# Soil Pedology Report – Carolus Solar Photo-Voltaic (PV) Solar Energy Facility and associated Grid Connection Infrastructure

# Pixley ka Seme District Municipality, Northern Cape Province

June 2022

**CLIENT**

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|---|---|
| Report Name | **Soil Pedology Report – Carolus Solar Photo-Voltaic (PV) Solar Energy Facility and associated Grid Connection Infrastructure** |
| Reference | **Carolus Solar Photovoltaic Energy Facility** |
| Submitted to | savannah environmental |
| Report Writer | **Matthew Mamera**<br><br>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). |
| Report Writer / Reviewer | **Andrew Husted**<br><br>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 12 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 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.

Matthew Mamera

Soil Pedologist

The Biodiversity Company

June 2022

# 1 Introduction

## 1.1 Background

Carolus Solar PV1 (Pty) Ltd is proposing the development of a Photovoltaic (PV) Solar Energy Facility and associated infrastructure on Portion 3 of the Farm Carolus Poort No.3, located approximately 10 km east of De Aar within the Emthanjeni Local Municipality in the Northern Cape Province. The facility will have a contracted capacity of up to 120 MW and will be known as Carolus Solar PV1. The project is planned as part of a cluster of renewable energy facilities known as Pixley Park, which includes three (3) additional Solar PV Facilities (Wagt Solar PV1, Rietfontein PV1, and Fontein Solar PV1), and grid connection infrastructure connecting the facilities to the existing Hydra Substation.

The Grid connection infrastructure will include a 132 kV IPP Substation and a powerline with a capacity up to 132 kV which is being assessed within a 300 m wide and between 3.3 km and 9. 3km long corridor connecting to either the new proposed Vetlaagte MTS or the new proposed Wag-'n-Bietjie MTS, which will respectively be located on the farm Vetlaagte (RE/4) or Wagt en Bittje (RE/5). The Vetlaagte MTS will Loop into the Hydra-Perseus 2 or Hydra-Perseus 3 line (400 kV). Substations on either end of the line: Hydra and Perseus. The Wag-'n-Bietjie MTS will loop into the Hydra-Beta 1 line (400 kV). Substations on either end of the line: Hydra and Beta.

It is the developer's intention to bid the proposed project under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme (or similar programme), with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP), with Carolus Solar PV1 Facility set to inject up to 120 MW into the national grid.

The Biodiversity Company was appointed by Savannah Environmental (Pty) Ltd (Savannah) to undertake a soil and agricultural potential basic assessment for the Pixley Park Renewable Energy project. The Pixley Park Solar Cluster Project comprises of photovoltaic (PV) facilities and associated powerlines, substations and BESS facilities.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the published Government Notices (GN) 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" (Reporting Criteria).

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 and enable informed decision making. This report aims to also present and discuss the findings following the DAFF, (2017) land capability potentials and sensitivities from the soil resources identified within the regulated 50 m, the soil suitability and land potential of these soils, the land uses within the regulated area and the risk associated with the proposed project.

## 1.2 Project Description

### 1.2.1 Photovoltaic Facility

Infrastructure associated with the Carolus Solar PV1 Facility will include the following:

- Solar PV array comprising bifacial PV modules and mounting structures, using single axis tracking technology;

- Inverters and transformers;
- Cabling between the panels;
- Battery Energy Storage System (BESS);
- Laydown areas, construction camps, site offices ;
- 12 m wide Access Road and entrance gate to the project site and switching station;
- 6 m wide internal distribution roads;
- Operations and Maintenance Building, Site Offices, Ablutions with conservancy tanks, Storage Warehouse, workshop, Guard House;
- Onsite 132 kV IPP Substation, including the HV Step-up transformer, and MV Interconnection building;
- 132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the Main Transmission Substation (MTS) located on farms Vetlaagte and Wagt, which is to be handed back to Eskom (a separate EA is being applied for in this regard);
- Extension of the 132 kV Busbar at the MTS;
- 132 kV Feeder Bay at the MTS;
- Extension of the 400 kV Busbar at the MTS; and
- Installation of a new 400/132 kV Transformer and bay at the MTS.

A development footprint of approximately 285 ha has been identified within the broader project site (approximately 8 200 ha in extent), by the developer for the development of the Carolus Solar PV1 Facility, which is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes.

#### 1.2.2 Grid Connection Infrastructure

The grid connection corridor will consist of:

- Onsite 132 kV IPP Substation including the HV Stepup transformer, MV Interconnection building (footprint up to 100 m x 100 m located within the 300 m wide corridor);
- Onsite 132 kV Eskom switching station – 100 m x 100 m and 30 m height, metering, relay & control buildings, laydown area, ablutions with conservancy tanks and water storage tanks, and access roads which roads which is handed back to Eskom (Separate EA);
- 132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the Main Transmission Substation (MTS) located on either Vetlaagte (RE/4) or Wag en Bittje (RE/5) farms which will be handed back to Eskom (within 300 m wide corridor and a 31 m wide servitude); and

- Access roads to substation sites (up to 8 m wide) and service tracks (up to 6 m wide) where no existing roads are available. These may be reduced to 6 m and 4 m respectively as permanent roads.

