# Soil and Agricultural Compliance Statement for the proposed Midas Battery Energy Storage Systems (BESS) Project

## Merafong City Local Municipality, West Rand District Municipality, Gauteng Province, South Africa

**2/13/2024**


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|---|---|
| **Report Name** | **Soil and Agricultural Compliance Statement for the proposed Midas Battery Energy Storage Systems (BESS) Project** |
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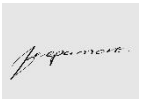
| **Fieldwork & Report Writer** | Masilabela Seepamore (SACNASP 113907)  |
| **Reviewer** | Andrew Husted (SACNASP 400213/11)  |
| **Declaration** | The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interest in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time, and budget) based on the principals of science. |

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# 1 Introduction

## 1.1 Background

The Biodiversity Company was appointed by Atlantic Renewable Energy Partners (Pty) Ltd to conduct a soil and agricultural potential assessment for the proposed Midas Battery Energy Storage Systems (BESS) and associated infrastructure, located approximately 11 km south-west of Westonaria and 18 km east of Carletonville towns, in the Gauteng Province. The proposed project area is found within the Merafong City Local Municipality in the West Rand District Municipality.

The approach adopted for the assessment has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 20 March 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation”. The National Web based Environmental Screening Tool (DFFE, 2023) has characterised the agricultural theme sensitivity of the project area as predominantly “High”, with a key consideration of this assessment being the determination of agricultural theme sensitivities for the project. However, based on the information gathered from the verified soil forms and the current land uses, the proposed site was found to be of a “Low” sensitivity.

This report aims to present and discuss the findings from the soil resources identified within the 50 m buffered area. The report will also identify the soil suitability and land potential of these soils, the land uses within the assessment area and the risks associated with the proposed BESS facility project.

This report should be interpreted after taking into consideration the findings and recommendations provided by the specialist herein. Further, this report should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the proposed project.

## 1.2 Project Description

Midas BESS (Pty) Ltd is proposing the construction of the Midas Battery Energy Storage (BESS) Facility, located on Portion 10 of the Farm Uitval No. 280, approximately 18 km east of Carletonville in the Gauteng Province.

The Applicant is also proposing to upgrade the existing access road on Portion 8 and Portion 10 of the Farm Uitval No. 280; and to construct new 132kV grid connection infrastructure on Portion 10 of the Farm Uitval No. 280, Portion 22 of the Farm Driefontein No. 355, Portion 5 of the Farm Doornkloof No. 350, Portion 71 of the Farm Leeuwpoort 356, Portion 70 of the Farm Leeuwpoort 356, Portion 36 of the Farm Leeuwpoort 356, Portion 35 of the Farm Leeuwpoort 356, Portion 33 of the Farm Leeuwpoort 356 and Portion 28 of the Farm Driefontein 355.

The Midas BESS facility will have a total development footprint of up to approximately 15 ha and will have a maximum export capacity of 77 MW. The development area is situated within the Merafong City Local Municipality and the Rand West City Local Municipality. The site is accessible via existing gravel roads from the R501 and N12.

The proposed Midas BESS will cover approximately 15 ha and will include the following infrastructure:

- Solid State Battery Energy Storage Systems (BESS) *up to 10 ha);
- Inverters and transformers;
- Site and internal access roads (up to 8m wide);

- Operation and Maintenace buildings including a gate house and security building, control centre, offices, warehouses and workshops for the storage and maintenances (up to 1 ha);
- Laydown areas (3 ha temporary and 1 ha permanent);
- A 132 kV facility substation (up to 1 ha); and
- 33 kV cabling between the project components and the facility substation.

The project will also include Grid connection infrastructure consisting of:

- 132 kV Eskom Switching Station (up to 1 ha); and
- 132 kV powerline (up to km long) connecting the Eskom switching station to the Midas Main Transmission Substation (s grid connection corridor of m wide will be assessed to allow foe environmental sensitivities and/or micro-siting).

The Grid connection infrastructure, although assessed cumulatively with the BESS, will be subject to a separate environmental application process administered by the provincial authority.

### 1.2.1 Project Area

The extent of the property/development footprint is referred to as the Project Area of Influence (PAOI) and pertains to the project area. A map of the PAOI and buffered area in relation to the local region is presented in Figure 1-1. The project area of interest (PAOI) consists of the project area provided, made up of the BESS, switching stations, temporary laydown, auxiliary buildings and a grid corridor. A map illustrating the proposed layout of to be assessed is presented in **Error! Reference source not found.**. The surrounding land uses include natural veld, grazing (livestock), crop fields and mining.

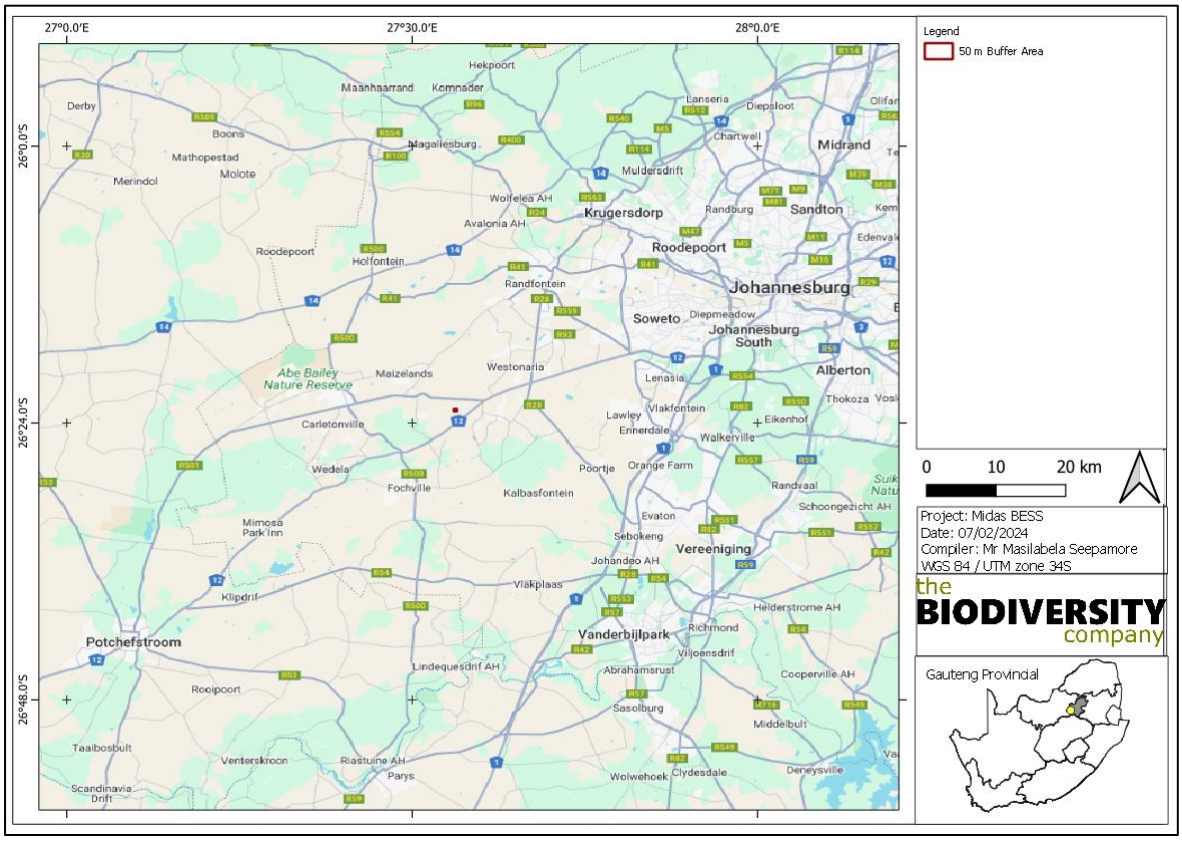



***Figure 1-1 Spatial context of the proposed development***

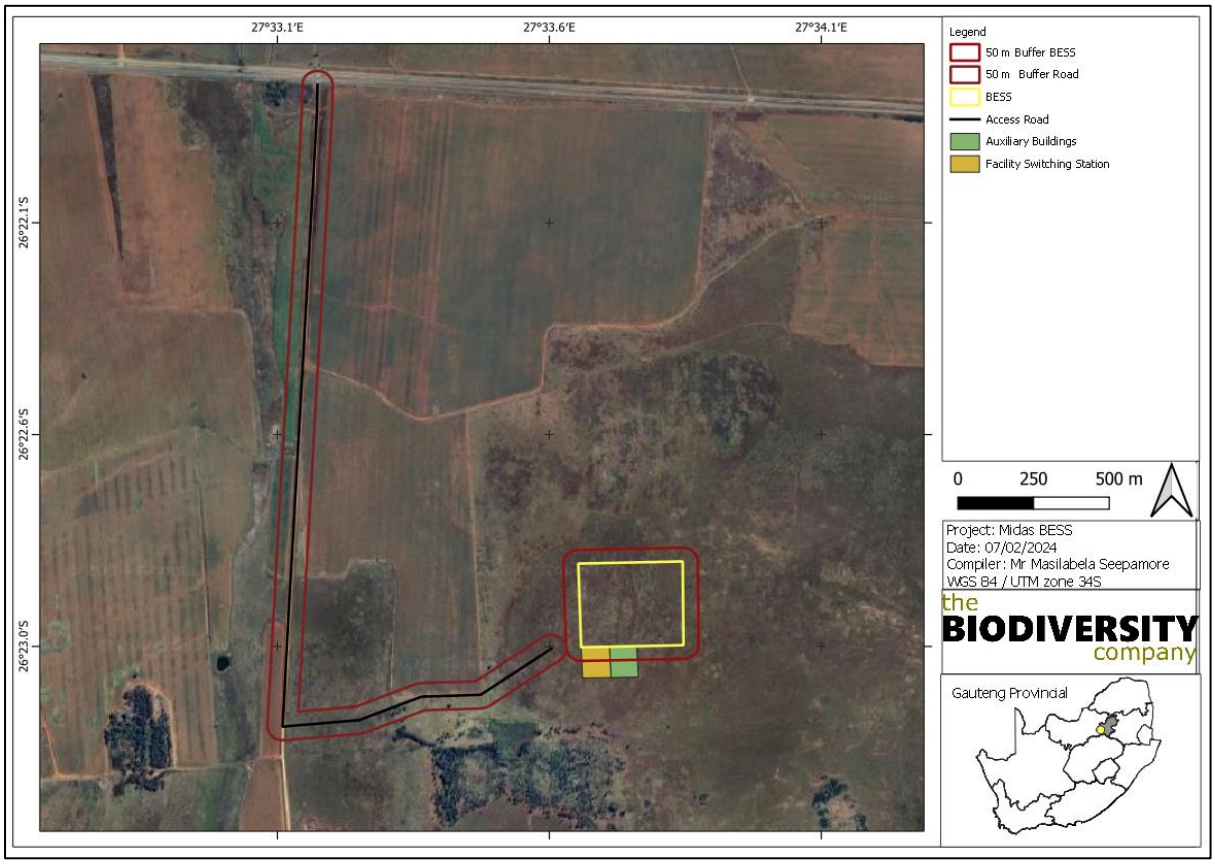



***Figure 1-2 The Proposed components of the project***

### 1.3 Scope of Work

In addition to the requirements stipulated in GNR 320, the following Terms of Reference, as stipulated, apply to the Agricultural Compliance Statement:

- Ensure a thorough assessment, which includes both the desktop assessment of databases and aerial photography; a description of the on-site verification of the agricultural potential of the area; and the soil forms present in the development area;
- Identify and assess potential impacts on both agricultural potential and soil resulting from the proposed project;
- Identify and describe potential cumulative soil, agricultural potential and land capability impacts resulting from the proposed project in relation to proposed and existing developments in the surrounding area; and
- Recommend mitigation, management, and monitoring measures, to minimise impacts and/or optimise benefits associated with the proposed project.

