Soil Compliance Statement for the proposed Limestone PV1 and Limestone PV2 Solar Photovoltaic Facility Project

Kgatelopele Local Municipality and ZF Mgcawu District Municipality, Northern Cape

November 2022

Client

Prepared by:

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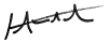
Report Name	**Soil Compliance Statement for the proposed Limestone PV1 and Limestone PV2 Solar Photovoltaic Facility Project**
Submitted to	savannah environmental
Report Reviewer	**Andrew Husted** 
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Report Writer	**Matthew Mamera** 
	Matthew Mamera 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. Matthew completed his M.Sc. in soil science, hydropedology and water management at the University of Fort Hare, Alice. He is also a holder of a PhD in soil science, hydropedology, water and sanitation obtained at the University of the Free State, Bloemfontein. 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.

Table of Contents

Figures

Tables

Document Guide

According to the Government Notice 320 dated 20 March 2020 and the 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 criteria is applicable to that of an agricultural compliance statement.

Requirement	Reference
Specialist Details and CV	Appendix A
Locality of the proposed activity	Section 2
Sensitivity verification	Section 5.2
Acceptability of impacts towards agricultural production capability associated with proposed activities	Section 6
Declaration of specialist(s)	Page vi
Project components with 500 m regulated area superimposed to that of the agricultural sensitivities of the screening tool	Section 5.2
Confirmation from specialist that mitigation to avoid fragmentation has been considered	Section 6
Statement from specialist regarding the acceptability and approval of proposed activities	Section 6
Conditions to acceptability of proposed activities	
Probability of land being returned to current state after decommissioning	N/A
Monitoring requirements and/or any inclusions into EMPr	N/A
Assumptions and uncertainties	Section 3.4

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.

Matthew Mamera

Soil Specialist

The Biodiversity Company

November 2022

1 Introduction

The Biodiversity Company was appointed by AGV Projects (Pty) Ltd to undertake a basic soil and agricultural potential assessment for the proposed Limestone PV1 and Limestone PV2 Solar Photovoltaic (PV) projects and associated infrastructure on Portion 4 of the Farm Engeland 300 near Danielskuil, Northern Cape Province. Each project will have a contracted capacity of between 75MWp to 100MWp. A broader study area of 1842ha and a preferred project site with an extent of 200-300ha have been identified by AGV Projects (Pty) Ltd as technically suitable for the development of the PV facilities. Each facility is proposed to include the following infrastructure:

- PV modules mounted on either a single axis tracking & fixed structure, dependent on optimisation, technology available and cost;
- Inverters and transformers;
- Low voltage cabling between the PV modules to the inverters;
- Fence around the project development area with security and access control;
- Camera surveillance;
- Internet connection;
- 33kV cabling between the project components and the facility substation;
- 33/132kV onsite facility substation;
- Battery Energy Storage System (BESS) with a footprint of 3-5ha;
- Site offices and maintenance buildings, including workshop areas for maintenance and storage as well as parking for staff and visitors;
- Laydown/staging area less site in front of mounting structures during installation. Temporary store area close to site entrance (Less than 1ha);
- Access roads (up to 6 m wide) and internal distribution roads (up to 4 m wide);
- Temporary concrete batching facility;
- Stormwater management infrastructure as required.

The approach adopted for the assessments has taken cognisance of the 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”. According to the National Web based Environmental Screening Tool, the proposed development is located within a predominantly “Low” agricultural theme sensitivity area.

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 renewable development project.

1.1 Scope of Work

The protocols for minimum requirements (DEA, 2020)1 stipulates that in an event that a proposed development is located within “Low” or “Medium” sensitivities, an agricultural compliance statement will be sufficient. It is worth noting that according to these protocols, a site inspection will still need to be conducted to determine the accuracy of these sensitivities. After acquiring baseline information pertaining to soil, terrain and climate features within the 50 m regulated areas, it is the specialist’s opinion that the soil forms

[1] A site identified by the screening tool as being of ’High” or “Very High” sensitivity for agricultural resources must submit a specialist assessment unless the impact on agricultural resources is from an electricity pylon (item 1.1.2).

and associated land capabilities concur with the sensitivities stated by the screening tool. Therefore, only an agricultural compliance statement will be compiled. This includes:

- 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 500 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 Environmental Management Programme (EMPr).

