Soil and Agricultural Compliance Statement for the proposed New Consort Mining Right and Environmental Authorisation Amendment Application

Ehlanzeni Local Municipality, Mpumalanga Province, South Africa

February 2024

CLIENTS

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Report Name	**Soil and Agricultural Compliance Statement for the proposed New Consort Mining Right and Environmental Authorisation Amendment Application Project**
Reference	**New Consort Mining Right Amendment Application**
Submitted to	Shango Solutions
Statement Contributor / Reviewer	**Matthew Mamera** Matthew Mamera is a Cand. Sci Nat registered (116356) in natural and agricultural sciences recognized in soil science. Matthew is a soil and hydropedology specialist with experience in soil, pedology, hydropedology, water and sanitation management and land contamination and has field experience and numerous peers reviewed scientific publications in international journals. He is a holder of a PhD in soil science, hydropedology, water and sanitation obtained at the University of the Free State, Bloemfontein. Matthew completed his M.Sc. in soil science, hydropedology and water management at the University of Fort Hare, Alice. Matthew is also a member of the Soil Science Society of South Africa (SSSSA).
Reviewer	**Andrew Husted** Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 13 years' experience in the environmental consulting field.
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 interests 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 principles of science.

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1 Introduction

The Biodiversity Company was commissioned to conduct a soil and agricultural potential assessment for the proposed New Consort Mining Right (Amendment) Application. The project is located approximately 10 km north of Barberton in the Ehlanzeni District Municipality, Mpumalanga Province.

Barberton Mines (Pty) Ltd (Barberton Mines), which forms part of Pan African Resources PLC, owns and operates the New Consort Mine near the town of Barberton, in the Mpumalanga Province of South Africa. Mining in the area commenced in the 1880's. The mine is operated under a mining right (Reference Number: **MP 30/5/1/2/2/10220 MR (190 MR)** and an approved Environmental Management Plan issued by the Department of Mineral Resources and Energy (DMRE) in terms of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002, as amended).

The updated Regulation 2(2) Plan (to be provided shortly) refers to the application area as;

i. A portion of the Farm 652 JU (formerly Mundts Concession Section C Kaap Block)
ii. A portion of the Farm 934 JU (formerly Mundts Concession Section C Kaap Block)
iii. A portion of the Remainder of Portion 8 of the Farm Riverside 245 JU (formerly Riverside 245 JU)
iv. A portion of the Farm Barberton Nature Reserve 954 JU (formerly Mundts Concession Section C Kaap Block)

The amendment application is required to address an administrative error that occurred at the time of execution of the right. The properties were omitted in Annexure "A" to the mining right. However, they are included in the Regulation 42 Plan of the mining right. In addition, they also formed part of the initial environment impact assessment process. It is anticipated that the proposed additions will not result in a change of scope to the mining work programme. Therefore, the inclusion of these properties into the mining right will allow for the continuation of current and scheduled mining operations. No surface infrastructure is planned for this property portion. The surface layout and underground layout plans can be seen in Figure 1-3 and Figure 1-4 respectively.

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.

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 mining right extension project.

This report, after taking into consideration the findings and recommendations provided by the specialist herein, 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.

1.1 Project Area

The extent of the property/development footprint pertaining to the "application area" is referred to as the Project Area of Influence (PAOI) as per protocol requirement and the project area. A map of the PAOI in relation to the local region is presented in Figure 1-1, and a map of the PAOI with the proposed layout is presented in Figure 1-2. The surrounding land uses include agriculture, grazing, game farming, waterbodies, and natural veld.

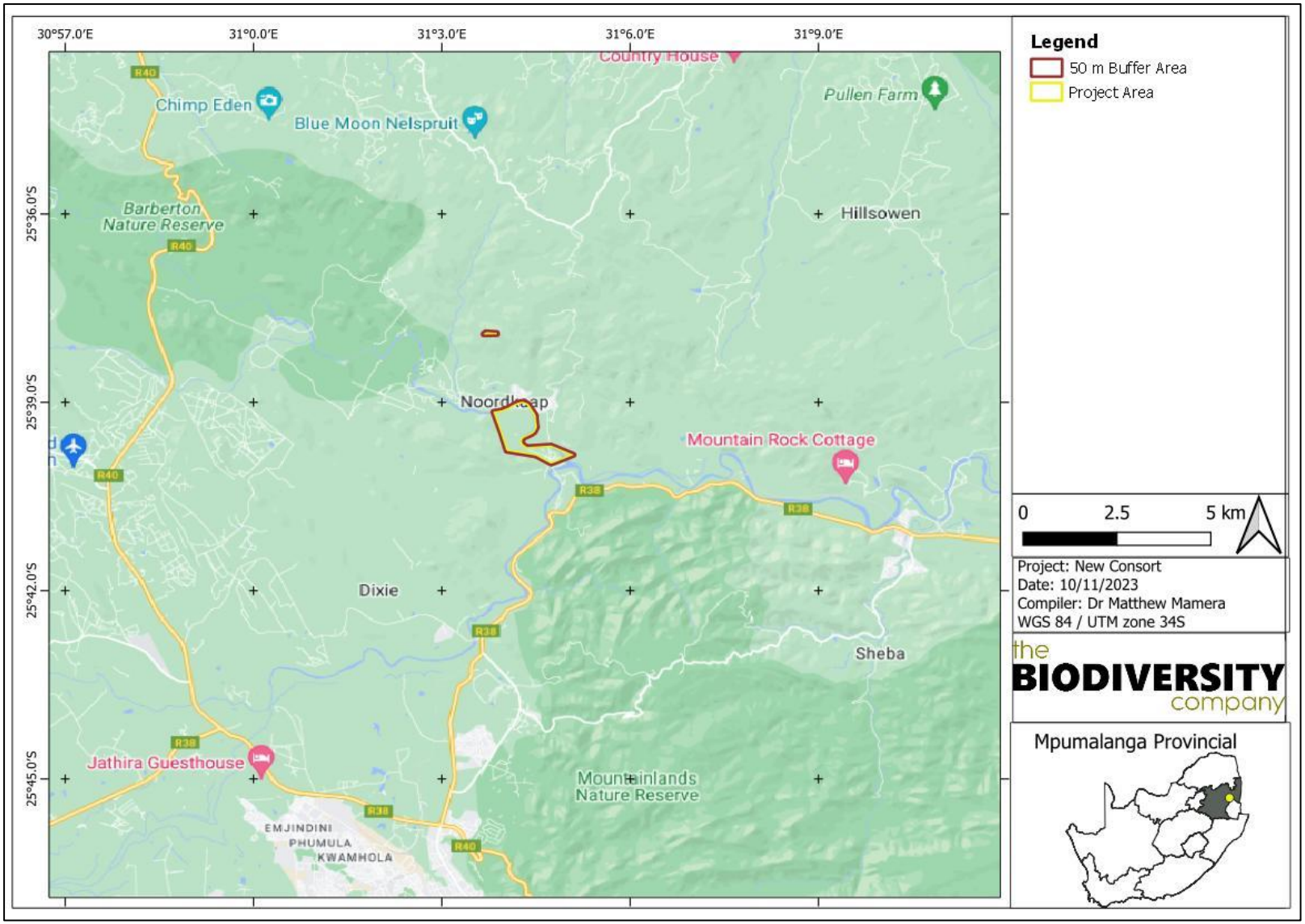

Figure 1-1 Locality map of the project area.