### 1.4 Assumptions and Limitations

The following aspects were considered as limitations;

- Only the slopes affected by the proposed development have been assessed;

- It has been assumed that the extent of the development area provided by the responsible party is accurate;
- The GPS used for ground truthing is accurate to within five meters. Therefore, the wetland and the observation site's delineation plotted digitally may be offset by at up to five meters to either side; and
- No heavy metals have been assessed nor fertility been analysed for the relevant classified soils.

### 1.5 Key Legislative Requirements

The report follows the protocols as stipulated for agricultural assessment in Government Notice 320 of 2020 (GNR 320). This Notice provides the procedures and minimum criteria for reporting in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA).

The above mentioned are supported by additional legislation that aims to manage the impact of development on the environment and the natural resource base of the country. Related legislation to this effect includes:

- Conservation of Agricultural Resources Act (Act 43 of 1983);
- Environment Conservation Act (Act 73 of 1989);
- National Environmental Management Act (Act 107 of 1998); and
- National Water Act (Act 36 of 1998).

### 1.6 Legislative Framework

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on soil and agricultural assessment as per the Government Notice 320 published in terms of NEMA, dated 20 March 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" – the following has been assumed:

- An applicant intending to undertake an activity identified in the scope of this protocol on a site identified on the screening tool as being of:
    - "Low & Medium sensitivity" for agriculture, must submit an Agricultural Compliance Statement.

An Agricultural Compliance Statement must contain the information as presented in Table 1-1 below.

***Table 1-1 Agricultural Compliance Statement information requirements as per the relevant protocol, including the location of the information within this report***

| Information to be Included (as per GN 320, 20 March 2020) | Report Section |
|---|---|
| **details and relevant expertise as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the statement including a curriculum vitae** | Pg i/ Appendix B |
| **a signed statement of independence by the specialist** | Appendix B |

| | |
|---|---|
| **a map showing the proposed development footprint (including supporting infrastructure) with a 50 m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool** | Section 3.3 or Figure 3-10 |
| **calculations of the physical development footprint area for each land parcel as well as the total physical development footprint area of the proposed development including supporting infrastructure** | Section 3.4 |
| **confirmation that the development footprint is in line with the allowable development limits…** | Section 3.4 |
| **confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities** | Section 4 |
| **a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development** | Section 4.2 |
| **any conditions to which this statement is subjected** | Section 4.3 |
| **where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr** | Section 4.1 |
| **a description of the assumptions made and any uncertainties or gaps in knowledge or data** | Section 1.4 |

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

# 2 Fieldwork

## 2.1 Soil Resources and Biodiversity Field Assessment

Field assessment for the proposed project area was conducted from the 5th of February 2024, (summer), which is a wet-season survey, to determine the soil forms and current land uses within the assessed area (**Error! Reference source not found.**).

***Figure 2-1 The Proposed components of the project***

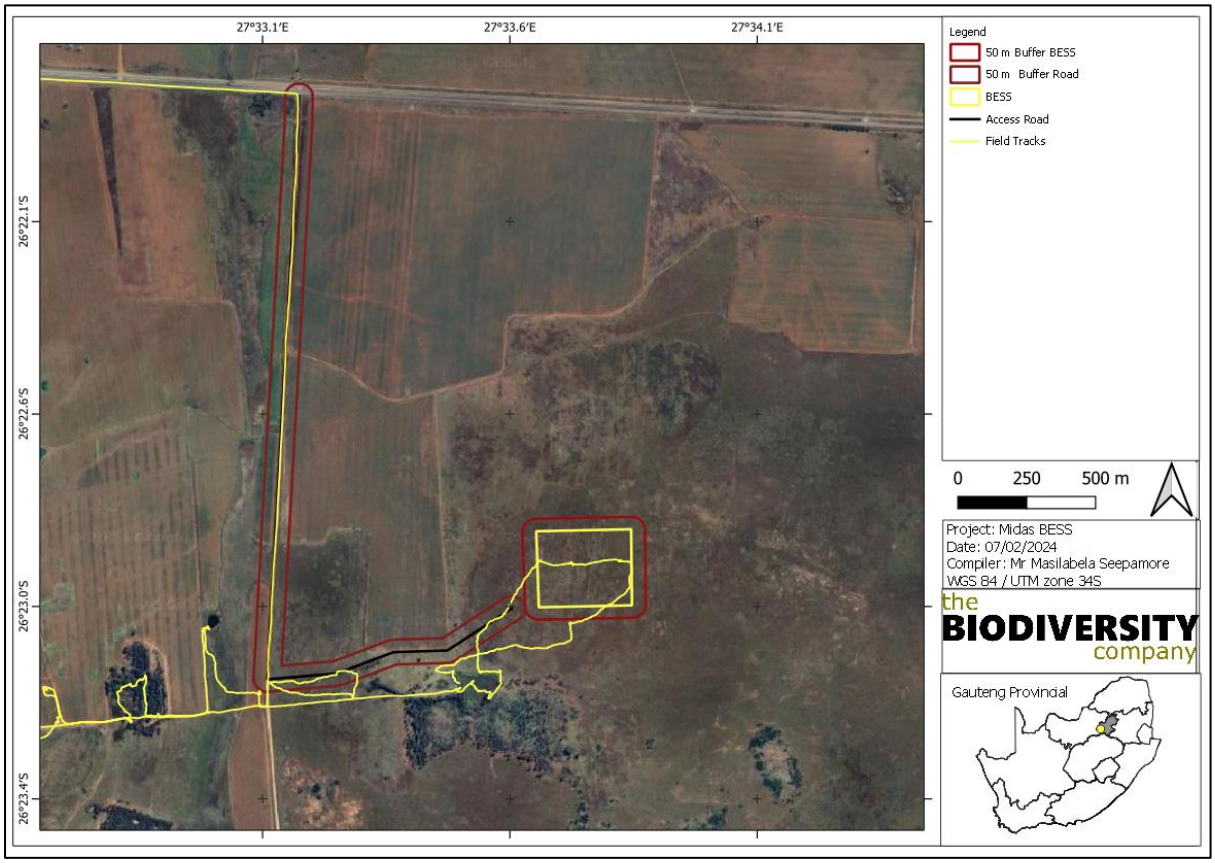



***Figure 2-2 The Proposed components of the project***

# 3 Results and Discussion

## 3.1 Desktop Information

### 3.1.1 Climate

The project area falls within the Carletonville Dolomite Grassland and Gauteng Shale Mountain Bushveld vegetation. It is characterised with warm-temperate summer-rainfall, high summer temperatures and severe frequent frost occurrence in winter. The area has a MAP ranging from 600 to 750 mm (Mucina & Rutherford, 2006) (see Figure 3-1).

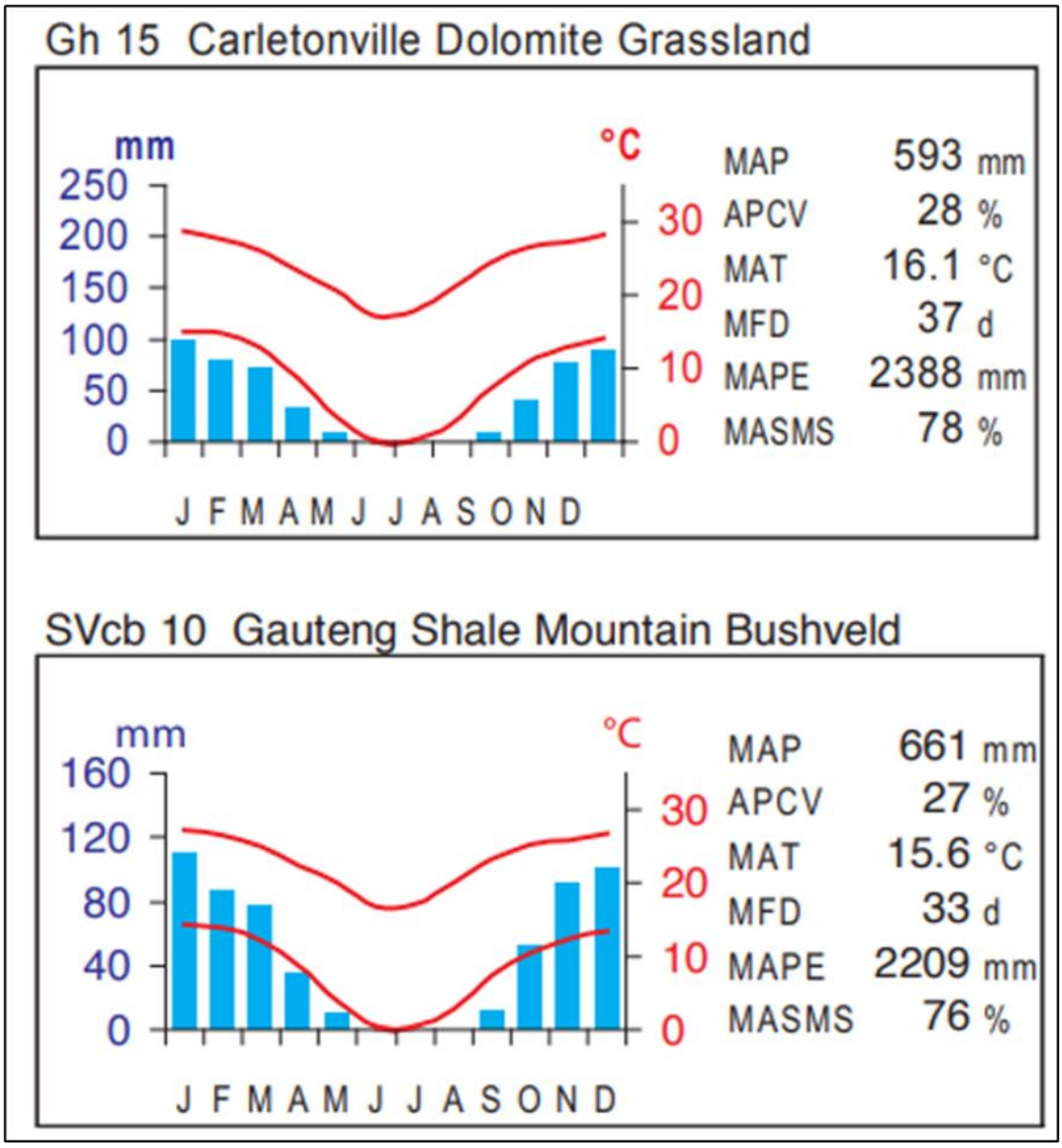



***Figure 3-1 Summarised climate for the region (Mucina & Rutherford, 2006)***

### 3.1.2 Geology & Soils

The geology of the area includes dolomite and chert of the Malmani Supergroup (Transvaal Supergroup) supporting shallow Mispah and Glenrosa soil forms. Additionally, shale and some coarse clastic sediments as well as significant andesite from the Pretoria Group (Transvaal Supergroup), all sedimentary rocks. All supporting the occurrence of shallow Mispah, but deeper soils occur at the foot of the slopes. Land types supported by the geology of the area includes Ab, Fb and some Ib land types.

