Arcus GIBB (PTY) LTD

Environmental Impact Assessment for the Establishment of the Caledon Wind Farm, Western Cape Province

Environmental Scoping Report

Soils and Agricultural Potential

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EXECUTIVE SUMMARY

ARC-ISCW was appointed to look at the soils and agricultural potential for the Caledon Wind Energy Facility.

Land type information, at 1:250 000 scale was used, and the soils in each land type were assessed for their broad agricultural potential.

Almost the whole study area is dominated by low potential soils and/or rock, with little potential for arable agriculture, so the potential impact caused by loss of agricultural land is very small.

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1 INTRODUCTION

1.1 Background

ARC-Institute for Soil, Climate and Water was contracted by Gibb Africa (Pty) Ltd to contribute to the environmental impact assessment (EIA) report for a proposed wind energy facility, near Caledon, in the Western Cape Province.

This report addresses the soils occurring on the site, and aspects concerning their broad agricultural potential

1.2 Scope and Limitations

The information used to compile this report comes from the 1:250 000 scale land type survey of the area. Each **land type** (the units on the map) comprises a unique combination of broad soil pattern, terrain type and macroclimate. All of the information contained in the land type survey has been digitised using ArcGIS.

The main limitation of the land type information is that, due to the mapping scale of 1:250 000, the soils occurring can only be given as degree of dominance, and their exact position within each land type cannot be established, except by general terrain position (crests, midslopes, valley bottoms etc).

1.3 Methodology

Each land type occurring was assessed in terms of the relevant features of the soils occurring (depth, texture, form etc), as well as the terrain features (slope and terrain position), to determine the broad agricultural potential of the area.

2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

2.1 General Study Area

2.1.1 Locality

The study area is located between the towns of Caledon and Botrivier, in the Western Cape Province. It lies to the north of the N2 National Road, and is bisected by the R43 trunk road to Villiersdorp (see Figure 1).

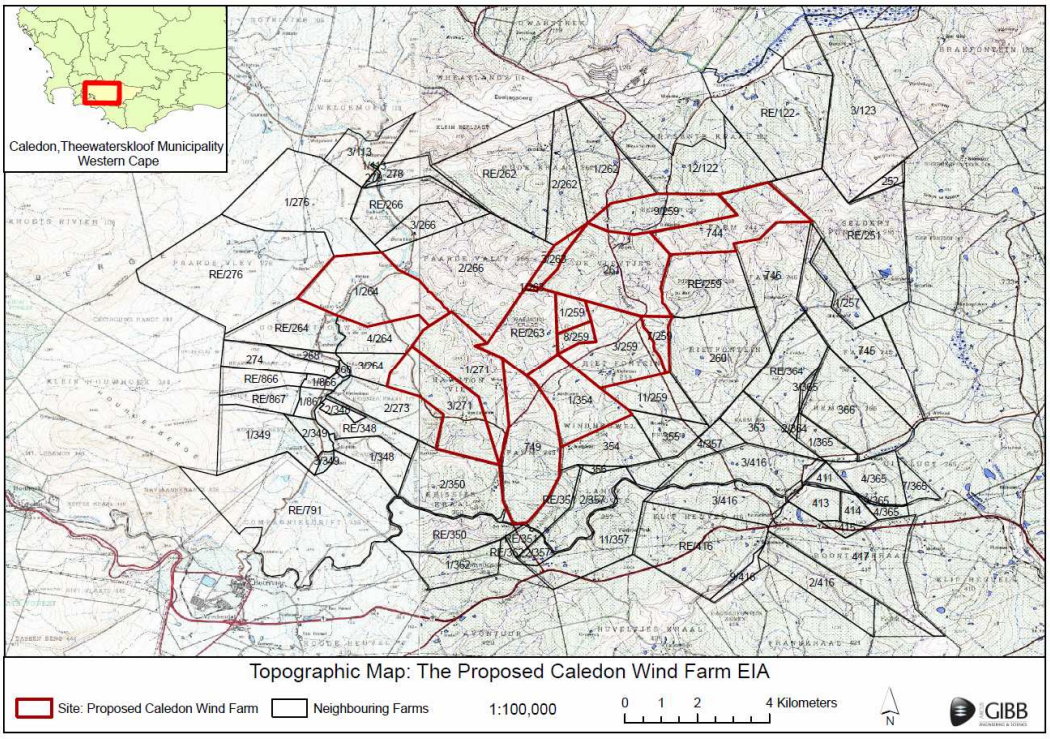

Figure 1 Locality map

2.1.2 Terrain

The area lies at an altitude of around 200 to 350 m above sea level, and has generally undulating topography, with slopes of between 4% and 25%, although some of the steeper areas have slope angles up to 40%.

2.1.3 Climate

The climate of the area (Monnik & Jacobs, 2002) is characterised by a rainfall pattern of all-year-round rainfall, with a definite peak in the winter months. Average long-term annual rainfall is between 384 mm in the lower areas, rising to around 534 mm in the higher areas.

