



SCOPING PHASE REPORT

SOIL, LAND USE, LAND CAPABILITY AND AGRICULTURAL POTENTIAL SURVEY:

PROPOSED 300 MW WIND ENERGY FACILITY NEAR KLEINZEE, NORTHERN CAPE PROVINCE

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DECLARATION

I, Johan Hilgard van der Waals, declare that I –

- 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.

J.H. VAN DER WAALS
TERRA SOIL SCIENCE

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SCOPING PHASE SOIL, LAND USE, LAND CAPABILITY AND AGRICULTURAL POTENTIAL SURVEY – PROPOSED 300 MW WIND ENERGY FACILITY NEAR KLEINZEE, NORTHERN CAPE PROVINCE

1. TERMS OF REFERENCE

Terra Soil Science (TSS) was commissioned by Savannah Environmental (Pty) Ltd to undertake a scoping level soil, land use, land capability and agricultural potential survey for the proposed 300 MW Wind Energy Facility near Kleinzee in the Northern Cape Province.

2. INTRODUCTION

A scoping level soil, land use, land capability and agricultural potential survey was conducted for the proposed wind energy facility (300 MW) near Kleinzee in the Northern Cape Province.

3. DESCRIPTION OF THE SURVEY AREA

3.1 Survey Area Boundary

The survey area lies between 29° 42' 28" and 29° 51' 30" south and 17° 04' 01" and 17° 10' 45" east 75 km west of the town of Springbok in the Northern Cape Province (**Figure 1**).



Figure 1 Locality of the survey site

3.2 Survey Area Physical Features

The survey area lies on sloped terrain that slopes down in a westerly direction to the sea on the western edge of the site. The site lies approximately 100 m above mean sea level and is characterised by aeolian sands that overly marine sediments. The main characteristic therefore is the sandy nature of the soils with north-south running dune features.

4. SOIL, LAND CAPABILITY, LAND USE SURVEY AND AGRICULTURAL POTENTIAL SURVEY

4.1 Method of Soil, Land Capability, Land Use Survey and Agricultural Potential Survey

The scoping soil, land capability, land use and agricultural potential surveys were conducted in two phases.

4.1.1 Phase 1: 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). The land type data is presented at a scale of 1:250 000 and entails the division of land into land types, typical terrain cross sections for the land type and the presentation of dominant soil types for each of the identified terrain units (in the cross section). The soil data is classified according to the Binomial System (MacVicar et al., 1977). The soil data was interpreted and re-classified according to the Taxonomic System (MacVicar, C.N. et al. 1991).

4.1.2 Phase 2: Aerial Photograph Interpretation and Land Use Mapping

The most up to date aerial photographs of the site were obtained from Google Earth and Bing Maps. The images were used to interpret aspects such as land use and land cover as well as historic land uses such as cultivation.

4.2 Soil, Land Capability, Land Use and Agricultural Potential Survey Results

4.2.1 Phase 1: Land Type Data

The site falls into the **Ai13** and **Hb80** land types (Land Type Survey Staff, 1972 - 2006). (Refer to **Figure 2** for the land type map of the area). Below follows a brief description of the land type in terms of soils, land capability, land use and agricultural potential.

Land Type Ai13

Soils: Mainly light to yellow-brown coloured sands ranging from high base status to calcareous. Soils are of variable depth and shallow soils overlying hard rock and calcrete layers occur throughout.

Land capability and land use: Exclusively extensive grazing due to climatic constraints.

Agricultural potential: Very low potential due to the low rainfall (less than 100 mm per year – **Figure 3**).

Land Type Hb80

Soils: Mainly light to yellow-brown coloured sands ranging from high base status to calcareous. Soils are of variable depth and shallow soils overlying hard rock and calcrete layers occur throughout.

Land capability and land use: Exclusively extensive grazing due to climatic constraints.

Agricultural potential: Very low potential due to the low rainfall (less than 100 mm per year – **Figure 3**).