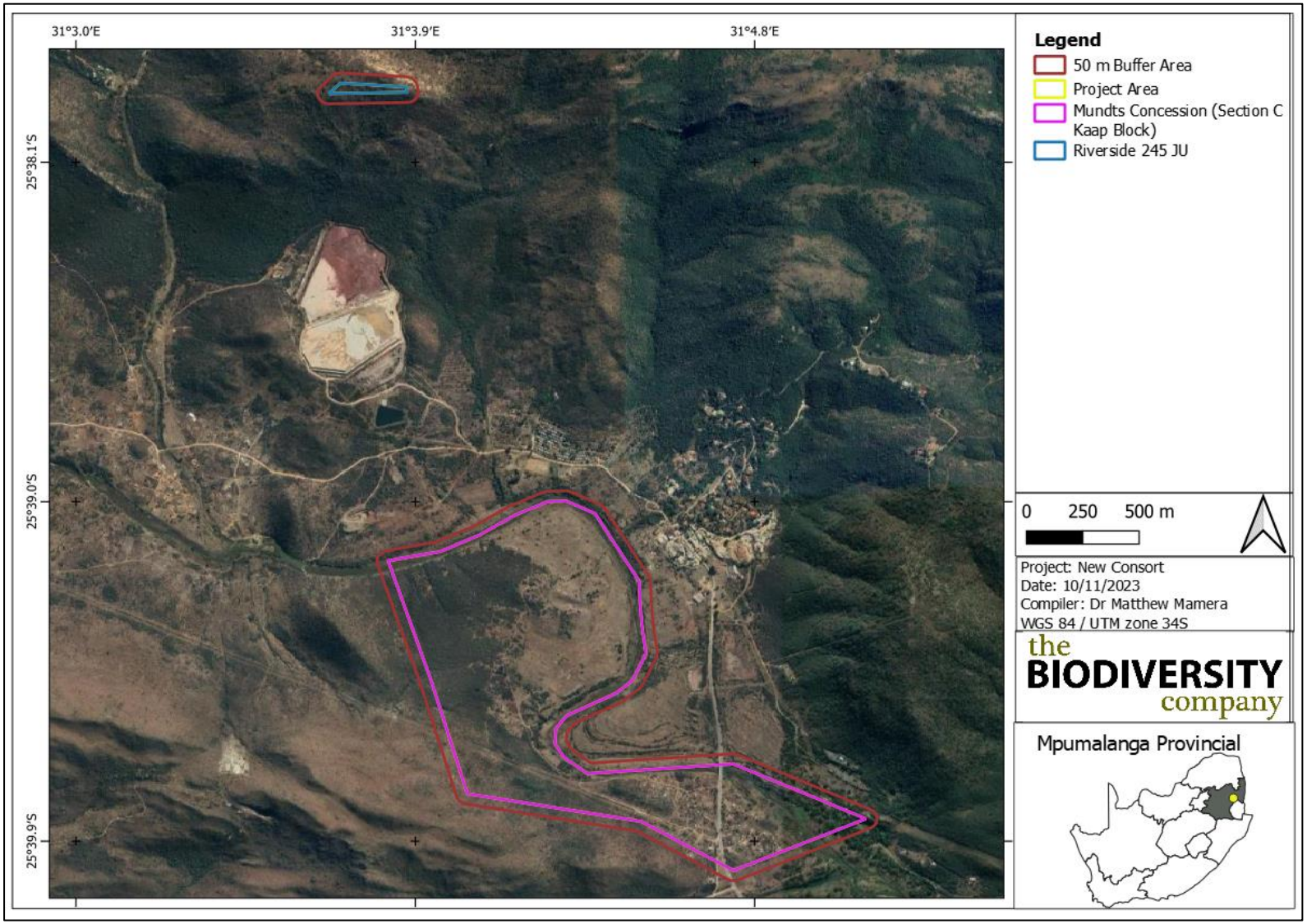

Figure 1-2 Map illustrating the local context of the PAOI.

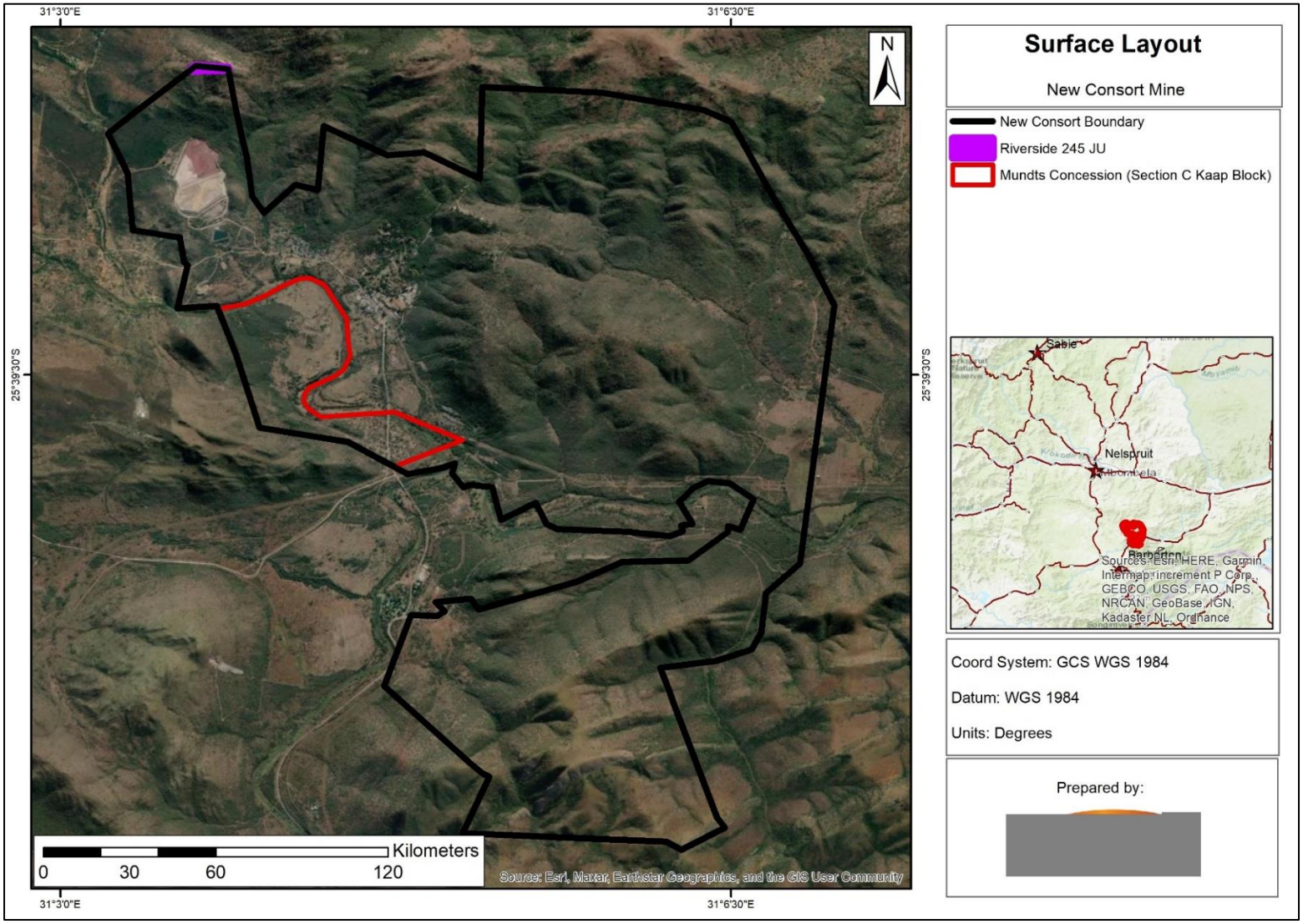

Figure 1-3 Map illustrating the surface layout for New Consort mine, as provided by Shango Solutions

