Soil Compliance Statement for the proposed Prospecting Mining Right Application for Klipvley 153

Lutzville, Western Cape Province, South Africa

June 2023

CLIENTS

Prepared by:

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Report Name	**Proposed Prospecting Mining Right Application for Klipvley 153**
Submitted to	
Report 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.
Report Writer	**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 peer 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).
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 principals of science.

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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

June 2023

1 Introduction

The Biodiversity Company (TBC) was commissioned to conduct a soil and agricultural potential assessment for the proposed prospecting rights application for the Klipvley 153, South Africa. The proposed extent of the area for prospecting (3635 ha) is located 40 km west of the town Lutzville, within the western Cape Province.

The approach adopted for the assessments 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 area as “Low to Medium”.

This report aims to present and discuss the findings from the soil resources identified within the 50 m regulated 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 solar photovoltaic 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 Scope of Work

The following scope of work is applicable:

- The feasibility of the proposed activities;
- Confirmation about the “Low” and “Medium” sensitivities;
- The effects that the proposed activities will have on agricultural production in the area;
- A map superimposing the proposed footprint areas, a 50 m regulated area as well as the sensitivities pertaining to the screening tool;
- Confirmation that no agricultural segregation will take place and that all options have been considered to avoid segregation;
- The specialist’s opinion regarding the approval of the proposed activities; and
- Any potential mitigation measures described by the specialist to be included in the EMPr.

2 Project Area

The project area is located 40 km west of the town Lutzville, within the Western Cape Province. The proposed project area is approximately 23 km west of the R363 regional road and approximately 24 km northwest of the R362 regional road and 61 km west of the N7 national road (see Figure 2-1). The surrounding land uses include grazing, waterbodies, and game farming.

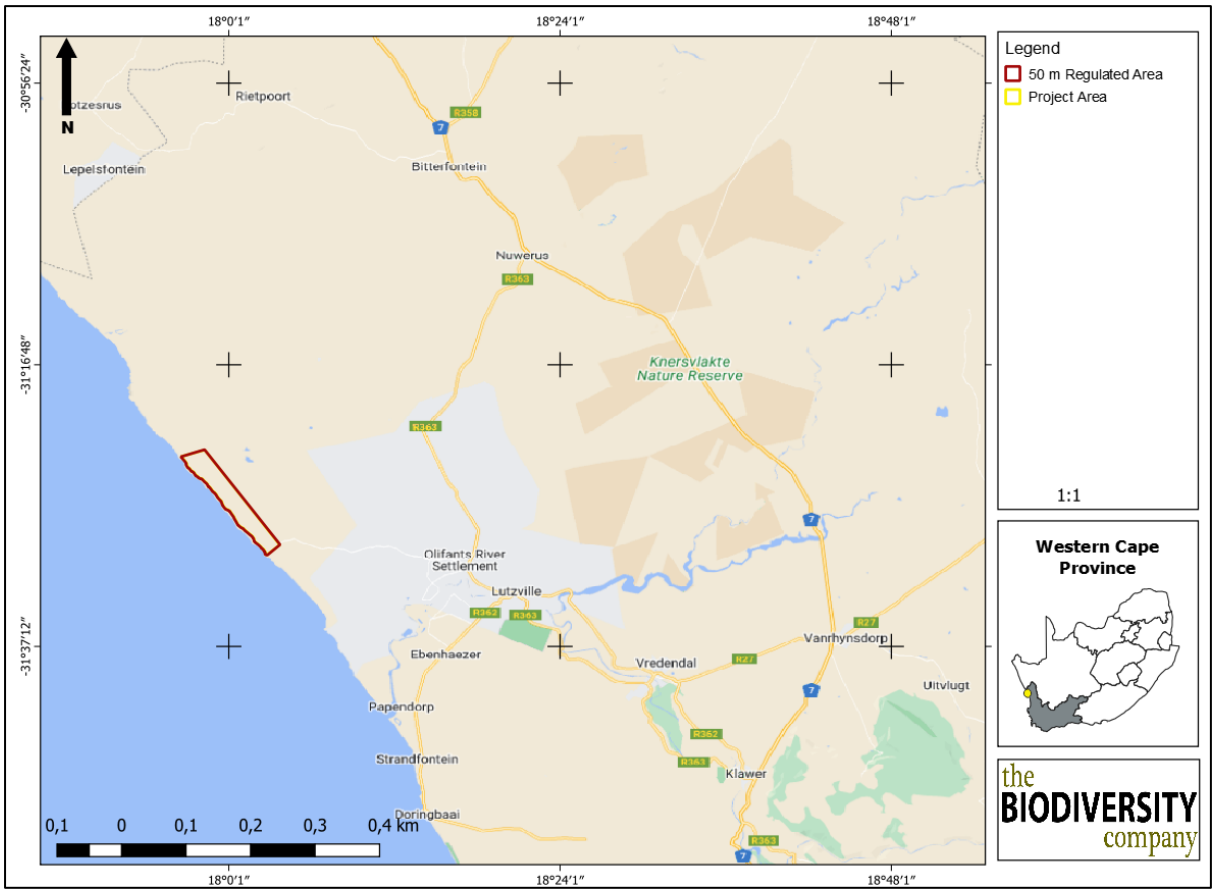


Figure 2-1 Locality map of the project area

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 in May 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 0.5 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

Given the nature of the compliance statement and the fact that baseline findings correlate with the screening tool’s sensitivities, land capability was solely determined by means of the National Land Capability Evaluation Raster Data Layer (DAFF, 2017). Land capability and land potential will also briefly be calculated to match to that of the screening tool to ultimately determine the accuracy of the land capability sensitivity from (DAFF, 2017).

