by myself

Assessor	**Zimbini Scott**
Field	**Agricultural Science**
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Qualification	**MSc Entomology**
Date	**2026-04-05**
Signature	

EXECUTIVE SUMMARY

AGRICULTURAL AGRO-ECOSYSTEM SPECIALIST ASSESSMENT FOR THE BLIKANA BULK WATER SUPPLY, STERKSPRUIT, SENQU LOCAL MUNICIPALITY, EASTERN CAPE.

Introduction

This report presents the findings of a specialist Agricultural Impact Assessment and Agroecosystem assessment of the proposed development and forms part of the Environmental Impact Assessment (EIA). The objective of this assessment is to discusses the soil types, land capability, present land use, and rehabilitation considerations within the proposed site of development. Furthermore, this assessment will assess the potential impacts of the proposed development on the integrity of the surrounding soils and agricultural land.

Findings

The proposed development site is characterized by the temperate highland climate with limited and extreme variability in precipitation and rising temperatures, which threaten staple crop viability and increased erosion risks. The study area is drained largely by means of surface run-off, resulting in soil erosion and subsequently land degradation. The presence of water bodies across the development sites indicates the possibility of the development of irrigation systems for agriculture. However, the area is susceptible to soil erosion and the prevalence climate variability conditions as well as varied soil types and landforms that limit crop cultivation and make it less important for agricultural productivity. The vegetation that mainly grow in these areas, which is mainly shrubs, is an indication of poor soils for crop production. The land has low potential yield to produce crops due to its soil and climate limitations. Some soils and the presence of rocky soils result in limited capacity to allow crops to grow due to limited soil depth.

Based on the results, it has been noted that the study area is characterized by the following limitations:

- Relief intensity of < 100m/km.
- Soil has been eroded to the extent that hard rock comes near to the surface.
- The soils and soil profile in the area is mainly characterized by limited horizons, with mainly A, B and a bed rock.
- Some soils are good for agriculture but are limited by climate and land degradation

- The area is severely degraded due to soil erosion
- Soils with limitations to root growth are shallow to very shallow soils, with depth restricted by a continuous hard rock layer, such as limestone or dolomite.
- Very low water-holding capacity because of their shallow and often rocky nature.
- They have very limited agricultural potential and are generally suitable only for extensive grazing.
- Their distinguishing properties include a brownish black to reddish and greyish, fine sand to loamy sand, with a PH of slightly to highly alkaline and are well drained.

The screening tool analysis was conducted, which presented the findings as the impact on agricultural resources being of high sensitivity in terms of agricultural potential. Based on the outcomes of the field assessment and desktop assessment, this was found to be of low significance impact compared to the result presented on the screening tool. This is due to the dominant soil forms, which are not high potential agricultural soils due to various limitations, which include shallower depth and requiring intensive management strategies to cultivate on. The land capability of the surrounding soils, as well as the agricultural potential, are very low due to inadequate climatic conditions (i.e.,limited rainfall, temperature) and inappropriate slope, which does not allow for intensive commercial agricultural practices. Based on the project area, the land capability within the proposed project development area falls within land capability class IV and VI. These land capability classes have severe limitations due to soil, slope, temperatures or rainfall.

Recommendations

The proposed bulk water supply development is assessed to have negligible agricultural impact, regardless of their route and design and the agricultural potential of the land they traverse. All agricultural activities can continue completely unhindered, because the direct, permanent, physical footprint that has any potential to interfere with agriculture, is insignificantly small. There will therefore be no reduction in future agricultural production potential in this area. The only potential source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction. This impact can be completely mitigated with standard, generic mitigation measures that are included in report. Cumulative impacts have been described as the impact of an activity that is not significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. The area is already characterized by severe land degradation and therefore the impact may be exacerbated. In terms of significance, the cumulative impacts anticipated on soil and land capability will be Low.

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DOCUMENT GUIDE

This report was compiled according to the following information guidelines for a specialist report in terms of the Environmental Impact Assessment (EIA) Sections 24(5)(a) And (h) and 44 of The National Environmental Management (NEMA), Act 1998, as summarised on the Table below.

Table 1: Document guide according to Regulation (No. R. 982) as amended. Theme-Specific Requirements as per Government Notice No. 320Agricultural Resources Theme – Very High and High Sensitivity Rating as per Screening Tool Output

No.	NEMA Regs (2014) - Appendix 6	Relevant section in the report
2	Agricultural Agro-Ecosystem Specialist Assessment	
2.1	The assessment must be undertaken by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professionals (SACNASP).	CV Attached, Appendix 1& 2
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	Section 1, Page 1.1, Figure 1
2.3	The assessment must be undertaken based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past 5 years, and must identify:	
2.3.1	the extent of the impact of the proposed development on the agricultural resources and	Page 35
2.3.2	whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site, and in the event it does, whether the positive impact of the proposed development on agricultural resources outweighs such a negative impact.	Section 6, Page 8
2.4	The status quo of the site must be described, including the following aspects, which must be considered as a minimum in the baseline description of the agro-ecosystem:	
2.4.1	the soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit, and slope;	Section 3, Page 19, 20, 27
2.4.2	where applicable, the vegetation composition, available water sources, as agro-climatic information;	
2.4.3	the current productivity of the land-based on production figures for all agricultural activities undertaken on the land for the past 5 years, expressed as an annual figure and broken down into production units;	N/A
2.4.4	the current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure and	N/A
2.4.5	existing impacts on the site, located on a map (e.g., erosion, alien vegetation, non-agricultural infrastructure, waste, etc.).	
2.5	Assessment of impacts, including the following aspects which must be considered as a minimum in the predicted impact of the proposed development on the agro-ecosystem:	
2.5.1	change in productivity for all agricultural activities based on the figures of the past 5 years, expressed as an annual figure and broken down into production units;	N/A
2.5.2	change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure and	N/A
2.5.3	any alternative development footprints within the preferred site would be of “medium” or “low” sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification.	N/A

2.6	The Agricultural Agro-Ecosystem Specialist Assessment findings must be written up in an Agricultural Agro-Ecosystem Specialist Report.	
2.7	This report must contain the findings of the agro-ecosystem specialist assessment and the following information, as a minimum:	
2.7.1	Details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment, including a curriculum vitae;	Appendix 1&2
2.7.2	A signed statement of independence by the specialist;	Page i
2.7.3	The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Page 7
2.7.4	A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant;	Page 7
2.7.5	A map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool;	Figure 12 – page 33
2.7.6	An indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development;	N/A
2.7.7	an indication of possible long term benefits that will be generated by the project in relation to the benefits of the agricultural activities on the affected land;	Section 7
2.7.8	additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc.;	Section 7
2.7.9	information on the current agricultural activities being undertaken on adjacent land parcels;	Section 3, Figure 11& 10
2.7.10	an identification of any areas to be avoided, including any buffers;	No
2.7.11	a motivation must be provided if there were development footprints identified as per paragraph 2.5.3 above that were identified as having a “medium” or “low” agriculture	There are no such footprints
2.7.12	confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities;	Section 7
2.7.13	a substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development;	Section 8& 9
2.7.14	any conditions to which this statement is subjected;	Section 9
2.7.15	where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr); and	Section 6
2.7.16	a description of the assumptions made and any uncertainties or gaps in knowledge or data.	Section 1, page 5
2.8	The findings of the Agricultural Agro-Ecosystem Specialist Assessment must be incorporated into the Basic Assessment Report	

1. INTRODUCTION

The conservation of South Africa's limited soil resources is essential for human survival. In the past, misuse of land due to not classifying the soils and their capability/potential correctly has led to the loss of these resources through erosion and destabilization of the natural systems. In order to accurately determine the characteristics of soils, it is necessary to conduct a soil survey using established methods. The aim is to create precise documentation of the soil resources of an area. Based on these findings, assessments are made regarding the land's capability and potential. The objective of this assessment is to identify the most sustainable utilization of the soil resource while ensuring the system remains undegraded. Therefore, soil mapping is essential to determine soil types that are present, their depths and their land capability/land potential. These results will then be used to give practical recommendations on preserving and managing the construction of the dam and its associated structures.

1.1. LOCALITY AND SITE DETAILS OF THE PROPOSED PROJECT

The proposed project location is situated at Blikana in Sterkspruit under the Senqu local municipality, which falls under the Joe Gqabi District in the Eastern Cape, South Africa. The proposed dam construction will include 2 abstraction points, 3 command reservoirs and a Wastewater treatment, as depicted in the study area map in Figure 1.

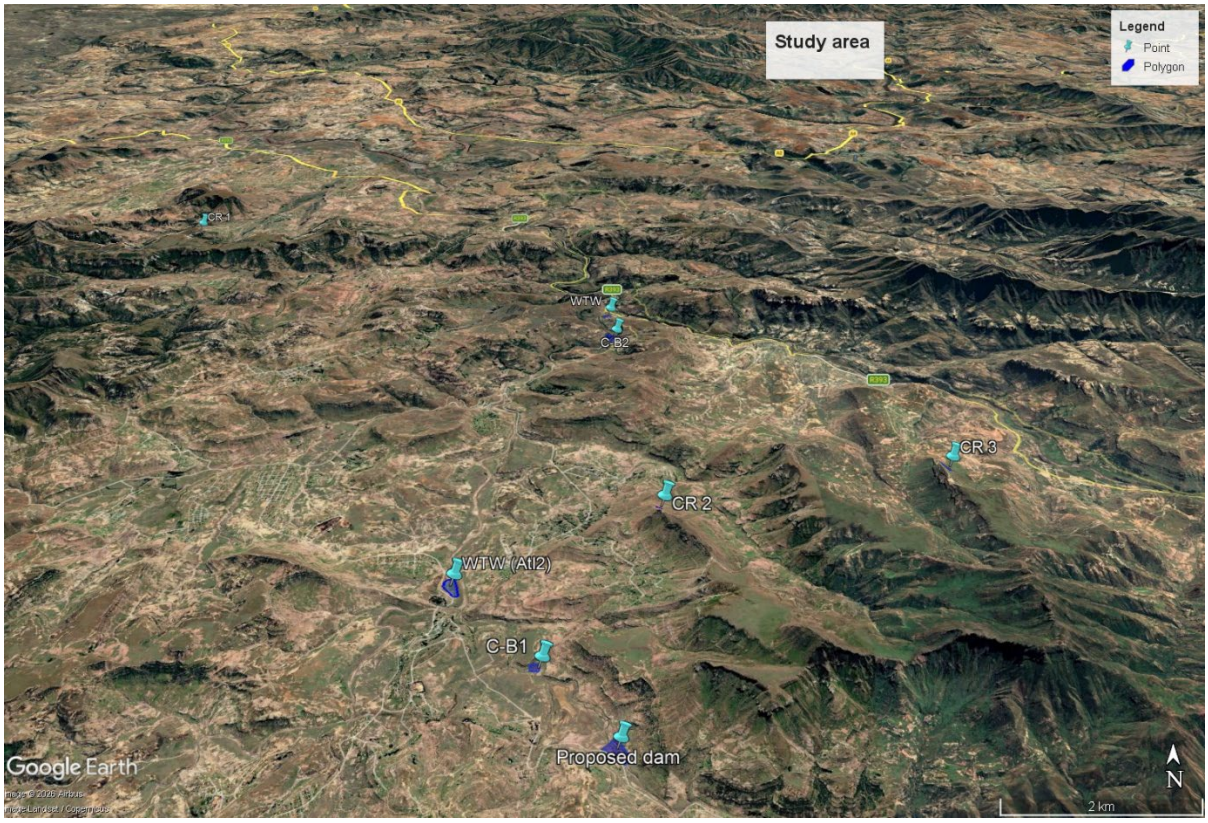


Figure 1: Locality map illustrating the area for the proposed Dam construction and associated development structures.