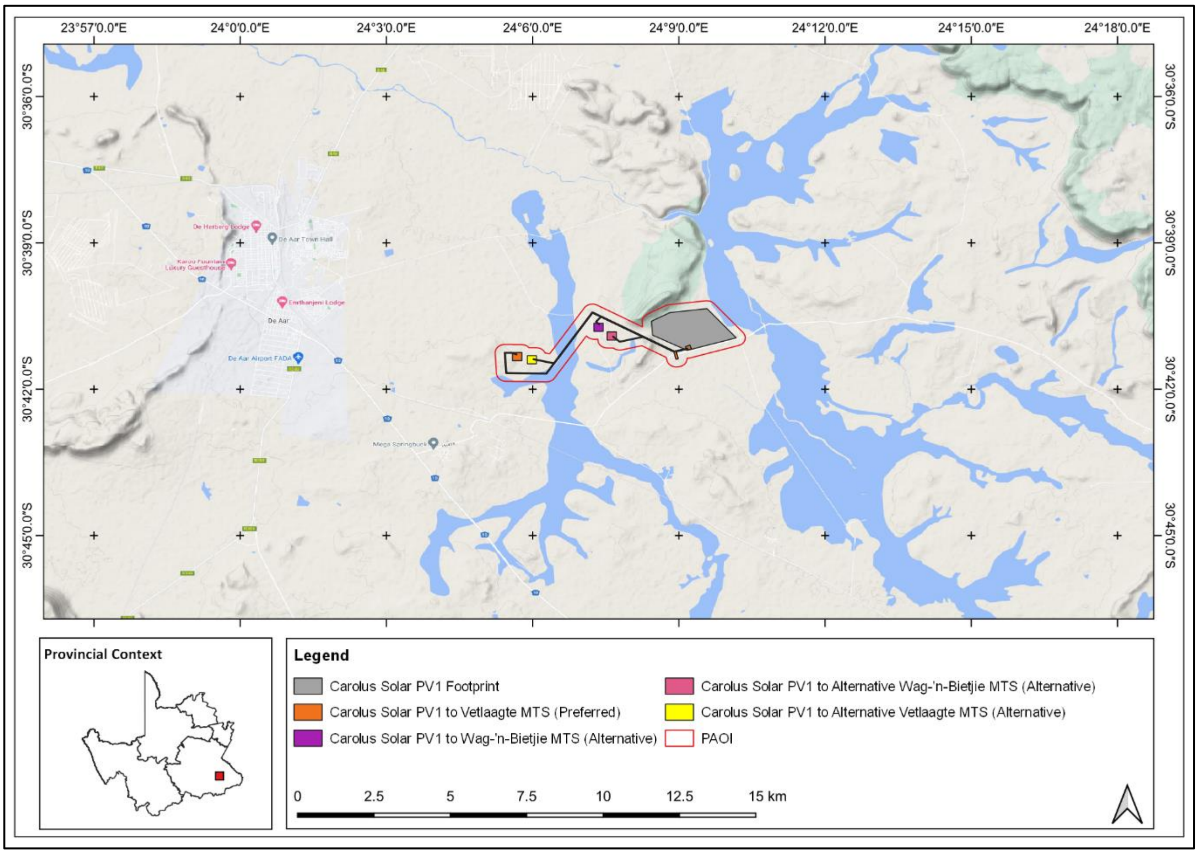


***Figure 1-1*** ***Map illustrating the location and layout design of the proposed Carolus Solar PV1 Facility***

## 1.3 Scope of Work

According to the National Web based Environmental Screening Tool, the proposed development is located within a "Medium" sensitivity land capability area. The protocols for minimum requirements (DEA, 2020)[1] stipulates that in the 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 resources within the 50 m regulated areas, it is the specialist's opinion that the soil forms 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 50 m regulated area as well as the sensitivities pertaining to the screening tool;

[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).

- 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.

## 1.4 Expertise of the Specialists

### 1.4.1 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 12 years' experience in the environmental consulting field.

### 1.4.2 Matthew Mamera

Matthew Mamera is a Cand. Sci Nat registered (116356) in natural and agricultural sciences, recognition 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 scientific publications in international peer reviewed journals. Matthew completed his MSc 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 Photovoltaic (PV) Solar Energy Facility and associated infrastructure development is located approximately 10 km east of De Aar within the Emthanjeni Local Municipality in the Northern Cape Province (Figure 2-1). The area is immediately north-east of the hydra substation and approximately 8 km north of the N10 Highway. The surrounding land use includes nature or game reserves, wool production, mountainous areas, agricultural activities predominantly livestock farming and watercourses.