Land capability and agricultural potential will briefly 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 was 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 3-1).

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 Namaqualand Seashore and Strandveld vegetation. It is an arid region, characterised by winter rainfall with an average of 112 mm in May to August. Frost is rare in the area (Mucina & Rutherford, 2006). The mean average temperature for the project area ranges with the maximum temperatures of 30°C in summer and minimum temperature of 8°C in winter (see Figure 4-1).

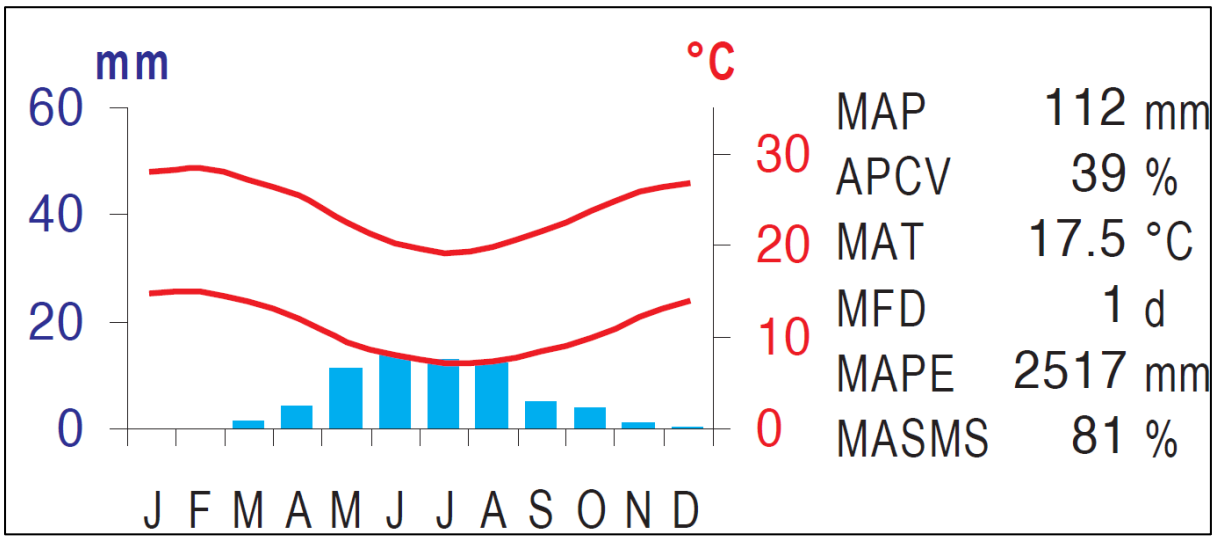


Figure 4-1 Summarised climate for the region (Mucina & Rutherford, 2006)

4.2 Soils and Geology

The geology of the area is characterised by marine sediments and granite gneisses. According to the land type database (Land Type Survey Staff, 1972 - 2006) the assessment corridor to be focused on falls within the Ah 44 land type (Figure 4-3 to Figure 4-2). The Ah 44 land type is predominated by Bare rock, Bonheim, Milkwood, Mispah and Glenrosa soil forms with also the occurrence of other soils occurring throughout the terrain, following the South African soil classification working group (2018). The Ea 41 land type is also characterised by one or more of vertic, melanic, and red structure horizons that are undifferentiated. The geology of Ea 41 land type includes shale, mudstone and sandstone of the Beaufort Group with many dolerite intrusions. The terrain units and expected soils for the Ea 41 land type are presented in Figure 4-2 and

Table 4-1, respectively.

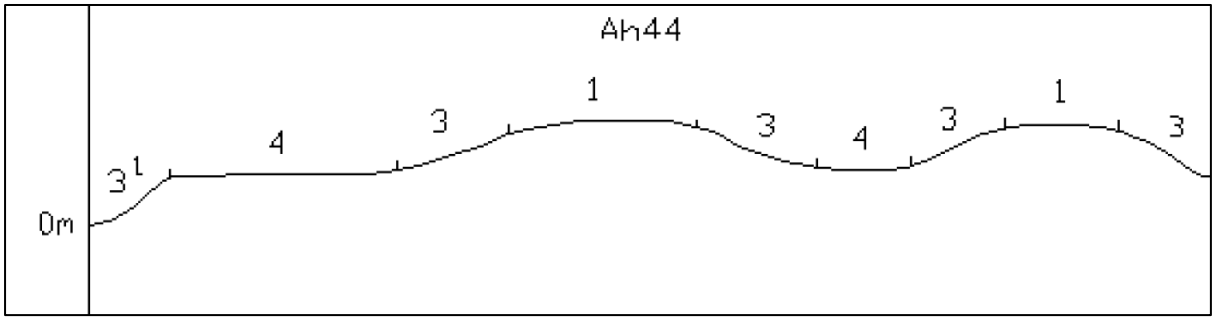


Figure 4-2 Illustration of land type Ah 44 terrain units (Land Type Survey Staff, 1972 – 2006)