According to the land type database (Land Type Survey Staff, 1972 - 2006) the assessment area to be focused on mainly falls within the Ab 7 and Fb 5 land types (**Error! Reference source not found.**). The Ab 7 land types mainly consist of Glenrosa and Hutton soil forms according to the Soil classification working group, (1991), with the occurrence of other soils within the landscape. The Fb 5 land types mainly consist of Glenrosa, Hutton, Arcadia and Rensburg soil forms and rocky areas according to the Soil classification working group, (1991), with the occurrence of other soils within the landscape.

In addition, the Ab land types are also commonly dominated by red-yellow apedal, freely drained soils: red, dystrophic and/or mesotrophic. The land Fb land types are commonly dominated by Glenrosa and/or Mispah forms (other soils may occur), lime rare or absent in upland soils but generally present in low-lying soils. The land terrain units for the featured Ab 7 land type are illustrated in ***Figure 3-3*** with the expected soils listed in Table 3-1 and Fb 5 land types in **Error! Reference source not found.** and Table 3-2.

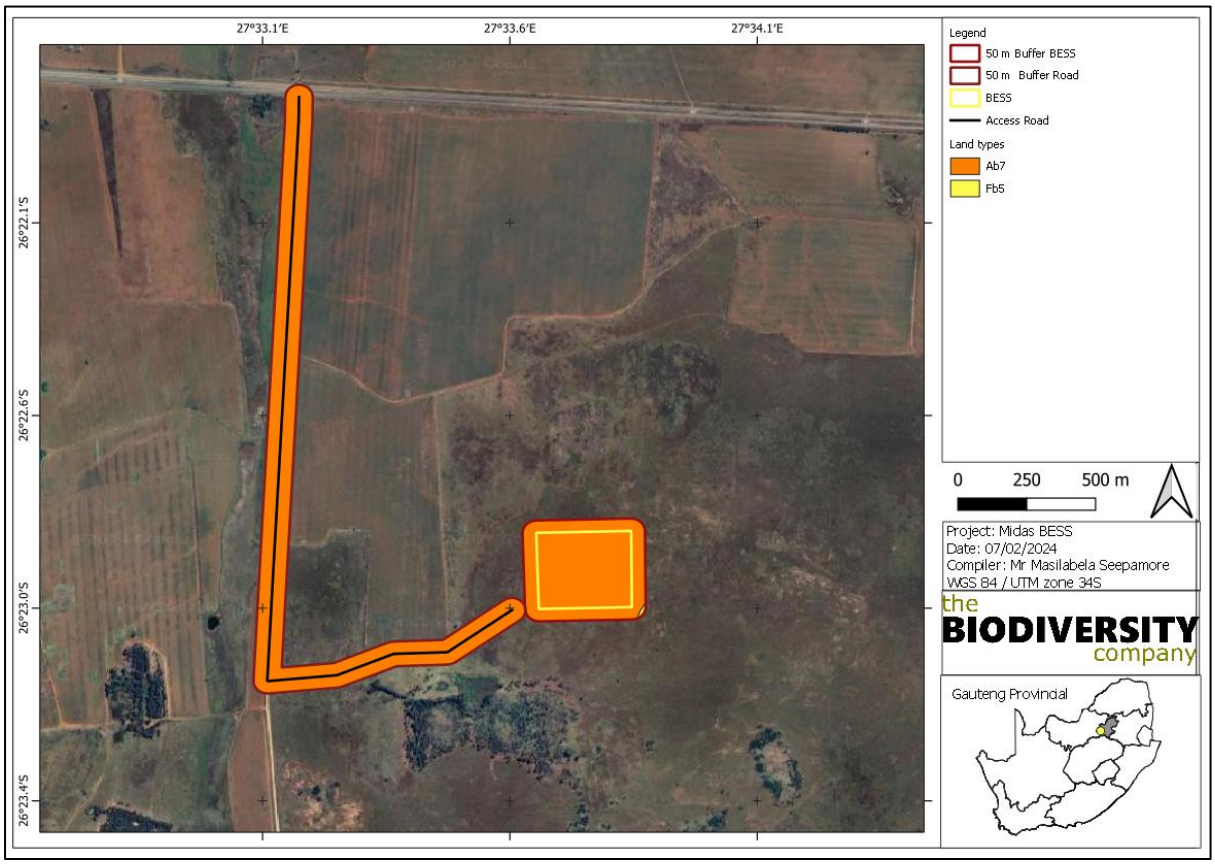



***Figure 3-2 Summarised climate for the region (Mucina & Rutherford, 2006)***

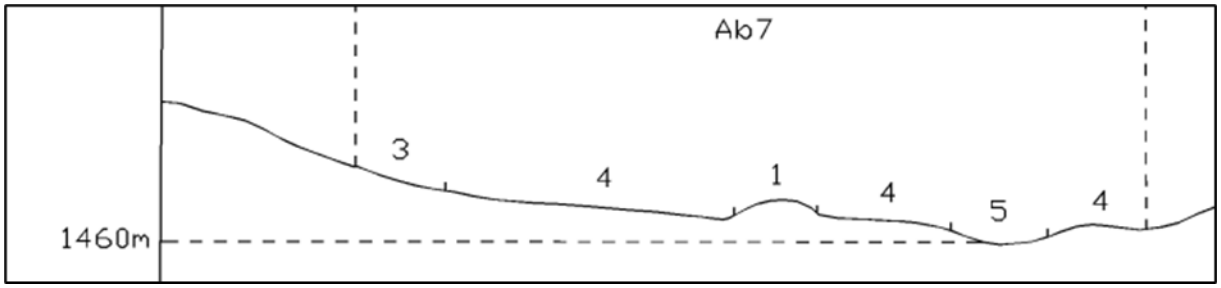



***Figure 3-3 Illustration of land type Ab 7 terrain units (Land Type Survey Staff, 1972 - 2006)***

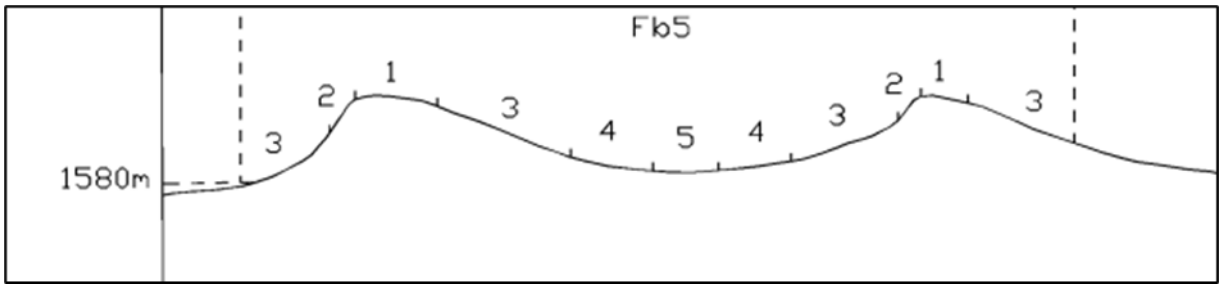



***Figure 3-4 Illustration of land type Fb 5 terrain units (Land Type Survey Staff, 1972 - 2006)***

***Table 3-1 Soils expected at the respective terrain units within the Ab 7 land type (Land Type Survey Staff, 1972 - 2006)***

| Terrain Units | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1 (%)** | | **3 (10%)** | | **4 (82%)** | | **5 (6%)** | |
| Glenrosa | 70% | Hutton | 68% | Hutton | 97% | Hutton | 50% |
| Hutton | 15% | Glenrosa | 30% | Glenrosa | 1% | Oakleaf, Longlands | 33% |
| Bare Rocks | 15% | Bare Rocks | 2% | Clovelly | 1% | Glenrosa | 16% |
| | | | | Bare Rocks | 1% | Bare Rocks | 1% |

***Table 3-2 Soils expected at the respective terrain units within the Fb 5 land type (Land Type Survey Staff, 1972 – 2006)***

| Terrain Units | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **1 (15%)** | | **2 (5%)** | | **3 (33%)** | | **4 (42%)** | | **5(5%)** | |
| Bare Rocks | 40% | Bare Rocks | 70% | Glenrosa | 29% | Hutton | 48% | Arcadia, Rensburg | 52% |
| Mispah | 33% | Mispah | 20% | Mispah | 25% | Glenrosa | 12% | Mispah | 16% |
| Glenrosa | 23% | Glenrosa | 10% | Hutton | 23% | Mispah | 11% | Bare Rocks | 12% |
| Hutton | 4% | | | Bare Rocks | 21% | Clovelly | 10% | Stream Beds | 10% |
| | | | | Shortlands | 2% | Oakleaf, Dundee | 9% | Oakleaf, Dundee | 10% |
| | | | | | | Bare Rocks | 5% | | |
| | | | | | | Shortlands | 3% | | |
| | | | | | | Avalon | 2% | | |

### 3.1.3 Terrain

The slope percentage of the proposed project area has been calculated and is illustrated in ***Figure 3-5***. Most of the project area is characterised by a slope percentage ranging between 1 to 10% with some irregularities in areas with slopes between 15 to 17%. This illustration indicates a mostly uniform topography with occurrence of some steep sloping being present. The Digital Elevation Model (DEM) of the project area (***Figure 3-6***) indicates an elevation of 1574 to 1641 Metres Above Sea Level (MASL).

