Environmental Impact Assessment for the Establishment of the St. Helena Wind Farm, Western Cape Province

Scoping Report: Visual Impact Assessment

February 2011
Visual Assessment Scoping Report for the proposed St. Helena Wind Farm, Western Cape Province

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LIST OF ABBREVIATIONS

3D: Three dimensional
DEA&DP: Western Cape Department of Environmental Affairs and Development Planning
GIS: Geographical Information System
GPS: Global Positioning System
VIA: Visual Impact Assessment

GLOSSARY

Viewshed: The theoretical area from which a development or feature will be visible, defined on the basis of topography.
1 INTRODUCTION

1.1 Introduction

In October 2010 Arcus GIBB (Pty) Ltd (GIBB) was appointed by Just Energy to undertake a Visual Impact Assessment (VIA) for the construction of a wind farm on the Farm Langeklip 47 south of St. Helena Bay on the west coast of the Western Cape Province. The site is located north of the towns of Saldanha and Vredenburg and west of Velddrif. The R339 road, which connects Velddrif to Vredenburg, passes to the south of the site. This scoping report identifies the issues that must be assessed in the full VIA and describes the methodology that must be used.

1.2 Visual Assessment Team and Expertise

The VIA was undertaken by Reuben Heydenrych of GIBB. Mr Heydenrych is qualified as a Landscape Architect. He has 17 years of experience in Environmental Impact Assessments (EIAs) and two years of experience in Visual Impact Assessments (VIAs).

Mr Heydenrych completed the following VIAs in the past two years:

- A boathouse for 4 Special Forces Regiment at Langebaan, Western Cape (for the Department of Public Works);
- A wind farm for SAGIT at Caledon, Western Cape; and
- A wind farm for SAGIT at Wolseley, Western Cape.

Mr Heydenrych was assisted by Mr Neil Falconer of GIBB with regards to Geographic Information System (GIS) map production.

1.3 Statement of Independence

Neither GIBB nor any of its staff members are involved in, or stand to gain financially in any way, from the design, construction or future use of the proposed Caledon Wind Farm.

1.4 Scope of Work

The scope of work included of this report is to:

- Describe the methodology that will be used in the VIA
- Briefly describe the visual characteristics of the proposed wind farm development;
- Briefly describe the existing visual characteristics of the site and its environs.
- Provide brief descriptions of the proposed development and the affected environment;
• Identify any visual issues that may need to be taken into account in the future planning and implementation of the proposed development;
• Provide recommendations for the scope of an approach to the VIA that is to be undertaken during the EIA phase; and
• Identify any potential fatal flaws from a visual perspective that would result in significant risk to the project.
2 METHODOLOGY

2.1 Assessment Methodology

The following sequence will be employed in the visual impact assessment:

- A desktop survey has been done using 1:50 000 trigonometric survey maps, and GIS and Global Positioning System (GPS) information. These sources have been used to identify landforms and landscape patterns and to determine the overall viewshed.
- A photographic survey of the site and surrounding area has been conducted to determine the visibility of the site from important viewpoints that may be visually affected by the development. The site visit was conducted on 6 January 2011. The view from and to the site are shown in Figures 7 to 12.
- A 3-dimensional (3D) GIS terrain model will be used during the EIA phase to assess the visibility of the development as a whole, or parts thereof, from significant viewpoints within the viewshed.
- The visual impact of various configurations of elements of the development (e.g.: the wind turbines and roads) will be tested using a 3D GIS terrain model over the entire viewshed. This will include assessing the visual impact from view viewpoints in surrounding settlements and from surrounding roads, including the R43, based on the presence of heritage resources, tourist routes and tourist facilities.
- Visual simulations (photomontages) will be prepared to show the appearance of the wind turbines from selected viewpoints.
- Visual impacts will be identified and assessed using standard impact assessment criteria as defined by the EIA team.
- Specific attention will be given to the visual effect on tourism and heritage resources.
- Mitigation measures will be proposed to aid future planning and the compilation of associated documentation.

The assumption is that the wind turbines can be positioned anywhere on the site and so the visual analysis will be used to determine optimal positions, from a visual perspective, of the elements listed above. Findings will take into consideration such practical considerations as air safety and optimal placement for wind speed. It is acknowledged that placement for optimal wind use may take precedence over placement to minimise visual impact.

2.2 Assumptions and Limitations

- No positions have yet been defined for the wind turbines. Only a broad area within which the wind turbines could be placed has been defined. The positions of the turbines will be determined by a combination of technical factors and environmental factors.
• It is assumed that the hub height of the wind turbines will be between 50 m and 100 m and that the blade length will be between 25 m and 45 m.