Table 4-1 Soils expected at the respective terrain units within the Ah 44 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units							
1 (40%)		3 (10%)		3 (1)(5%)		4 (45%)	
Hutton	95%	Hutton	85%	Clovelly	40%	Hutton	65%
Clovelly	5%	Clovelly	15%	Hutton	30%	Clovelly	20%
				Fernwood	30%	Fernwood	10%
						Vilafontain	5%

Figure 4-3 Land type distribution within the proposed project area

4.3 Terrain

The slope percentage of the project area has been calculated and is illustrated in Figure 4-4. Most of the regulated area is characterised by a slope percentage between 0 - 10% with some few irregularities in areas with slopes reaching 31%. This illustration indicates a uniform topography with occurrence of a few steep sloping areas being present. The Digital Elevation Model (DEM) of the project area (Figure 4-5) indicates an elevation of 20 to 130 Metres Above Sea Level (MASL).

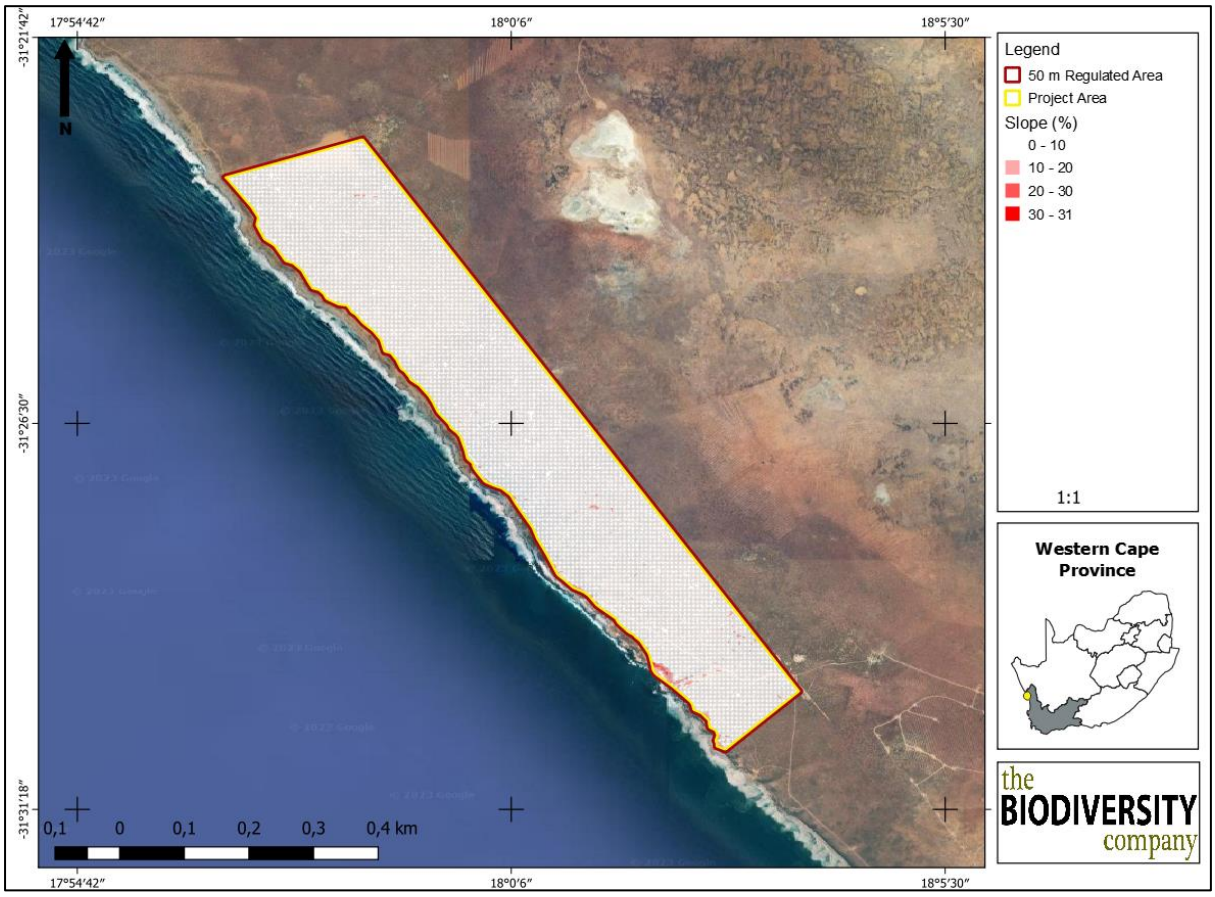


Figure 4-4 Slope percentage map for the project area

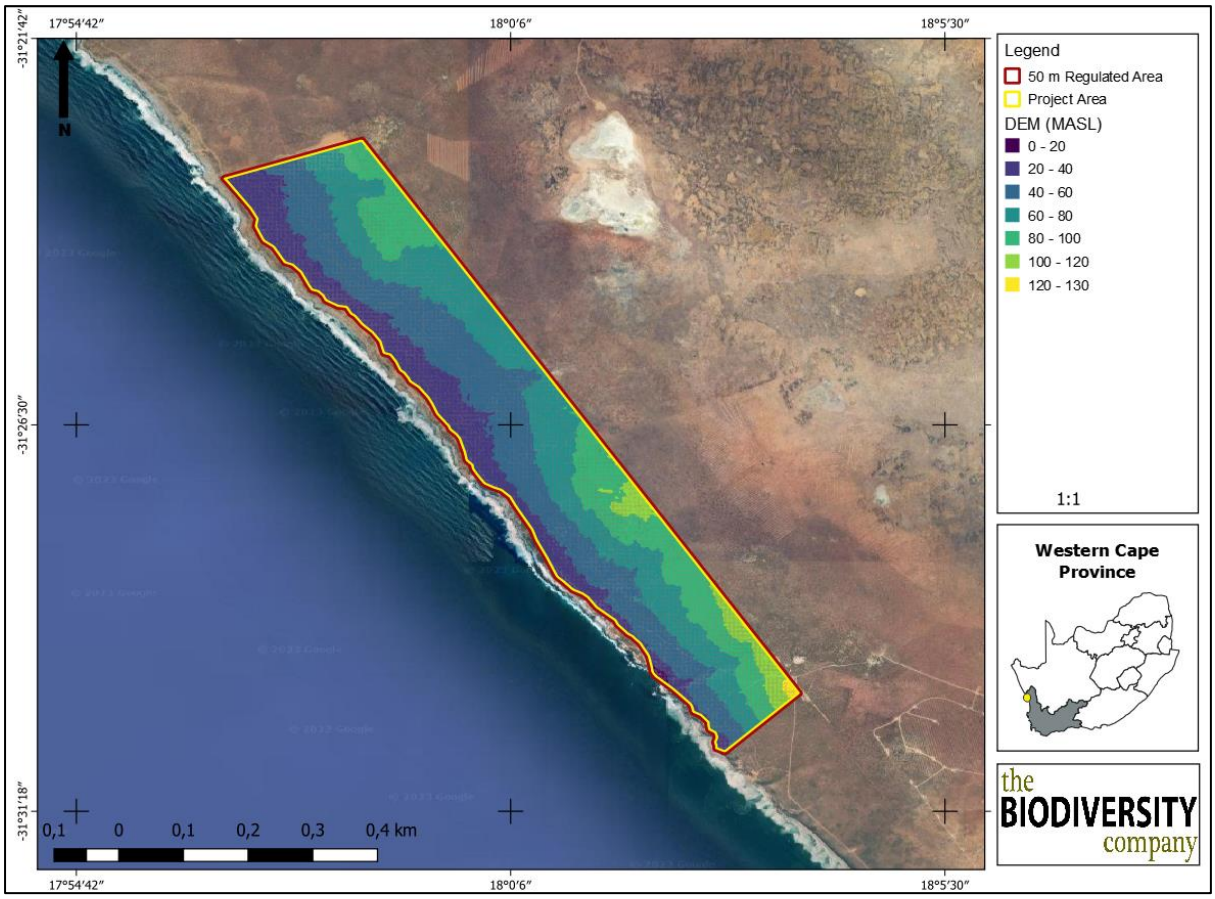


Figure 4-5 Digital Elevation Model of the project area (Metres Above Sea Level)

5 Results and Discussion

5.1 Baseline findings

The two most sensitive soils forms which were identified in the proposed prospecting project area is that of Tongwane and Clovelly soil forms. The Tongwane soil form consists of an orthic topsoil horizon on top of a red apedal horizon underlain with a neocutanic horizon below. The Clovelly soil form has an orthic topsoil with a yellow-apedal subsurface horizon with a lithic horizon below. Other associated fewer sensitive soils identified in the prospecting area includes the Fernwood, Constantia and Namib soil forms (see Figure 5-1 to Figure 5-3). The project area is dominated by apedal soils, which are well drained mostly merging into a gleylithic horizon.

The above-mentioned most sensitive soil forms have been determined to have a land capacity class of “III” and “IV” with a climate capacity level 8 given the Low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capability class and climate capability results in land potential “L6”. The “L6” land potential level is characterised by very restricted potential due to the severe limitations as a result of the soil, slope, temperature, or rainfall. This area is non-arable, and it is characterised with a “Low” sensitivity.