1.2. PROJECT DESCRIPTION

The proposed dam construction and associated infrastructure includes the following:

Structure of the reservoirs and dams

1. Proposed dam
2. C-B1= Abstraction point1-An abstraction point in construction refers to the specific, consented location where water is extracted from a source
3. CR2= Command reservoir 2, Rising gravity main 1.67km
4. C-B2= (abstraction point 2/pick-up weir)

Abstraction point 2 gravity main to WTW (1.11 km)

5. SR 2 =rising main from WTW (inaccessible no access road) 4.1 km
6. CR3= Command reservoir 2

rising main (6.73km)
gravity main to R393 (inaccesible no access road) 2.85km

7. WTW- Waste Treatment Works
8. SR 1 - CR 1 rising mains from WTW tie-in (5.17km)

SR 1 rising main mid (2 km)
SR 1 rising main end (2.1km)

9. CR 1 (command reservior 1)

CR 1 gravity main crossing to R393 (2 km)

1.3. AIMS AND OBJECTIVES OF THE STUDY

The primary objective of this assessment is to provide specialist agricultural, soil and land use input for the comprehensive Environmental Impact Assessment Report, which is meant to fulfill and align the proposed project with the requirements of the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983) of South Africa. In order to accomplish this objective a study of the climate, soils, terrain, aspect, land capability, geology and current agricultural practices, and an impact assessment needs to be carried out. Thus, the proposed study aims to determine the possible impacts that the proposed development could have on the soil, land use, land capability, and agricultural potential and to identify areas of high sensitivity within the study area.

It is hoped that this assessment, along with the other specialist studies, will inform the construction of the stabilization structures and thus minimise the predicted impacts on the receiving environment.

As such this specialist report assesses and considers the following:

- The soil forms occurring within the study area;
- The associated land capability and agricultural sensitivity of the soils occurring within the study area;
- Discussion of the land capability and sensitivity in terms of the soils and land use surrounding the area of development, and current status of land;
- Discussion of potential and actual impacts as a result of the proposed development; and
- Provide mitigation for the impacts as part of the Environmental Management Programme (EMPr).

1.4. TERMS OF REFERENCE AND SCOPE OF WORK

- The terms of reference for this study are to fulfill the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources*, gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998).

- To conduct a soil assessment which includes a description of the physical properties which characterizes the soil within the proposed area of development of the relevant portions of the property;
- Using the findings from the soil assessment to determine the existing land capability/potential and current land use of the entire surface area of the relevant portions of the project area;
- To delineate soil resources by means of on-site soil observations;
- To determine the sensitivity of the baseline findings;
- Compile an impact assessment to indicate the significance of the expected impacts;
- Discussing the feasibility of the proposed activities;
- Confirmation that no agricultural segregation will take place and that all options have been considered to avoid segregation; and
- Recommend relevant mitigation measures to limit all associated impacts.

1.5. ASSUMPTIONS, UNCERTAINTIES, GAPS AND LIMITATIONS OF THE STUDY

The following assumptions, uncertainties, limitations, and gaps were applicable for the soil, land use, and land capability assessment:

- It is assumed that the infrastructure components will remain as indicated on the layout and that the activities for the construction and operation of the infrastructure are limited to that typical for a project of this nature;
- The soil survey was confined to the study area outline with consideration of various land uses outside the study area;
- During the site assessment and compilation of the report, employment figures pertaining to the study area could not be sourced,
- A detailed investigation of economic aspects pertaining to the Production figures in terms of yield could not be sourced from the Natural Agricultural Resources Atlas of South Africa as the data was not available for areas utilizing their land for pasture; and
- Soil profiles were observed using a 1.5m hand-held soil auger; thus, a description of the soil characteristics deeper than 1.5m cannot be given.

1.6. ENVIRONMENTAL LEGISLATIONS APPLICABLE TO THE STUDY

This section identifies all applicable agricultural legislation and permit requirements over and above what is required in terms of NEMA. The project may require agricultural approval (or at least comment from Department of Agriculture) as part of the required approval in terms of applicable municipal land use legislation, as well as in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970 - SALA), if the property is currently zoned for agriculture.

Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)

Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –Prevent pollution and ecological degradation, promote conservation, secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)

The Conservation of Agricultural Resources Act 43 of 1983 states that the degradation of the agricultural potential of soil is illegal.

The Act 43 of 1983 requires that protection of land against soil erosion and the prevention of water logging and salinization of soils means of suitable soil conservation works to be constructed and maintained.

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

The National Environmental Management Act 107 of 1998 (NEMA) requires that pollution and degradation of the environment be avoided, or, where it cannot be avoided be minimised and remedied.

National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA)

The NEM: WA defines “contaminated” in relation to land as:

“The presence in or under any land, site, buildings or structures of a substance or micro-organism above the concentration that is normally present in or under that land,

which substance or micro-organism directly or indirectly affects or may affect the quality of soil or the environment adversely."

The NEM: WA identifies the status and risk of contaminated sites and provides a legal mechanism for implementation of remediation activities. Remediation interventions are generally associated with high costs necessitating a holistic, risk-based approach founded on international best practice to address remediation, irrespective of the sector of occurrence. The National Framework for the Management of Contaminated Land provides National Norms and Standards for the practical implementation of remediation activities in compliance with NEM: WA.

2. METHODOLOGY FOR THE ASSESSMENT

A desktop study was compiled from various data sources as listed under references.

2.1. Desktop Screening

A background study including a literature review was conducted prior to the commencement of the field assessment. The information collected from the desk top literature review included the land capability data, climate, soil types, vegetation, agricultural activities and terrain characteristics of the project location, as well as the geology of the area. The information was compiled from different spatial data sources such as such as Soils and Terrain of South Africa (SOTER) and other sources as listed in the references. This was done in order to gather the pre-determined soil and land capability data within the study area.

2.2. Soil Classification and Sampling

- A soil survey was conducted in February 2026 by a qualified Agricultural specialist at which time the identified soils within the study area were classified into soil forms;
- Subsurface soil observations were made using a manual hand auger in order to assess individual soil profiles, which entailed evaluating physical soil properties and prevailing limitations to various land uses;
- Dominant soil forms were classified according to the South African Soil Classification System (Soil Classification Working Group, 2018). A Global Positioning System (GPS) was used to record assessed survey and sampling

points;

- It was also the objective of the assessment to provide recommended mitigation measures and management practices to implement in order to comply with applicable articles of legislation.
- The attributes included during the observations include soil form and family (identifying diagnostic horizons), soil colour, soil depth, estimated soil texture, soil structure (coarse fragments, calcareousness), and the underlying material.

Table 2: Typical Arrangement of Master Horizons in Soil Profile.

<table>
<tr><td rowspan="6">Soil</td><td rowspan="6">Zone in which soil processes are maximally expressed</td><td colspan="4">Arrangement of master horizons</td></tr>
<tr><td rowspan="5">O- Organic</td><td rowspan="3">C- Regic sand (c), Stratified alluvium, (c), Man - Made Soil Deposits</td><td>A</td><td colspan="2">Humic, Vertic, Melanic, Orthic</td></tr>
<tr><td rowspan="2"></td><td colspan="2">E</td></tr>
<tr><td>B</td><td>Red Apedal, yellow Brown Apedal, Soft Plinthic, Hard Plinthic, Prismacutanic, Pedocutanic, Lithocutanic, Neocutanic, Neocarbonate, Podzol, Podzol with placic pan</td><td rowspan="3">G - Horizon</td></tr>
<tr><td>C</td><td colspan="2">Dorbank, Soft Carbonate horizon, Hard Carbonate horizon, Saprolite, Unconsolidated without signs of wetness, Unconsolidated with signs of wetness, Unspecified material with signs of wetness</td></tr>
<tr><td colspan="3">R- Hard rock</td></tr>
</table>

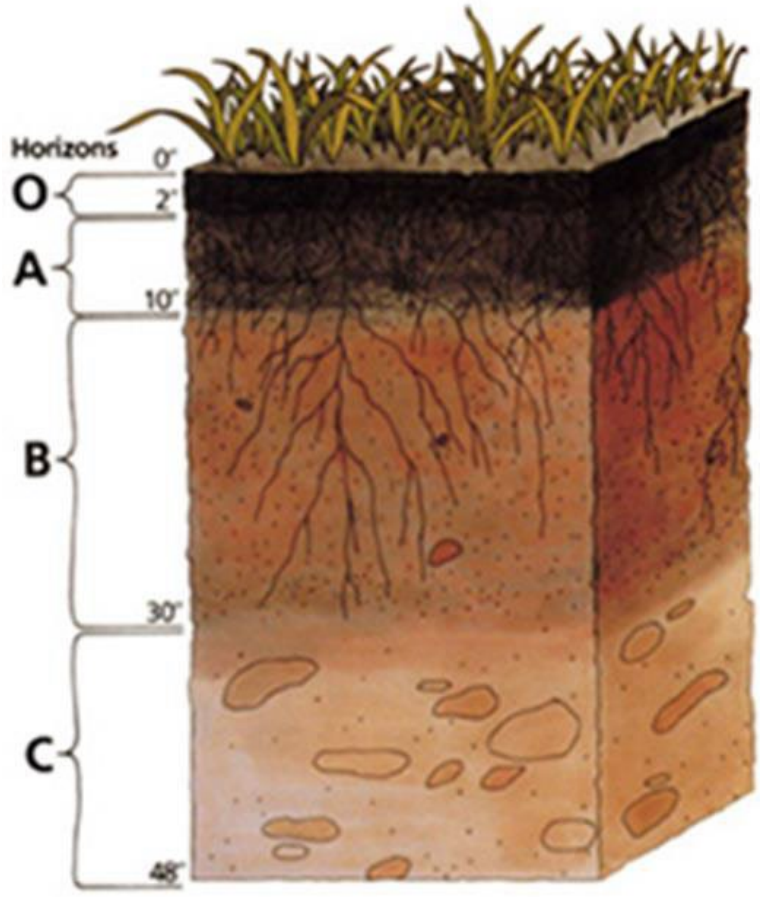


Figure 2: An illustration of the conceptual presentation of a typical soil profile.

2.3. DESKTOP LAND CAPABILITY CLASSIFICATION OF THE STUDY AREA

Land Capability may be defined as a ranking of the ability of land to sustain a range of agricultural land uses without degradation of the land resource. Land capability classification is an internationally recognised means of land classification, used to evaluate the capability of land to support a range of land uses, on a long-term sustainable basis. Land capability assessment considers the physical nature of the land (eg. geology, soils, slope) plus other factors (eg. climate, erosion hazard, land management practices) which determine how that land can be used without destroying its long-term potential for sustainable agricultural production. It also considers limitations that might affect agricultural use, eg. stoniness, drainage, salinity or flooding. Land capability assessment is therefore based on the permanent biophysical features of the land (including climate).