1.2 Expertise of the Specialists

1.2.1 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.

1.2.2 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. Matthew completed his M.Sc. in soil science, hydropedology and water management at the University of Fort Hare, Alice. He is also a holder of a PhD in soil science, hydropedology, water and sanitation obtained at the University of the Free State, Bloemfontein. Matthew is also a member of the Soil Science Society of South Africa (SSSSA).

2 Project Area

The proposed project area is located approximately 16 km south-east of Danielskuil town within the Kgatelopele Local municipality and the ZF Mgcawu District Municipality of the Northern Cape Province, South Africa. The area is approximately 9 km southwest of the town of Lime Acres and 10 km southeast of the town of Witputs. The project area is also found approximately 8.3 km west of the R385 road and 6.4 km north of the R31 road (Figure 2-1). The surrounding land use includes limestone mining, watercourses, livestock, and game farming activities.

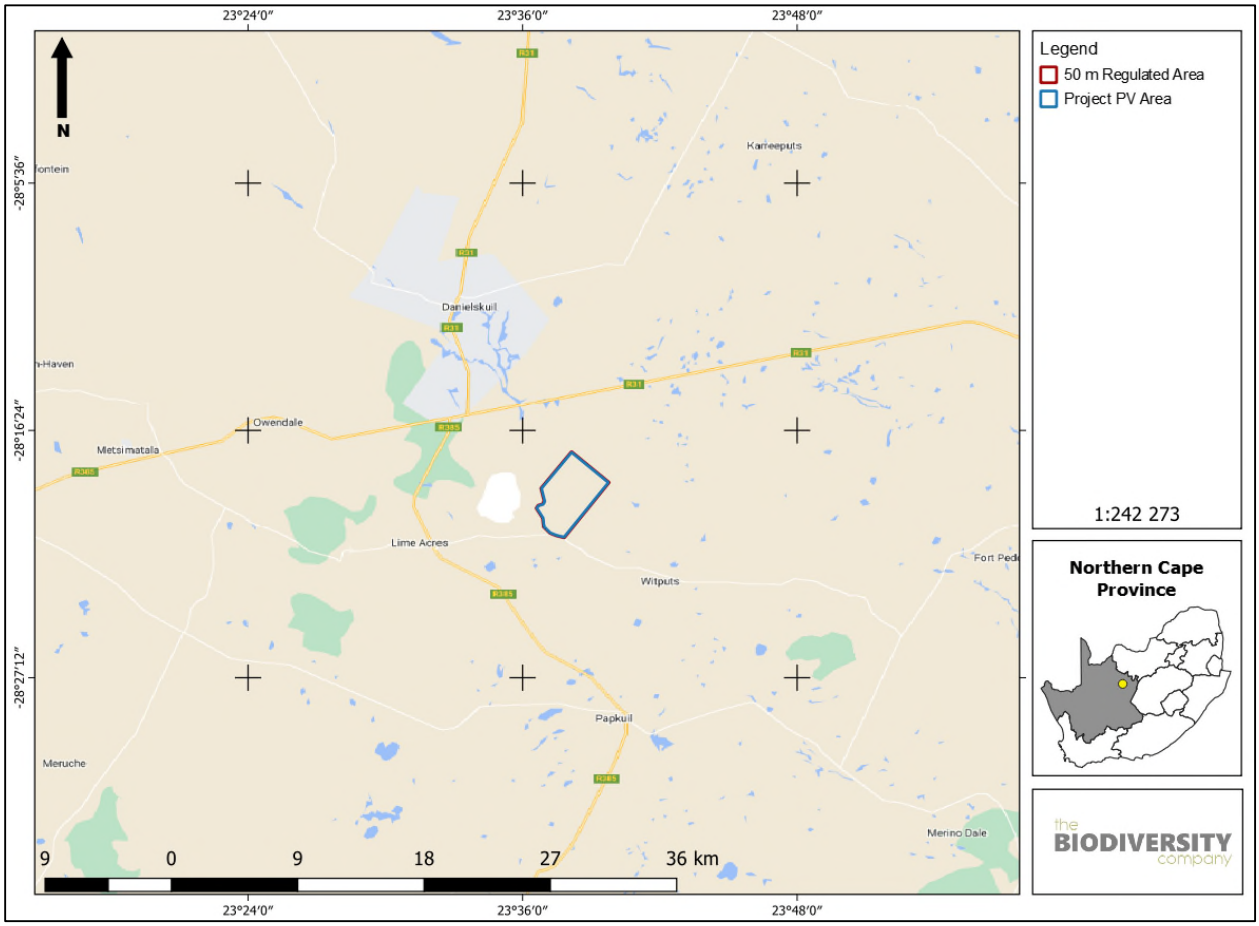

Figure 2-1 Locality map of the project area

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 a field survey in October 2022. 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 1,5 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

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 or fertility has been analysed for the relevant classified soils.