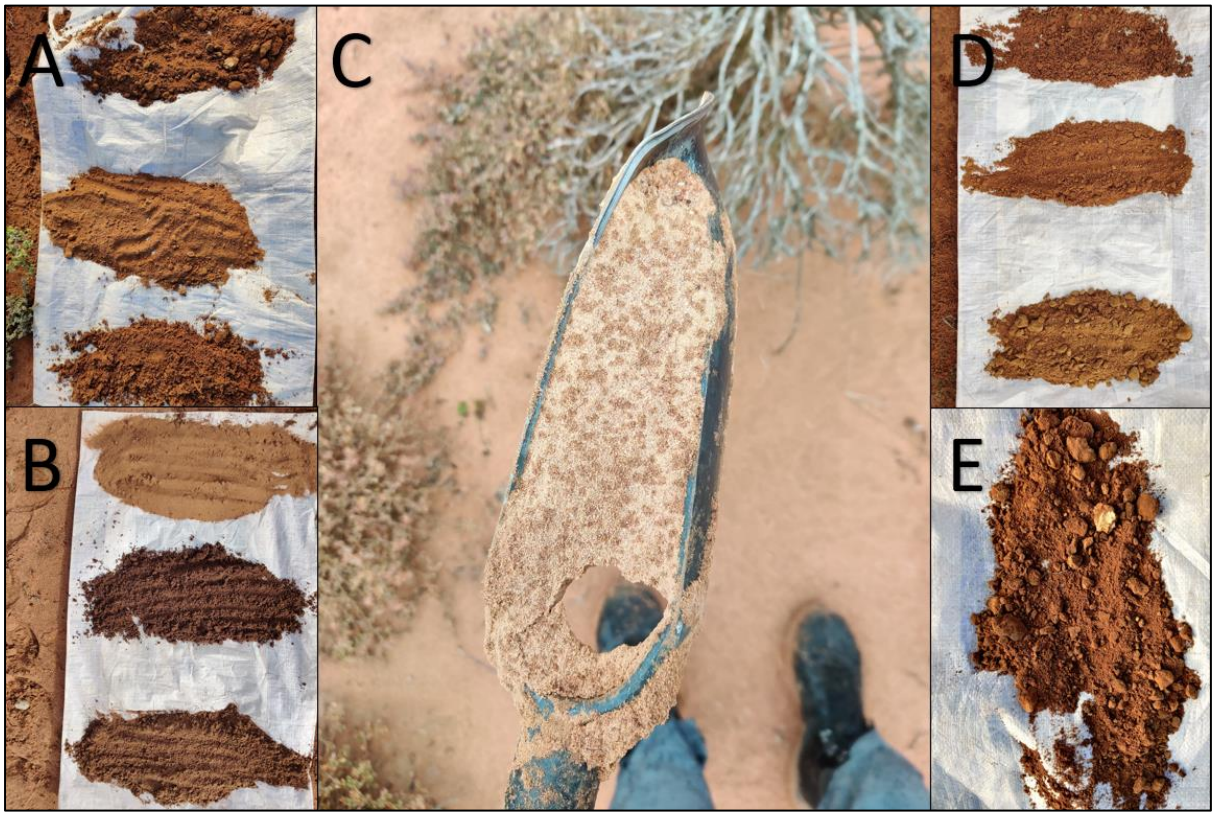


Figure 5-1 Soil forms found within the proposed project area; A) Orthic topsoil on top of a yellow-brown apedal horizon; B) Orthic topsoil on top of red apedal horizon with a neocutanic below; C) Albic subsurface horizon; D&E) Yellow-apedal surface horizon with a lithic horizon below.