Table 2 shows how the land classes and groups are arranged in order of decreasing capability and ranges of use. The risk of use increases from class I to class VIII (Smith, 2006) as shown in Table 3. Agricultural potential is directly correlated to Land Capability, as measured on a scale of I to VIII, as presented in Table 2 below; with Classes I to III classified as prime agricultural land that is well suitable for annual cultivated crops.

Table 3: Land capability classification criteria (Smith 2006)

LG-Light grazing	F-Forestry	W-Wild life	Wildlife	Grazing land			Arable land				Land capability group
			VIII.	VII.	VI.	V.	IV.	III.	II.	I.	Land capability classes
LC-Light cultivation	IG-Intensive grazing	MG-Moderate grazing	W	W	W	W	W	W	W	W	Increased intensity of use
				F	F	F	F	F	F	F	
				LG	LG	LG	LG	LG	LG	LG	
					MG	MG	MG	MG	MG	MG	
							IG	IG	IG	IG	
VIC-Very intensive cultivation	IC-Intensive cultivation	MC-Moderate cultivation					LC	LC	LC	LC	
								MC	MC	MC	
								IC	IC	IC	
										VIC	
			Extremely severe limitations. Not suitable for grazing or afforestation	Very severe limitations. Suitable only for natural vegetation.	Limitations preclude cultivation. Suitable for perennial vegetation	Water course and land with wetness limitations	Severe limitations	Moderate limitations	Slight limitations	No or few limitations	Limitations

2.4. SITE SENSITIVITY ANALYSIS

Site sensitivity analysis is a crucial step required before the commencement of any environmental authorisation process. The National Management Environmental Act was promulgated in May 2019 and guides the application of the environmental authorization by outlining the minimum criteria to be followed, as published in Notice

648 of the Department of Environmental Affairs. The key objective of this protocol is to guide the assessment and reporting of impacts on agricultural resources for any activity that requires environmental authorisation. The assessment mainly focuses on the environmental sensitivity of the sites that require environmental authorisation and are identified through a national web based environmental screening tool for agricultural resources.

2.5. Desktop Agricultural Impact Assessment

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance.

Table 4: Criteria for determining the impact consequences

Aspect	Score	Definition
Nature	-1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible without incurring significant time and cost.
	4	Impact is reversible without incurring significant time and cost.
	5	Impact is reversible without incurring significant time and cost.

Table 5: Probability scoring.

Probability	**1**	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

Table 6: Criteria for the determination of prioritisation.

Public response PR	Low (1)	Not raised as a concern by the I&AP's
	Medium (2)	Issue/ impact raised by the I&AP's
	High (3)	Significant and meaningful response from the I&AP's
Cumulative impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

Table 7: Determination of prioritisation factor

Priority	Ranking	Prioritisation Factor
=3	Low	1
3-8	Medium	1.5
=9	High	2

Table 8: Environmental Significance Rating

Value	Description
<15	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
≥15; <30	Medium (i.e. where the impact could influence the decision to develop in the area),
≥ 30	High (i.e. where the impact must have an influence on the decision process to develop in the area).

3. BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM AND RESULTS

3.1. CLIMATE

The assessment of the climate is of Sterkspruit which is the nearest town Blikana area of development and share similar climate. The climate data for Sterkspruit was sourced from https://www.saexplorer.co.za/south africa/climate/sterkspruit_climate.html. Sterkspruit, generally experiences a Cwb climate in the Köppen-Geiger classification. This signifies a temperate highland climate with warm summers, dry winters, and cool temperatures, often influenced by the Drakensberg Mountains.

Sterkspruit normally receives about 571mm of rain per year, with most rainfall occurring mainly during summer, and receives the lowest rainfall (5mm) in July and the highest (90mm) in February (Figure 5). The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Sterkspruit range from 14.5°C in June to 26.8 °C in January. The region is the coldest during July when the mercury drops to 0.1°C on average during the night (Figure 3&4).

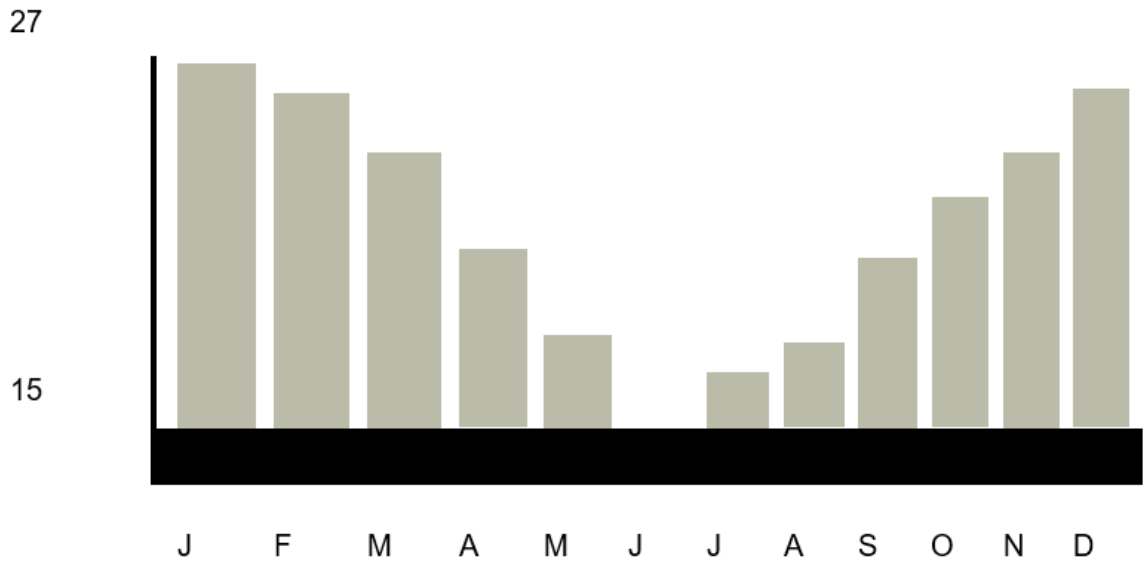


Figure 3: Average midday temperature (°C) per month.

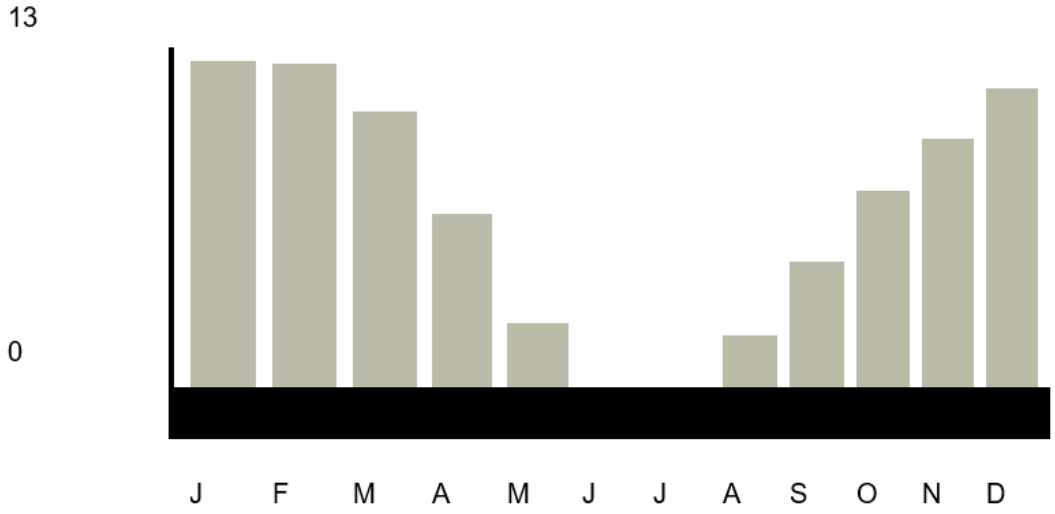


Figure 4: Average night-time temperature (°C)

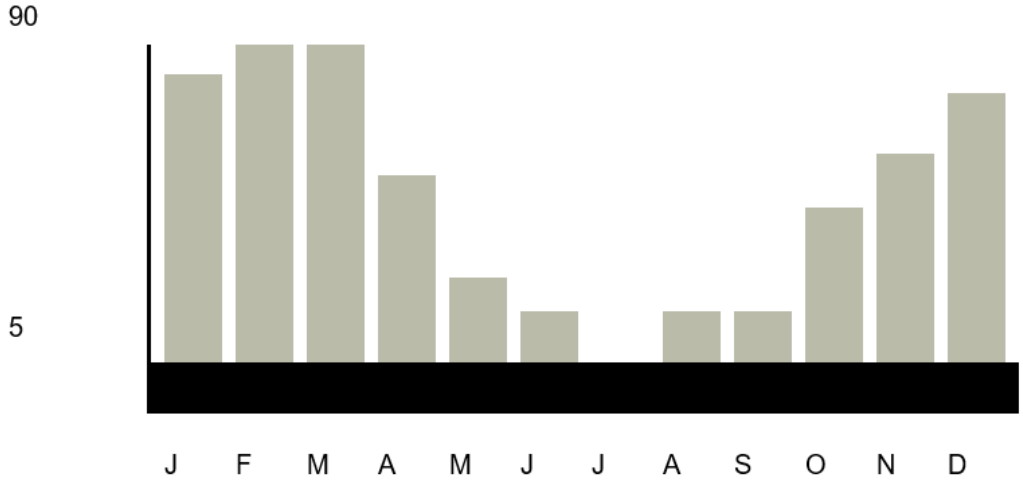


Figure 5: Average rainfall (mm)

3.2. VEGETATION

According to the Vegetation of South Africa, (Mucina & Rutherford 2006; Dayaram et al. in prep), the vegetation of the designated locality falls within the Mesic Highveld Grassland Bioregion which is one of the largest bioregions in the Grassland biome.