Temperature ranges from an average daily minimum and maximum of 15.5^{o}C and 28.6^{o}C to 5.6^{o}C and 17.7^{o}C for January and July respectively. The extreme maximum temperature recorded was 41.4^{o}C (presumably in “berg wind” conditions) with the extreme low of -2.0^{o}C. Frost occurs occasionally (on 8 days per year on average) between mid-June and early September.

2.1.4 Geology

The parent material of the area (Geological Survey, 1977) consists of rocks of the Cape Supergroup, namely siltstone and mudstone of the Klipbokkop Formation, Bidouw Subgroup, with, in the west, siltstone, shale and mudstone of the Ceres Subgroup, Bokkeveld Group and, in the east, siltstone, sandstone and mudstone of the Wagen Drift Formation, Weltevreden Subgroup.

3 IMPACTS AND ISSUES IDENTIFICATION

3.1 Soils

Existing information was obtained from the map sheet 3319 Worcester (Jacobs *et al.,* 1994) from the national Land Type Survey, published at 1:250 000 scale. The soils are classified according to MacVicar *et al* (1977).

The area under investigation is covered by four land types, as shown on the map in the Appendix, namely:

Fa206 (Shallow soils, usually non-calcareous)
Fa207 (Shallow soils, usually non-calcareous)
Fb106 (Shallow soils, may be calcareous)
Fb110 (Shallow soils, may be calcareous)
Ib113 (Shallow soils with much rock)

It should be clearly noted that, since the information contained in the land type survey is of a reconnaissance nature, only the general dominance of the soils in the landscape can be given, and not the actual areas of occurrence within a specific land type. Also, other soils that were not identified due to the scale of the survey may also occur. **The site was not visited during the course of this study, and so the detailed composition of the specific land types has not been ground-truthed.**

A summary of the dominant soil characteristics of each land type is given in Table 1 below (the colours correspond to those used in the map in the Appendix).

The distribution of soils with high, medium and low agricultural potential within each land type is also given, with the dominant class shown in **bold type**.

Table 1 Land types occurring (with soils in order of dominance)

Land Type	Dominant soils	Depth (mm)	Percent of land type	Characteristics	Agric. Potential (%)
Fa206	Rock	-	28%	-	High:4.5
	Mispah 10	50-250	25%	Brown, sandy topsoils on hard rock	Mod: 1.6
	Cartref 20	50-250	21%	Grey-brown, sandy topsoils on hard rock	**Low: 93.9**
Fa207	Glenrosa 13/16/19	250-450	41%	Grey-brown, sandy/loamy topsoils on weathering rock	High:4.6
	Mispah 10	50-250	27%	Grey-brown, sandy/loamy topsoils on hard rock	Mod: 16.8
	Swartland 11/12/31/32	300-500	15%	Brown, loamy topsoils on brown to red-brown, blocky structured clay subsoils on rock	**Low: 78.6**
Fb106	Glenrosa 13/16	200-400	42%	Grey-brown, sandy/loamy topsoils on weathering rock	High:1.6
	Swartland 31/32	350-600	16%	Brown, loamy topsoils on brown, blocky structured clay subsoils on rock	Mod: 26.7
	Mispah 10	50-150	14%	Grey-brown, sandy/loamy topsoils on hard rock	**Low: 71.7**
Fb110	Glenrosa 13/16	250-450	30%	Brown, loamy topsoils on weathering rock	High: 4.1
	Cartref 11/12	250-450	21%	Grey-brown, sandy topsoils on hard rock	Mod: 3.8
	Mispah 10	50-150	15%	Grey-brown, sandy/loamy topsoils on hard rock	Low: 92.1
Ib113	Rock	-	79%	-	High:0.0
	Mispah 10	50-150	9%	Grey-brown, sandy/loamy topsoils on hard rock	Mod: 3.0
					Low: 97.0

3.2 Agricultural Potential

As can be seen from the information contained in Table 1, very little of the area contains high potential soils, and all land types are dominated by low potential soils.

Much of the study area consists of either:

- structured, clay soils (mainly Swartland and Sterkspruit soil forms) of low to moderate potential,
- shallow lithosols (Mispah, Glenrosa) of low potential, or
- rock.

However, the low rainfall in the area (Section 2.3) means that there is limited potential for arable agriculture in the area and that the soils are suited for extensive grazing at best. The grazing capacity of the area is moderately low, around 14-20 ha/large stock unit (ARC-ISCW, 2004).

4 TERMS OF REFERENCE FOR IMPACT ASSESSMENT PHASE

The major impact on the natural resources of the study area would be the loss of potentially agricultural land due to the construction of the turbines and associated infrastructure. However, this impact would be of limited significance and would be local in extent, and would obviously not be sensible in the irrigated areas.

However, this may well not be relevant, since sources such as Google Earth show little evidence of any irrigation within the study area. As far as any non-irrigated cultivation is concerned, the fact that the turbines will be placed far apart would mean that cultivation would still be possible between the structures.