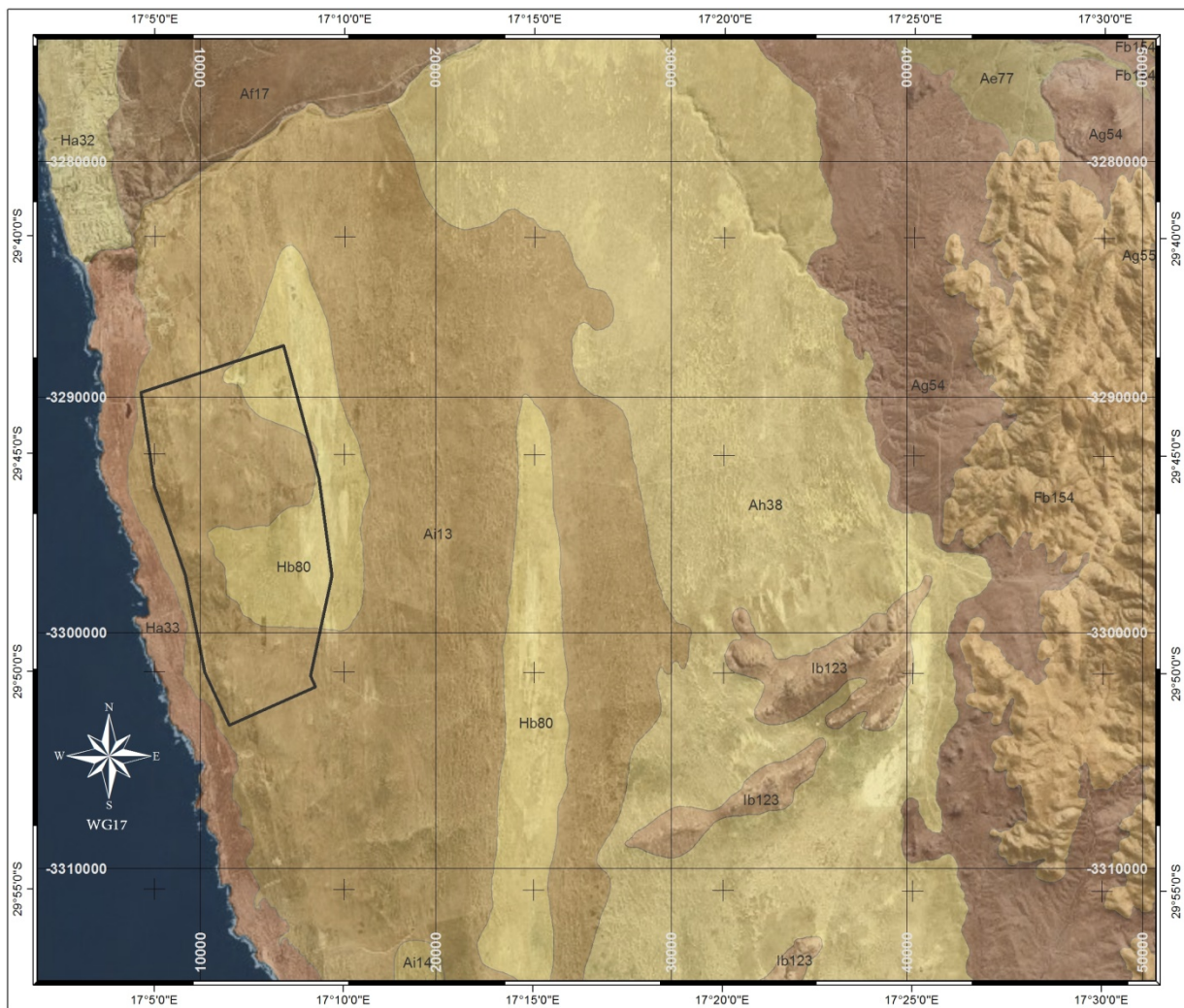


Figure 2 Land type map of the survey site

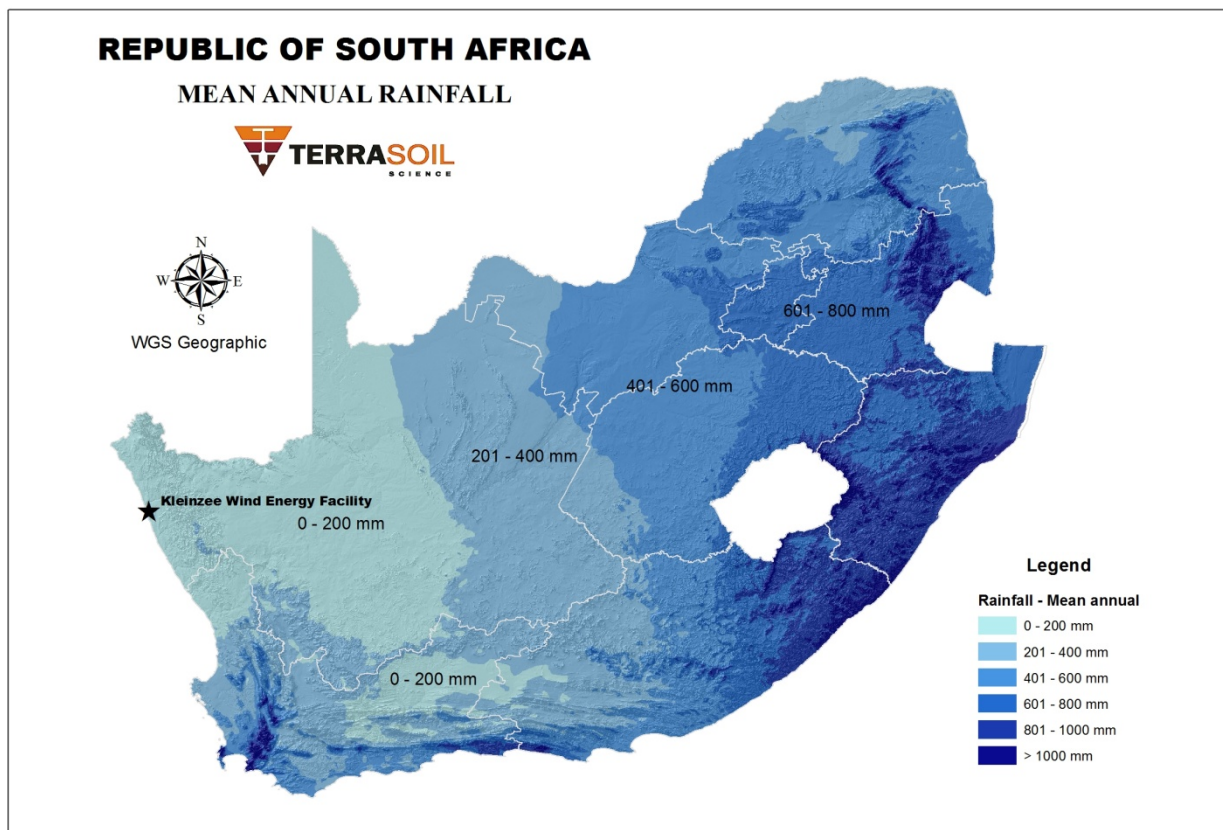


Figure 3 Rainfall map of South Africa indicating the survey site

4.2.2 Phase 2: Aerial Photograph Interpretation and Land Use/Capability Mapping

The interpretation of aerial photographs (Google Earth image and satellite image from Bing Maps) yielded one dominant land use, namely extensive grazing (**Figure 4**). From the images it appears that mining also plays a role on and around the site but the extent of this land use will have to be confirmed during the EIA phase field survey. The land capability of the site can be considered to be “wilderness” as the grazing capacity is low enough that only natural land uses and low intensity grazing are feasible.

5. INTERPRETATION OF SOIL, LAND CAPABILITY AND LAND USE SURVEY RESULTS

The interpretation of the land use and land capability results yielded a number of aspects that are of importance to the project.

5.1 Agricultural Potential

The agricultural potential of the site is very low and limited to extensive grazing due to the very low rainfall. There is currently no potential to increase the agricultural potential as the climatic constraints are severe. Although the soils are potentially suitable for irrigated agriculture this seems an impossible land use as water availability is the main constraint.



Figure 4 Homogenous land use on the site limited to extensive grazing

5.2 Overall Soil Impacts

The overall impacts of the proposed wind energy facility on soil and agricultural capability will be low due to the low agricultural potential of the site. Due to the low rainfall, impacts on the soils such as erosion and dust generation are considered problematic and will have to be addressed in more detail in the EIA process. At present there are no preferred areas for the placement of the turbines as the impacts are considered to be similar throughout the site. This situation can however change once the detailed investigation has been conducted.

6. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the proposed development of a wind farm facility on the site near Kleinzee will not have large impacts on the current land use of the area. This is mainly due to the low agricultural potential, dominant soils and climatic constraints for the site. Long-term detrimental impacts are not expected but adequate mitigation and management measures have to be put in place. The main aspects that will have to be managed on the site include erosion and dust generation during the construction process.