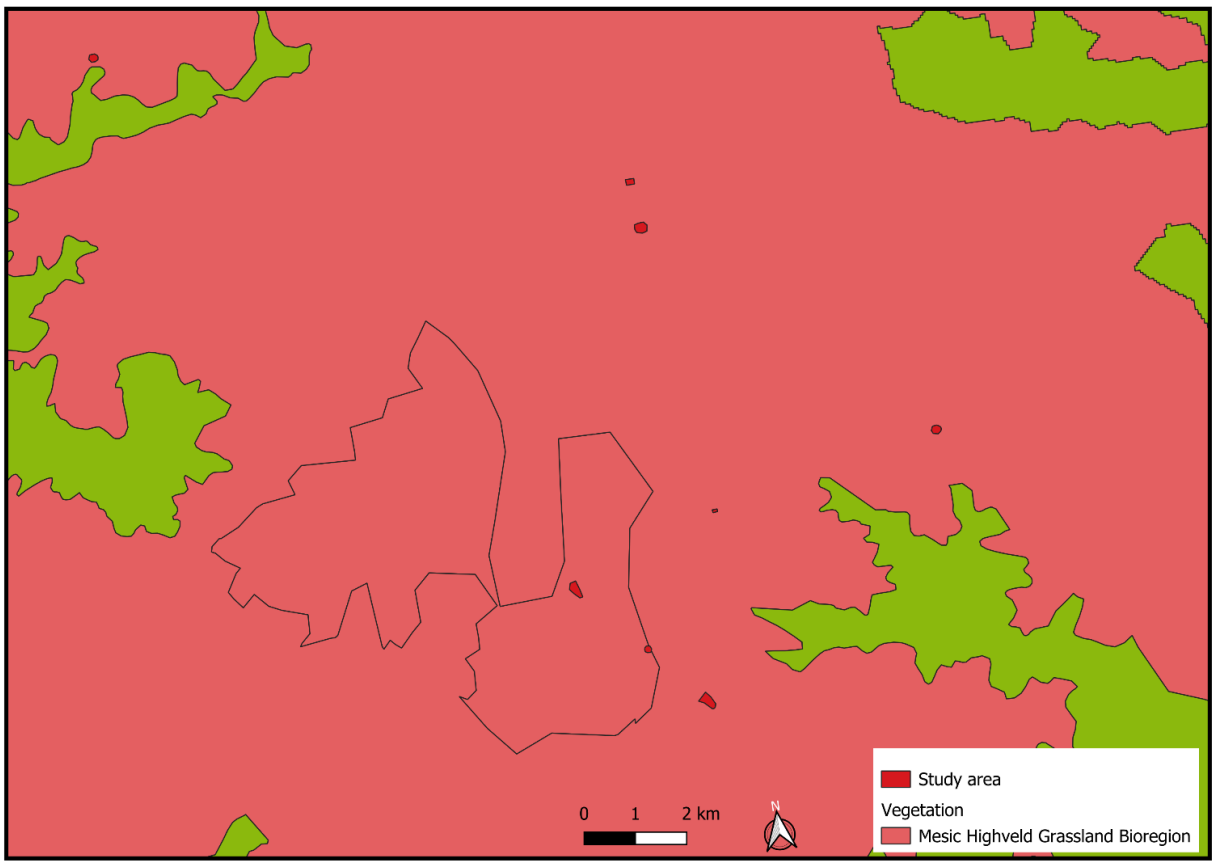


Figure 6: Map of the vegetation type within the project locality (Mesic Highveld Grassland).

Mesic Highveld Grassland is found mainly in the eastern, precipitation-rich regions of the Highveld, extending as far as the Northern Escarpment (Figure 6). These are 'sour' grasslands and are dominated primarily by andropogonoid grasses. The different grassland units are distinguished based on geology and other substrate properties, as well as elevation, topography and rainfall. Shrublands are found on outcrops of rock within Mesic Highveld Grassland where the surface topography creates habitats in which woody vegetation is favoured above grasses. This may include protection from fire and grazing or conditions under which woody plants can access subterranean water supplies. Generally, the higher the surface rock cover, the higher the cover of woody vegetation relative to herbaceous vegetation. The rocky outcrops are mostly of volcanic origin, e.g. dolerite, and are more resistant to weathering in addition to having more nutrient-rich soils. The climate in these areas is generally warm and moist, and it is the lack of well-developed soils as well as the unique geological influences on these mountains that determines the presence of grassland vegetation instead of savanna in these areas, although the local increased elevation also simulates

conditions found in the core Grassland Biome. Due to the substrate factors, the grasslands in these areas often have unique floristic elements and high levels of endemism.

3.3. LANDFORMS

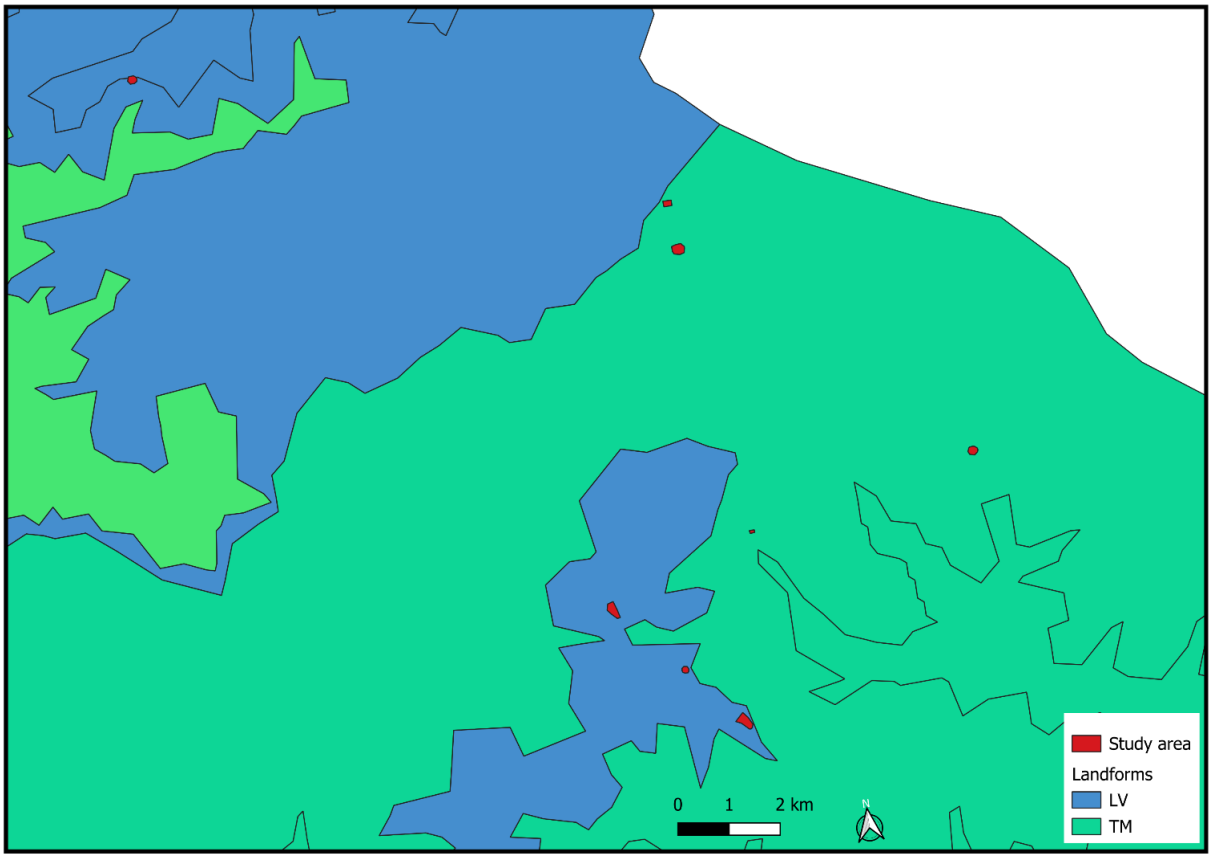


Figure 7: Map of the Landforms within the project locality (Leptosols (TM) and Luvisols (LV)).

The landform and soil data was sourced from SOTER database and the description of the data from the ISRIC report 2008. The dominant landform classes found in the study area are the Leptosols (TM) and Luvisols (LV). The Leptosols (TM) fall within the Steep land class and are characterised by the high gradient mountain, with a slope of > 30 % and a relief intensity of > 300m. km^{-2}. The luvisoles (LV) landform classes are characterised by a slope of <10%, and a relief intensity of < 50m/km^{-2}. The LV class is found within a valley floor sloping type in areas where soil has been eroded to the extent that hard rock comes near to the surface.

3.4. SOIL TYPES

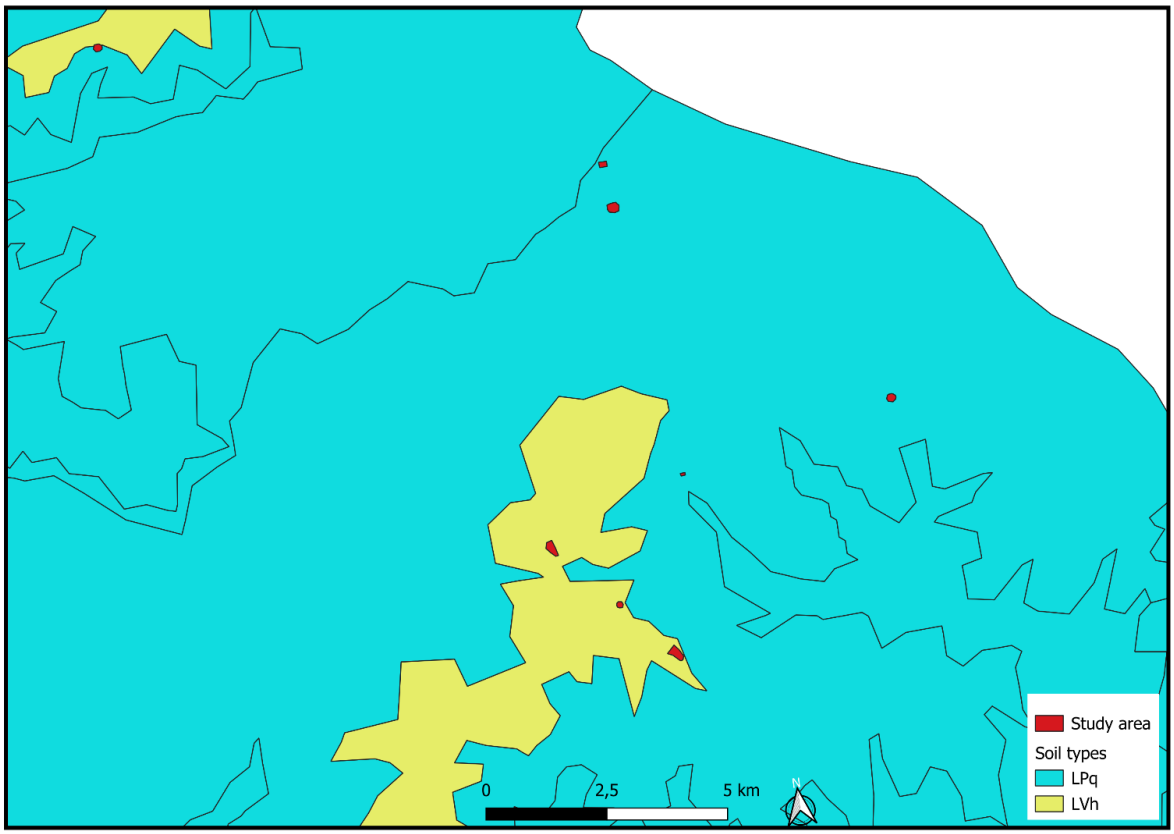


Figure 8: Map of the dominant soils within the project locality (Lithic Leptosols (LPq) and Haplic Luvisols (LVh)).

Soil types that occur within the Sterkspruit project locality are the Lithic Leptosols (LPq) and Haplic Luvisols (LVh), as indicated in Figure 8. Lithic Leptosols (LPq) are soils with limitations to root growth, are shallow to very shallow soils, with depth restricted by a continuous hard rock layer, such as limestone or dolomite, often with low water-holding capacity, and are vulnerable to erosion. The LPq soils have very limited agricultural potential and are generally suitable only for extensive grazing or forestry. Their distinguishing properties include a brownish black to dark brown colour, fine sand to loamy sand, with a PH of slightly to highly alkaline and are well drained.