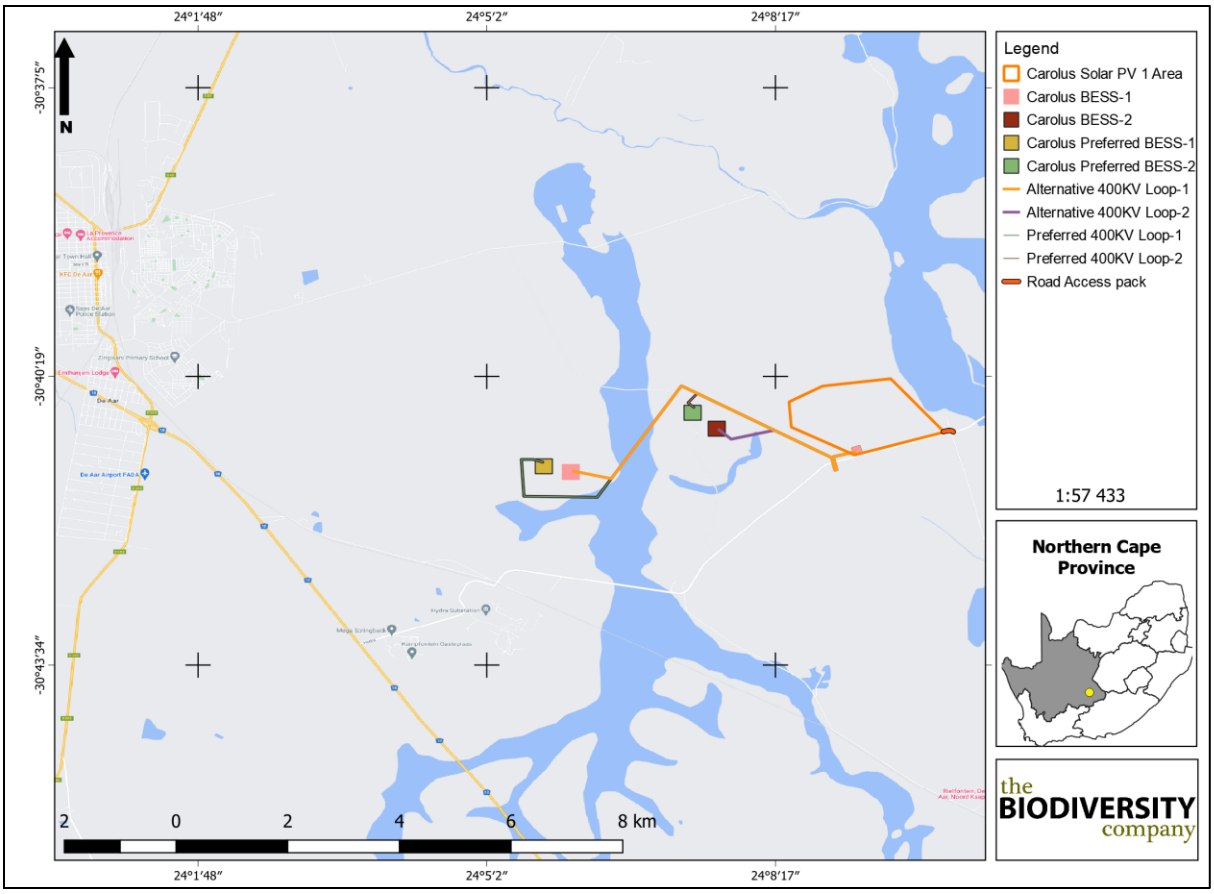


*Figure 2-1 The location of the project area*

# 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 based on previous literature field surveys (Land Type Survey Staff, 1972 - 2006). 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 | |
| II | W | F | LG | MG | IG | LC | MC | IC | | Arable Land |
| III | W | F | LG | MG | IG | LC | MC | | | |
| IV | W | F | LG | MG | IG | LC | | | | |
| V | W | F | LG | MG | | | | | | |
| VI | W | F | LG | MG | | | | | | Grazing Land |
| 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 should be noted for the study:

- The assessment has only been completed at a desktop level. It is assumed all datasets and information considered for the assessment is representative of the area and is well suited for the intended purposes of this soil compliance report;
- Soil field surveys can add more informed decision on the impact assessment report;
- The sensitivity map included in this report is based on desktop information alone; and
- This assessment has only considered pedological resources.

## 4 Project Area

### 4.1 Soil and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Ae 137, Ae 138, Ae 139, Ae 140, Ib 47 and Fb 72 land types. The Ae land types are characterized with Hutton, Oakleaf and Mispah soil forms according to the Soil Classification Working Group, (1991) with the possibility of other soils and bare rocky areas. The Ae land type consists of red to yellow apedal soils which are freely drained. The soils tend to have a high base status and are deeper than 300 mm. The Fb land type consists of Glenrosa and/or Mispah soil forms with the possibility of other soils occurring throughout. Lime is generally present within the entire landscape. The Ib land type consists of miscellaneous land classes including rocky areas with miscellaneous soils. The land terrain units for the featured Ae 137 to 140 land types are illustrated in Figure 4-1 to Figure 4-4 with the expected soils listed in Table 4-1 to Table 4-4; Fb 72 in Figure 4-5 and Table 4-5; Ib 47 in Figure 4-6 and Table 4-6.