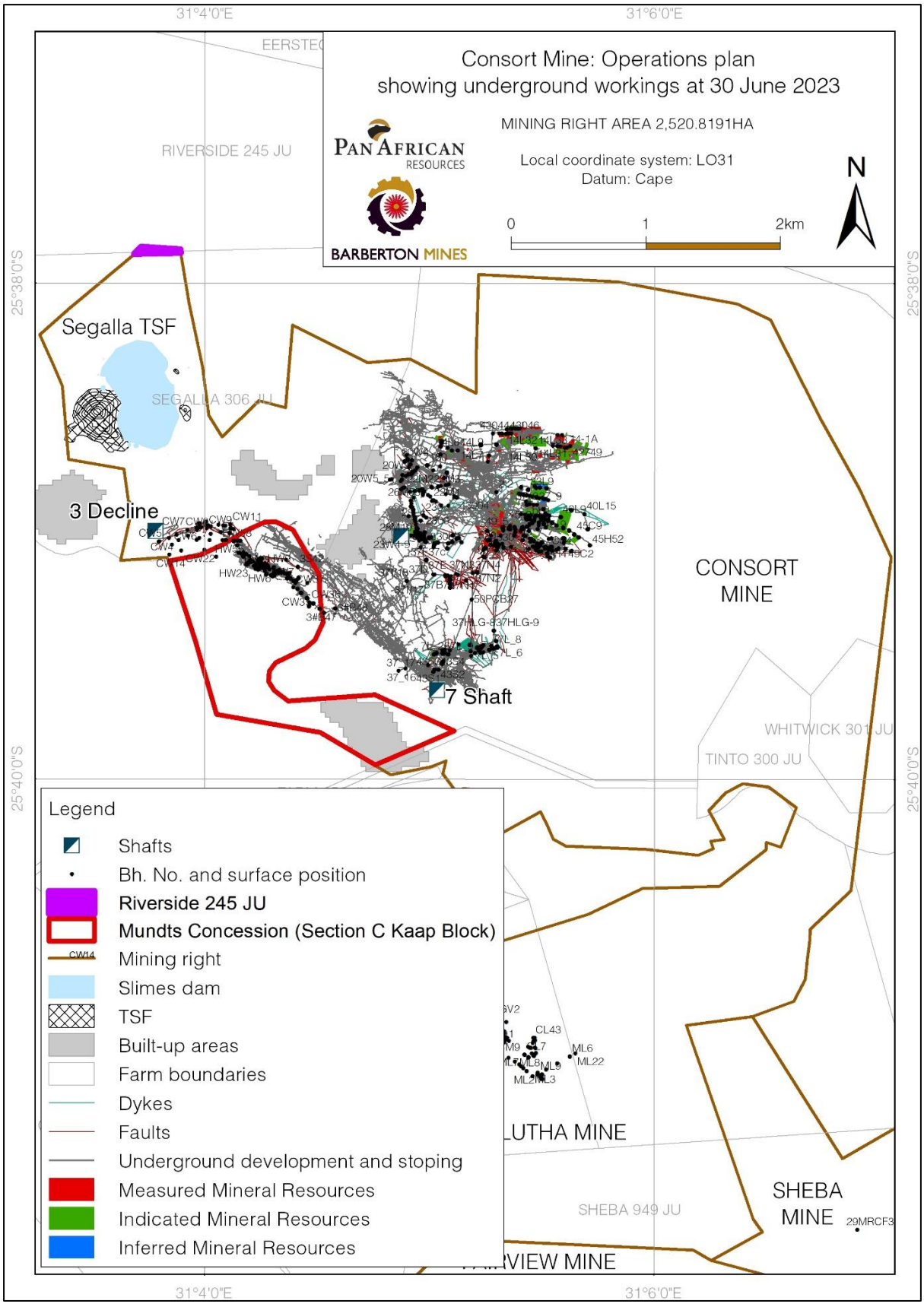

Figure 1-4 Map illustrating the underground layout for New Consort mine, as provided by Shango Solutions

1.2 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, that 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.

2 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).

2.1 Legislative Framework

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity, as per 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:
    - “medium sensitivity” for agriculture, must submit an Agricultural Compliance Statement.

An Agricultural Compliance Statement must contain the information as presented in Table 2-1 below.

Table 2-1 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
a signed statement of independence by the specialist	Appendix A
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	6 / Figure 6-1
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	5.5
confirmation that the development footprint is in line with the allowable development limits…	5.5
confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities	6
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	6.2
any conditions to which this statement is subjected	6.3
in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase	5.4
where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr	6.1
a description of the assumptions made and any uncertainties or gaps in knowledge or data	3.4

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

3 Methodology

3.1 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.

3.2 Field Survey

An assessment of the soils present within the project area was conducted during the field survey from the 13th to the 15th of November 2023. 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.

3.3 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 3-1 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 3-1 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 Table 3-2. The final land potential results are then described in Table 3-3.

Table 3-2 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 3-3 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 3-4), 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 3-3). 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 3-4 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	

3.4 Limitations

The following limitations are relevant to this agricultural potential assessment:

- The handheld GPS used potentially could have inaccuracies up to 5 m. Any and all delineations therefore could be inaccurate within 5 m; and
- No heavy metals have been assessed nor fertility been analysed for the relevant classified soils.

4 Project Area

4.1 Climate

The project area falls within the Barberton Montane Grassland, Granite Low veld, Kaalrug mountain bushveld and Legogote Sour Bushveld vegetation. It receives an annual precipitation average (MAP) 650 mm on the footslope of the mountains to about 1 200 mm where it borders grassland at higher altitudes. Frost infrequent to occasional at higher altitudes (Mucina & Rutherford, 2006). The area has a mean average temperature (MAT) of 19.8 º C (see Figure 4-1 Summarised climate for the region (Mucina & Rutherford, 2006)

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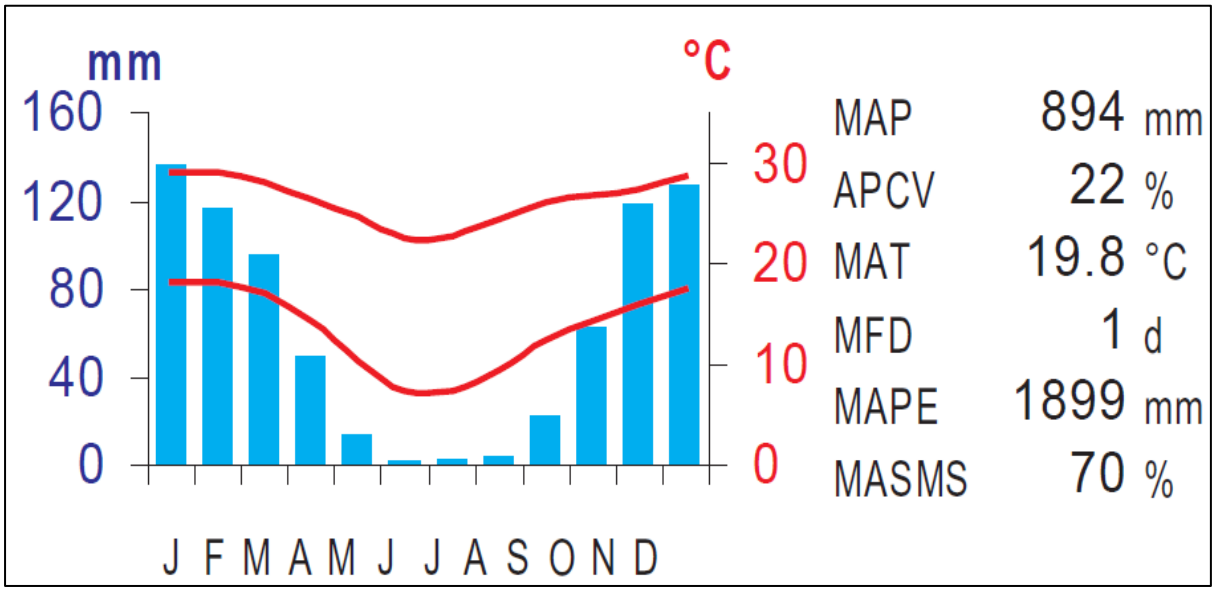


Figure 4-1 Summarised climate for the region (Mucina & Rutherford, 2006)

4.2 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006) the assessment area to be focused on mainly falls within the Ea 74 and Fb 162 land types (Figure 4-4). The Ea 74 land types commonly has Shortlands and Hutton soil forms, also associated the occurrence of other soils within the terrain, following the South African soil classification working group (2018). The Fb 162 land types are characterised with Shortlands soil forms and rocky areas with also the occurrence of other associated soils found within the terrain.

In addition, the soils in the Ae land types also have red to yellow apedal, freely drained soils. These soils have a high base status and usually deeper than 300 mm. there is no occurrence of dunes in this land type. The Ea land types are characterized by vertic, melanic and red structured undifferentiated diagnostic horizons. The Fb land types commonly has shallow soils. Lime is rare or absent in the upper terrains and occurs in the low-lying soils. The terrain unit for the Ea 74 land type is presented in Figure 4-2 and Table 4-1; the Fb 162 in Figure 4-3 and Table 4-2, respectively.

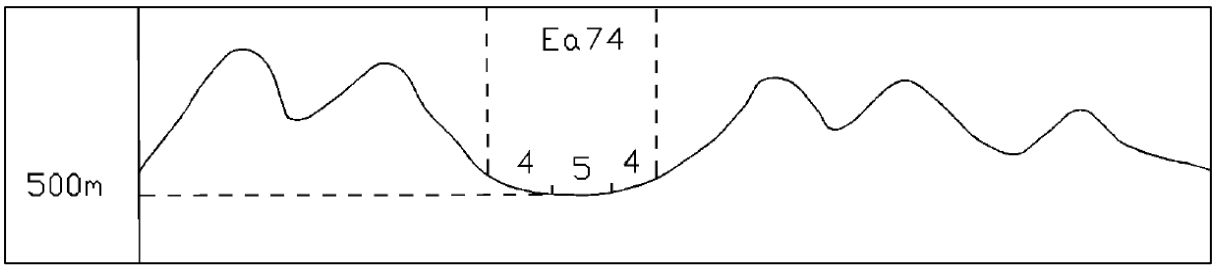


Figure 4-2 Illustration of land type Ea 74 terrain units (Land Type Survey Staff, 1972 – 2006)