The haplic luvisol (LVh) soil group is characterised by clay enriched sub-soil, with high activity clays and high base status. Their surface horizon is depleted of clay and with accumulation of clay in a subsurface. They either starting within 100 cm from the soil surface or within 200 cm from the soil surface if the argic horizon is overlain by material that is loamy sand or coarser throughout. This type of soil is most common in flat or gently sloping land in cool temperate regions and in warm (e.g. Mediterranean) regions

with distinct dry and wet seasons. Haplic Luvisols with a good internal drainage are potentially suitable for a wide range of agricultural uses because of their moderate stage of weathering and high base saturation. They have a high cation exchange capacity and high base saturation, meaning they can hold and supply nutrients to plants effectively. They are typically brown to reddish-brown. They have a neutral to alkaline pH, typically ranging between 6.5 and 8.9, fine sand to sandy loam in the upper horizons to coarser, clay-loam in the subsoil. Soil colors are often brown, reddish-brown, or red, indicating well-drained conditions, they are typically well-drained to somewhat excessively drained, though they may experience seasonal water-logging, they have a high cation exchange capacity (CEC), are rich in calcium and magnesium, but often have a low organic matter content in the topsoil.

3.5. GEOLOGY

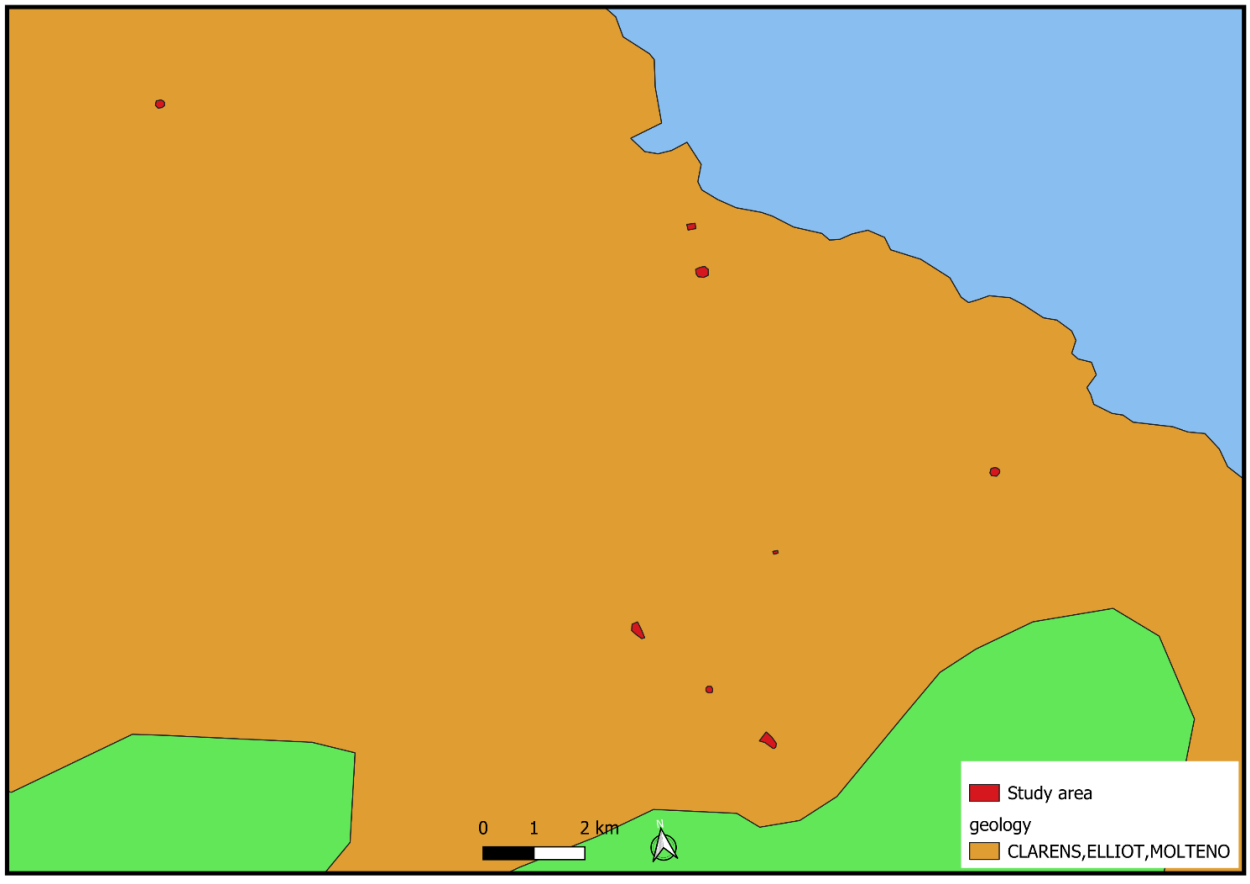


Figure 9: Map of the geology within the project locality (Clarens, Elliot and Molteno).

The proposed site of development falls within the Sterkspruit Complex, which is characterised by contiguous outcrops of volcaniclastic, intrusive and extrusive rocks in the Sterkspruit valley and its tributaries in the Drakensberg Mountains near the

border between South Africa's Eastern Cape Province and Lesotho. The basic geology surrounding the proposed site of development lies within the Clarens, Elliot and Molteno Formations (McClintock. 2008). The Molteno formation consists of occasional coal seams of the, Red Beds," which are a thick succession of red mudstone, siltstone, and light yellow-brown sandstone of the Elliot formation and fine-grained, cream-to-pink sandstone (aeolianite) of Clarens formation. The Elliot formation overlies the Molteno formation with a marked boundary, showing a shift from wetter to more oxidized (arid) conditions. It is subdivided into the Lower Elliot (meandering rivers) and Upper Elliot (ephemeral rivers, sheet floods, and playa lakes). The formation of Clarens is characterized by its prominent, yellowish cliffs that are often heavily undercut (caves). It can reach up to 300m thick, although thickness can be highly variable.

3.6. LAND COVER AND LAND USE

The results from Global land analysis and Discovery, a database with the Global Land Cover and Land Use 2020, showed that the land cover and land use within the project locality mainly comprises of short vegetation, dense short natural vegetation, and croplands.

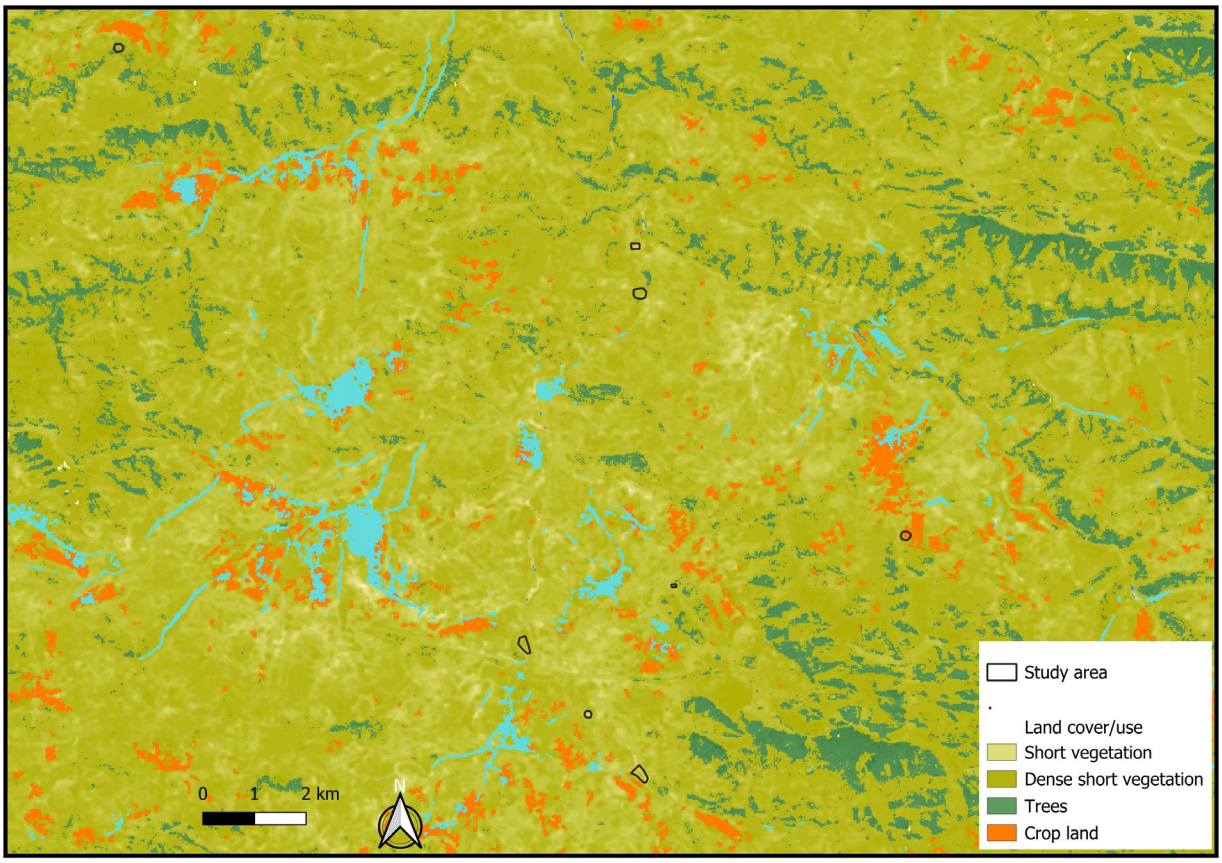
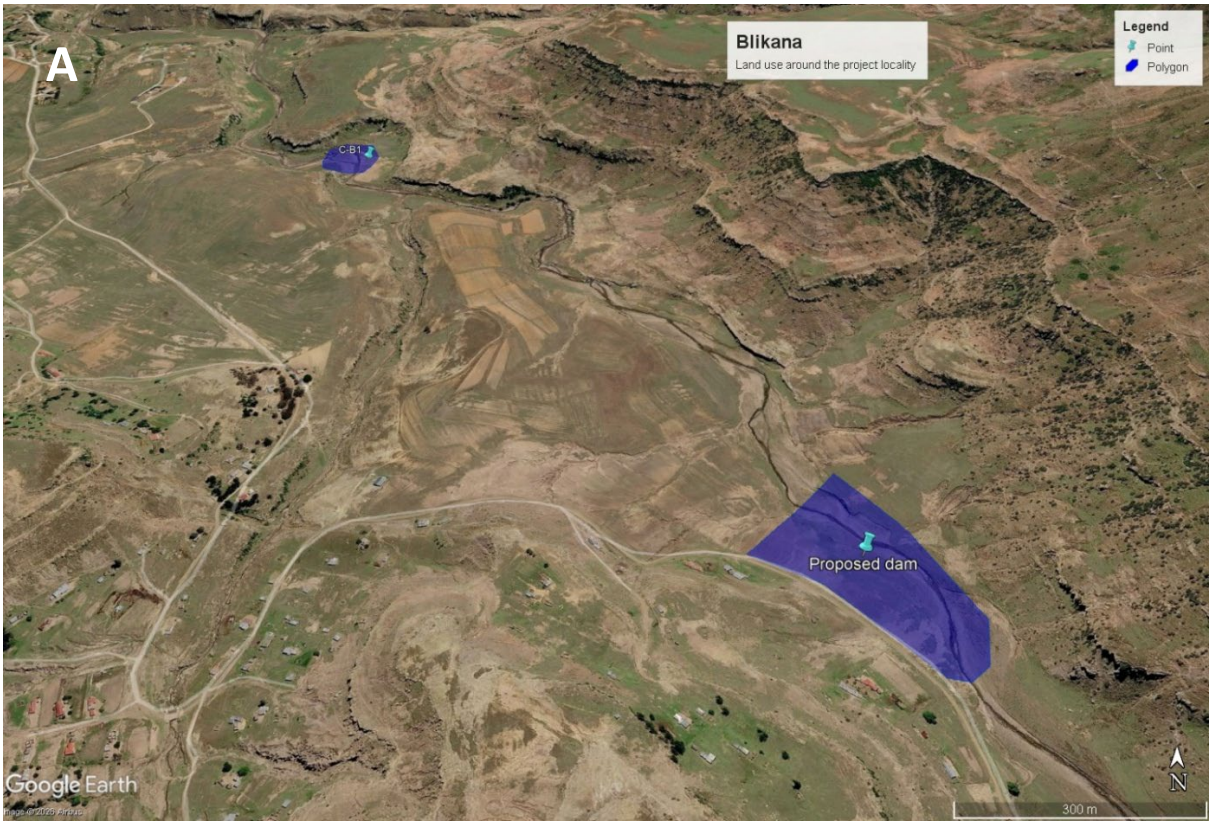