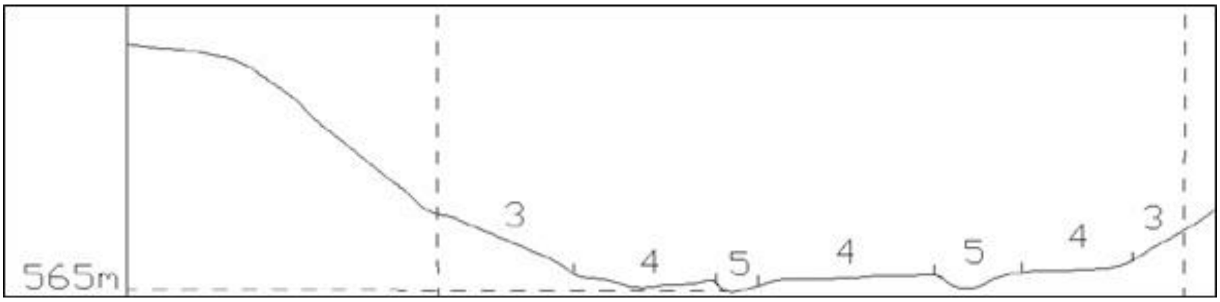


*Figure 4-1* ***Illustration of land type Ae 137 terrain unit (Land Type Survey Staff, 1972 - 2006)***

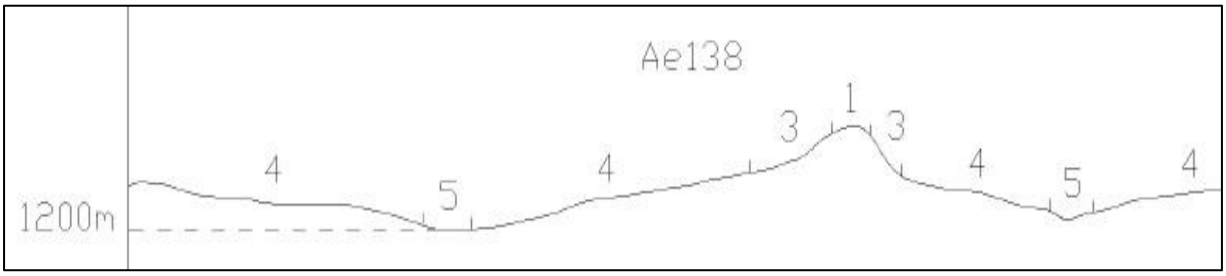


*Figure 4-2* ***Illustration of land type Ae 138 terrain unit (Land Type Survey Staff, 1972 - 2006)***

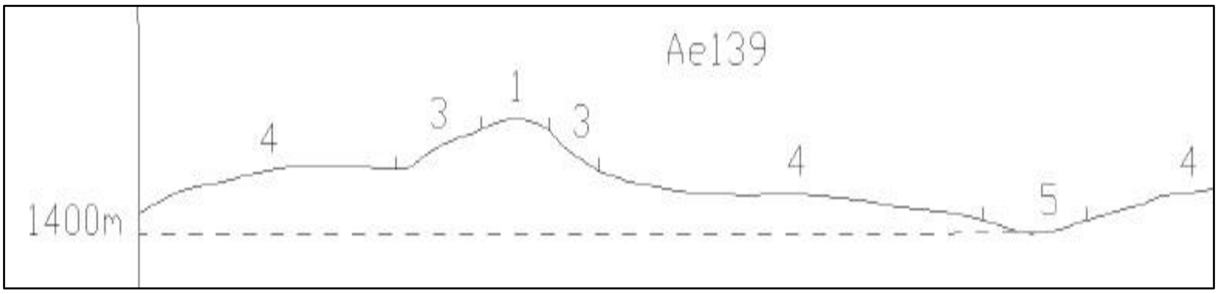


*Figure 4-3* ***Illustration of land type Ae 139 terrain unit (Land Type Survey Staff, 1972 - 2006)***

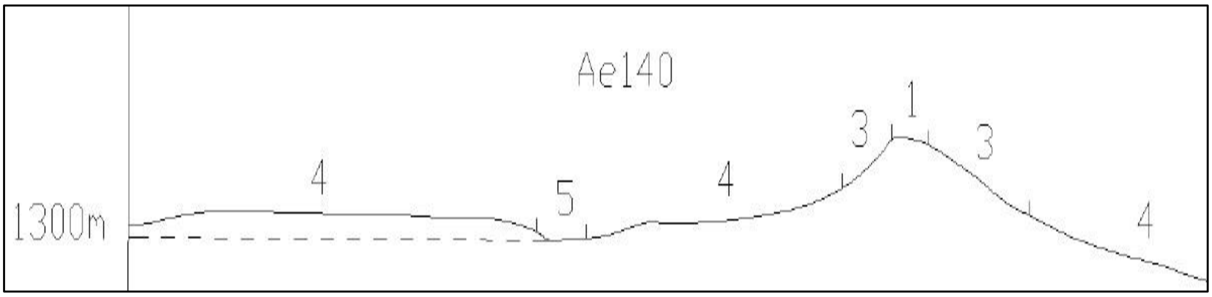


*Figure 4-4* ***Illustration of land type Ae 140 terrain unit (Land Type Survey Staff, 1972 - 2006)***