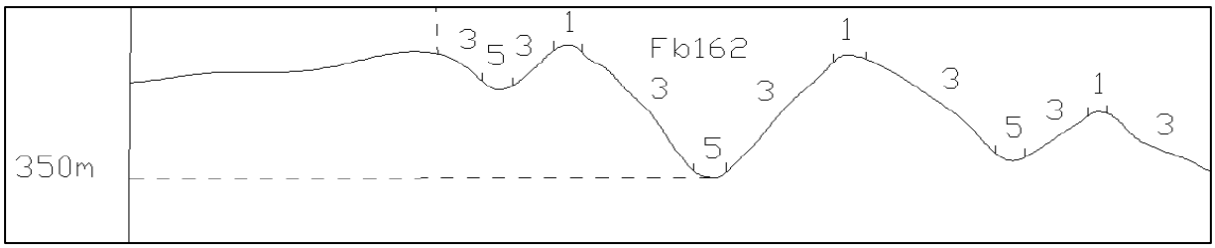


Figure 4-3 ***Illustration of land type Fb 162 terrain units (Land Type Survey Staff, 1972 – 2006)***

Table 4-1 ***Soils expected at the respective terrain units within the Ea 74 land type (Land Type Survey Staff, 1972 - 2006)***

Terrain Units			
4 (50%)		**5 (50%)**	
Shortlands	65%	Hutton	40%
Hutton	35%	Shortlands	30%
		Bonheim	20%
		Streambeds	10%

Table 4-2 ***Soils expected at the respective terrain units within the Fb 162 land type (Land Type Survey Staff, 1972 - 2006)***

Terrain Units					
1 (30%)		**3 (68%)**		**5 (2%)**	
Bare Rocks	45%	Bare Rocks	55%	Shortlands	40%
Shortlands	20%	Shortlands	20%	Bonheim, Arcadia	20%
Mispah	15%	Mispah	10%	Dundee	20%
Glenrosa	10%	Glenrosa	5%	Hutton	20%
Mayo	5%	Swartland	5%		
Swartland	5%	Mayo	5%	Westleigh	5%
		Shortlands	5%		

According to Mucina & Rutherford (2006), the geology of the region is primarily composed of ultramafic lavas (including komatiites and serpentinites), of the Onverwacht group of the Barberton supergroup (Barberton greenstone belt). The ultramafic geology is associated soils with high magnesium: calcium ratios. Such soils have high concentration of heavy metals like Ni and Cr, which are generally toxic to most plants.

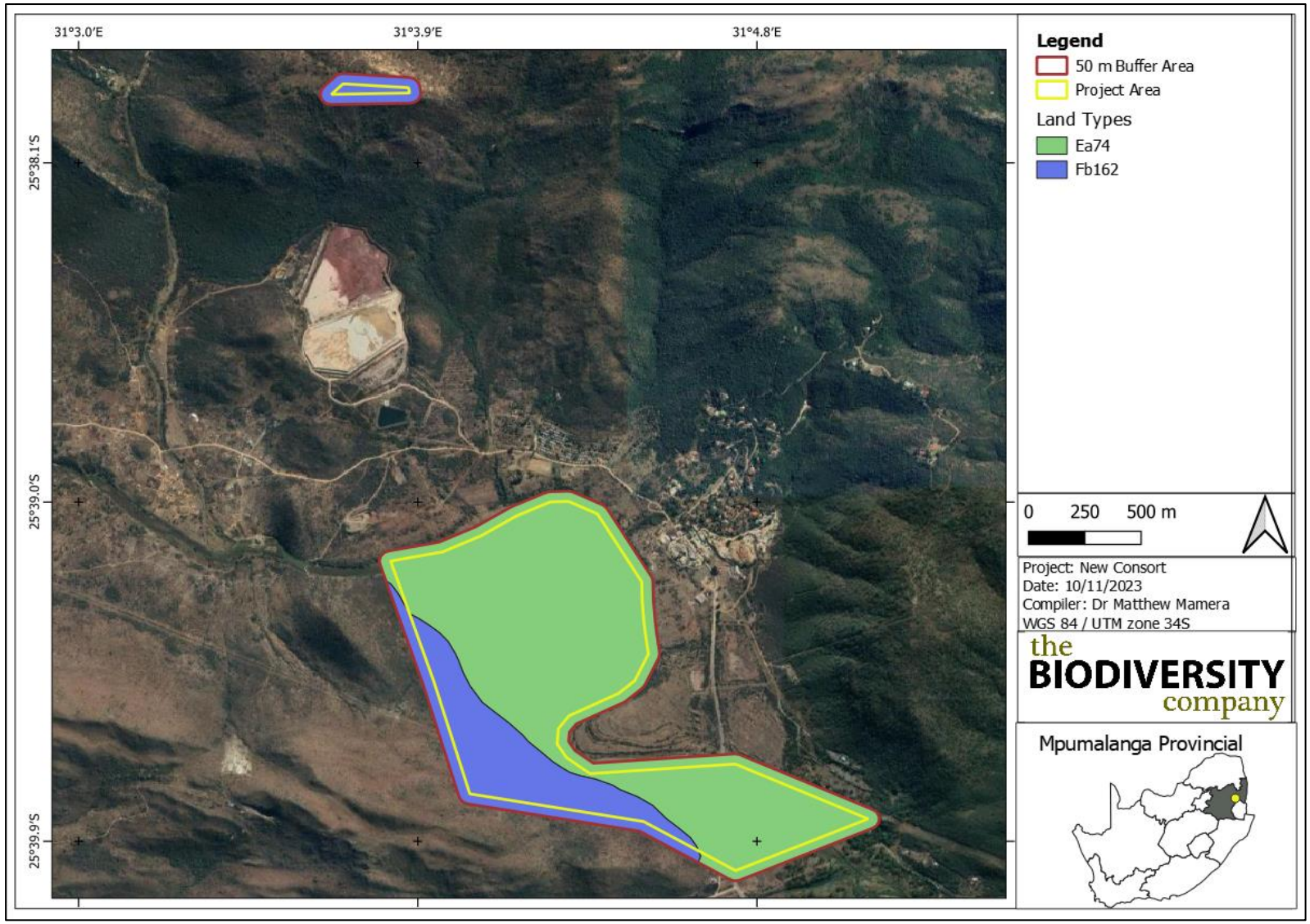


Figure 4-4 Land types associated with the proposed project area.

4.3 Terrain

The slope percentage of the project area has been calculated and is illustrated in Figure 4-5. Most of the project area is characterised by a slope percentage between 0-4% with some irregularities in areas with slopes reaching 8%. This illustration indicates a mostly non-uniform topography with occurrence of some steep sloping areas being present. The Digital Elevation Model (DEM) of the project area (Figure 4-6) indicates an elevation of 571 to 944 Metres Above Sea Level (MASL).