• The VIA report will be drawn up in conformity with the requirements of the various provincial guidelines including:
  • *Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes* compiled for the Department of Environmental Affairs and Development Planning of the Provincial Government of the Western Cape. (June 2005)
  • *Guidelines for the Management of Development on Mountains, Hills and Ridges of the Western Cape.* Originally for the then Western Cape Department of Environmental and Cultural Affairs and Sport. (April 2002)
  • The approximate viewshed, i.e. the area that will potentially be visually affected by the development, will be defined during the EIA phase.
3 NATURE OF THE PROPOSED DEVELOPMENT

The project will include:

- Between 10 and 35 wind turbines (with hub height between 50 m and 100 m) will be installed.
- The blade length of the wind turbines will be between 25 m and 45 m.
- Each turbine will have a generating capacity between 0.85MW and ~3MW.
- Wind turbines will have permanent red marker lights;
- 6m wide access roads to the site and turbines (to be determined once the position of the turbines is established);
- A temporary construction camp;
- At present it is anticipated that no new fencing will be required and that there will be no need for the construction of a new substation; and
- It is anticipated that current farming activities will continue on the site, with the exception of the areas affected by the access roads and the foundations of the wind turbines.

No new transmission lines will be required as there are existing power lines that traverse the site. Low voltage feeder powerlines will be required to connect the wind turbines to a proposed new substation, which in turn will connect the wind farm to the grid.

There is a current test mast of 50 m height, located on Stemmet’s Kop, the highest point on the farm at approximately 240 m above sea level. This is a thin lattice mast, stabilised by guy wires, that is not visually comparable to the proposed wind turbines, which have a solid appearance and masts of much greater height and diameter than the test mast.

The typical appearance of the wind turbines is indicated in Figure 1. The appearance of the current test mast is indicated in Figure 2. It must be noted that the final height and appearance of the wind turbines will be dependent on the test mast records, as well as other technical factors.
Figure 1: Approximate appearance of the proposed wind turbines

Figure 2: Appearance of the current test mast (50m high)
4 NATURE OF THE CURRENT VISUAL ENVIRONMENT

4.1 Location and Status of the Study Area

The site of the proposed St. Helena Wind Farm is located south of St. Helena Bay on the west coast of the Western Cape Province (Figure 3). The site is located north of the towns of Saldanha and Vredenburg and west of Velddrif. The R339, which connects Velddrif to Vredenburg, passes to the south of the site. The town of Velddrif is located approximately 12 km east-northeast of the site, Vredenburg is located approximately 10.5 km southwest of the site and Laingville is located approximately 4 km north of the site. There are a number of other settlements (mainly holiday towns) strung along the coast west of Laingville. These include (in order from east to west) Steenberg Cove, Britannia Heights, Stompneus Village, Shelley Point and Britannia Bay. Saldanha Bay lies approximately 21 km south of the site and the Langebaan Lagoon further to the south at a distance of 30 km.

Access to the site is gained from the R339 and then along the road that leads north from the R399 approximately halfway between Velddrif and Vredenburg. The turnoff to the site is approximately 4 km from the turnoff from the R399 along this road.

The site includes only the Farm Langeklip 47 (Figure 4). No other farms or farm portions are included in the project area. The entire extent of the farm is being considering for the placement of wind turbines.

The possibility exists that the farm may need to be rezoned and that servitudes may need to be created for the access roads and wind turbines.
4.2 The Viewshed

The viewshed is defined as the theoretical outermost limit of the area from which views of development on the site many be possible. Therefore the viewshed defines the area that will be assessed in the VIA.

The coastal plain in the study area is relatively flat, and due to the site being located on one of the highest points of the Saldanha Peninsula, it should theoretically have a very large viewshed. The view of the site to the north is blocked by low hills, and the site should therefore not be visible from the settlements along the coast west of Laingville. Once turning back inland from Stompneus Bay along the Stompneus Bay - Vredenburg road, the site once again becomes visible, albeit at a large distance (approximately 10 km). Paternoster, on the far north-western portion of the peninsula, is 15km from the site, and although there is line of site from here to the proposed wind farm site, the distance would result in very poor visibility of the wind turbines.

To the east and south of the site, the theoretical viewshed stretches as far as Saldanha Bay (21 km south of the site). The closest settlement from which the site could be viewed is Vredenburg. There are no significant topographical features to the southeast of the wind farm site to acts as a boundary for the viewshed. However, it is unlikely that the wind turbines would remain visible for a distance of more than 10km from the site. For comparative purposes, the appearance of the wind turbines at Darling along the R27 is indicated in Figure 5 and Figure 6. Although these wind
turbines have a hub height of 50m, which is 30 m less than the proposed turbines for St. Helena, it is clear that at a distance of more than 4 km, the wind turbines are hardly visible.