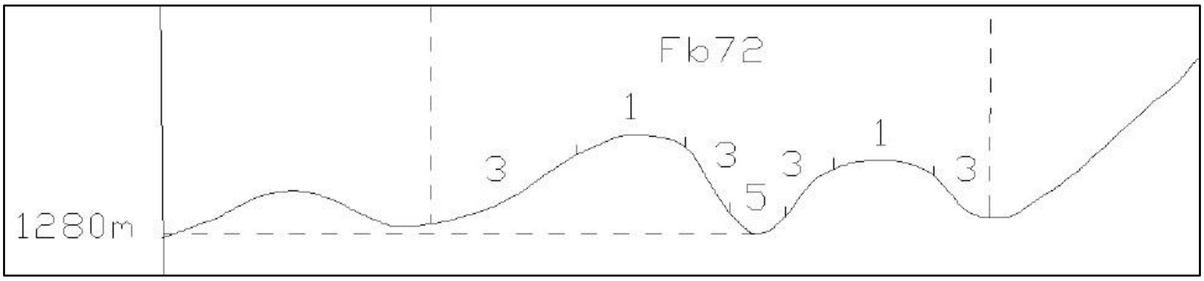


***Figure 4-5 Illustration of land type Fb 72 terrain unit (Land Type Survey Staff, 1972 - 2006)***

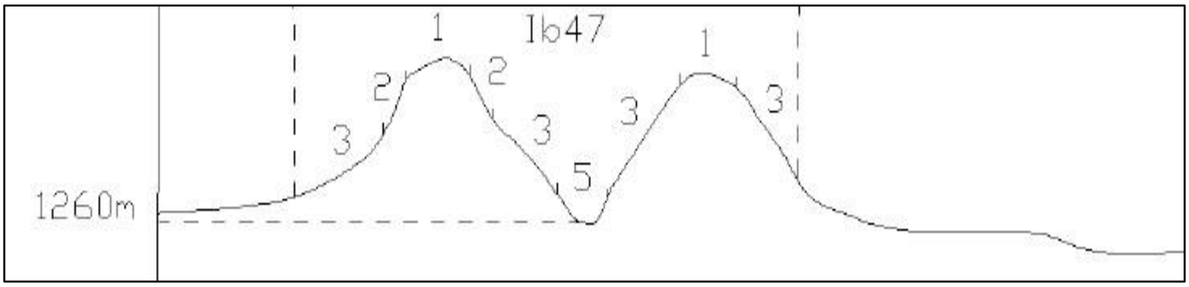


***Figure 4-6 Illustration of land type Ib 47 terrain unit (Land Type Survey Staff, 1972 - 2006)***

***Table 4-1 Soils expected at the respective terrain units within the Ae 137 land type (Land Type Survey Staff, 1972 - 2006)***

| Terrain units | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 (30%) | | 3 (55%) | | 4 (10%) | | 5 (5%) | |
| Hutton | 72% | Hutton | 75% | Hutton | 63% | Oakleaf | 53% |
| Mispah | 15% | Mispah | 13% | Swartland | 15% | Valsrivier | 30% |
| Swartland | 10% | Swartland | 10% | Mispah | 10% | Hutton | 5% |
| Bare Rock | 3% | Clovelly | 3% | Valsrivier | 5% | Swartland | 5% |
| | | | | Oakleaf | 5% | Clovelly | 5% |
| | | | | Clovelly | 2% | Streambeds | 2% |

***Table 4-2 Soils expected at the respective terrain units within the Ae 138 land type (Land Type Survey Staff, 1972 - 2006)***

| Terrain units | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 (3%) | | 3 (20%) | | 4 (75%) | | 5 (2%) | |
| Bare Rock | 40% | Hutton | 70% | Hutton | 85% | Oakleaf | 40% |
| Hutton | 30% | Mispah | 15% | Mispah | 10% | Swartland | 25% |
| Mispah | 30% | Swartland | 10% | Swartland | 5% | Valsrivier | 20% |
| | | Mispah | 5% | | | Hutton | 10% |
| | | | | | | Streambeds | 5% |

***Table 4-3 Soils expected at the respective terrain units within the Ae 139 land type (Land Type Survey Staff, 1972 - 2006)***

**Terrain units**

| 1 (2%) | | 3 (8%) | | 4 (50%) | | 5 (40%) | |
|---|---|---|---|---|---|---|---|
| Bare Rock | 60% | Mispah | 30% | Hutton | 60% | Oakleaf | 45% |
| Glenrosa | 20% | Hutton | 25% | Swartland | 25% | Valsrivier | 25% |
| Mispah | 10% | Swartland | 20% | Mispah | 5% | Hutton | 20% |
| Hutton | 5% | Glenrosa | 20% | Valsrivier | 5% | Streambeds | 10% |
| Swartland | 5% | Bare Rock | 5% | Glenrosa | 5% | | |

***Table 4-4 Soils expected at the respective terrain units within the Ae 140 land type (Land Type Survey Staff, 1972 - 2006)***

| Terrain units | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1 (2%)** | | **3 (8%)** | | **4 (85%)** | | **5 (5%)** | |
| Bare Rock | 75% | Mispah | 30% | Hutton | 55% | Oakleaf | 45% |
| Glenrosa | 10% | Hutton | 20% | Swartland | 30% | Glenrosa | 35% |
| Mispah | 5% | Bare Rock | 20% | Mispah | 5% | Swartland | 10% |
| Hutton | 5% | Glenrosa | 20% | Valsrivier | 5% | Streambeds | 5% |
| Swartland | 5% | Swartland | 10% | Glenrosa | 5% | Hutton | 5% |