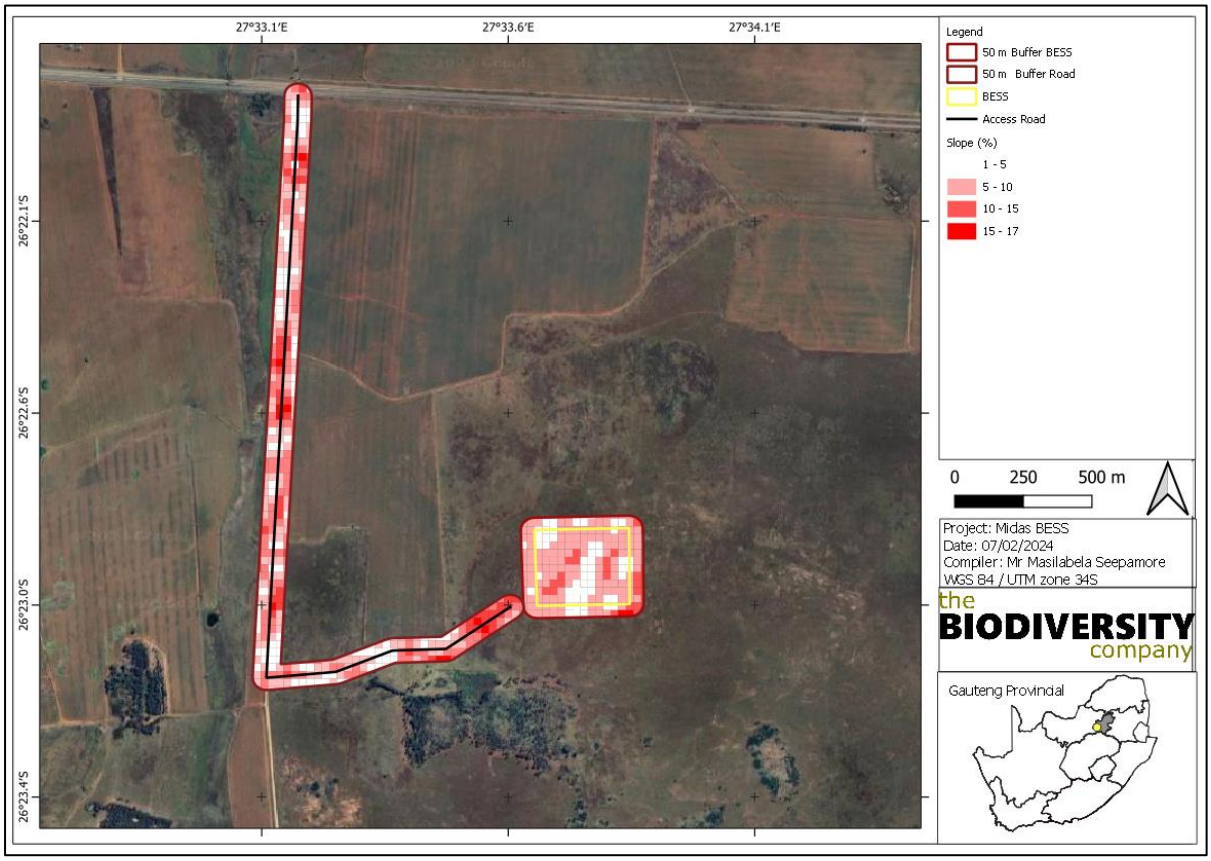



***Figure 3-5 Slope percentage map for the project area***

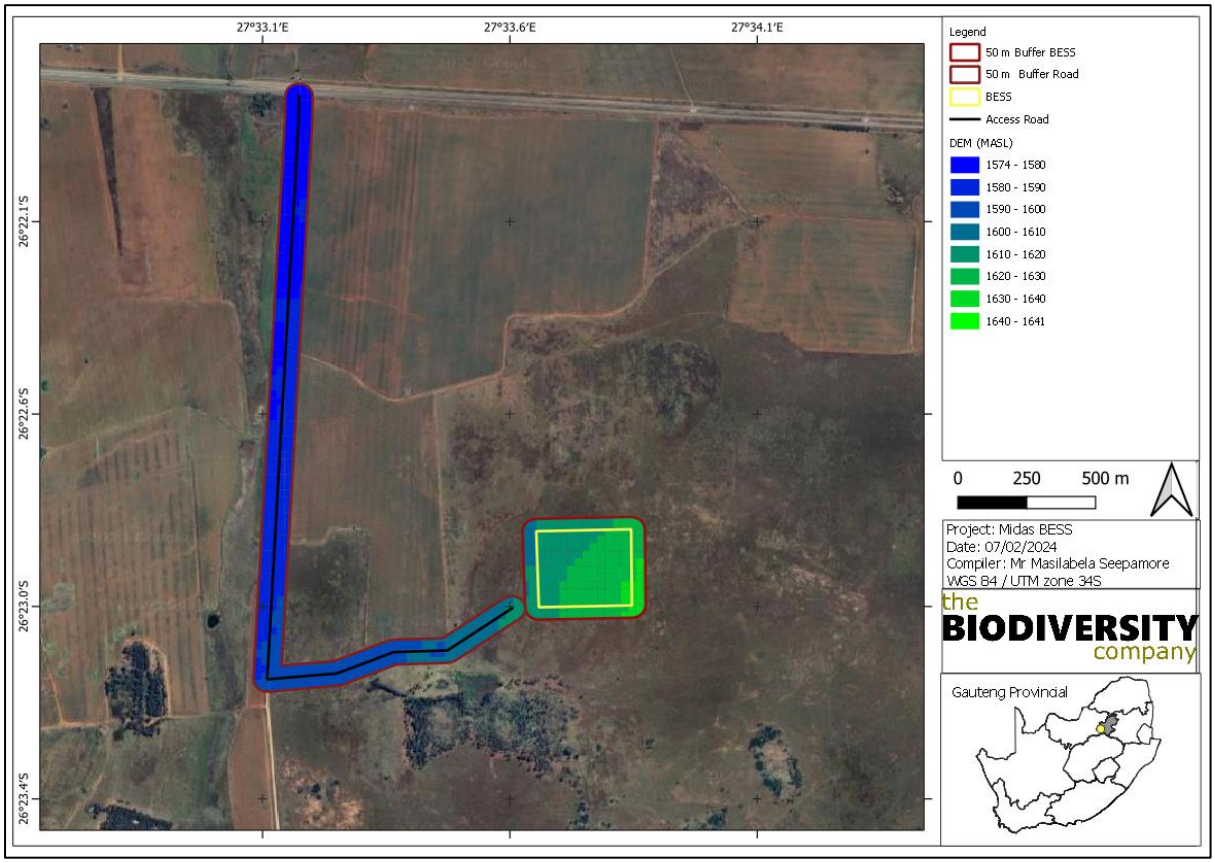



***Figure 3-6 Digital Elevation Model of the project area (Metres Above Sea Level)***

### 3.2 Baseline findings

Three representative soil forms were identified within the 50 m buffer area include the Ermelo, Hutton, and Glenrosa soil forms, with the Hutton being the most dominant soil form within the area (see ***Figure 3-7***). The different soil forms identified within the proposed project area, as well as the current land uses are illustrated in **Error! Reference source not found.** and ***Figure 3-9*** respectively. The proposed activities generally fall on gentle slope area with occurrence of steep areas. Moreover, no permanent hydromorphic soils with signs of wetness were observed during the field survey.

The most sensitive soil forms identified within the proposed project area, with high suitability for crop production is the Ermelo and Hutton soil forms. The Ermelo soil form consists of an orthic topsoil on top a thick yellow-brown apedal horizon below. The Hutton soil form consists of an orthic topsoil on top of a deep red apedal subsoil horizon below. This soil is characterised with high suitability for crop production due to their good fertility that result because of moderate retention of nutrients and water. The soil also has a good drainage and permeability due to their moderate porosity which increase water filtration and root respiration. Furthermore, with the assistance of irrigation systems, the soils will have a higher agricultural potential.

Other less sensitive soil form identified within the project area include the Glenrosa soil form. The Glenrosa soil from has an orthic topsoil horizon with a lithic horizon below. This soil is considered to have a low suitability for crop production and growth due to their restrictive limitations which include impermeable subsoil horizons of fractured and solid rocks.

The most sensitive land capability of the above-mentioned soils has been determined to be class “III” and the other identified soil to “VI”. A climate capability level 8 has been assigned to the area given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. By using the determined land capability for the most sensitive soils and the determined climate

capability, a land potential of “L6” was calculated and “L7” for the less sensitive soils. According to Smith (2006), the “L6” land potential level is characterised by very restrictive potential with regular and/or severe limitations due to soil, slope, temperatures or rainfall. The “L7” land potential level is characterized by a low potential with a severe limitation due to soil, slope, temperatures, or rainfall. The areas associated with the “L6” and “L7” land potentials are considered non-arable.