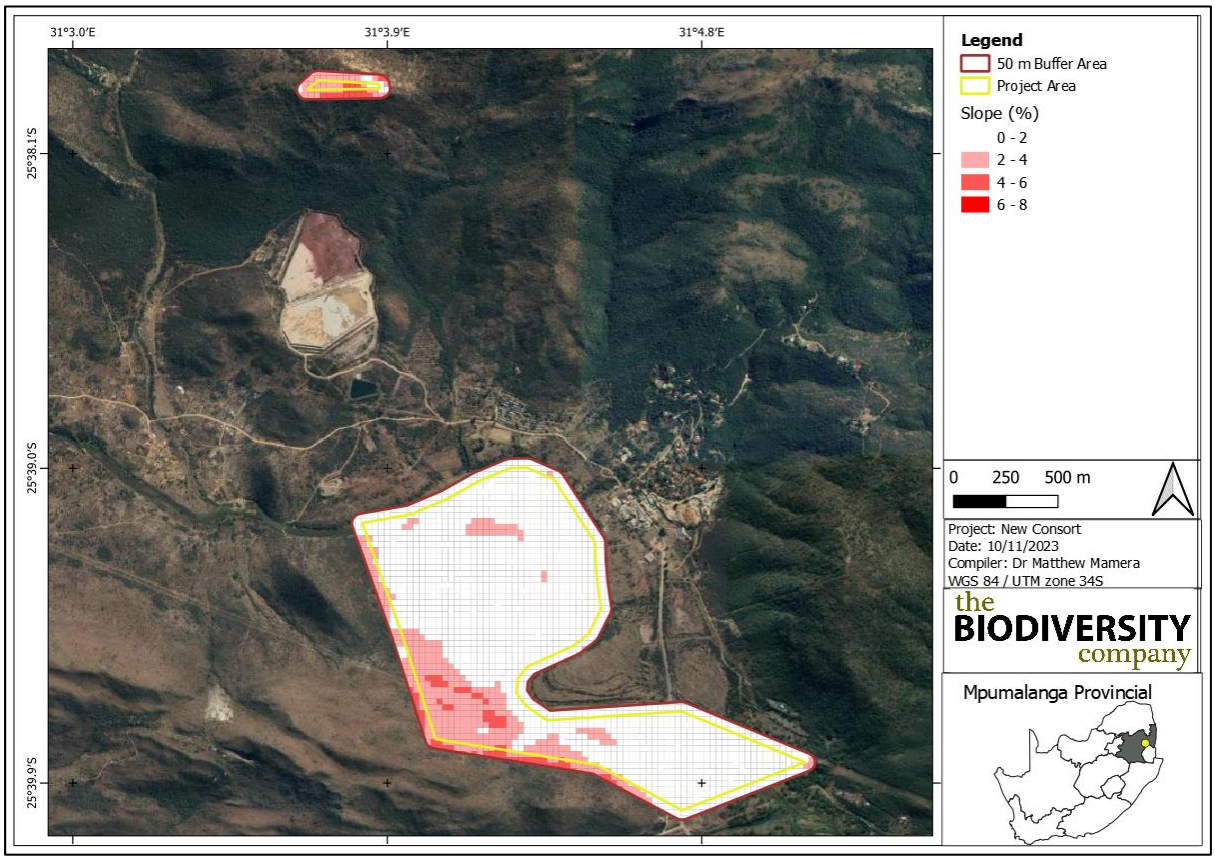


Figure 4-5 Slope percentage map for the project area.

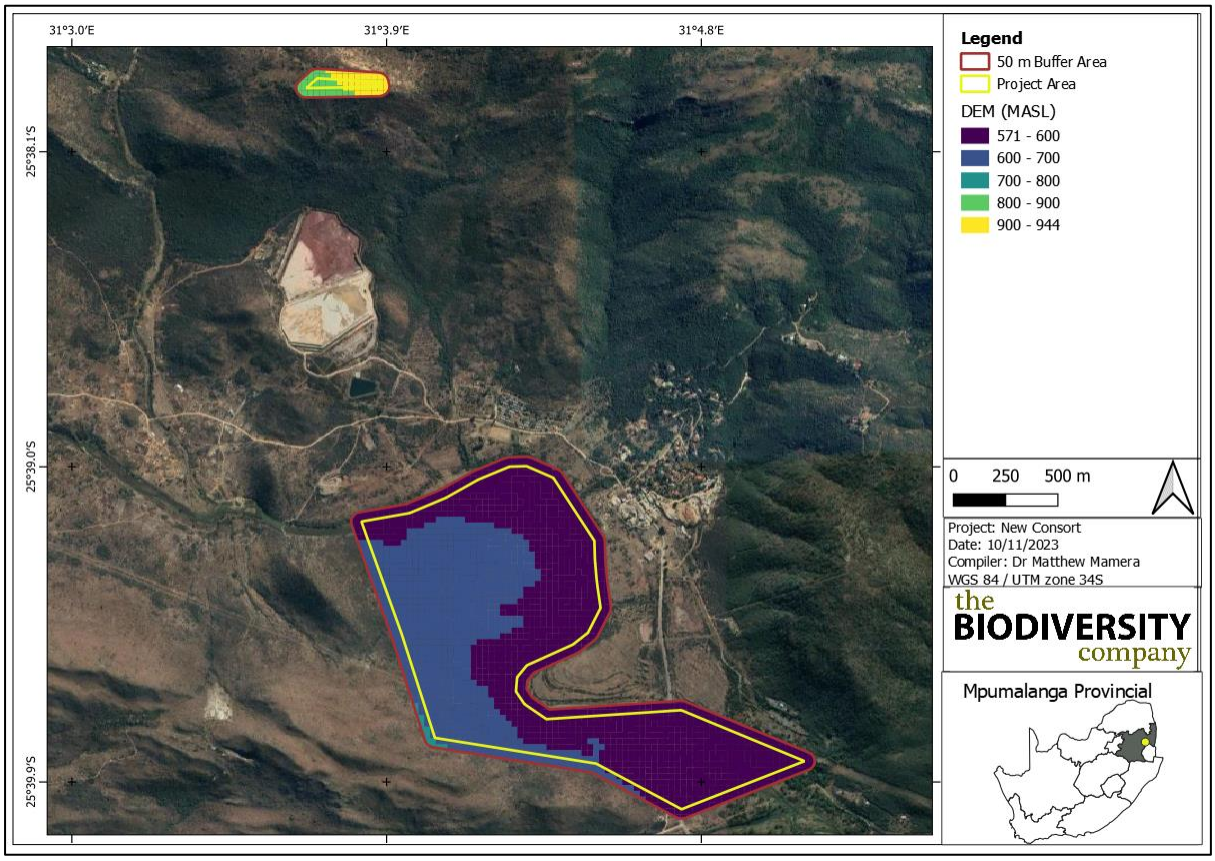


Figure 4-6 Digital Elevation Model of the project area (Metres Above Sea Level).

5 Results and Discussion

5.1 Baseline Findings

Six soil forms were identified throughout the 50 m buffered area namely Hutton, Shortlands, Tukulu Glenrosa, Mispah and Kroonstad soil forms, with the Shortlands, Glenrosa and Mispah soil form being the most dominant soil form over the area (see Figure 5-1). Hydromorphic soils were identified within the area, namely the Kroonstad soil form.

The Hutton, Shortlands and Tukulu soil forms are regarded to be most important in the study area as they demonstrate the most sensitive land capabilities. The Hutton soil form consists of an orthic topsoil horizon on top of a thick red apedal horizon below. The Shortlands soil form has an orthic topsoil on top of thick red structured horizon below. The Tukulu soil form consist of an orthic topsoil with a neocutanic horizon underlain with a gley horizon. The Glenrosa soil form has an orthic topsoil on top of a lithic horizon below. The Mispah soil form has an orthic topsoil on top of hard rock substratum below. The different soil horizons are illustrated in Figure 5-2.

The most sensitive land capability of the above mentioned soil forms has been determined to be class “II” and the other identified soils to ““VI”. A climate capability level 6 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 soil and the determined climate capability, a land potential of “L4” was calculated and “L6” for the dominant less sensitive soil. According to Smith (2006), the “L4” land potential level is characterised by moderate potential. Moderately regular and/ or severe to moderate limitations due to soil, slope, temperatures or rainfall.

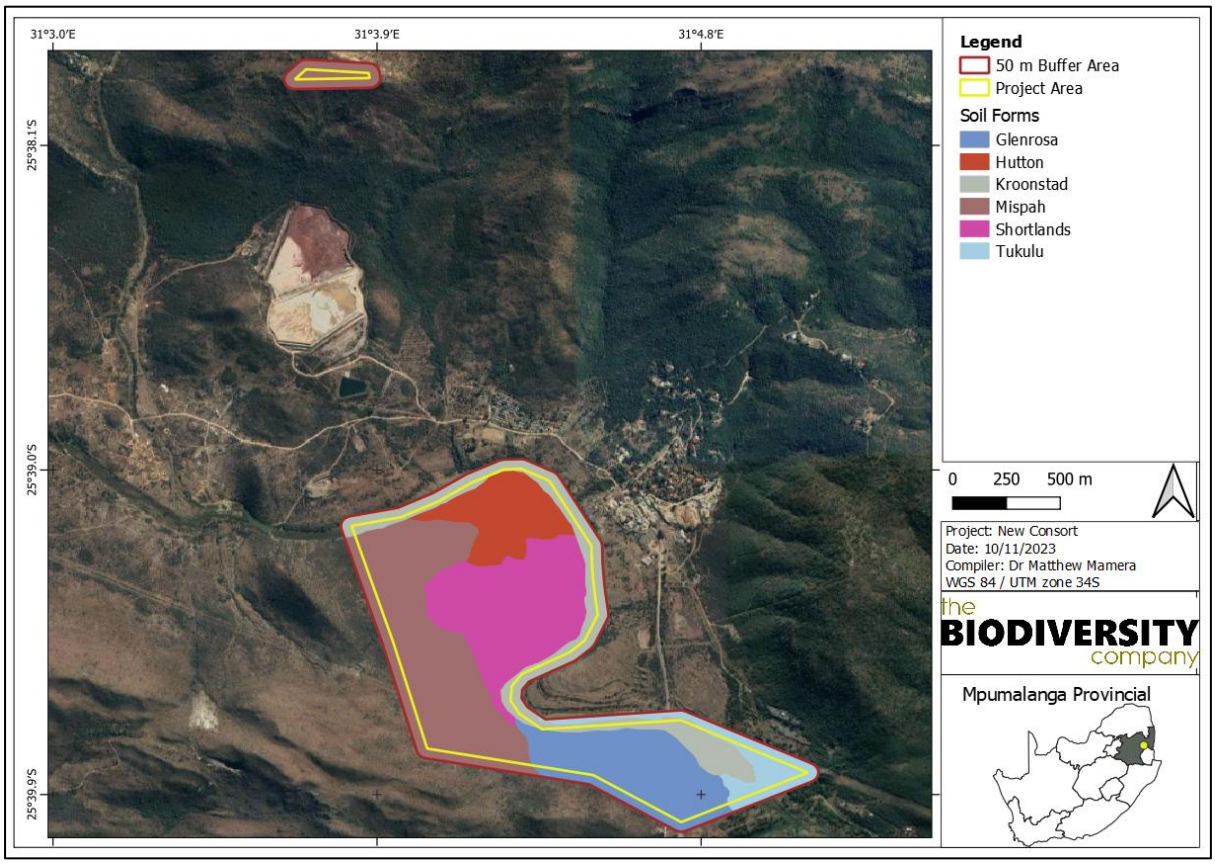


Figure 5-1 Soil forms found within the proposed project area.