***Table 4-5 Soils expected at the respective terrain units within the Fb 72 land type (Land Type Survey Staff, 1972 - 2006)***

| Terrain Units | | | | | |
|---|---|---|---|---|---|
| **1 (10%)** | | **3 (80%)** | | **5 (10%)** | |
| Mispah | 45% | Mispah | 60% | Mispah | 30% |
| Bare Rock | 30% | Bare Rock | 20% | Glenrosa | 15% |
| Glenrosa | 20% | Glenrosa | 15% | Oakleaf | 15% |
| Swartland | 5% | Swartland | 5% | Valsrivier | 15% |
| | | | | Bare Rock | 10% |
| | | | | Swartland | 5% |
| | | | | Hutton | 5% |
| | | | | Streambeds | 5% |

***Table 4-6 Soils expected at the respective terrain units within the Ib 47 land type (Land Type Survey Staff, 1972 - 2006)***

| Terrain Units | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1 (5%)** | | **2 (3%)** | | **3 (90%)** | | **5 (2%)** | |
| Bare Rock | 80% | Bare Rock | 100% | Bare Rock | 65% | Mispah | 50% |
| Mispah | 10% | | | Mispah | 15% | Bare Rock | 30% |
| Glenrosa | 5% | | | Shortlands | 10% | Glenrosa | 20% |
| Hutton | 3% | | | Glenrosa | 5% | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Shortlands | 2% | | | Hutton | 5% | | |

## 4.2 Terrain

The slope percentage of the project areas has been calculated and is illustrated in Figure 4-7. Most of the project area is characterised by a slope percentage between 0 and 10%, with some patches within the project area characterised by a slope percentage ranging from 10 to 65%. This illustration indicates a non-uniform topography in scattered areas (see Figure 4-7) most of the area being characterised by a gentle slope. The DEM of the project area (Figure 4-8) indicates an elevation of 1238 to 1462 Metres Above Sea Level (MASL).