![Figure 5: View of the Darling wind turbines from a distance of 1.7 km](image)

![Figure 6: View towards the Darling wind turbines from a distance of 4.5 km](image)

### 4.3 General Description of the Site and Surrounding Area

**Topography**

The site of the proposed wind farm is situated on the coastal plain, which is a relatively flat region stretching from the sea to the inland mountains. The topography of this area is gently undulating, with no sharp or jagged landforms. The geology of the area from St. Helena in the north to Langebaan in the south is composed of Basement Granite, which gives the landscape its rolling topography. There are numerous dome-shaped granite formations that form the tops of hills in the area. In some instances, granite domes form outcrops at the high points of these hills, while in
other cases the granite remains buried. The granite geology is interspersed by more recent sand deposits, which generally give rise to a flatter landscape than the granite.

The highest point on the property is Stemmet's Kop (240m above sea level), at which the test mast is located. There are few other high points in the region up to Langebaan. The highest point on the Postberg Peninsula west of the Langebaan Lagoon is 194 m above sea level, which makes Stemmet's Kop the highest point in the study area.

Vegetation

Vegetation of the region of the west coast contains a mosaic of two biomes, namely Fynbos and Succulent Karoo. The specific vegetation types that occur in this region are Sand Plain Fynbos and Strandveld Succulent Karoo (Low & Rebelo 1995). Generally, the natural vegetation of this area consists of low-growing plants up to 1.5m consisting of herbaceous perennials, restios, proteas and, in disturbed areas, annual flowers. There are very few natural large trees in the study area and these are mostly restricted to protected positions where water collects, e.g. in the folds of the granite outcrops. Virtually all the large trees in the area are exotic trees that have been planted in urban areas or as windbreaks around agricultural lands. The natural vegetation, being part of the fynbos biome, is dependent on fire, and as a result the appearance of the natural landscape may change rapidly (from dense cover to bare ground) after a fire.

The majority of the property on which the wind farm is proposed to be located is cultivated or disturbed land. The largest portion of the high-lying ground on the farm has been ploughed at some stage in the recent past, although in some areas pioneer plants have re-established a dense cover. The major agricultural crop in this area is wheat or other annuals. Rainfall in this area is low (average of 250 mm per year), which does not allow for intensive agriculture. The remainder of the land that is has not been ploughed is used for grazing, mostly for sheep.

Thus, the vegetation of the study area offers little to no visual screening.

Land use character

The land use character varies greatly across the study area. The large scale industrial activities around Saldanha, including the iron ore export terminal, the Saldanha Steel and Namakwa Sands processing plants, give an industrial atmosphere to the land adjacent to the northern rim of Saldanha Bay. The passage of large ships in the northern portion of Saldanha Bay between the export terminal and the mouth of the bay serve as a constant reminder of these industrial activities. The towns of Vredenburg and Saldanha largely serve these industries, and views of the industrial activities from these towns reduce their residential character.

Recreational and tourism-related activities are centred on three nodes:

- the town of Langebaan on the south-eastern side of Saldanha Bay;
- the tourist-orientated developments on the north-facing coastline north of the proposed wind farm site. These developments are orientated to the north, away from the site, as their visual amenity is created by the north-facing sea views. The majority of these towns are very recent developments, and are characterised by a lack of unity and lack of a distinct and unifying visual character. A notable exception to this lack of architectural theme is the town of Paternoster approximately 15 km west of the site, on the westernmost portion
of the peninsula. This town has developed with an overriding Cape Dutch vernacular architectural theme, which greatly enhances its visual character.

- the town of Velddrif at the mouth of the Berg River. Development here is orientated to the south, as their visual amenity is created by the views across the Berg River.

The remainder of the land is used for non-intensive agriculture: mainly dryland wheat production and grazing. Due to the low rainfall, the landscape is drab and pale during the dry summer season and green only during the winter rainy season. The natural vegetation is predominantly dark in colour during summer and winter, but there are very few patches of natural vegetation left in the northern portion of the peninsula close to the proposed wind farm site, as most of the land has already been ploughed for crop farming.
4.4 Key Views to and from the Site

Figure 7: View from Stemmet’s Kop (252 m above sea level) looking south in the direction of Saldanha Bay and Vredenburg, showing the current 50 m test mast
Figure 8: View from Stemmet’s Kop looking south in the direction of Saldanha Bay and Vredenburg

Figure 9: View north towards Laingville and Velddrif, showing the current transmission lines and the Atlantic Ocean
Figure 10: View looking southwest along the Vredenburg – St. Helena road, showing the position and height of the test mast, 3km from the test mast