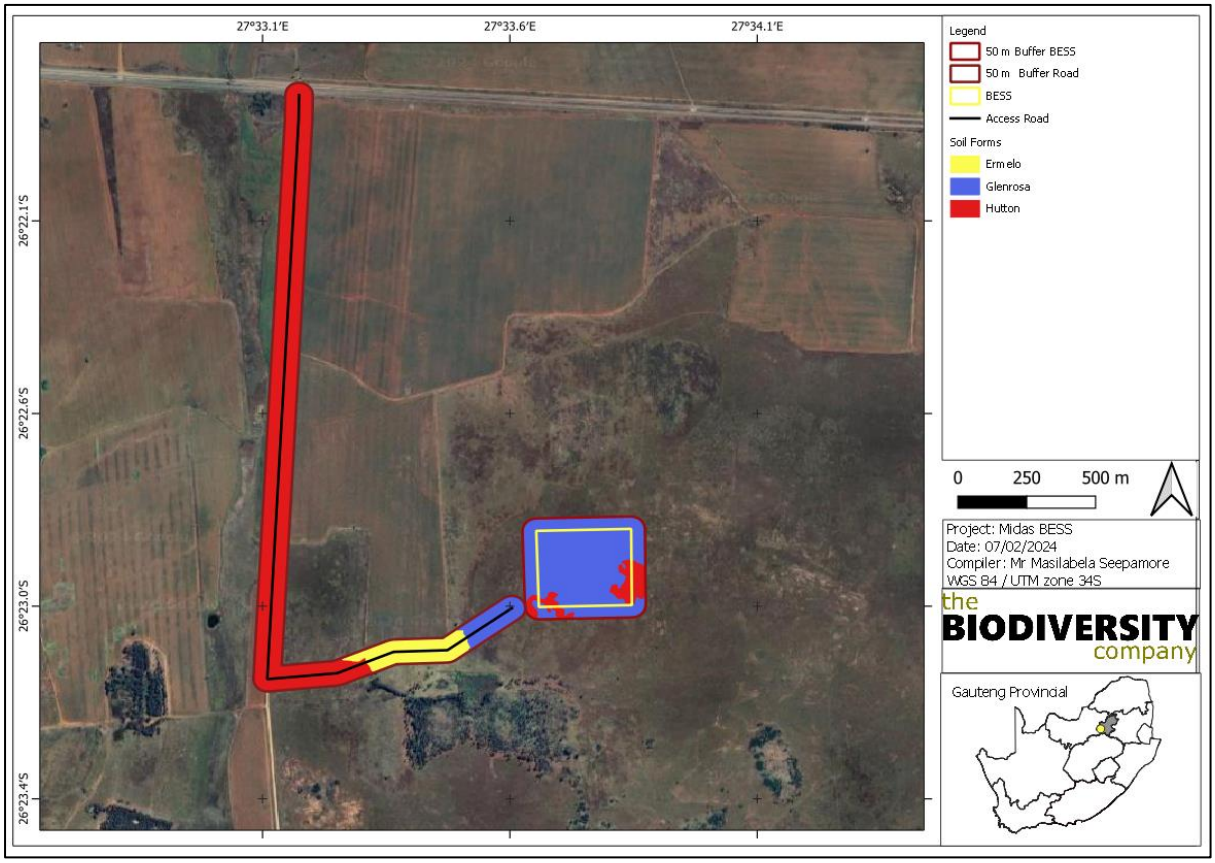



***Figure 3-7 Soil forms found within the proposed project area***

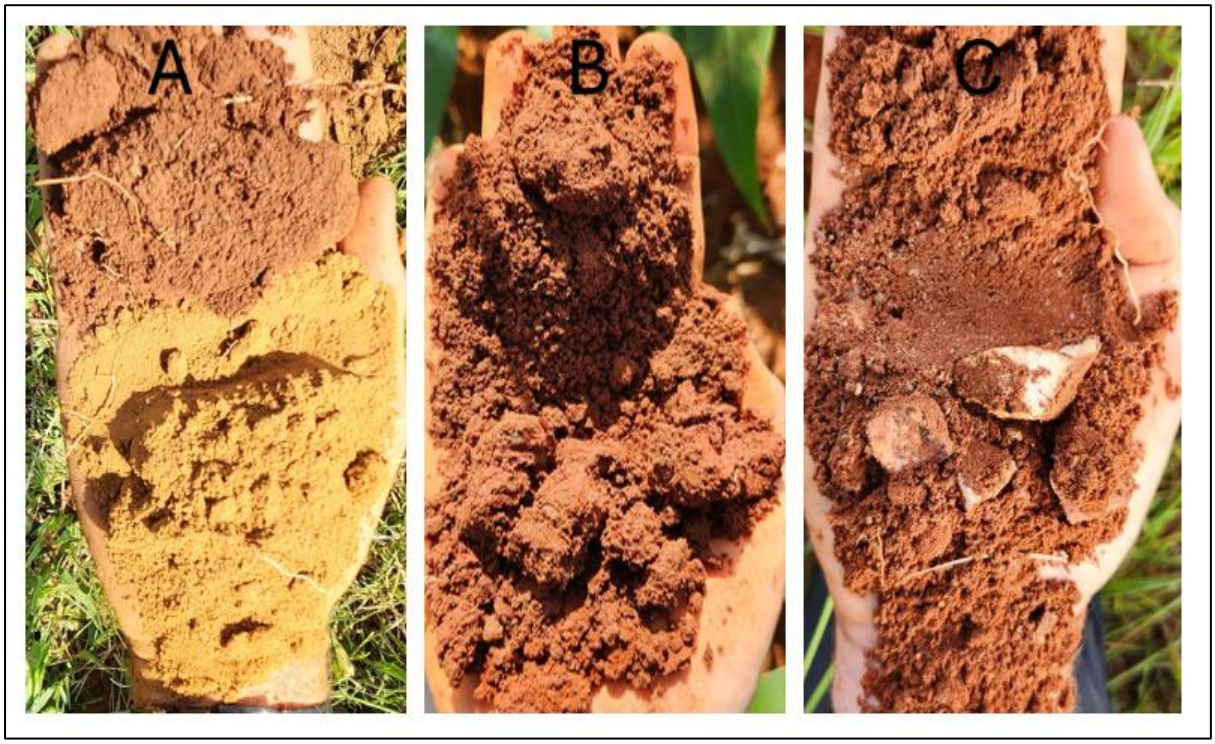



***Figure 3-8*** ***Diagnostic soil horizons identified on-site: A) Ermelo soil form; B) Hutton soil form; and C) Glenrosa soil form.***

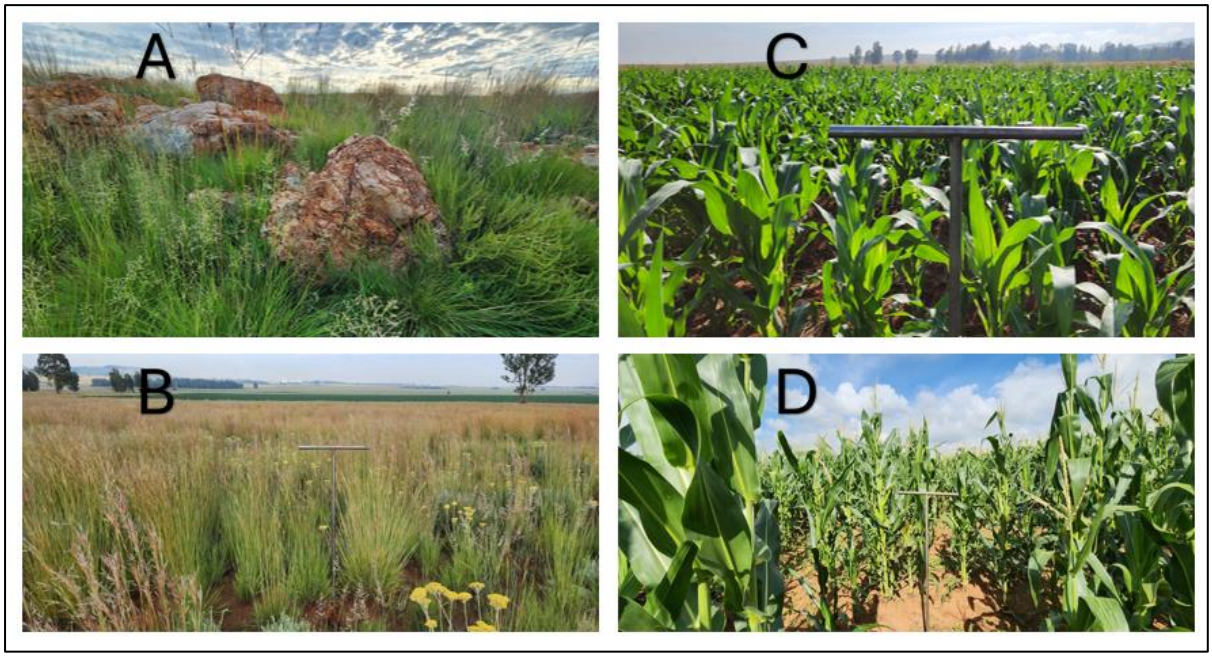



***Figure 3-9*** ***Different landscapes found within the proposed project area A) & B) Open veld; and C) & D) active crop fields***

### 3.3 Sensitivity Verification

#### 3.3.1 Screening Report – Midas BESS Project

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- Agriculture Theme Sensitivity indicates that the proposed project area falls within the 'Medium to High' agricultural sensitivity (***Figure 3-10***).

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY


| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | X | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| High | Land capability;09. Moderate-High/10. Moderate-High |
| High | Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate |
| High | Annual Crop Cultivation / Planted Pastures Rotation;Land capability;09. Moderate-High/10. Moderate-High |
| Medium | Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate |

***Figure 3-10 Map of Relative Agricultural Theme Sensitivity for the Midas BESS Project generated by the Environmental Screening Tool Site Ecological Importance (SEI)***

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which five potential land capability classes are located within the proposed footprint area's assessment area, including;

- Land Capability 6 to 8 (Low Sensitivity to Moderate Sensitivity) and;
- Land Capability 9 to 10 (Moderate High Sensitivity).

The land capability dataset (DAFF, 2017) indicates the proposed project area falls evenly within the "Low Moderate to Moderate" sensitivity category, with few areas having a "Moderate High" sensitivity (see ***Figure 3-11***).

Furthermore, "High" sensitive crop field boundaries identified by means of DFFE Screening Tool (2024;**Error! Reference source not found.**) within the project area.

The baseline soil findings and the current land uses concur with the agricultural theme in areas associated with sensitivities ranging from Low to Moderate. The Glenrosa soil form is classified with a low land capability sensitivity due to their low suitability for crop production because of impermeable subsoil horizons. Moreover, the identified crop fields (**Error! Reference source not found.**) are currently under cultivation. The proposed access crop will have a negligible impact on soil resources as the active crop fields are found within the buffer area.

As a result, based on the verified baseline findings and the current land uses, the land capability and land potential of the resources in the regulated area are both classified with an overall "Low sensitivity, with an isolated "Medium" sensitive area.