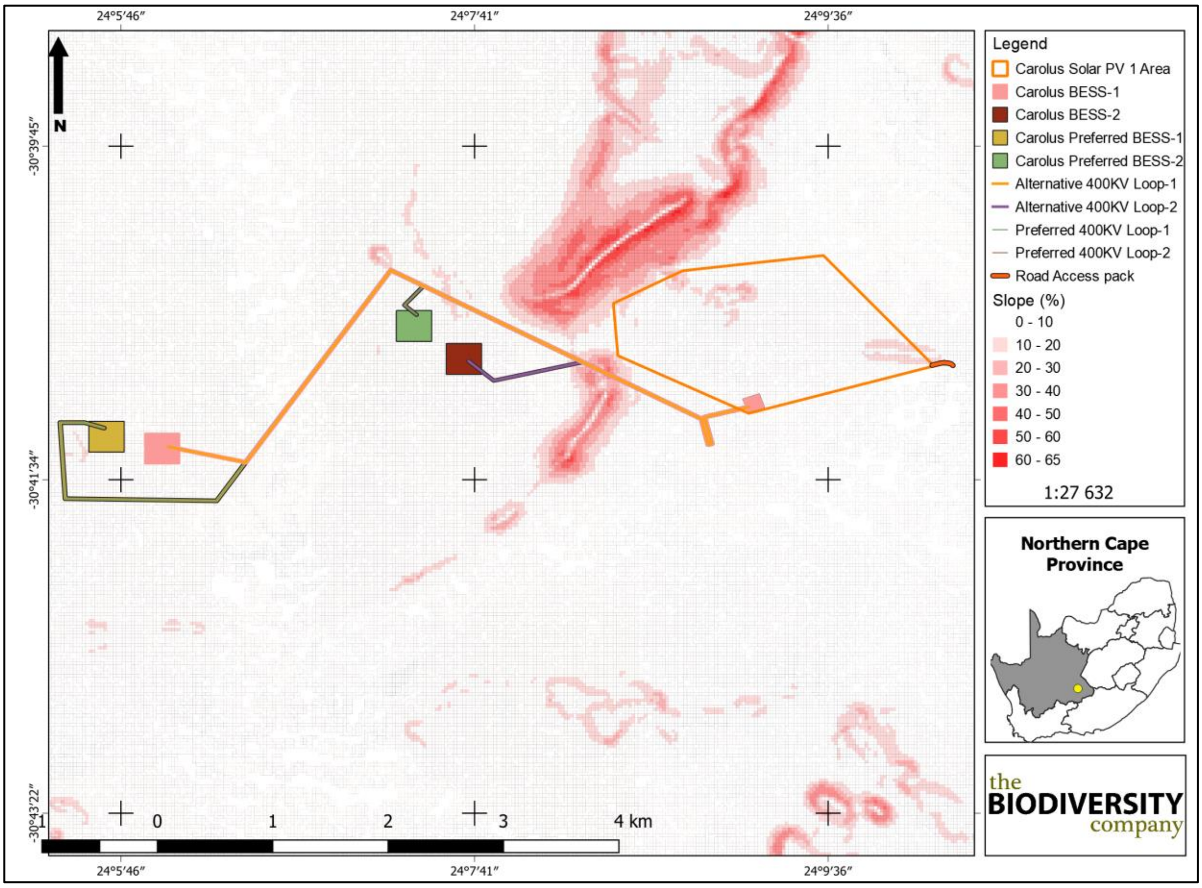


***Figure 4-7 The slope percentage calculated for the project area***

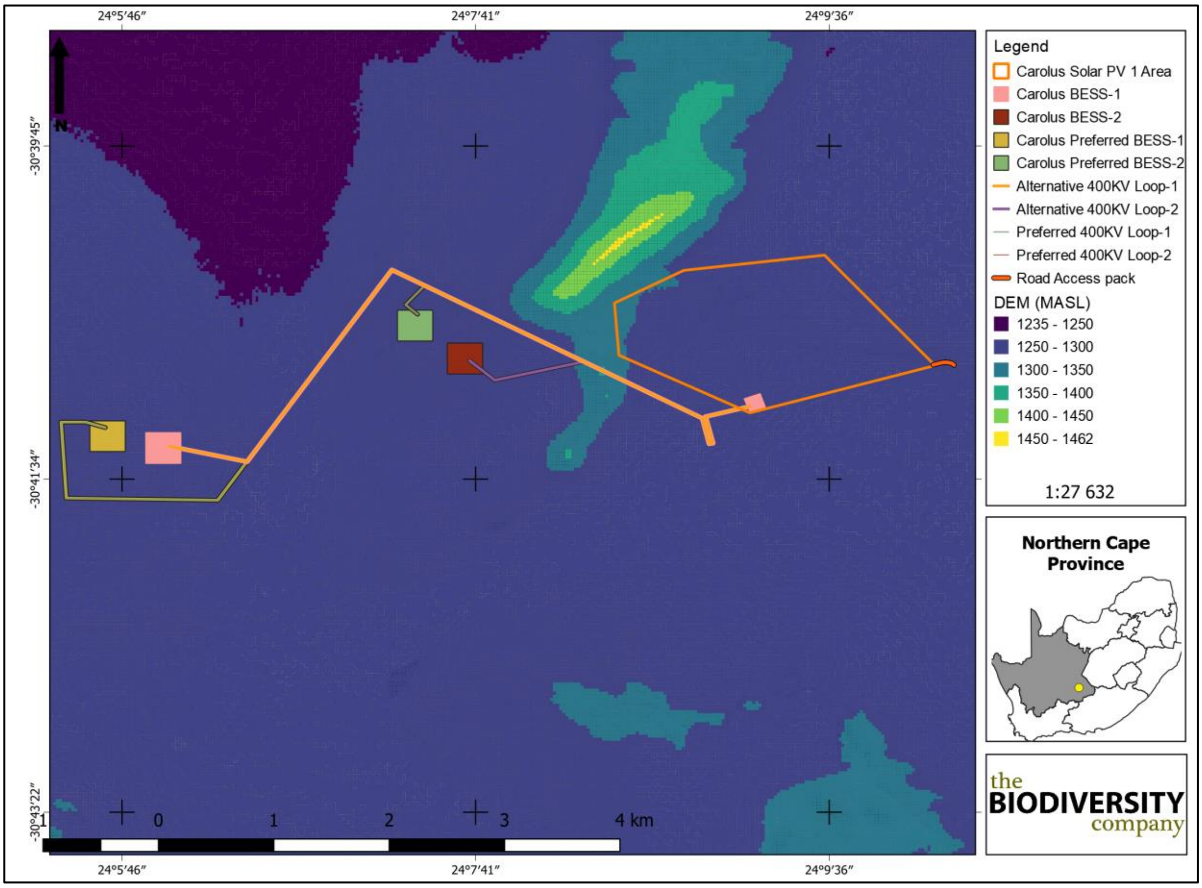


*Figure 4-8 The DEM generated for the project area*

# 5 Results and Discussion

## 5.1 Baseline Findings

The most sensitive soil forms that can be expected based on the Land Type Survey Staff, (1972 – 2006) soil forms data in Table 4-1 to Table 4-6 within the project area is the Hutton and Oakleaf soil forms, with other associated soils also occurring. The Hutton soil form consists of an orthic topsoil on top of a thick red apedal horizon. The Oakleaf soil form has an orthic topsoil underlain with a neocutanic subsurface diagnostic horizon.

The climate capability level of the above-mentioned soils has been determined to have a climate capability level “8”. This climate capability has low Mean Annual Precipitation (MAP) and high Mean Annual Potential Evapotranspiration (MAPE) rates. Commonly severe to moderate limitations occur due to soil, slope, temperatures, or rainfall in such areas.