4 Project Area

4.1 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006) the proposed project area falls within the Fc 04 land type. The Fc 04 land types mostly consist of bare rocks and Mispah soil forms following the South African soil classification working group (1990) with the possibility of other soils occurring throughout the landscapes. The area is also characterised with Glenrosa and shallow soils. Lime is absent in the entire terrain landscape. The terrain units and expected soils for the Fc 04 land type is presented in Figure 4-1 and Table 4-1 respectively.

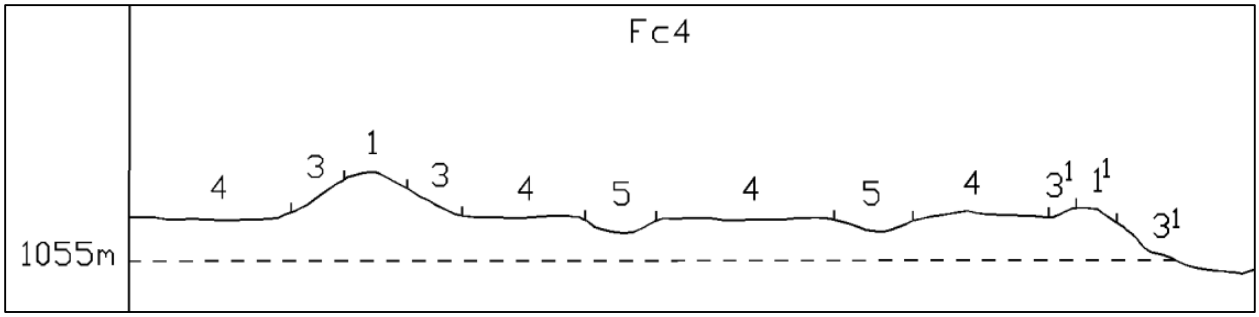

Figure 4-1 Illustration of land type Fc 04 terrain units (Land Type Survey Staff, 1972 – 2006)

Table 4-1 Soils expected at the respective terrain units within the Fc 04 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units											
1 (0.2%)		**1 (1) (0.5%)**		**3 (0.3%)**		**3 (1) (1%)**		**4 (78%)**		**5 (20%)**	
Bare Rocks	80%	Bare Rocks	80%	Bare Rocks	80%	Bare Rocks	80%	Bare Rocks	70%	Bare Rocks	80
Mispah	20%	Mispah	20%	Mispah	20%	Mispah	20%	Mispah	25%	Mispah	20%
						Bare Rocks	6%	Hutton	5%		

4.2 Terrain

The slope percentage of the project area has been calculated and is illustrated in Figure 4-2. Most of the regulated area is characterised by a gentle slope percentage between 0 to 10% with some few irregularities in areas with slopes reaching 20%. This illustration indicates a more uniform topography with occurrence of some few steep sloping areas being present. The Digital Elevation Model (DEM) of the project area (Figure 4-3) indicates an elevation of 1 435 to 1 500 Metres Above Sea Level (MASL).