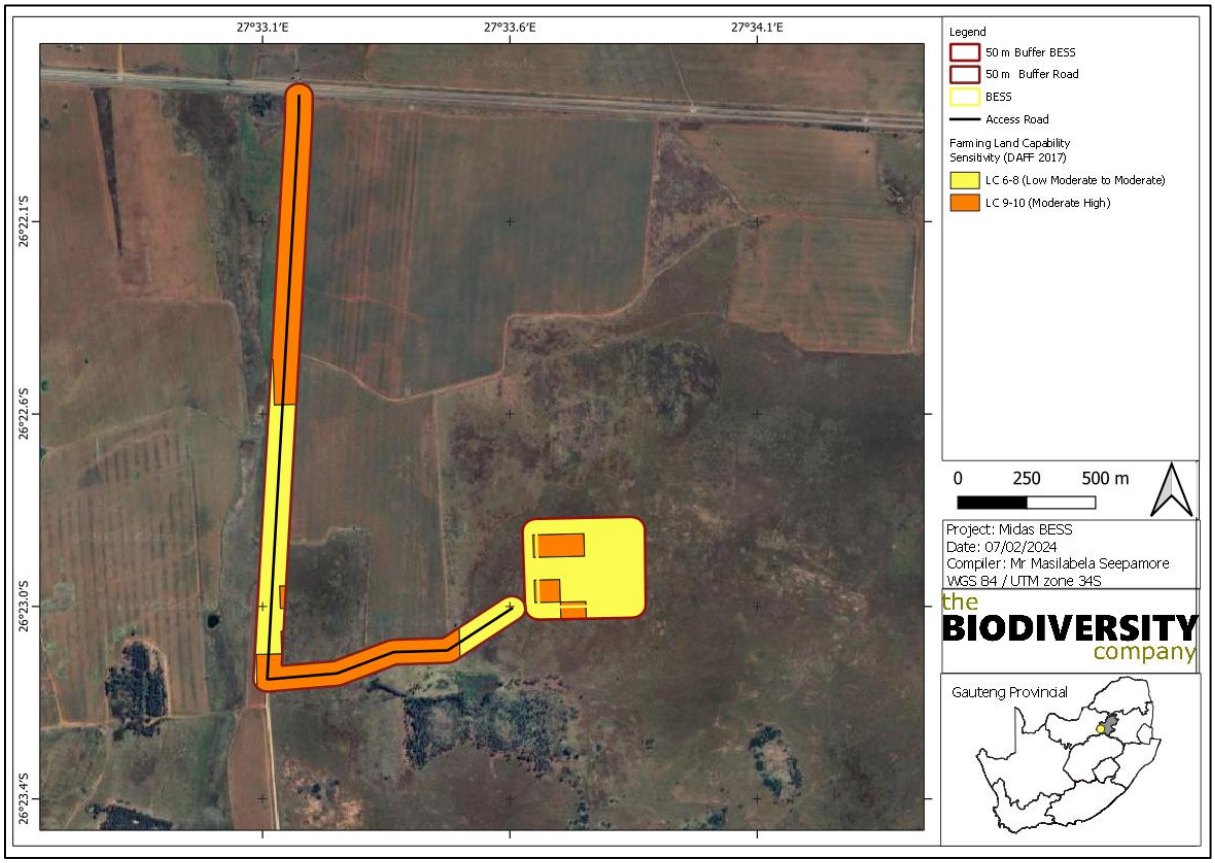



***Figure 3-11 Land Capability Sensitivity (DAFF, 2017)***

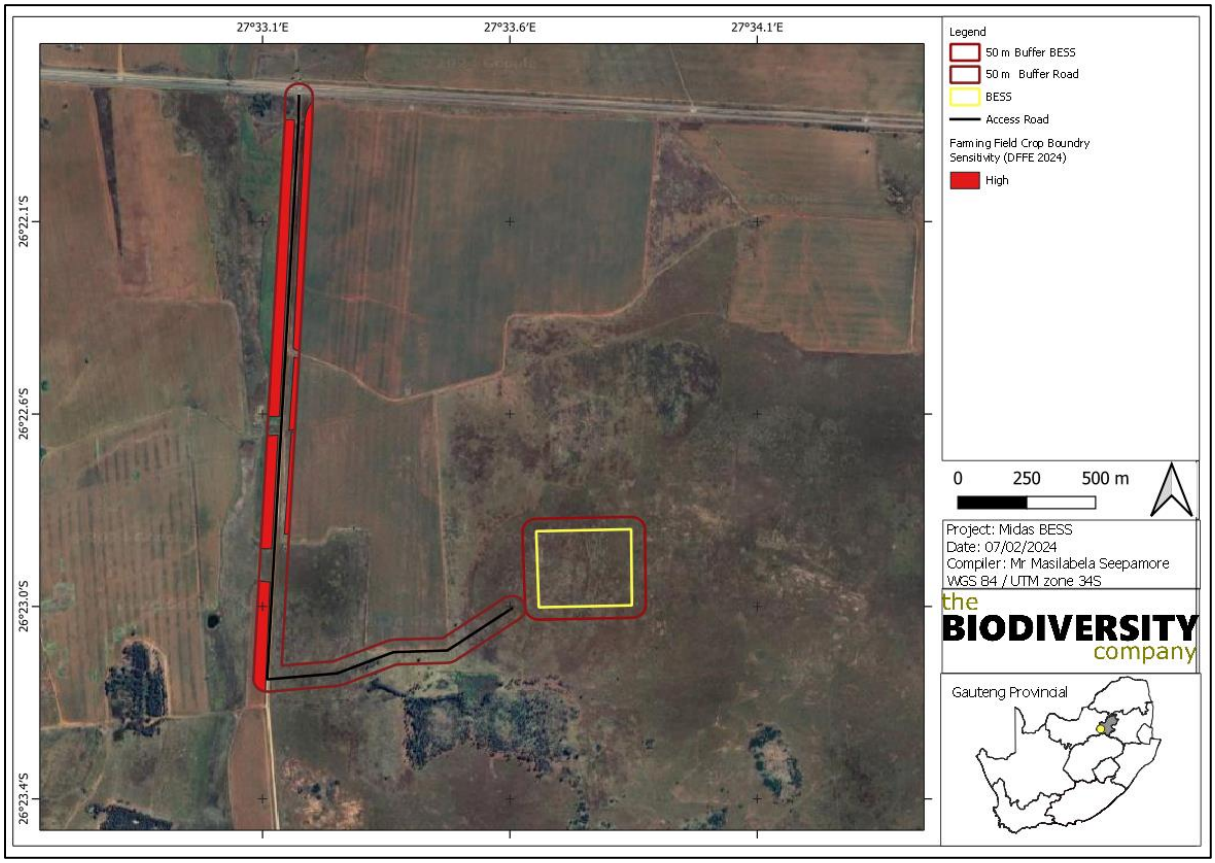



***Figure 3-12 Field Crop Boundary Sensitivity (DFFE 2024)***

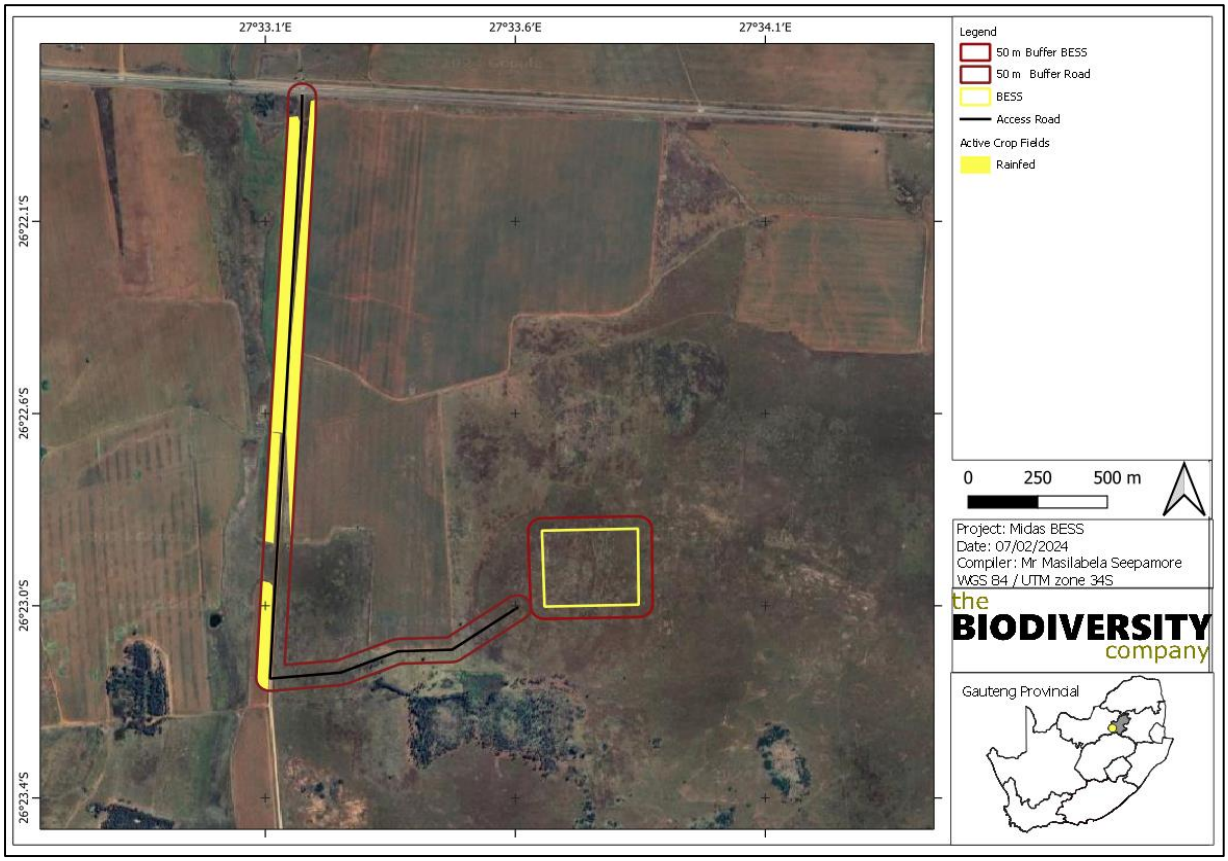



***Figure 3-13 Active crop fields (rainfed) confirmed within the project area***

### 3.3.2 A Site Ecological mportance (SEI)

The following land potential levels have been determined;

- Land potential level 6 (this land potential level is characterised by very restricted potential. Regular and/or moderate to severe limitations due to soil, slope, temperatures, or rainfall). Non-Arable; and

- Land potential level 7 (this land potential level is characterised by low potential. Severe limitations due to soil, slope, temperatures, or rainfall). Non-arable.

Land potential levels of the proposed area are illustrated in **Error! Reference source not found.**.