The impacts on the site need to be viewed in relation to the opencast mining of coal in areas of high agricultural potential soils – such as the Eastern Highveld. With this comparison in mind the impact of a wind energy facility is negligible compared to the damaging impacts of coal mining – for a similar energy output, especially bearing in mind that no mining of fuel is required for a wind energy facility. Therefore, in perspective, the impacts of the proposed facility can be motivated as necessary in decreasing the impacts in areas where agriculture potential plays a more significant role.

A detailed site visit will have to be conducted as part of the EIA level investigation and the following parameters should be investigated:

- » Soil distribution (classification) on the site;
- » Extent of degradation due to current land use (including mining);
- » Erosion status and erodibility of the soils on the site; and
- » Mitigation measures to arrest current impacts and manage future impacts associated with the development.

7. LIMITATIONS / GAPS IN KNOWLEDGE

The following limitations, or gaps in knowledge, exist for the proposed activity on the site

- » Soil distribution (classification) on the site (to be generated during the EIA phase);
- » Extent of degradation due to current land use (to be generated during the EIA phase);
- » Erosion status and erodibility of the soils on the site (to be generated during the EIA phase); and
- » Design specifications and layout of proposed development. This detail will guide the specific impacts to be assessed as well as the proposed mitigation measures.

REFERENCES

LAND TYPE SURVEY STAFF. (1972 – 2006). *Land Types of South Africa: Digital map (1:250 000 scale) and soil inventory databases*. ARC-Institute for Soil, Climate and Water, Pretoria.

MACVICAR, C.N. et al. 1977. *Soil Classification. A binomial system for South Africa*. Sci. Bull. 390. Dep. Agric. Tech. Serv., Repub. S. Afr., Pretoria.

MACVICAR, C.N. et al. 1991. *Soil Classification. A taxonomic system for South Africa*. Mem. Agric. Nat. Resour. S.Afr. No.15. Pretoria.