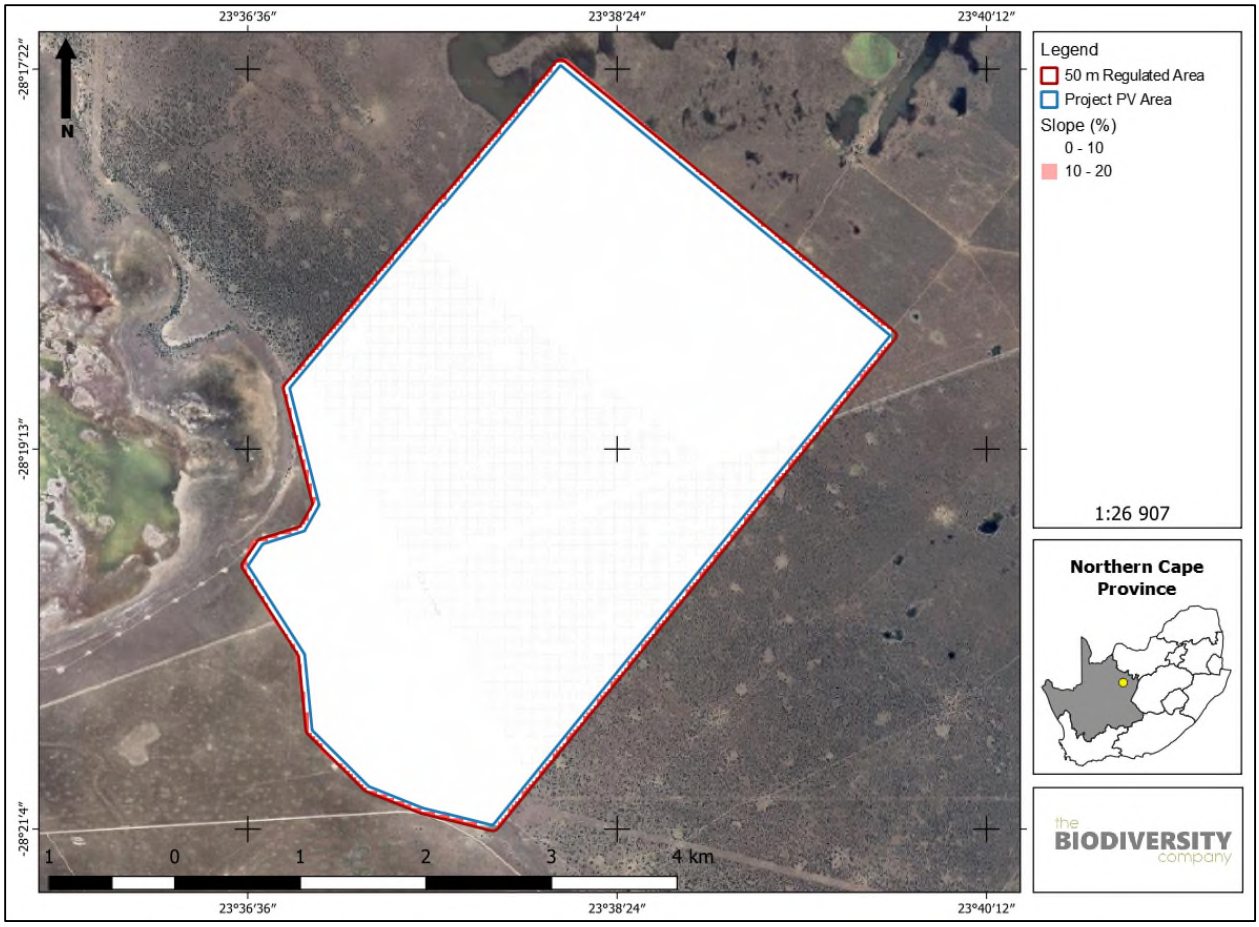

Figure 4-2 Slope percentage map for the project area

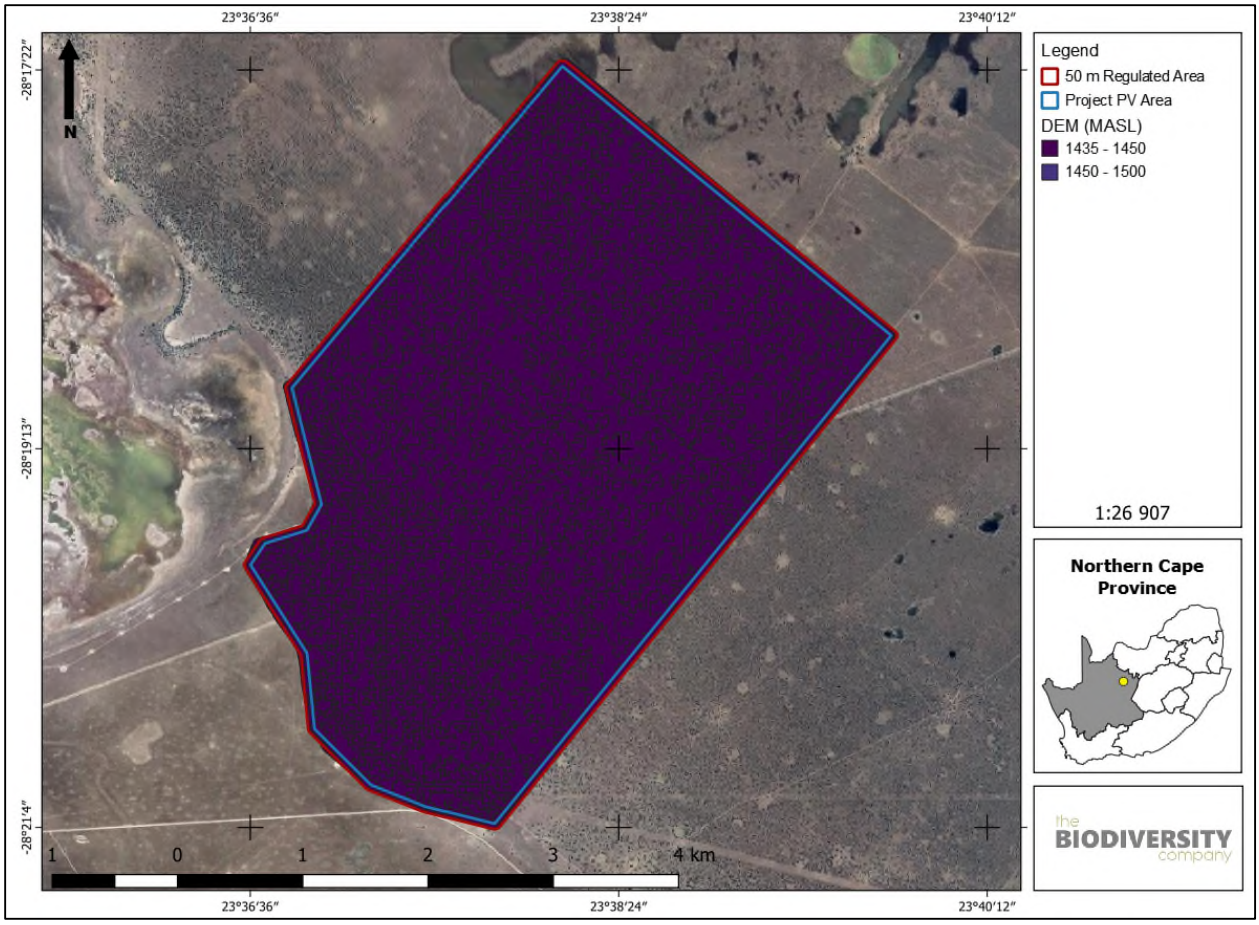

Figure 4-3 Digital Elevation Model of the project area (Metres above sea level)

5 Results and Discussion

5.1 Baseline Findings

The most sensitive soil forms identified within the assessment area is the Etosha and Vaalbos soil forms, with other associated soils also occurring. The Etosha soil form has an orthic topsoil with a neocutanic subsurface horizon underlain by a soft carbonate horizon. The Vaalbos soil form consists of an orthic topsoil horizon on top of a red apedal horizon merging into a hard rock substratum below (see