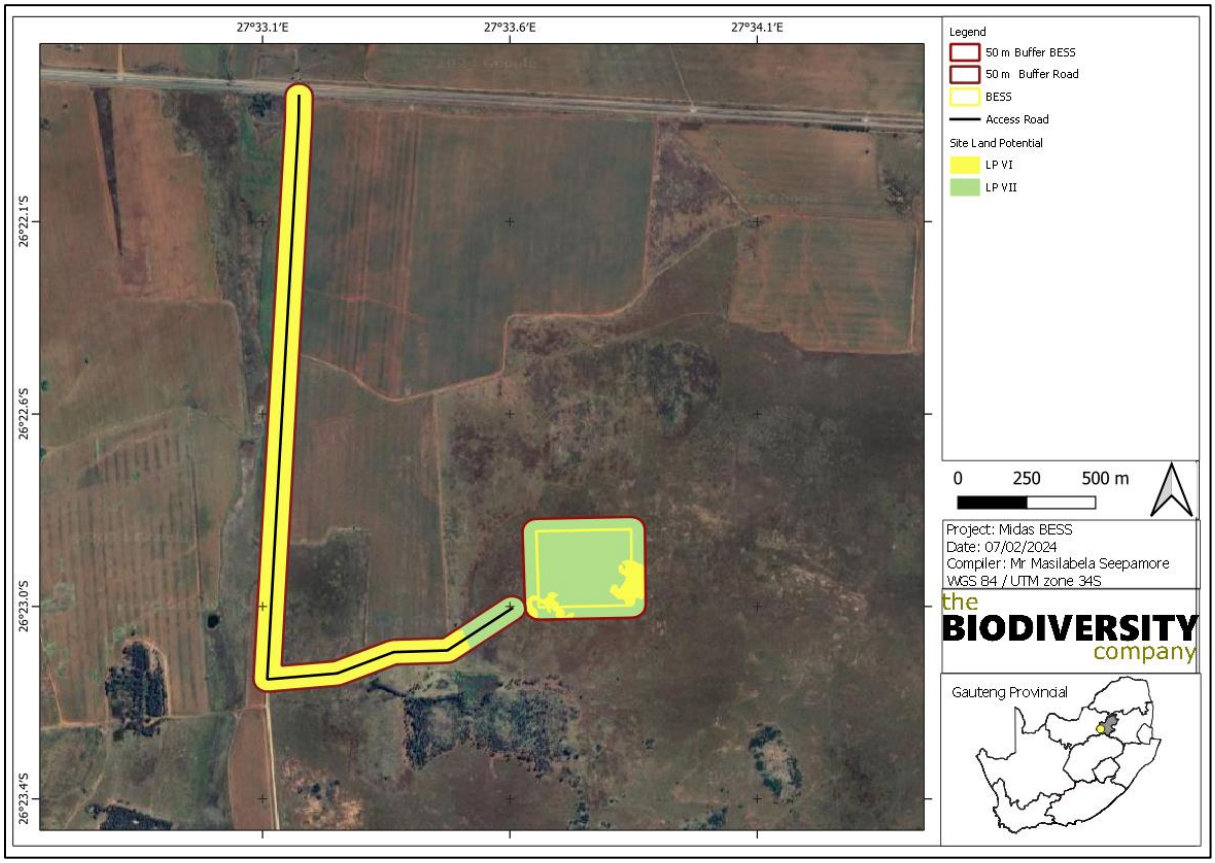



***Figure 3-14 Land Potential levels within the 50 mm buffer area of the project area***

These identified land potential levels were used to determine the overall sensitivity of resources relevant to this assessment. The “L6” areas were assigned a “Medium sensitivity”, and “L7” land potential areas were assigned a “Low sensitivity within the BESS area. However, the “L6” and L7” within the access road were assigned “Low sensitivity” (see **Error! Reference source not found.**).

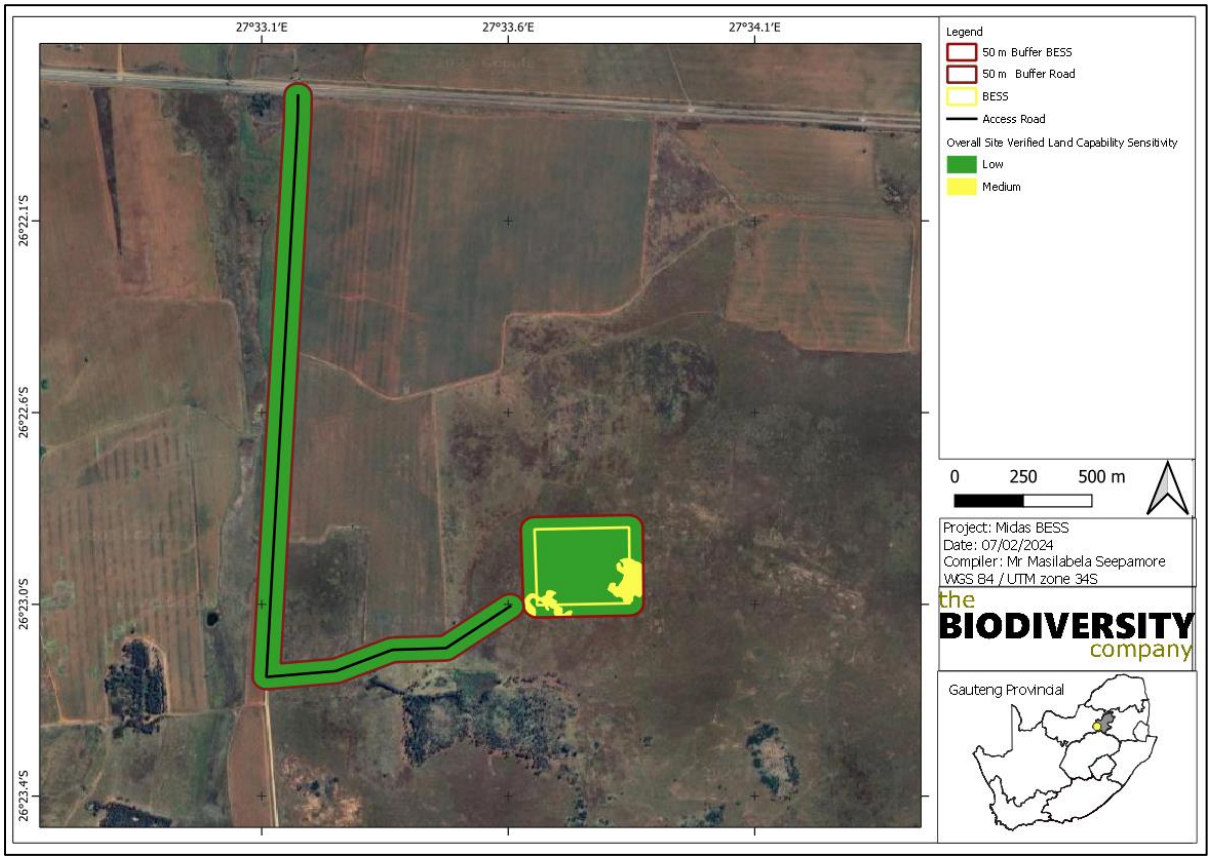



***Figure 3-15 Overall sensitivity of the project area***

Considering the soil properties, agricultural potential as well as the current land use of the BESS development area, the area has a “Low” agricultural sensitivity. Based on the confirmed sensitivities, the overall sensitivity of the proposed project area is also categorized as “Low”. The allocated sensitivities for the theme are either disputed or validated in Table 3-3 below.

***Table 3-3 Summary of the screening tool vs specialist assigned sensitivities***

| Screening Tool Theme | Screening Tool | Specialist | Tool Validated or Disputed by Specialist - Reasoning |
|---|---|---|---|
| Agricultural Theme | High | Low | Disputed – Land capability Low to Medium, with the presence of low potential soil such as Glenrosa, no irrigation infrastructure and active crop fields. |
| | Medium | Medium | Confirmed – Land capability Low to Medium, with the presence of medium potential soil such as Ermelo and Hutton, but no irrigation infrastructure and active crop fields |

# 4 Conclusion

The most sensitive soil forms found in the proposed project area were Ermelo and Hutton soil forms characterised by a restrictive land potential “L6” and ultimately a “Medium” sensitivity due to the present poor climate conditions. The soils are also usually found to be Moderately suitable for crop production. Moreover, the less sensitive and dominant soil form was Glenrosa, which were also identified within the project area are categorised as a “Low” sensitivity due their very restrictive permeability and the poor climatic conditions.

The land capability sensitivity (DAFF, 2017) is dominated by land capabilities with “Low Moderate to Moderate”, with few areas associated with “Moderate High” sensitivity. There were no field crop boundaries identified within the proposed project area, following the agricultural theme screening tool.

It is the specialist's opinion that the proposed Midas BESS project and associated infrastructure will have an overall low residual impact on the agricultural production ability of the land. That being the case, the proposed Midas Bees project and associate infrastructure may be favourably considered for development.

### 4.1 Access Road Consideration

The revised design has been informed by the specialist findings and corresponding sensitivities. This layout, encompassing all necessary infrastructure and access routes is presented in . It is the opinion of the specialist that the revised layout is acceptable and may be considered favourably for approval by the Competent Authority.

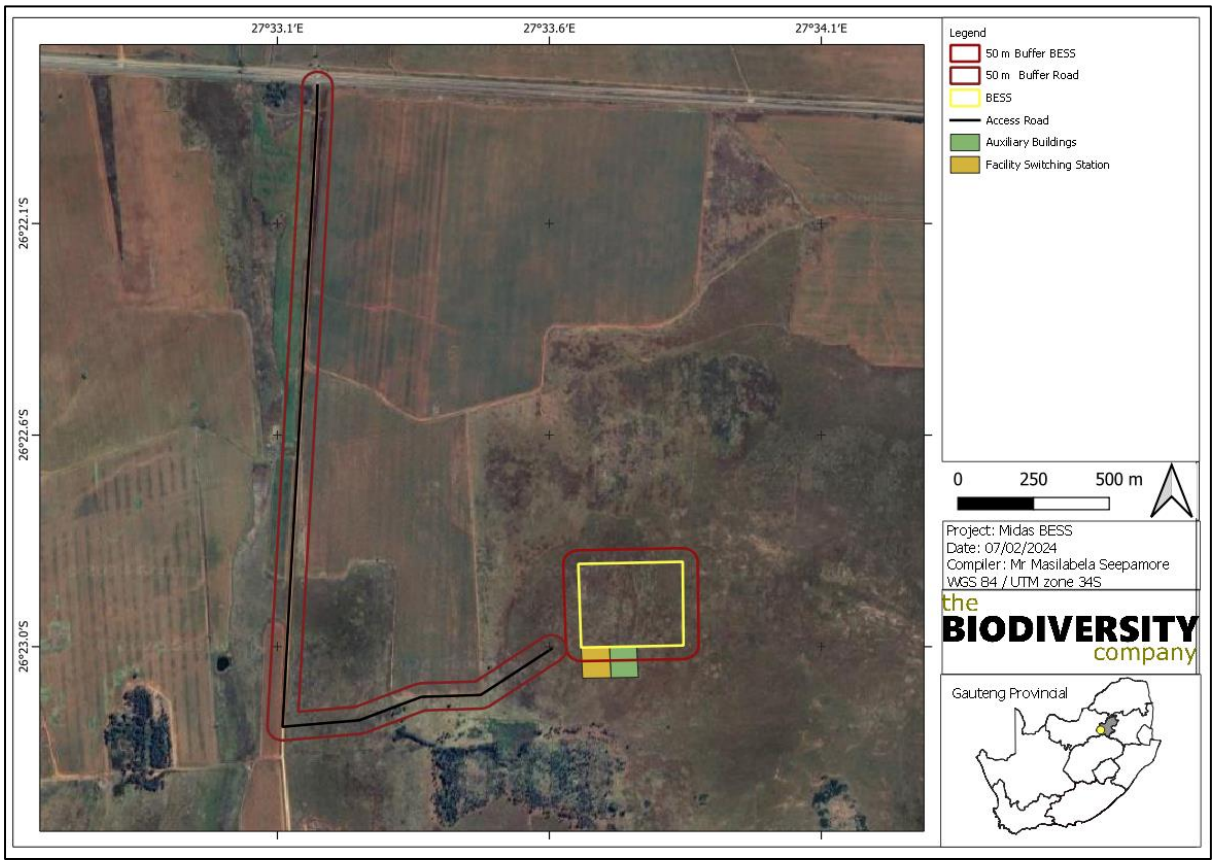



***Figure 4-1 Proposed project layout***

### 4.2 Management Measures

An Agricultural Compliance Statement is not required to complete an impact assessment, but where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr must be provided. The following measures are provided:

- Vegetation clearance must be restricted to areas authorised for development;
- Land clearing and preparation may only be undertaken immediately prior to construction activities and within authorised areas;
- A stormwater management plan must be developed and implemented for the project; and
- If soil erosion is detected, the area must be stabilised using geo-textiles and facilitated re-vegetation.