Figure 5-2 ***Dominant soil horizons found within the proposed project area; A) Orthic topsoil with a lithic horizon or Hardrock substratum. B) Neocutanic subsurface horizon with a gley horizon below. C) Orthic topsoil with a red apedal horizon. D) Orthic topsoil with a red structured horizon.***

Figure 5-3 ***Surrounding of the identified dominant soil horizons found within the proposed project area; A) Subsistence cropping, B-D) Livestock grazing and pasture lands***

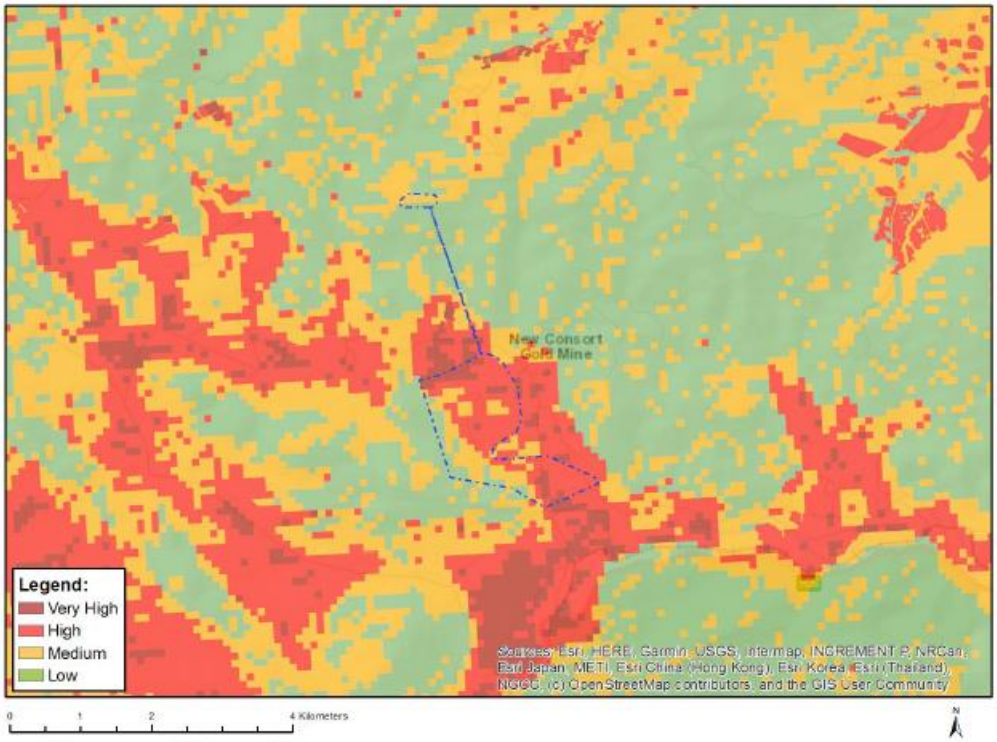
5.2 Sensitivity Verification

5.2.1 Screening Report

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 “Low” to “Very High” agricultural sensitivity (Figure 5-4).

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
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
Very High	Land capability;11. High/12. High-Very high/13. High-Very high/14. Very high/15. Very high

Figure 5-4 Map of Relative Agricultural Theme Sensitivity for the New Consort Mining Right Extension Project generated by the Environmental Screening Tool Site Ecological Importance (SEI).

5.2.2 Site Ecological Importance (SEI)

The following land potential level have been determined;

- Land potential 4 level (this land potential level is characterised by moderate potential. Moderately regular and/ or severe to moderate limitations due to soil, slope, temperatures or rainfall; and

- 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;

Land potential of the proposed area is illustrated in Figure 5-5.

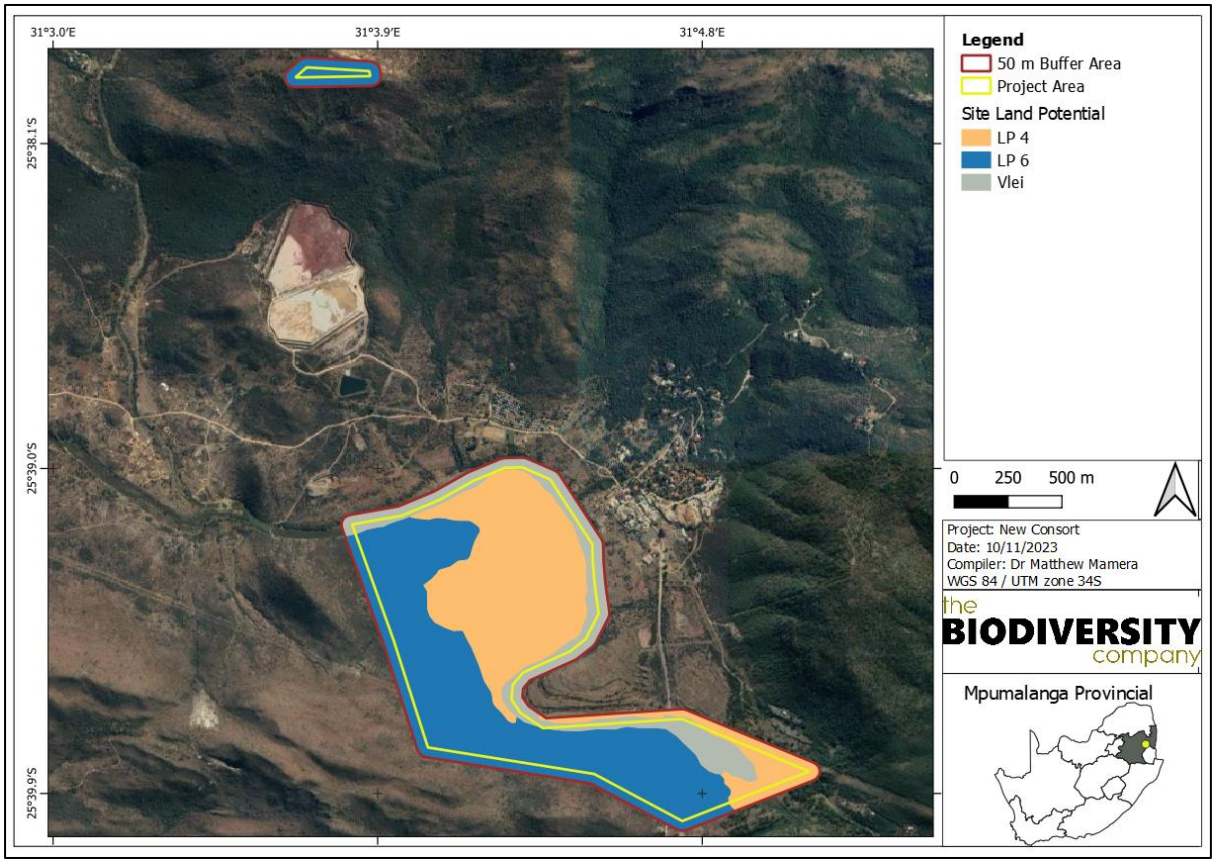


Figure 5-5 Land Potential within the 50 m Buffer area of the Project Area.

These features were used to determine the sensitivity of resources relevant to this assessment. The "L4" land potential areas were scored "High sensitivity", and "L6" land potential areas were scored "Low sensitivity" (see Figure 5-6).