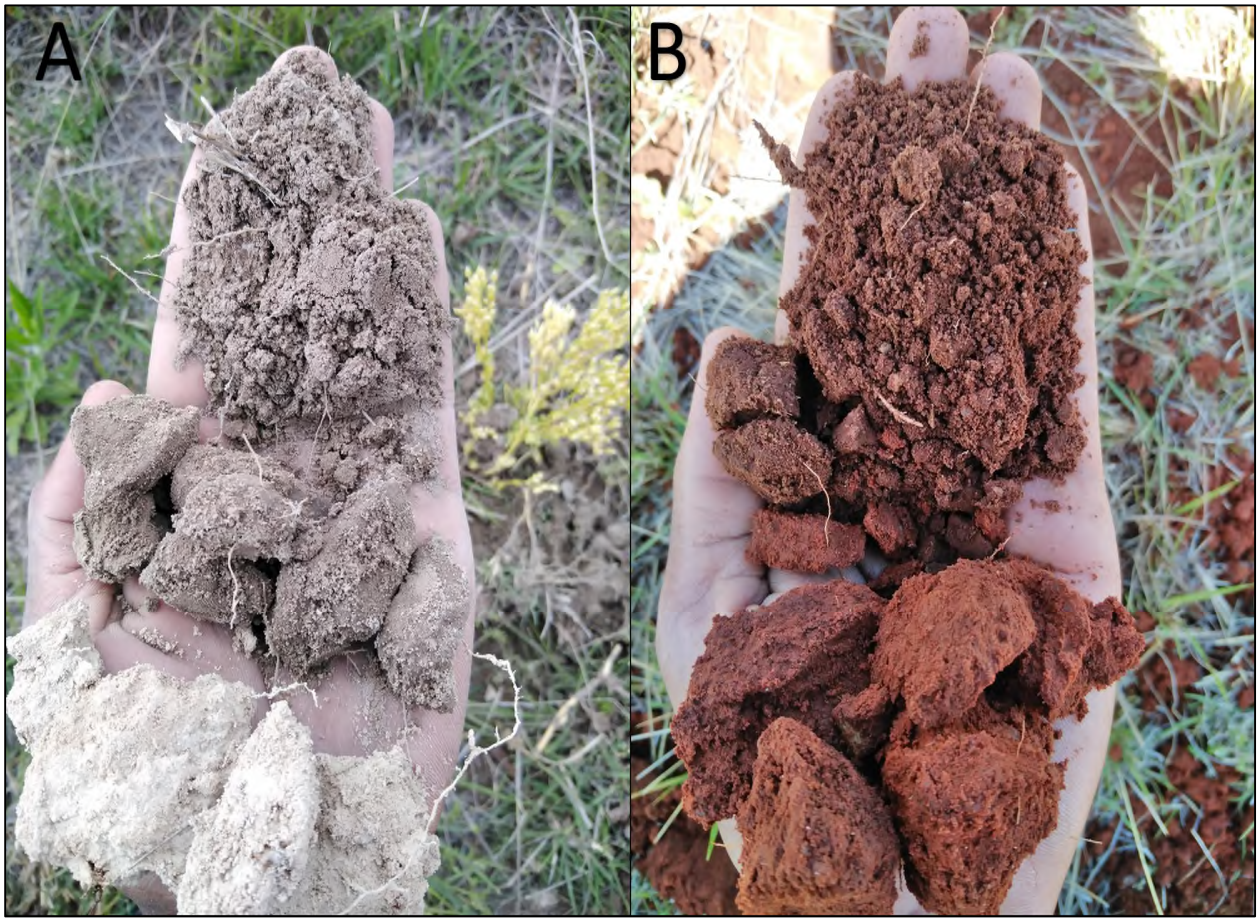

Figure 5-1).

The land capability of the above-mentioned soils has been determined to have land capability classes of “III” and “IV” with a climate capability 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 and climate capability results in land potential “L6”. The “L6” land potential level is characterised by a *very restricted potential. Regular and/or severe limitations occur due to soil, slope, temperatures or rainfall. These areas are non-arable*. The “L6” land potential of the assessment area is characterized with an overall **“Low” sensitivity** following the baseline findings.