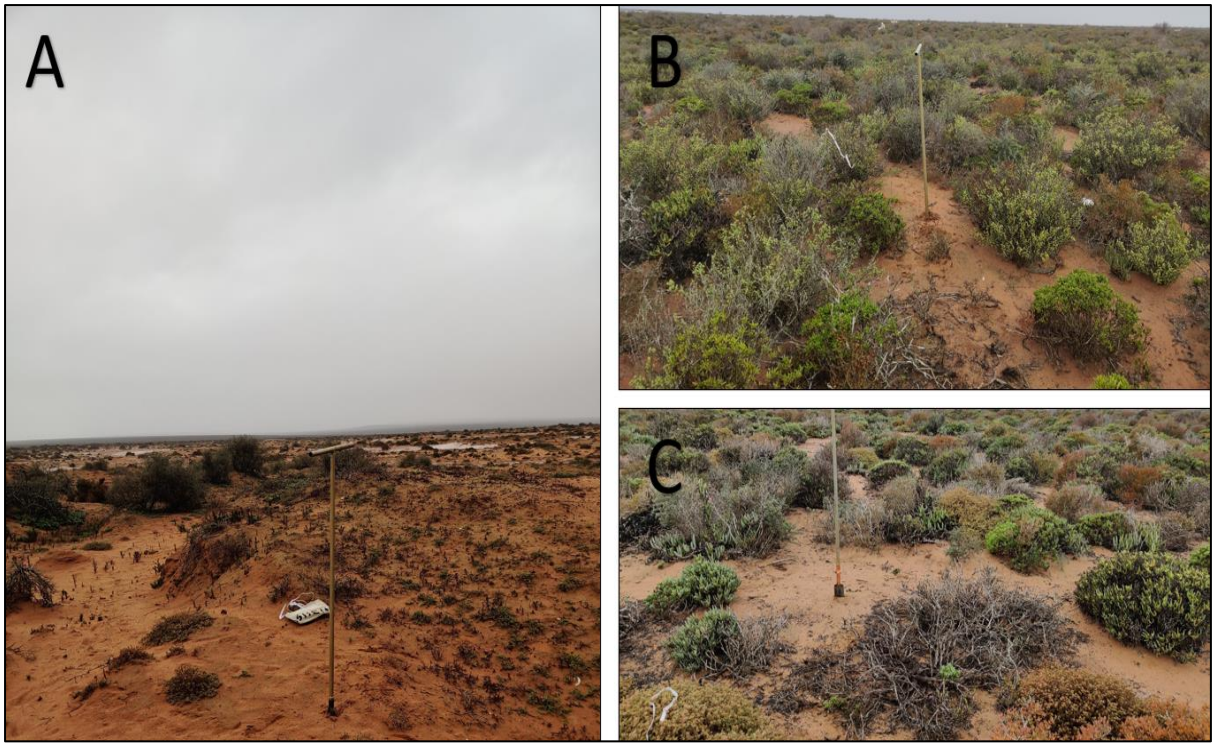


Figure 5-2 A-C) General landscape of the prospecting area with the identified soil forms.

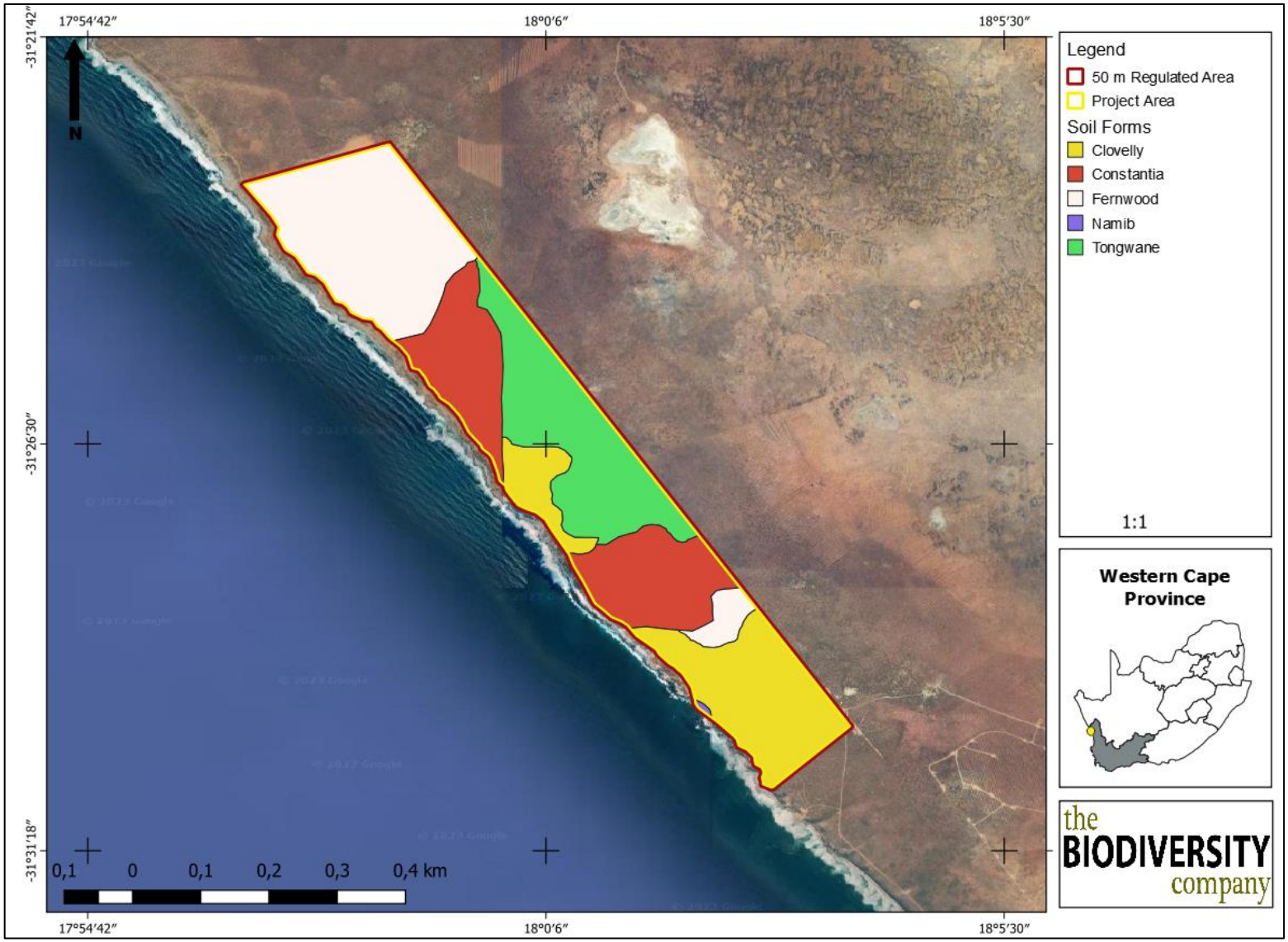


Figure 5-3 Dominant soil forms distribution identified in the project area.