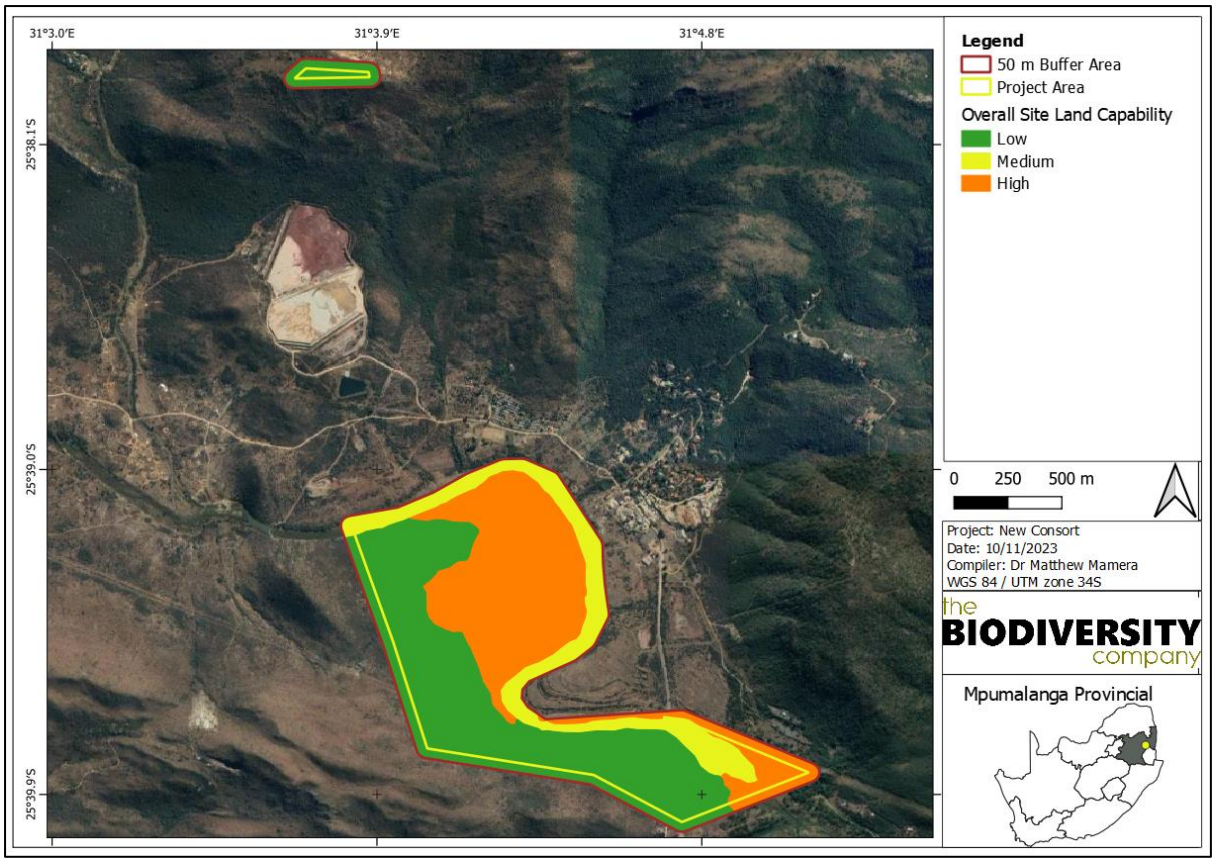


Figure 5-6 Overall sensitivity of the project area.

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

- Land Capability 1 to 5 (Very Low Sensitivity to Low Sensitivity
- Land Capability 6 to 8 (Moderate Low Sensitivity to Moderate Sensitivity);
- Land Capability 9 to 10 (Moderate High Sensitivity); and
- Land Capability 11 to 15 (High to Very High Sensitivity).

The land capability dataset (DAFF, 2017) indicates a range of categories expected throughout the project area. The project area falls within the "Very Low to Low" and "Moderate to Moderate High" sensitivity category and a few isolated areas have "High to Very High" sensitivity (see Figure 5-7). The land capability and land potential of the resources in the regulated area are both characterised as "Medium."

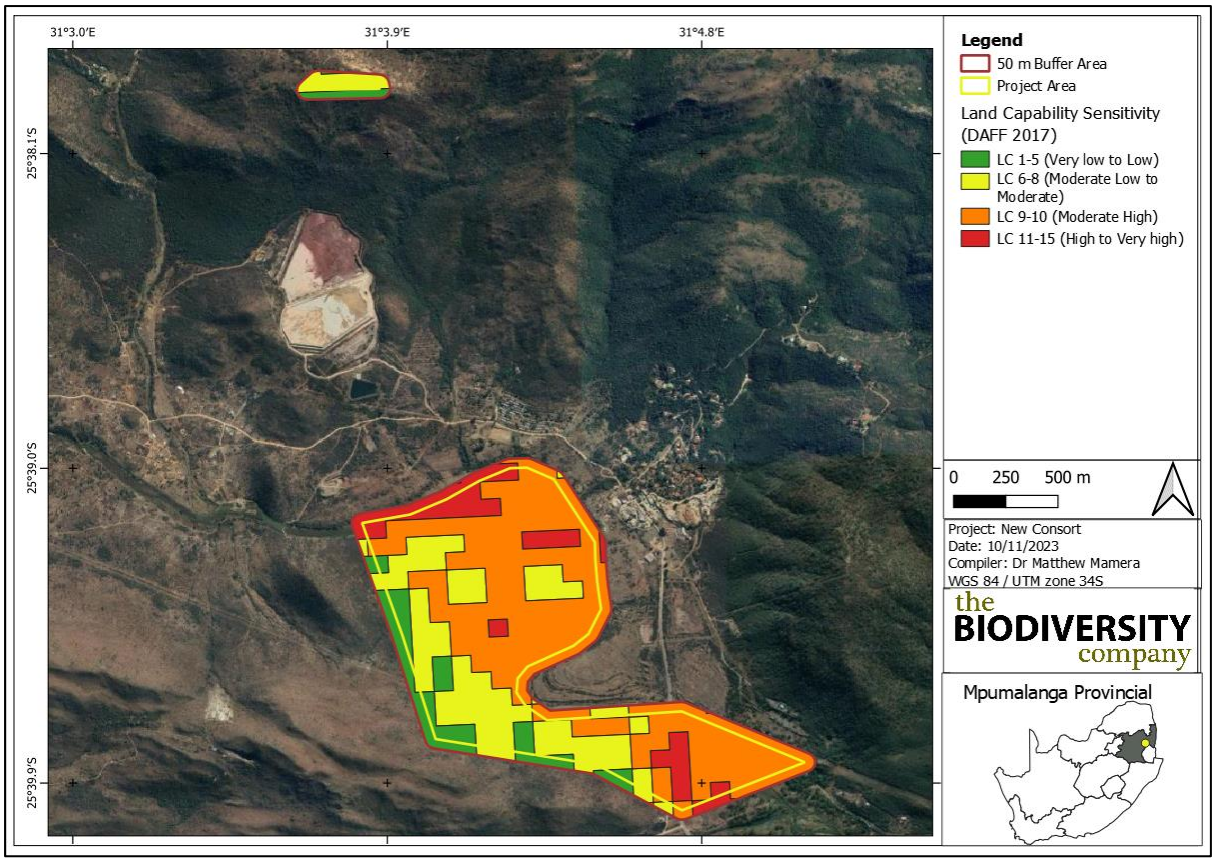


Figure 5-7 The land capability sensitivity (DAFF, 2017).

The baseline soil findings and the DFFE (2023) agricultural theme concur with one another to an extent.

In addition, there are crop boundary areas which were identified by means of the DEA Screening Tool (2022). There is potential segregation of areas classified as having “High” sensitivities in the proposed project area. These crop fields are associated with subsistence cropping practices. Moreover, the areas associated to these soils have been fragmented with the current residential developments and infrastructure developments.

By field work observation, it is evident that they are actively cultivated (crop) fields present within the proposed project area. However, no working irrigation infrastructure, such as centre pivots or drip irrigation are present within the project area.

Considering the soil properties (i.e., limited profile depth), agricultural potential as well as the current land use of the proposed extension development area, the area has a “Medium” agricultural sensitivity.

Based on the confirmed sensitivities, the overall sensitivity of the proposed project area can be categorized as “Medium”. The allocated sensitivities for the theme are either disputed or validated in Table 5-1 below.

Table 5-1 Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Agricultural Theme	**Very High**	**High**	Disputed/Validated – Land capability High, presence of high potential soils, fragmented, no irrigation infrastructure present.

	High	**Medium**	Disputed – Land capability Low, shallow soils.
	Medium	**Low**	Disputed – Land capability very low, presence of low potential soils.
	Low	**Low**	Validated – Land capability very low, presence of low potential soils.