## 5.2 Sensitivity Verification

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 corridors, including;

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

The land capability sensitivity (DAFF, 2017) indicates a range of sensitivities expected throughout the project focus area, which is covered by “Very Low” to “Low” sensitivities. Some patches are characterised by “Moderate Low to Moderate” sensitivities (see Figure 5-1). In the assessment area, there is no segregation of agricultural lands or crop fields with high potentials from all the infrastructure, (i.e., powerlines, proposed alternative routes, solar substation and BESS facilities). It is also worth noting that, there are limitations on the actual soil properties distribution and field occurrence as the baseline soil assessment results were not presented. Such soil properties are important in the determination of the soil field land capability classes required for the land potential classes (i.e., combination of climate capability level and land capability class). The “Very Low to Moderate” sensitivities fall within the DAFF, (2017) requirements for a compliance statement report only. It is the specialist`s recommendation that, the proposed Carolus solar renewable energy facility and associated infrastructure will have limited effects based on the desktop sensitivities and potentials from the DAFF, (2017). Therefore, the project may be favourably considered.

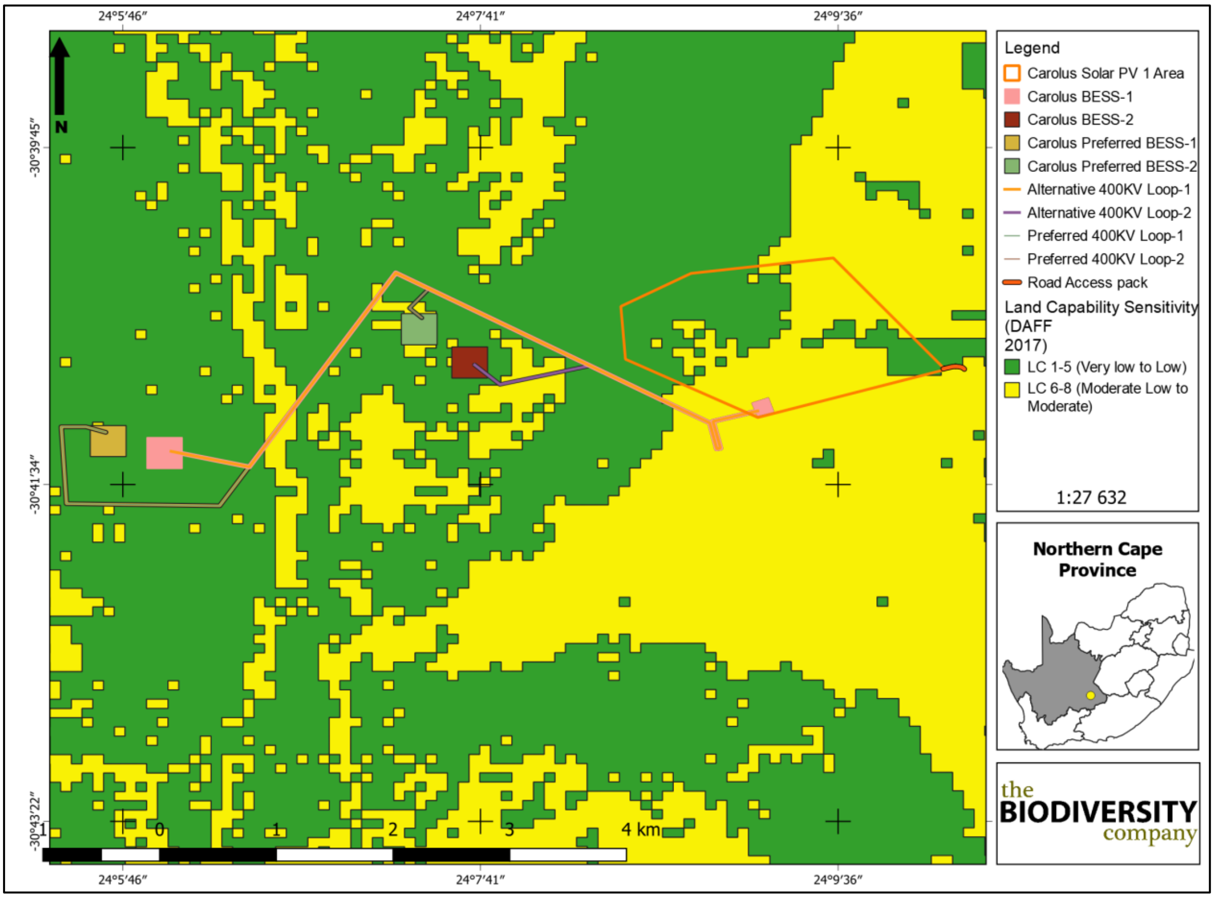


*Figure 5-1 The land capability sensitivity (DAFF, 2017)*

# 6 Conclusion

The most sensitive soil forms that can be expected within the assessment corridor is the Hutton and Oakleaf soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with “Very Low to Moderate” sensitivities, which correlates with the requirements for a compliance statement only.

The available climate can limit crop production significantly. 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.

It is worth noting that, additional baseline soil field assessments can give a better and informed understanding of the proposed project area soil, land potential classes with minimal limitations. It is the specialist’s opinion that the proposed solar renewable energy project based on the DAFF (2017) land capability sensitivity of the areas will have limited impact on the agricultural production ability of the land. Additionally, the proposed activities for the Carolus solar facility and associated infrastructure will not result in the segregation of any high production agricultural land. Therefore, the proposed solar renewable energy project development may be favourably considered.

# 7 References

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