Figure 11: View looking southeast from the Stompneus Bay – Vredenburg Road, 9.7km from the test mast site. The test mast is not visible from this point
Figure 12: View looking northeast from the northern outskirts of Vredenburg towards the test mast site, over a distance of 8 km. The test mast is not visible from this point due to the distance, but its position has been indicated.
4.5 Main Issues that need to be addressed in the Impact Assessment Phase

The following issues need to be addressed in the impact assessment phase:

- Potential visibility of the wind turbines from tourism-orientated towns in the vicinity, including Velddrif;
- Potential visibility of the proposed wind turbines to the south from the towns of Saldanha, Vredenburg and Langebaan;
- Potential visibility of the proposed wind turbines from the West Coast National Park;
- The degree to which increased distance from the proposed wind turbine site mitigates the visual impact, in spite of the fact that the turbines will be situated on one of the highest points in the landscape and will be visible against the skyline;
- The degree to which the hills to the north of the site for the proposed wind turbines screen the turbines from the settlements around the northern and western side of the peninsula, between Laingville and Paternoster;
- Potential cumulative impacts of the proposed wind farm when considered together with other possible wind farm proposals in this region;
- The increase in the visual impact required by the potential requirement for red and white colouring of the wind turbine masts for aeronautical purposes;
- The optimal placing of the wind turbines and the number of wind turbines to mitigate the visual impact.

4.6 Approach to the Impact Assessment Phase

Terms of Reference for the impact assessment phase are based on the findings of the site visit, as well as interpretation of the guideline document for VIAs (Oberholzer 2005) commissioned by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP).

In terms of this guideline document, the depth and scope of a VIA is based on a combination of the sensitivity of the environment and the nature of the existing environment. The type of environment and type of development and both divided into five categories, which are indicated in a matrix (Table 1 from Oberholzer 2005). The category of development is based on Box 3 from the same document (see below).
It is clear from the above that wind farms are categorised as Category 5 developments, and accordingly for the landscape in the study area, which is regarded to be of medium scenic significance, the development can be expected to result in a development of high visual impact.

Accordingly, the level of VIA that would be required, based on the expected level of impact (obtained from Table 1), is determined by Table 2 (see below).
The approach required for a Level 4 VIA includes the following:

- Identification of issues raised in the scoping phase, and site visit;
- Description of the receiving environment and the proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Inclusion of potential lighting impacts at night;
- Description of alternatives, mitigation measures and monitoring programmes.
- Review by independent, experienced visual specialist (if required);
- Complete 3D modelling and simulations, with and without mitigation; and
- Review by independent, experienced visual specialist (if required).
5 CONCLUSION

The proposed St. Helena wind farm will be located on one of the highest points in the Vredenburg-Saldanha region, at a height of some 232m above sea level. The topography is gently rolling and does offer screening between the proposed wind farm site and the settlements around the northern side of the peninsula, from Laingville west to Stompneus Bay and possibly as far as Paternoster.

The sense of place in the region varies greatly. The West Coast National Park, which is centred on the Langebaan Lagoon, has a wilderness atmosphere and is focused on tourism. The town of Langebaan similarly has a tourism focus. However, the town of Saldanha, the iron ore export terminal in Saldanha Bay, the Saldanha Steel plant and the Namakwa Sands smelting plant result in an industrial atmosphere around the northern rim of Saldanha Bay and the areas inland of this. The settlements that hug the coastline to the north of the proposed site are tourist towns, which derive their visual amenity from north-facing sea views. Velddrif is also tourism-focused, and is orientated towards the Berg River lagoon.

There is little doubt that there will be direct line of sight to the proposed wind turbines from the east, south and west. However, the area to the south has an industrial character, and it is doubtful that the turbines would be visible from Langebaan and the West Coast National Park, due to the long distance to the site. The views from Vredenburg and Velddrif are important, as they are from the closer distance. It is essential to provide simulations of the appearance of the turbines from these viewpoints.

Based on the above factors, it is considered that the risk that the project may not be authorised on the basis of visual impacts is not significant. In spite of the wind turbine site being situated in one of the highest points in the study area, the impacts is expected to be moderate due to the screening from a number of tourist towns north of the site, as well as the long distance over which the wind farm will be viewed. However, this needs to be confirmed through visual simulations. The recommendation by Heritage Western Cape will also be key to determining the viability of the project. Although Heritage Western Cape is not the decision-making body from an EIA perspective, their decision will be regarded as important by the national Department of Environmental Affairs, which will be the competent authority in this instance.

According to the DEA&DP guideline document for VIAs, the proposed development can be expected to result in high visual impacts, and accordingly a Level 4 assessment is required for this project, should it proceed to the EIA phase. The VIA must be based on computer modelling to make the assessment and comparison of various scenarios possible.
6 REFERENCES