6 Conclusion

The most sensitive Hutton, Shortlands and Tukulu soil forms found in the proposed project area are characterised by a land potential "L4" and ultimately a "Medium" sensitivity due to the poor climate present. The Glenrosa and Mispah soil forms which were also identified within the project area has a "Low" sensitivity. The land capability sensitivity (DAFF, 2017) indicates land capabilities with "Very Low" to "Very High" sensitivities, which correlate with the findings from the baseline assessment to an extent.

Furthermore, the available climate also limits crop production significantly. The climatic conditions are associated with low annual precipitation and high evapotranspiration potential demands of the area, which is not favourable for most cropping practices.

6.1 Anticipated Impact Framework

An impact framework was considered for the impact assessment. The following list provides a framework for the identified major impacts associated with the project (***Table 6-1***).

Table 6-1 Anticipated impacts for the proposed mining on agricultural resources

Main Impact	Project activities that can cause loss/impacts to habitat (especially with regard to the proposed infrastructure areas)	Secondary impacts anticipated
Loss of land capability	• Construction, operation and decommissioning of roads; • Construction, operation and decommissioning of construction camps, layout areas and office space; • Construction, operation and decommissioning of stockpiles; • Excavation of shafts and associated infrastructure soil and mining resources; • Water treatment; • Mixing of soil; • Soil dust precipitation in surface stockpiles; • Dust precipitation; and • Removal of vegetation for the underground shifts.	• Erosion; • Soil degradation; • Compaction; • Increase in salinity; • Land contamination; and • Loss of soil via aeolian processes.

6.2 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 and further mitigations in Appendix B: Impact Mitigation measures:

- Strict adherence to the proposed project buffer areas for all activities;
- 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.

6.3 Specialist Statement

The proposed mining extension 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 very low to High;
- The agricultural potential of the area ranges from low to medium;
- There are active delineated crop fields for the project area which are cultivated, without irrigation infrastructure within the proposed project area;
- The agricultural sensitivity for the project area is low.

6.4 Statement Conditions

Development of the crop fields needs permissible or consent from the landowners. An agreement between the applicant and landowner must be completed for the development of any actively cultivated crop fields, should these areas be available or required for the project where they are proven loss of livelihoods.

7 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.

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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.

8 Appendix A 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

8.1 Appendix B: Impact Assessment

Table 8-1 Impact assessment related to the loss of the land capability during the planning, construction, operation, decommissioning and re-habilitation phases.

IMPACT DESCRIPTION		PRE - MITIGATION							POST - MITIGATION								IMPACT PRIORITISATION				
Impact	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Public response	Cumulative impact	Irreplaceable loss	Priority factor	Final score
Loss of land capability; Soil degradation; soil fertility; Soil compaction	Planning	1	1	2	1	1	1	1,25	1	1	2	1	1	1	1,25	High	1	1	1	1,00	1,25
	Construction	1	3	3	3	3	3	9	1	2	3	2	2	2	4,5	Medium	3	2	2	1,67	7,50
	Operation	1	2	3	3	3	3	8,25	1	2	3	2	3	2	5	High	3	2	3	1,83	10,08
	Decommissioning	1	2	2	2	3	2	4,5	1	2	2	1	3	2	3.5	High	2	2	2	1,50	6,00
	Rehab and closure	1	2	2	2	2	2	4	1	2	1	1	3	1	1,75	High	2	1	1	1,17	2,04

8.2 Appendix B: Impact Mitigation measures

Table 8-2 Mitigation measures including requirements for timeframes, roles and responsibilities.

Activity	Mitigation Measures	Phase	Time Frame	Responsible party for implementation	Monitoring party (frequency)	Target	Performance indicator (Monitoring tool
Relevant planning	• Proper planning of mining sequences; • Surface stockpiling guidelines; and • rehabilitation and monitoring plans.	Planning	Prior to kick-off of construction	Applicant	Applicant	Ensure compliance with relevant legislation.	No legal directives Legal compliance audit scores (Legal register) (ECO Monthly Checklist/Report)
Site clearance of underground shafts and topsoil removal prior to the commencement of physical construction activities.	• Ensure proper storm water management designs are in place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Only the designated access routes are to be used to reduce any unnecessary compaction; • Compacted areas are to be ripped to loosen the soil structure; • The topsoil on shafts and associated infrastructure should be stripped by means of an excavator bucket, and loaded onto dump trucks; • Surface stockpiles must be kept to a maximum height of 4m if space allows. Soil can be stockpiled to a height of 10m where it is absolutely necessary, keeping the 10m footprint as small as possible.	Construction Operation	Ongoing	Applicant Contractor ECO	Contractors EO (Daily) Mine EO (Weekly) ECO (Monthly)	Ensure compliance with relevant legislation.	No legal directives Legal compliance audit scores (Legal register) (ECO Monthly Checklist/Report)

	• A soil fertility and post-mining land capability assessment must be done to address any compaction or fertility issues that may arise from the stock-piling (Post-rehabilitation). • Topsoil is to be stripped when the soil is dry, as to reduce compaction; • Bush clearing contractors will only clear bushes and trees larger than 1m the remaining vegetation will be stripped with the top 0.3 m of topsoil to conserve as much of the nutrient cy-cle, organic matter and seed bank as possible; • The subsoil approximately 0.3 – 0.8 m thick will then be stripped and stock-piled separately; • The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate signifi-cantly; • Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles; • Stockpiles should only be used for their designated final purposes; and • The stockpiles will be vegetated (de-tails contained in rehabilitation plan) in order to reduce the risk of erosion, prevent alien weed growth and to rein-stitute the ecological processes within the soil. • Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks; • If a spill occurs, it is to be cleaned up						

	immediately and reported to the appropriate authorities; • All vehicles are to be serviced in a correctly bunded area or at an off-site location; • Leaking vehicles will have drip trays place under them where the leak is occurring; and • If there are leaks the pipelines must be repaired immediately.						
• **Operation and maintenance of the topsoil and processed underground material stockpiles.** • **Decommissioning; and** • **Rehabilitation of the Project area will be undertaken. includes the ripping of the compacted soil surfaces, spreading of topsoil and establishment of vegetation.**	• Ensure proper storm water management designs are in place; • If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Only the designated access routes are to be used to reduce any unnecessary compaction; • Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated; • Implement land rehabilitation measures as defined in rehabilitation report. • Follow rehabilitation guidelines; • The topsoil should be moved by means of an excavator bucket, and loaded onto dump trucks; • Topsoil is to be moved when the soil is dry, as to reduce compaction; • After the completion of the project the area is to be cleared of all infrastructure;	Operation, Decommissioning and Rehabilitation.	Ongoing	Applicant Contractor ECO	Contractors EO (Daily) Mine EO (Weekly) ECO (Monthly)	Ensure compliance with relevant legislation.	No legal directives Legal compliance audit scores (Legal register) (ECO Monthly Checklist/Report)

	• The foundations to be removed; • Topsoil to be replaced for rehabilitation purposes; • The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate; and • Stockpiles should only be used for their designated final purposes. • Prevent any spills from occurring. Machines must be parked within hard-park areas and must be checked daily for fluid leaks; • If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities; • All vehicles are to be serviced in a correctly bunded area or at an off-site location; • Leaking vehicles will have drip trays place under them where the leak is occurring; • Pipelines must be maintained; • Pipeline must be checked regularly for leaks; and • If there are leaks the pipelines must be repaired immediately.						
• **Rehabilitation of the Project area will be undertaken. includes the ripping of the compacted soil surfaces, spreading of topsoil and establishment of vegetation.** • **Post-closure monitoring and rehabilitation will determine the level of success of the rehabilita-**	• The rehabilitated area must be assessed once a year for compaction, fertility, and erosion; • The soils fertility must be assessed by a soil specialist yearly (during the dry season so that recommendations can be implemented before the start of the wet season) as to correct any nutrient deficiencies; • Compacted areas are to be ripped to loosen the soil structure and vegeta-	Rehabilitation, Closure and monitoring	During monitoring	Applicant ECO Soil Specialist	ECO (Yearly) Soil Specialist (Yearly)	Ensure compliance with relevant legislation.	No legal directives Legal compliance audit scores (Legal register) (ECO Monthly Checklist/Report)

tion, as well as to identify any additional measures that have to be undertaken to ensure that the mining area is restored to an adequate state. Monitoring will include soil fertility and erosion.	tion cover re-instated; • If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Only the designated access routes are to be used to reduce any unnecessary compaction; and • Areas of subsidence must be reported and remediated as soon as possible with the best practises at the time of occurrence.						