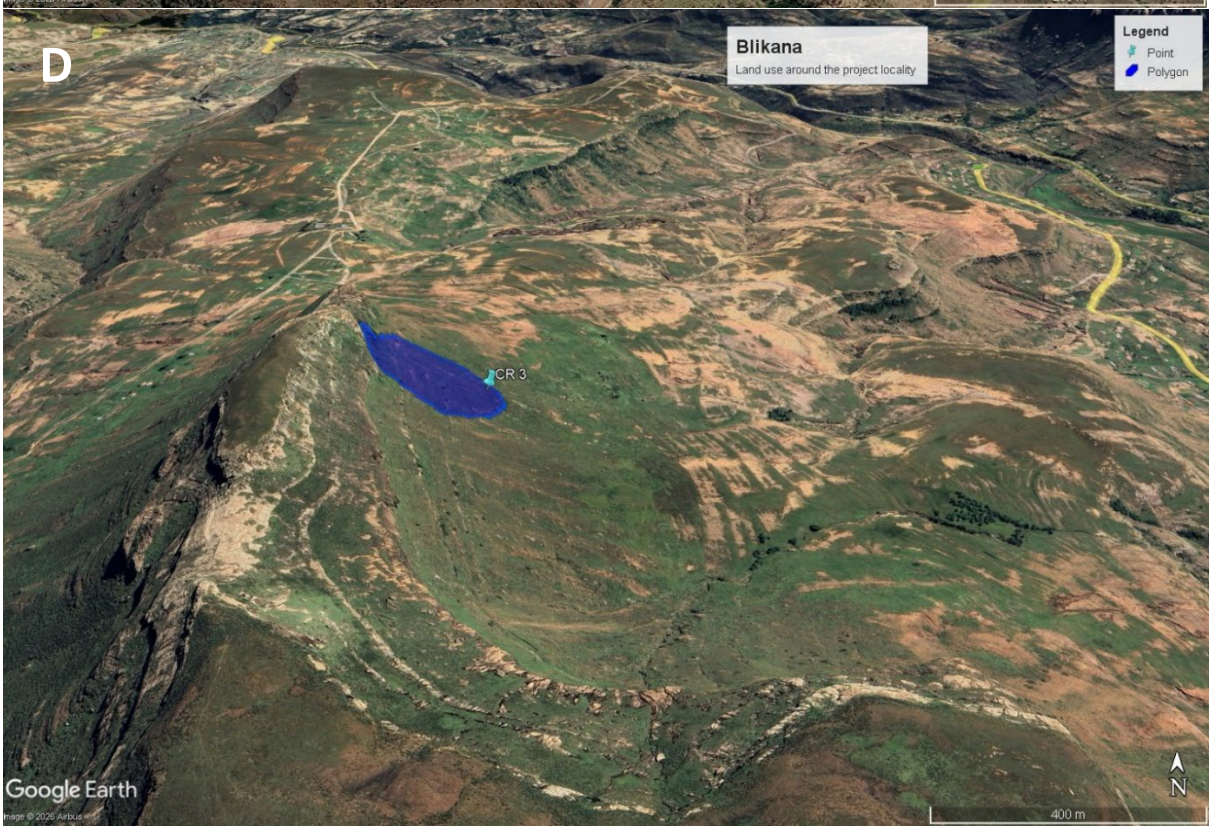
Figure 10: Map of the land cover/use within the project locality (Short vegetation, trees and cropland).

As illustrated in figure 11, the land use within the proposed area of development, is predominantly characterized by rural residential settlements, communal grazing, and subsistence agriculture. This region is a developing rural landscape with significant livestock farming (sheep, cattle, goats) and limited commercial development.


A
Blikana
Land use around the project locality
Legend
Point
Polygon
C-B1
Proposed dam
Google Earth
N
300 m


B
Blikana
Land use around the project locality
Legend
Point
Polygon
CR-2
WTW (Atl2)
Google Earth
N
500 m


C
Blikana
Land use around the project locality
Legend
Point
Polygon
WTW
C-B2
Google Earth
N
200 m


D
Blikana
Land use around the project locality
Legend
Point
Polygon
CR 3
Google Earth
N
400 m

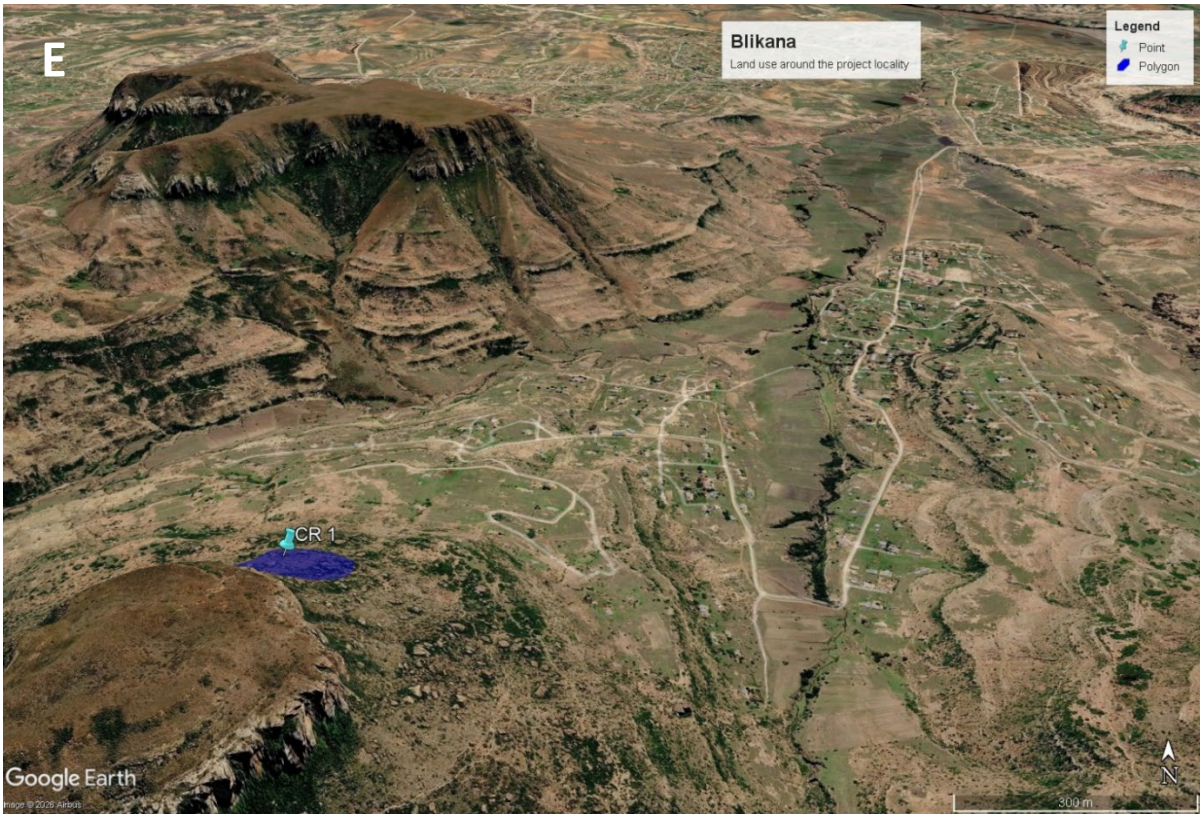


Figure 11: Aerial imagery for the land-use within the project locality, image are showing the land use around each point of construction (A= Proposed dam and CB1, B= CR2 and the Waste Water Treatment identified alternative, C= Waste Water Treatment and C-B2, D= CR3, E= CR1).

3.7. Description of Soil Profiles and Diagnostic Horizons

Soil profiles were studied up to a depth of 1 m to identify specific diagnostic horizons which are vital in the soil classification process as well as determining the agricultural potential and land capability. The following diagnostic horizons were identified during the site assessment (also see Figure 9-5):

- Orthic horizon;
- Melanic horizon.

Orthic A horizon

Orthic topsoils are mineral horizons that have been exposed to biological activities and varying intensities of mineral weathering. The climatic conditions and parent material ensure a wide range of properties differing from one orthic topsoil to another (i.e. colouration, structure etc) (Soil Classification Working Group, 2018).

Melanic A horizon

Melanic A soils are often characterized by dark-colored, base-rich, and well-structured topsoils that are fertile and support high agricultural productivity. These soils have high organic matter, usually and a high percentage of swelling (smectite) clays, often forming on calcium/magnesium-rich parent materials like limestone, dolerite, or basalt.

Red apedal-B horizons

Red apedal B-horizons are well-drained, porous subsoil layers (B-horizons) found below topsoil, characterized by a uniform red color caused by iron oxide coatings on particles. They are weakly structured or structureless (apedal), making them ideal for agriculture.

Gleycutanic-B horizon

The gleycutanic B horizon is a diagnostic subsoil horizon characterized by a combination of high clay content, structural development, and distinct signs of wetness (gleying). It represents a "wet" subsoil that often acts as a drainage-retarding layer, influencing water movement and agricultural potential.

Hard plinthic and plinthic B

Plinthic B-horizons are soil layers characterized by iron oxide accumulation due to fluctuating water tables, classified into soft and hard types. Soft plinthic B holds iron mottles that can be broken by hand, while hard plinthic B is cemented and irreversible (ferricrete). These horizons limit root penetration and agricultural potential, often causing poor drainage.