### 4.3 Specialist Statement

The proposed Midas BESS development area will have an acceptable negative impact on the agricultural production capability of the area. The proposed development can be favourably considered for authorisation. The following serves to substantiate this statement:

- The land capability of the area ranges from low to medium;
- The agricultural potential of the area ranges from low to medium
- There are no active delineated crop fields for the BESS facility infrastructure area; and
- The overall agricultural sensitivity for the BESS facility area is low.

### 4.4 Statement Conditions

The conclusion of this assessment on the acceptability of the proposed project and the recommendation for its approval is not subject to any conditions.

# 5 References

Land Type Survey Staff. 1972 - 2006. Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.

Mucina, L., & Rutherford, M. C. 2006. The Vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19. Pretoria: National Biodiversity Institute.

Smith, B. 2006. The Farming Handbook. Netherlands & South Africa: University of KwaZulu-Natal Press & CTA.

Soil Classification Working Group. 1991. Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

Soil Classification Working Group. 2018. Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

# 6 Appendix Items

## 6.1 Appendix A: Methodology

### 6.1.1 Desktop Assessment

As part of the desktop assessment, baseline soil information was obtained using published South African Land Type Data. Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 - 2006). The land type data is presented at a scale of 1:250 000 and comprises of the division of land into land types. In addition, a Digital Elevation Model (DEM) as well as the slope percentage of the area was calculated by means of the NASA Shuttle Radar Topography Mission Global 1 arc second digital elevation data by means of QGIS and SAGA software.

### 6.1.2 Field Survey

The site was traversed on foot. A soil auger was used to determine the soil form/family and depth. The soil was hand augured to the first restricting layer or 1.2 m. Soil survey positions were recorded as waypoints using a handheld GPS. Soils were identified to the soil family level as per the "Soil Classification: A Taxonomic System for South Africa" (Soil Classification Working Group, 2018). Landscape features such as existing open trenches were also helpful in determining soil types and depth.

### 6.1.3 Land Capability

Land capability and agricultural potential will be determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes.

Land capability is divided into eight classes, and these may be divided into three capability groups. Table 6-1 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).

***Table 6-1 Land capability class and intensity of use (Smith, 2006)***

| Land Capability Class | Increased Intensity of Use | | | | | | | | | Land Capability Groups |
|---|---|---|---|---|---|---|---|---|---|---|
| I | W | F | LG | MG | IG | LC | MC | IC | VIC | Arable Land |
| II | W | F | LG | MG | IG | LC | MC | IC | | |
| III | W | F | LG | MG | IG | LC | MC | | | |
| IV | W | F | LG | MG | IG | LC | | | | |
| V | W | F | LG | MG | | | | | | Grazing Land |
| VI | W | F | LG | MG | | | | | | |
| VII | W | F | LG | | | | | | | |
| VIII | W | | | | | | | | | Wildlife |
| | | | | | | | | | | |
| **W - Wildlife** | | MG - Moderate Grazing | | | MC - Moderate Cultivation | | | | | |
| **F- Forestry** | | IG - Intensive Grazing | | | IC - Intensive Cultivation | | | | | |
| **LG - Light Grazing** | | LC - Light Cultivation | | | VIC - Very Intensive Cultivation | | | | | |

The land potential classes are determined by combining the land capability results and the climate capability of a region as shown in **Error! Reference source not found.**. The final land potential results are then described in

Table 6-3 The Land Potential Classes

.

***Table 6-2 The combination table for land potential classification***

| Land capability class | Climate capability class | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 |
| **I** | L1 | L1 | L2 | L2 | L3 | L3 | L4 | L4 |
| **II** | L1 | L2 | L2 | L3 | L3 | L4 | L4 | L5 |
| **III** | L2 | L2 | L3 | L3 | L4 | L4 | L5 | L6 |
| **IV** | L2 | L3 | L3 | L4 | L4 | L5 | L5 | L6 |
| **V** | Vlei | Vlei | Vlei | Vlei | Vlei | Vlei | Vlei | Vlei |
| **VI** | L4 | L4 | L5 | L5 | L5 | L6 | L6 | L7 |
| **VII** | L5 | L5 | L6 | L6 | L7 | L7 | L7 | L8 |
| **VIII** | L6 | L6 | L7 | L7 | L8 | L8 | L8 | L8 |

***Table 6-3 The Land Potential Classes***

| Land potential | Description of land potential class |
|---|---|
| **L1** | Very high potential: No limitations. Appropriate contour protection must be implemented and inspected. |
| **L2** | High potential: Very infrequent and/or minor limitations due to soil, slope, temperatures, or rainfall. Appropriate contour protection must be implemented and inspected. |
| **L3** | Good potential: Infrequent and/or moderate limitations due to soil, slope, temperatures, or rainfall. Appropriate contour protection must be implemented and inspected. |
| **L4** | Moderate potential: Moderately regular and/or severe to moderate limitations due to soil, slope, temperatures, or rainfall. Appropriate permission is required before ploughing virgin land. |
| **L5** | Restricted potential: Regular and/or severe to moderate limitations due to soil, slope, temperatures, or rainfall. |
| **L6** | Very restricted potential: Regular and/or severe limitations due to soil, slope, temperatures, or rainfall. Non-arable |
| **L7** | Low potential: Severe limitations due to soil, slope, temperatures, or rainfall. Non-arable |
| **L8** | Very low potential: Very severe limitations due to soil, slope, temperatures, or rainfall. Non-arable |

The land capability of the proposed footprint will be compared to the National Land Capability which was refined in 2014- 2016. The National Land Capability methodology is based on a spatial evaluation modelling approach and a raster spatial data layer consisting of fifteen (15) land capability evaluation values (Table 6-4 National Land Capability Values (DAFF,2017)

), usable on a scale of 1:50 000 – 1:100 000 (DAFF, 2017). The previous system is based on a classification approach, with 8 classes (Table 6-1). Land capability and land potential will also be determined in consideration of the screening tool to ultimately establish the accuracy of the land capability sensitivity from (DAFF, 2017).

***Table 6-4 National Land Capability Values (DAFF,2017)***

| Land Capability Evaluation Value | Land Capability Description |
|---|---|
| **1** | Very low |
| **2** | |
| **3** | Very Low to Low |

| | |
|---|---|
| 4 | |
| 5 | Low |
| 6 | Low to Moderate |
| 7 | |
| 8 | Moderate |
| 9 | Moderate to High |
| 10 | |
| 11 | High |
| 12 | High to Very High |
| 13 | |
| 14 | Very High |
| 15 | |

## 6.2 Appendix B Specialist declarations

**DECLARATION**

I, Matthew Mamera, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant 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;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

**Dr Matthew Mamera**

**Soil Scientist**

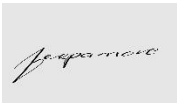
The Biodiversity Company

February 2024

**DECLARATION**

I, Masilabela Seepamore, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant 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;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



**Masilabela Seepamore**

**Agricultural Scientist**

The Biodiversity Company

February 2024

## 6.3 Appendix C Curriculum vitae

# Matthew Mamera

## PhD Soil Science (*Cand Nat Sci*)

*Cell: +27 785 772 668*
*Email: matthew@thebiodiversitycompany.com*
*Identity Number: 8810315983183*
*Date of birth: 31 October 1988*

**Profile Summary**

Working experience throughout South Africa

Specialist experience with pedology and agriculture.

Specialist expertise include hydropedology, pedology, land contamination, agricultural potential, land rehabilitation, rehabilitation management and wetlands resources.

Experience hydropedological modelling

**Areas of Interest**

Mining, Farming, Soil and Water quality contamination, Soil Sanitation management, Soil Carbon, Sustainability and Conservation.

**Key Experience**

- Environmental Impact Assessments (EIA)
- Environmental Management Programmes (EMP)
- Wetland delineations
- Rehabilitation Plans
- Soil taxonomic classification (SA forms and WRB groups)
- Soil Hydropedology assessments
- Agriculture potential assessments
- Land contamination assessments

**Country Experience**

South Africa: All Provinces

Zambia - Kitwe and Mufulira

Angola- Zenza – Cacuso; Luena - Saurimo

**Nationality**

South African Permanent Residence

**Languages**

English – Proficient

Ndebele, Xhosa, Shona – Proficient

**Qualifications**

- PhD (University of the Free States)- Soil Science (Hydropedology, Sanitation and Water quality management)
- MSc (University of Fort Hare) – Soil Science (Hydropedology, Sanitation and Water quality management)
- BSc Honours *Cum laude* (University of Fort Hare) – Soil Science (Hydropedology, wetlands delineation and rehabilitation)
- BSc Agricultural Soil Science
- Cand Nat Sci 116356
- SSSSA- SSSSA 201

# Masilabela Klaas Seepamore

## MSc Soil Science (*Cand Nat Sci*)

*Cell: +27 788151878*
*Email: masilabela@thebiodiversitycompany.com*
*Identity Number: 8806085781088*
*Date of birth: 08 June 1988*

**Profile Summary**

Working experience in South Africa

Specialist experience with soil science, agronomy and agrometeorology.

Specialist expertise include production agronomy, pedology, fertilizer recommendation, trial management, data analysis and crop modelling.

**Areas of Interest**

Farming, resource use efficiency production agronomy, soil classification, soil and crop research, climate change adaptation and mitigation strategies,

**Key Experience**

- Land suitability studies and report writing
- Soil taxonomic classification SA forms
- Fertilizer recommendation
- Crop research
- Data analysis
- Farm visit
- Technology transfer

**Country Experience**

South Africa

**Nationality**

South African

**Languages**

English – Proficient

Setswana, Sesotho – Proficient

**Qualifications**

- BASOS-FACTS Course (FERTASA)
- MSc Agriculture *Cum laude* (University of the Free State) – Soil Science (soil science, agronomy, and production agronomy)
- BSc Agriculture Honours (University of the Free State) – Soil Science (soil science, agronomy, crop nutrition)
- BSc Agricultural Agronomy and Soil Science
- Cand Nat Sci 113907