5.2 Sensitivity Verification

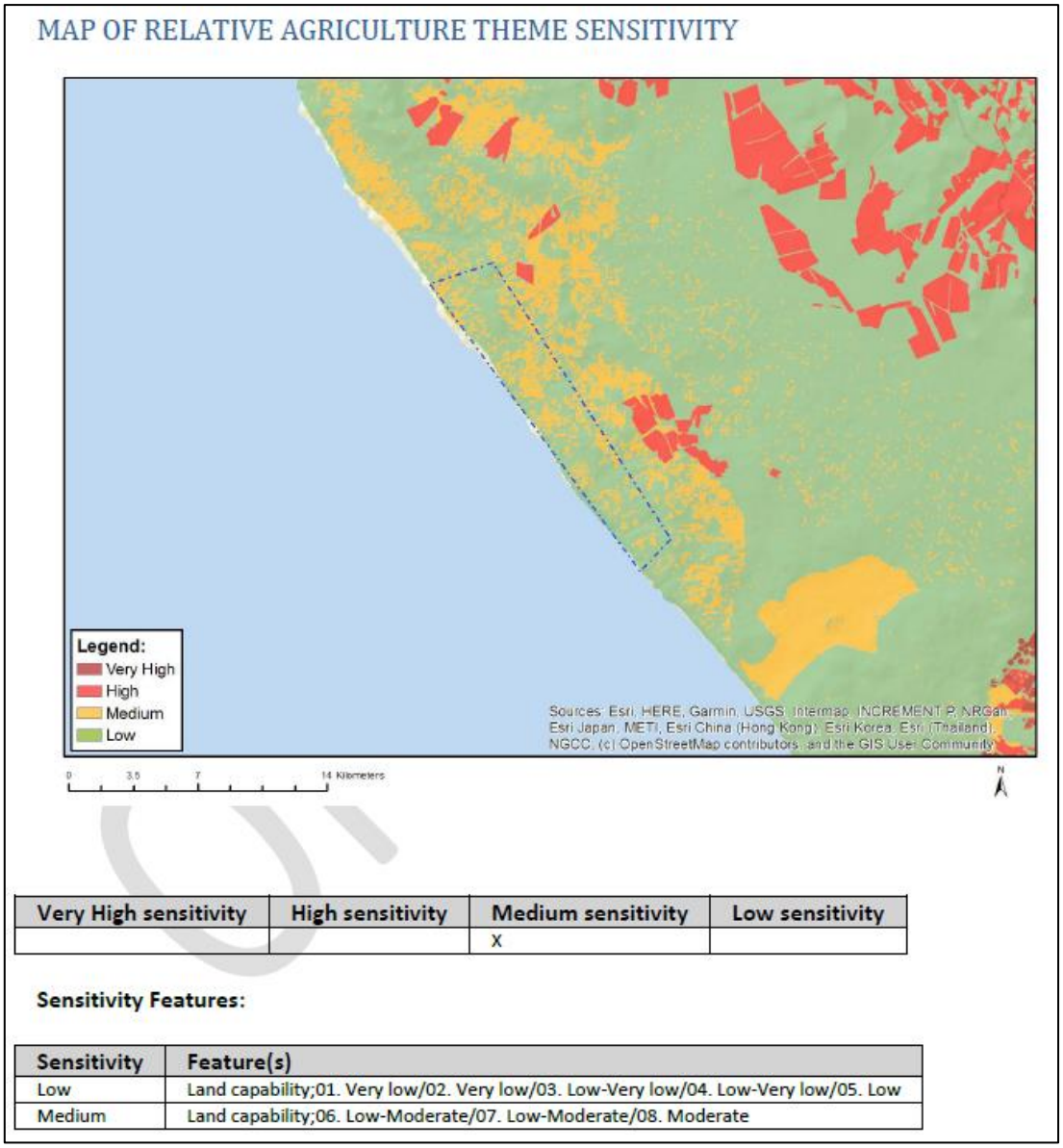
The following land potential level has been determined;

- Land potential level 6 (this land potential is characterised by a very restricted land potential. Severe limitations due to soil, slope, temperatures, or rainfall. Non arable).

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

- Land Capability 1 to 5 (Very low to Low Sensitivity); and
- Land Capability 6 to 8 (Low to Moderate Sensitivity).