Table 9: Soil classification results

	Picture	Description of soil profile
Site 1		Humic- A and reddish Brown apedal-B, with underlying rock
Site 2		Orthic A-Sterkspruit form with Prismacutanic B

Site 3		Melanic A, with pedacutanic B and soft plinthic B
Site 4		Orthic A, with underlying Hard rock
Site 5		Orthic A, Gleycutanic B

Site 6		Orthic A, Hard plinthic B
Site 7		Orthic A, Red apedal B
Site 8		Humic A,

4. SITE SENSITIVITY VERIFICATION

A specialist agricultural assessment is required to include a verification of the agricultural sensitivity of the development site as per the sensitivity categories used by the web-based environmental screening tool of the Department of Forestry, Fisheries and the Environment (DFFE). The screening tool's classification of sensitivity is merely an initial indication of what the sensitivity of a piece of land might be, as indicated by the only data that is available. What the screening tool attempts to indicate is whether the land is suitable for crop production (high and very high sensitivity) or unsuitable for crop production (low to medium sensitivity).

According to the screening tool, the site sensitivity is rated as high sensitivity, (Figure 11 and table 10), and table 2 indicates the sensitivity features identified in the study location. This verification of sensitivity addresses both components that determine it, namely cropping status and land capability. The results of the screening tool identified the agricultural activities such as subsistence farming as having a high agricultural sensitivity. The most prevalent agricultural activity in the area is subsistence farming, which is reported to have a high sensitivity level according to the screening tool. However, the entire development footprint is located on land assessed as low agricultural sensitivity so that it minimises agricultural impact with zero impact to land that is of high agricultural sensitivity. The agricultural sensitivity of the site, as classified by the screening tool, is shown in Figure 11.

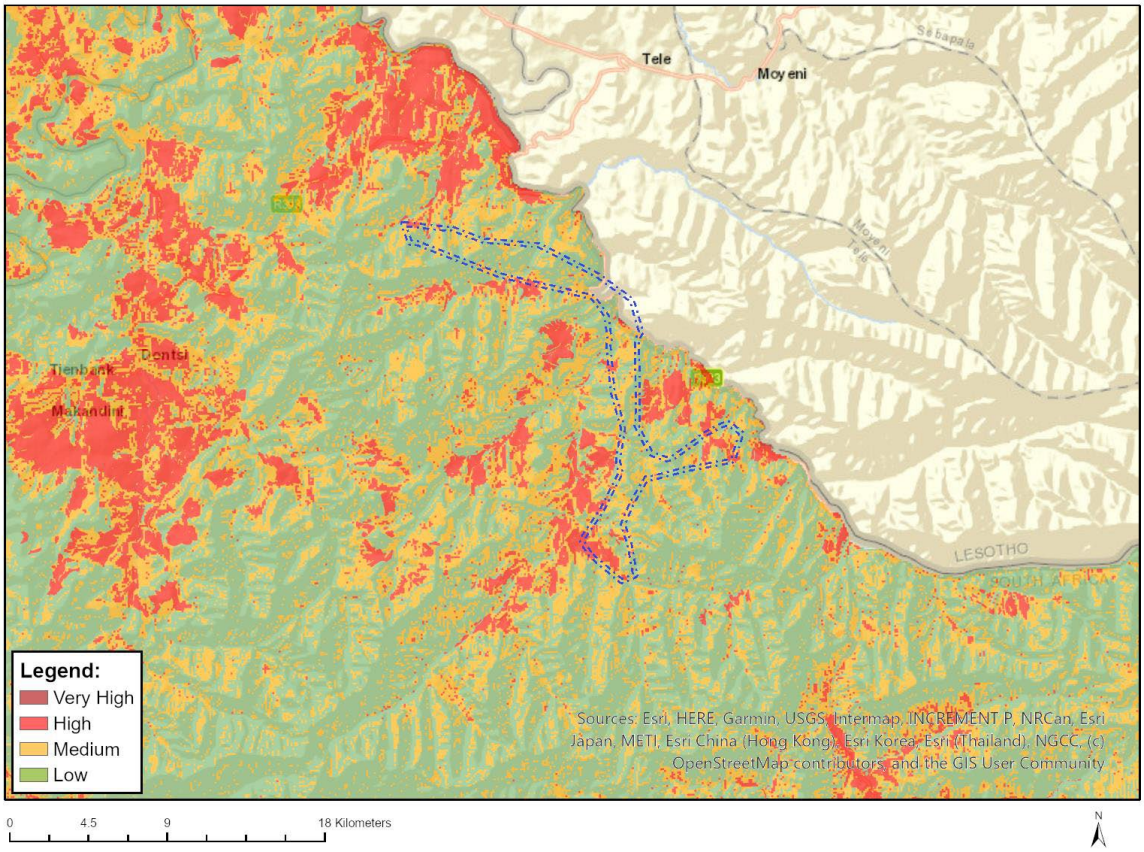


Figure 12: The development overlaid on agricultural sensitivity, as classified by the screening tool (green=low; yellow=medium; red=high; dark red=very high)

Table 10: Land capability verification from the screening tool

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Table 11: Sensitivity Features

Sensitivity	Feature(s)
High	Subsistence_Farming_1
High	09. Moderate-High
High	08. Moderate
High	10. Moderate-High
Low	05. Low
Low	04. Low-Very low
Low	03. Low-Very low
Low	02. Very low
Medium	06. Low-Moderate
Medium	07. Low-Moderate

5. LAND CAPABILITY RESULTS

The land capability classification of the proposed locality was determined by assessing the soil, climate and terrain. The land capability classification of the study area was therefor based on their characteristics and limitations.

Land Capability classification is applied to rain fed agriculture and distinguish between land suited for cultivation (Classes I II III and IV) and land generally not suited for cultivation. (Classes V VI VII and VIII) See table 2.

According to the soil types, climate and slope, the land capability of the site falls in class IV and VI. These two classes represent soils with severe limitations that reduce the choice of crops or require special conservation practices or both. In addition, they may only be used for communal livestock grazing. The limitations found in the project locality include:

- Soils that are shallow.
- Area affected by severe soil erosion
- Unfavourable climatic limitations, such as limited rainfall.

One, or a combination, of these limitations restrict the choice of agricultural activities in the area. The land may be used for cultivating crops for subsistence, but conservation practices are usually difficult to apply and maintain and the number of practical alternatives for average farmers is restricted to a few.

Additionally, the Sterkspruit area is considered to experience a high climate variability, severe droughts, and significant land degradation. In addition, the assessment results showed that the study area is located in rocky areas with shallow soils, and sloping area that are not suitable for crop cultivation.

6. IMPACT ASSESSMENT RESULTS, MITIGATION MEASURES AND SUMMARY

As of the NEMA EIA regulations (2010), it is a requirement that the environmental risks in an area of proposed environmental authorisation are identified, and measures to reduce those risks are put in place before the commencement of the project. In the impact assessment, potential impacts were identified and rated based on the criteria as shown in Table 3, Each individual aspect in the determination of the impact consequence is represented by a rating scale with mitigation measures provided. The identified potential impacts include:

- Increased soil erosion potential due to vegetation clearance and excavations.
- The clearing of existing natural vegetation creates an opportunity for the establishment alien invasive plant species in areas that are typically difficult to eradicate and may outcompete natural vegetation.
- Soil chemical pollution and degradation due to oil and fuel spillages.
- Soil compaction because of vehicle and machinery movement.
- Change in stream flow regime, morphological features and water quality

6.1. Construction Phase

During the construction phase of the proposed development, the soils are anticipated to be exposed to erosion, potential soil contamination and loss of land capability impacts during the construction phase of the proposed development. The main envisaged activities include the following:

- Current soil hydrological properties and functionality of soil if not mitigated properly;
- Frequent movement of heavy machinery increasing the likelihood of soil contamination from petroleum, oil, and grease substances;

Other activities in this phase that will impact on soil are the handling and storage of building materials and different kinds of waste. This will have the potential to result in soil pollution when not managed properly.

Soil chemical pollution as a result of potential oil and fuel spillages from vehicles, is a moderate deterioration of the soil resource. This impact will be localised within the site boundary and have medium significance on the soil resource if not managed.

Earthworks will include clearing of vegetation from the surface and stripping topsoil (soil excavation) for foundation preparation where the proposed infrastructure is to be placed.

6.2. IMPACT SUMMARY TABLES

Table 12: Increased soil erosion potential due to vegetation clearing and excavation

Nature: During the construction of the dam and associated structures, there will be excavations and clearing of vegetation which will affect the natural vegetation and may indirectly promote soil erosion.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	2	2
Duration *(Short term, Medium term, Long term)*	4	3
Magnitude *(Major, Moderate, Minor)*	2	1
Probability *(Definite, Possible, Unlikely)*	2	2
Calculated Significance Rating (Low, Medium, High)	Low	Low
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Reversible	Reversible
Irreplaceable loss of resources: (Yes or No)	No	No
Can impacts be mitigated?	Yes	Yes
Cumulative impacts: Low, all impacts will be site bounded.		
Residual Risks: No. The areas affected during construction will be rehabilitated and monitored after the activity		
Mitigation measures: - Implementing erosion control measures such as sediment traps, silt fences, and erosion control blankets will help prevent sedimentation and protect nearby streams and rivers. - Limit vegetation clearing to what is necessary. Only trees and shrubs within the limits of construction and tree limbs extending into the clearance area should be removed. Using and maintaining vegetative cover appropriately during construction will minimize erosion of excavated soil and sediment loading to surface waters.		

- The area must be rehabilitated with indigenous vegetation to reduce the risk of erosion, and to reinstate the ecological value of the area. A diverse mixture of vegetation in three canopy layers would stabilize soils and minimize erosion.
- Ensure proper stormwater management designs are in place to prevent soil erosion.
- Avoid unnecessary land clearance.
- In areas prone to severe erosion, consider using structural measures like retaining walls, gabions, and riprap to stabilize slopes.

Table 13: Clearing of vegetation with a potential to allow establishment of invasive plants and modify natural vegetation

Nature: The clearing of existing natural vegetation creates an opportunity for the establishment of alien invasive plant species in areas that are typically difficult to eradicate and may outcompete natural vegetation.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	3	2
Duration *(Short term, Medium term, Long term)*	3	2
Magnitude *(Major, Moderate, Minor)*	3	1
Probability *(Definite, Possible, Unlikely)*	2	1
Calculated Significance Rating (Low, Medium, High)	Low	Low
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Reversible	Reversible
Irreplaceable loss of resources: (Yes or No)	No	No
Can impacts be mitigated?	Yes	Yes
Cumulative impacts: No, all impacts will be site bounded.		
Residual Risks: No. The areas affected during construction will be rehabilitated and monitored after the activity		
Mitigation measures: - Only clear the minimal required area for the project, replant trees, and use pre-existing routes when possible. - consider alternative routes that minimise damage to sensitive ecosystems. Additionally, replanting efforts and restoration of affected areas should be part of the project plan. - Revegetation of disturbed areas with native trees, shrubs, and herbaceous plants. This would compensate for impacts and minimize colonization by invasive species. Sediment control features would be retained until the plants cover the site.		

- Clearing activities must be contained within the affected zones and may not spill over into adjacent no-go areas. No-go areas should be clearly demarcated prior to construction.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Re-vegetation with indigenous, locally occurring species should take place in areas where natural vegetation is slow to recover or where repeated invasion has taken place.