The impact can be summarized as follows:

Table 2 Impact significance

Nature of impact	Loss of agricultural land	Land that is no longer able to be utilized due to construction of infrastructure
Extent of impact	Site only	Confined to areas within the site where turbines (15x15m), substation (80x100m), and access roads etc will be located
Duration of impact	Long-term	Will cease if operation of activity ceases
Probability of impact	Highly probable	
Severity of impact	Moderately severe	
Significance of impact	Low	Mainly due to low potential of area, as well as scattered/random nature of infrastructure which allows for almost all agricultural activities to continue on the land
Mitigation factors	The main mitigation would be to ensure that as much as possible of the planned infrastructure be confined to transformed land, or use is made of existing roads etc. In addition, the infrastructure could be dismantled at a future stage to return the environment to approximately its original state.	

5 CONCLUSIONS AND RECOMMENDATIONS

The effects on agriculture are not likely to be severe, and the absence of any large component of high potential soils supports this.

No “fatal flaw” issues were identified.

6 REFERENCES

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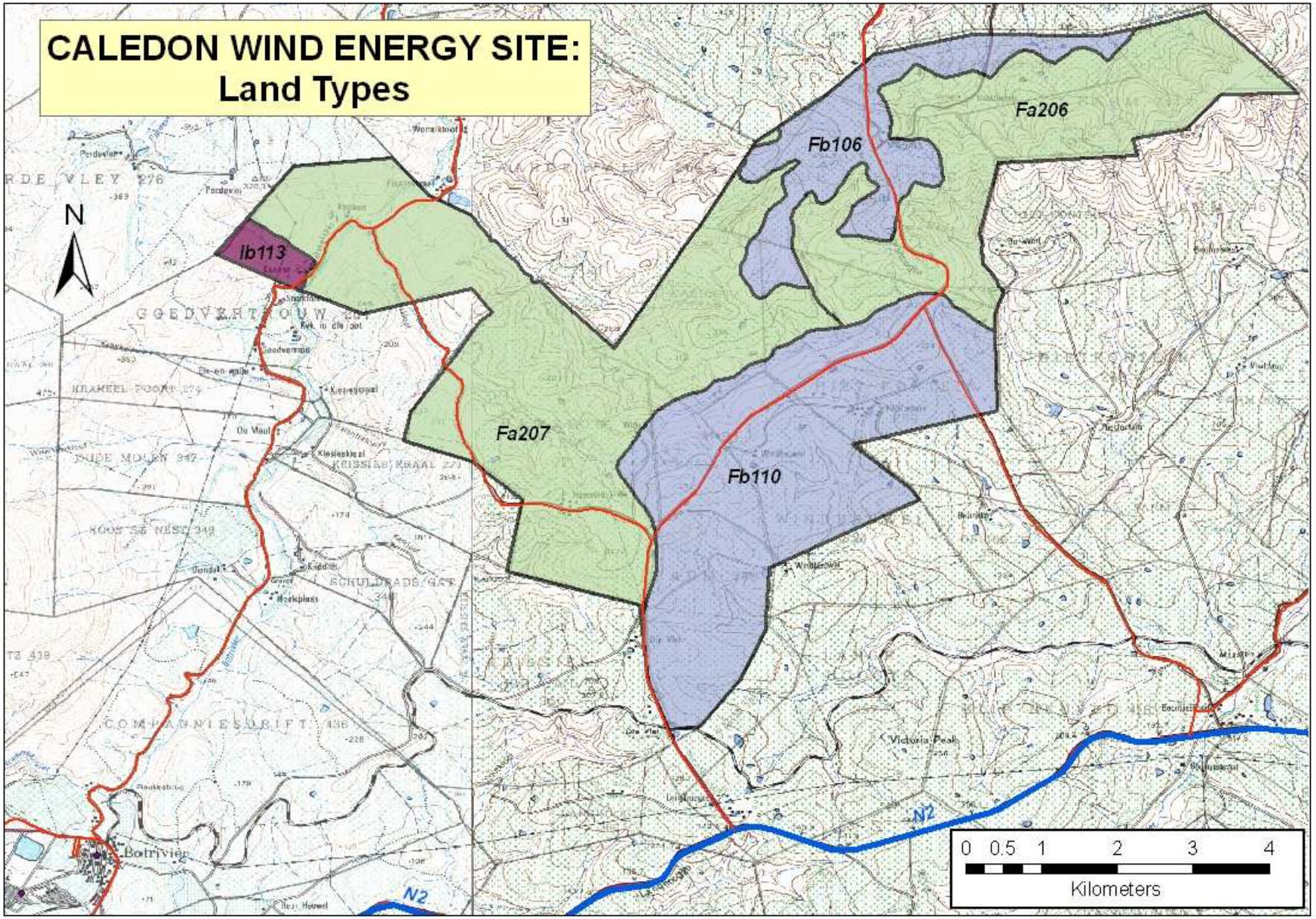
APPENDIX

Land Type Map



{Specialist study}