The baseline findings and the Land Capability sensitivity as per the Department of Agricultural, Forestry and Fisheries (DAFF, 2017) national raster file concur with one another. The proposed prospecting area is characterised with "Very low to Moderate" land capability sensitivity (DFFE screening tool, 2023; Figure 5-5). The land capability and land potential of the resources in the regulated area are both characterised by "Low" sensitivities, which conforms to the requirements of an agricultural compliance statement only. The specialist agrees with the DFFE (2023) agricultural themes on most areas identified with the "Low to Moderate" sensitivities. Some of the areas were disputed based on the verified baseline soils which were characterised as "Low" sensitivity are associated with soils with a good land potential, more specifically the Clovelly and Tongwane soil forms. However, the available harsh climatic conditions restrict most cropping practices, thus overall, the area can be categorized as "Medium" In the project area, there is no segregation of agricultural lands or crop fields with high potential according to the DFFE (2023). Its is therefore the specialist`s recommendation that the proposed project maybe favourably considered as has been planned.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
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

Figure 5-4 Map of the relative Agricultural Theme Sensitivity for the prospecting area generated by the Environmental Screening Tool

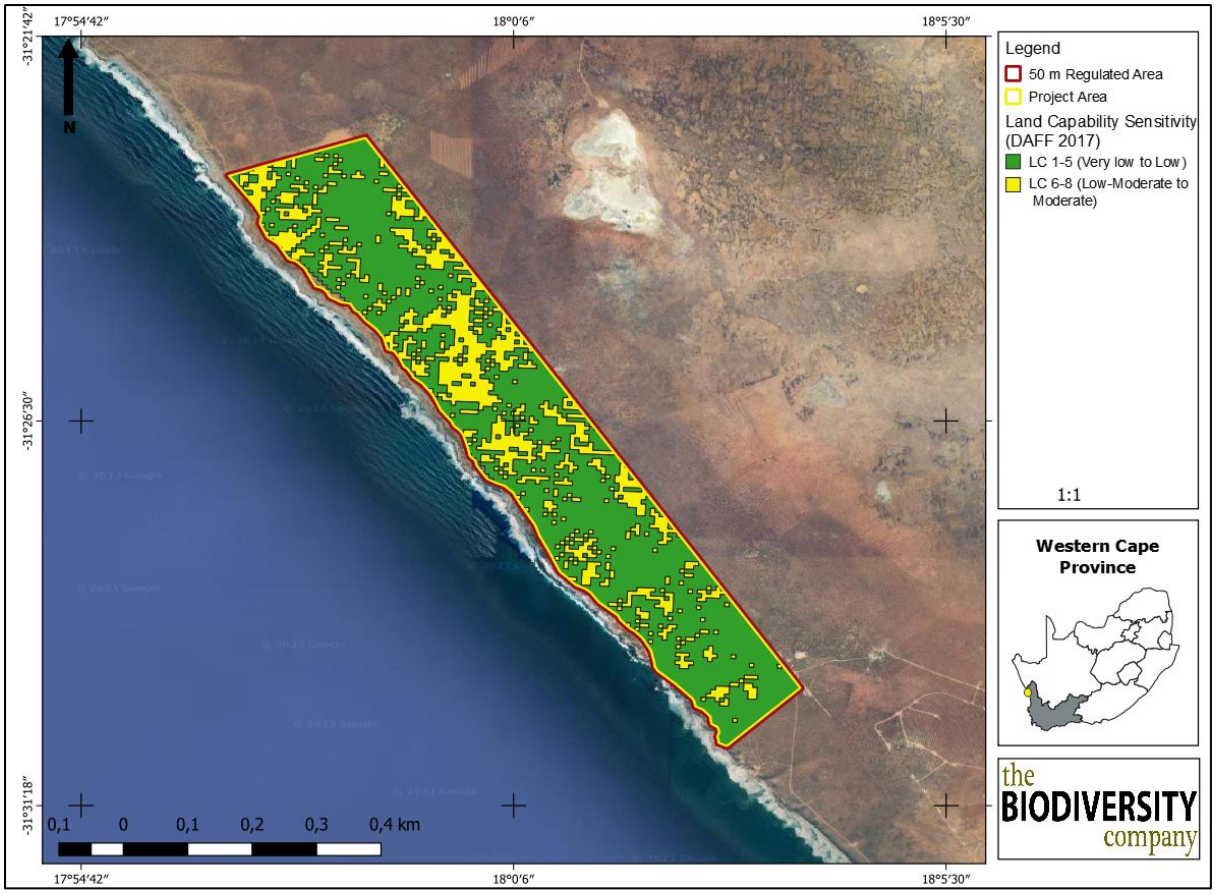


Figure 5-5 The land capability sensitivity for the prospecting project area (DAFF, 2017)

6 Conclusion

Two dominant soil forms, the more sensitive forms identified within the assessment area are the Clovelly and Tongwane soil forms. The baseline findings and land capability sensitivity concur with each other, in most areas indicating a “Low” to “Moderate” land capability sensitivity. In some areas which were identified with a “Low” are characterized with soils with a good potential following the verified soil baseline findings. Overall, the area can be classified as “Medium” following the verified soil baseline on-site.

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 might not be favourable for most cropping practices.

There is no segregation of crop fields or land with a high land potential and capability identified within the proposed area. It is the specialist’s opinion that the proposed project will have limited impacts on the agricultural production ability of the land, and the proposed prospecting mining project may be favourably considered.

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.

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

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