Table 14: Soil chemical pollution and degradation due to oil and fuel spillages

Nature: Soil chemical Pollution: Pollution of soil resources may occur as a result of the use of heavy machinery during installation of erosion stabilization structures–localised chemical pollution impacts are likely to occur due to spills, leaks and overfills.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	3	2
Duration *(Short term, Medium term, Long term)*	4	2
Magnitude *(Major, Moderate, Minor)*	2	1
Probability *(Definite, Possible, Unlikely)*	2	1
Calculated Significance Rating (Low, Medium, High)	Low	Low
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Reversible	Reversible
Irreplaceable loss of resources: (Yes or No)	No	No
Can impacts be mitigated?	Yes	Yes
Cumulative impacts: No, all impacts will be site bounded.		
Residual Risks: No. The areas affected during construction will be rehabilitated and monitored after the activity		
Mitigation measures: - Care must be taken in the handling and storage of all drilling fluids, oils, greases and fuel on site, including all drilling vehicles and support vehicle fluids. A spill kit will be available on site in case of accidental spillages. - All contractors and labour must undergo environmental awareness training, and be encouraged to maintain a “clean” working area, and report any (potential) risks to the environment because of the drilling program.		

- No fixing, servicing or cleaning of vehicles/machinery to take place on site. All malfunctioning drilling equipment must be moved designated workshop areas for fixing.
- All vehicles must be regularly inspected for potential oil leaks. High-level maintenance must be undertaken on all vehicles and construction/maintenance machinery to prevent oil spills. No storage of fuel and diesel on site.
- Fuel and oil spills should be remediated using a commercially available emergency clean up kits. For major spills, if the soil is contaminated, they must be stripped and disposed of at a licensed waste disposal site.
- Drip trays must be used while vehicles are not in use.
- Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately by trained staff with the correct equipment and protocols.

Table 15: Soil compaction because of vehicle movement.

Nature: Soil Compaction: During construction localised soil compaction is expected to take place during the movement of heavy machinery on the soil surface causes compaction which reduces the vegetation's ability to grow.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	3	2
Duration *(Short term, Medium term, Long term)*	4	3
Magnitude *(Major, Moderate, Minor)*	2	1
Probability *(Definite, Possible, Unlikely)*	3	2
Calculated Significance Rating (Low, Medium, High)	Low	Low
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Reversible	Reversible
Irreplaceable loss of resources: (Yes or No)	No	No
Can impacts be mitigated?	Yes	Yes
Cumulative impacts: No, all impacts will be site bounded.		
Residual Risks: No. The areas affected during construction will be rehabilitated and monitored after the activity		
Mitigation measures: - Only the designated access routes are to be used. This will assist in reducing any unnecessary compaction. - Avoid driving on soils when they are too wet or susceptible to compaction. - Restrict all heavy traffic to designated wheel tracks, leaving most of the soil undisturbed.		

Table 16: Change in stream flow regime, morphological features and water quality.

Nature: deterioration in water quality: Impoundment may increase or decrease (dilution) the pollutant load of receiving waters while withdraws may indirectly lead to an increase of pollutant loads. Therefore, construction of a dam (reservoir) implies creation of a new environment, developing its own typical water quality problems that may affect the downstream section to some extent.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	4	2
Duration *(Short term, Medium term, Long term)*	3	3
Magnitude *(Major, Moderate, Minor)*	3	1
Probability *(Definite, Possible, Unlikely)*	3	2
Calculated Significance Rating (Low, Medium, High)	Low	Low
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Reversible	Reversible
Irreplaceable loss of resources: (Yes or No)	No	No
Can impacts be mitigated?	Yes	Yes
Cumulative impacts: No, all impacts will be site bounded.		
Residual Risks: No.		
Mitigation measures: - Stick to good practices of dam operation rules of ensuring minimum flows in times of low flow - Ensure prior clearance of all deadwood/vegetation prior to dam filling - Ensure that the design has adequate design provisions to allow flow downstream even in times of dry months. - Observe water right permit regulations and requirements for the sake of downstream water right holders		

6.3. OPERATIONAL PHASE

This phase will have no additional impacts as compared to the establishment of infrastructure. The operational phase includes the completion and operation of the proposed development and will have no additional impacts as compared to the construction phase. The potential impacts include possible runoff, resulting in risk of erosion, constant disturbances of soils by maintenance vehicles and machinery

increasing the risk of soil compaction and poor waste management, resulting in waste materials being improperly stored increasing the risk of soil compaction.

It is recommended that concurrent rehabilitation techniques be followed to prevent topsoil from being stockpiled too long and losing its inherent fertility. Disturbed sites must be rehabilitated as soon as possible. The following management actions and targets are provided for this phase:

- Ensure designed stormwater management plans are in place.
- If any erosion occurs, corrective actions must be taken to minimise any further erosion from taking place.
- Only the designated access routes are to be used to reduce any unnecessary compaction.

6.4. UNPLANNED EVENTS

There is a risk of accidental spillages of hazardous substances (hydrocarbons or oils) from vehicles or other construction equipment during the construction and operational phase. Therefore, it must be ensured that the requirements of the National Environmental Management Waste Act of 2008 are met for the prevention of pollution. Hydrocarbon spills or leaks can occur; therefore, emergency procedures need to be put in place for remediation. These procedures can include the following:

- Contractors must ensure that all employees are aware of the procedure for dealing with spills and leaks and undergo training on-site.
- Ensure that emergency spill equipment is available to site personnel.
- All machines should be serviced and refuelled in demarcated bunded areas, workshops or at an off-site location specifically designed for servicing of machinery.
- If a hydrocarbon spill occurs, it should be cleaned up immediately, if applicable the incident will be reported to the appropriate authorities and recorded.
- Contaminated soils: if not effectively remediated in situ, must be disposed of in a registered and licensed Waste Landfill Facility.

7. ADDITIONAL ASPECTS REQUIRED IN AN AGRICULTURAL ASSESSMENT

7.1. RESPONSE TO CONCERNS RAISED BY INTERESTED & AFFECTED PARTIES

This section is to be completed in response to issues raised during the Public Participation Process. Thus far, no issues relating to the agricultural agro-ecosystem has been brought to the attention of the specialists. Should any comment be received, it will be addressed in this report.

7.2. Micro-siting

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. Because agriculture will be permanently excluded from the entire site, micro-siting will make no material difference to agricultural impacts and disturbance.

7.3. Confirmation of linear activity exclusion

If linear infrastructure has been given exclusion from complying with certain requirements of the agricultural protocol because of its linear nature, the protocol requires confirmation that the land impacted by that linear infrastructure can be returned to the current state within two years of completion of the construction phase. No such exclusion applies to this project.

7.4. Long term benefits versus agricultural benefits

It is outside of the scope and expertise of an agricultural assessment to determine the value of the potential benefits that the proposed development will provide to the area in order to compare them to the value of the agricultural production.

7.5. Additional environmental impacts

There are no additional environmental impacts of the proposed development that are relevant to this assessment of agricultural impact.

8. CONCLUSIONS AND RECOMMENDATIONS

By considering the site characteristics (climate, geology, land use, slope and soils),

the agricultural potential for the study area is characterised as being low considering the limitations for land capability. The assessment along the study area compared to the desktop study shows similar details with land being categorized as low. This poor agricultural potential rating is due to severe climatic limitations and soil characteristics. The land has low potential yield to produce crops due to its capability, climate associated with it. The soil has limited capacity to allow crops to grow due to limited soil depth. According to the general soil distribution pattern, the desktop shows that the soil along the proposed site of development has limited pedological development, within the rocky areas.

The area is prone to erosion which is already hindering many agricultural activities in the Sterkspruit area. Additionally, the area is primarily characterized by a rural economy heavily reliant on livestock farming, particularly sheep and cattle. The agricultural sector in the region faces significant challenges, including erratic rainfall, limited resources, soil erosion, and high rates of land degradation, particularly in communal areas. There are no active agricultural fields which will be impacted by the proposed development and as such there are no agricultural issues regarding the project locality.

The proposed dam construction and associated and the associated structures will have negligible agricultural impact on the land, regardless of their route and design and the agricultural potential of the land they traverse. All agricultural activities can continue completely unhindered. This is because the direct, permanent, physical footprint that has any potential to interfere with agriculture, is insignificantly small. There will therefore be no reduction in future agricultural production potential in this area. The only potential source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction. This impact can be completely mitigated with standard, generic mitigation measures that are included in report. The significance of the loss of agricultural land is a direct function of two things, firstly the amount of land that will be lost and secondly, the production potential of the land that will be lost. In this case the amount of land loss is small, and the production potential of the land is very limited.

The sensitivity analysis confirms the high agricultural sensitivity classification of the site by the screening tool because of the site's assessed cropping potential such as the annual crop cultivation or subsistence farming activities around the area. From an agricultural and land use perspective, no fatal flaws are associated with the project, if the mitigation measures are applied as recommended. Therefore, the agricultural impact of the proposed development is assessed as being of low significance.

9. ACCEPTABILITY STATEMENT

In my professional opinion based on the assessment above, this application is considered favourably, permitting that the soil management measures are considered to prevent soil erosion, pollution, and sedimentation and loss of habitat. The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on agricultural production of the study area, since it is not being used for agricultural production. The proposed development is therefore acceptable. From an agricultural impact point of view, the conclusion of this assessment on the acceptability of proposed development and the recommendation for approval is not subject to any conditions. If soil management measures are followed as outlined in this report and the land be rehabilitated to the highest standard possible. The recommendations set out in this report should form part of the conditions of the environmental authorisation for the proposed development.

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Appendix1

Zimbini Scott CV

Work Experience

- BIODIVERSITY MONITORING AND ASSESSEMENT -SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI)
- RURAL DEVELOPMENT AND AGRARIAN REFORM, MTHATHA
- AGRICULTURAL IMPACT ASSESSMENT FOR THE PROPOSED MDANGELWA BRIDGE IN NGCOBO TOWN
- AGRICULTURAL IMPACT ASSESSMENT FOR THE PROPOSED NEW GRADE SEPARATED INTERCHANGE ON NATIONAL ROUTE R71 AND D4020 AT ST ENGENAS ZCC, LIMPOPO PROVINCE.

Education

University of Fort Hare – Alice, EC | MSc Entomology
MSc Entomology, 2024

Walter Sisulu University – Mthatha, EC | BSc honours
Major in Botany, 2017
Walter Sisulu University – Mthatha, EC | BSc PEST MANAGEMENT
Majors (Botany, Zoology, Entomology), 2014
Holy Cross Education Center – Mthatha, EC | National senior certificate
Science, 2007

Additional Information

- Drivers license: Code 8
- SACNASP registered scientist: Ref: 128717

SCIENTIFIC PUBLICATIONS AND CONTRIBUTIONS:

- Coauthor of an Article published in Ecology& Evolution journal. Title: The critical role of coastal protected areas in
  buffering impacts of extreme climatic events on bird diversity and their ecosystem services' provisioning in the Eastern Cape Province, South Africa
- The invasion threat of the emerging alien cactus Cylindropuntia pallida (Rosa), F.M. Knuth in South Africa and the potential for control using herbicides.
  Contributed to SANBI work by conducting a risk analysis on the invasive insect (*Bemisia tabaci*), and it was accepted on 11/01/2022 by the SANBI Review panel.

Appendix2

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Zimbini Scott

Registration Number: 128717

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Agricultural Science (Candidate Natural Scientist)

Effective **19 January 2023** Expires **31 March 2026**

President of Council

Chief Executive Officer

To verify this certificate scan this code