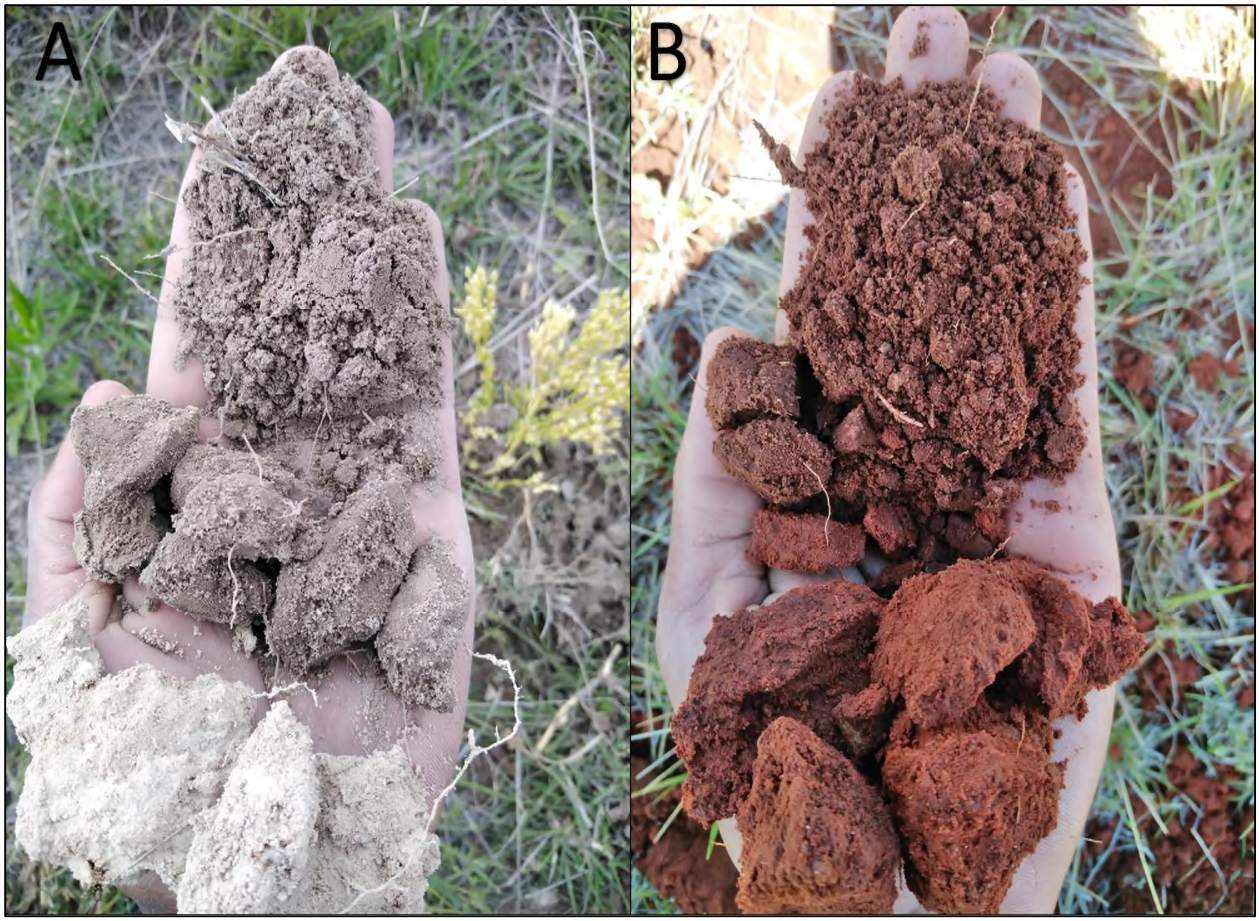

Figure 5-1 Etosha and Vaalbos soil forms identified within the assessment area footprint (A and B respectively).

5.2 Sensitivity Verification

The following land potential levels has been determined;

- Land potential level 6 (this land potential level is characterised by a very restricted potential. Regular and/or severe limitations occur 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)
- Land Capability 6 to 8 (Low/Moderate to Moderate Sensitivity)

The baseline findings and the sensitivities as per the Department of Agriculture, Forestry and Fisheries (DAFF, 2017) national raster file concur with one another. The proposed Danielskuil Solar PV project and associated infrastructure is mostly characterised with "Very Low" to "Low" land capability sensitivities (see Figure 5-2). Very limited portions in the assessment area are characterised with "Moderate" sensitivity. There are few arable soils in the project area. It therefore is the specialist's opinion that the land capability and land potential of the resources in the footprint area is characterised by predominantly "Low" with limited "Moderate" sensitivities (see Figure 5-2), which conforms to the requirements of an agricultural compliance statement only. The DEA screening tool, (2022) shows that there are no crop fields with "High" sensitivity within the assessment area and as a result there will be no segregation of crop production.

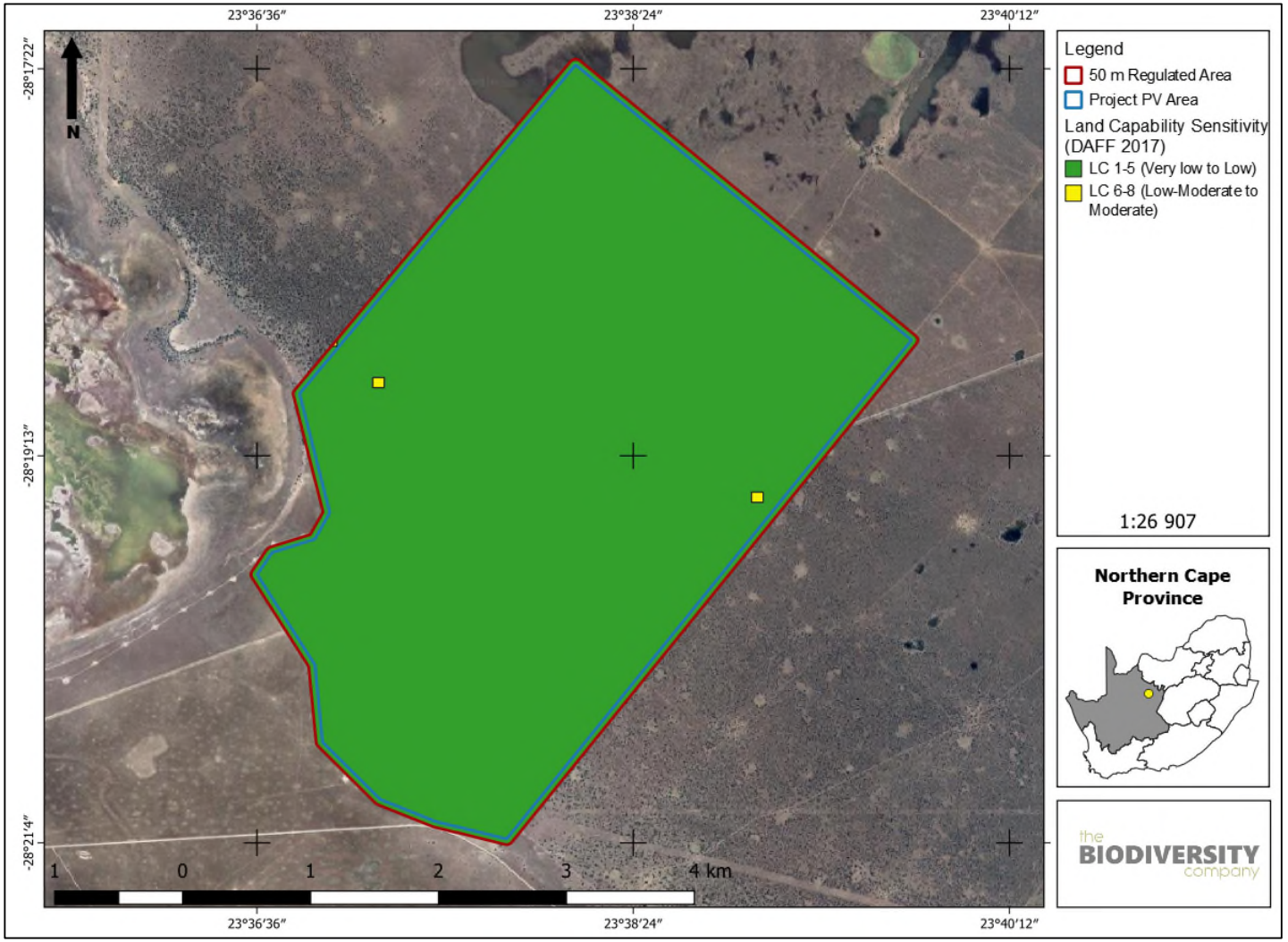

Figure 5-2 Land Capability Sensitivity (DAFF, 2017)

6 Conclusion

The most sensitive soil forms identified within the assessment area is the Etosha and Vaalbos soil forms. The assessment area land potential falls within “Low” sensitivities which also concurs with the DAFF, (2017) sensitivities. The soil baseline assessment findings and the DEA, (2022) agricultural theme screening tool characterised the area as predominantly “Low” with (very) limited “Medium” sensitivity areas. The project area is therefore assigned an overall sensitivity of ”Low”.

The assessment area is associated with non-arable soils. The available climate limits crop production. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area. The area is not favourable for most cropping practices, which corresponds to the current livestock and game farming production in the area.

It is the specialist’s opinion that the proposed Limestone PV1 and Limestone PV2 Solar PV facilities and associated infrastructure will have no impacts on the agricultural production ability of the land. There is no segregation of crop fields with “High” sensitivity in the proposed project area. It is, therefore, the specialist`s recommendation that, the proposed Limestone PV1 and Limestone PV2 Solar PV facilities and associated infrastructure may be favourably considered without mitigation as it has (very) limited impacts on the land potential capability of the resources in the project area.

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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