

**PROPOSED CASTLE WIND ENERGY FACILITY PROJECT,  
NORTHERN CAPE PROVINCE**

**AMENDMENT:  
COMPARATIVE VIEWSHED ANALYSIS AND VISUAL ASSESSMENT**

**Produced for:**

**Castle Wind Farm (Pty) Ltd**

**Produced by:**

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**- 18 August 2016 -**

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**Map 1:** Comparative Viewshed Analysis – Castle Wind Energy Facility.

**SMEC**, specialists in visual assessment and Geographic Information Systems, undertook the comparative viewshed analysis and visual assessment for the proposed amendment. MetroGIS (now incorporated into SMEC) did the Visual Impact Assessment for the original Castle WEF (November 2014).

Lourens du Plessis, the lead practitioner undertaking the assessment, has been involved in the application of Geographical Information Systems (GIS) in Environmental Planning and Management since 1990.

He has extensive practical knowledge in spatial analysis, environmental modeling and digital mapping, and applies this knowledge in various scientific fields and disciplines. His expertise are often utilised in Environmental Impact Assessments, State of the Environment Reports and Environmental Management Plans.

Lourens is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape province of South Africa, the core elements are more widely applicable (i.e. within the Northern Cape Province).

Juwi appointed MetroGIS (Pty) Ltd as an independent specialist consultant to undertake the visual assessment for the proposed amendment to the Castle Wind Energy Facility. Neither the author nor MetroGIS will benefit from the outcome of the project decision-making.

## **1. INTRODUCTION**

**Castle Wind Farm Pty Ltd** wishes to amend the dimensions of their wind turbine generators (WTG) for the Proposed Castle Wind Energy Facility (WEF), located near De Aar in the Northern Cape Province.

The intended amendment includes:

- The increase of the maximum turbine rotor diameter from 132m (as assessed in the EIA) to a maximum of 150m diameter (an increase of 18m).
- The increase of the maximum turbine hub-height from 120m (as assessed in the EIA) to a maximum of 130m (an increase of 10m).

The primary relevance of this proposed increase in dimensions, from a visual impact perspective, is that the total vertical dimension (height) of the wind turbine increases from approximately **186m** (120m hub-height + 66m blade length) to **205m** (130m hub-height + 75m blade length) above ground level. This translates to a total 19m increase in height per WTG.

## **2. SCOPE OF WORK**

The scope of work includes a comparative viewshed analysis and identification of potential sensitive visual receptors that may be influenced by the increase in dimensions of the WTGs. This is done in order to determine:

- If there are any additional visual receptors that may be negatively influenced by the change;

- Whether the increase in dimensions would significantly aggravate the potential visual impact on identified receptors (identified during the EIA phase);
- If additional impact mitigation measures are relevant;
- And, to suggest alterations or additions to the EMPR (if applicable).

### 3. METHODOLOGY

The visual assessment includes a comparative viewshed analysis in order to determine the visual exposure (visibility) of the original turbine dimensions compared to the potential (additional) exposure of the increased (proposed) turbine dimensions. The viewshed analysis focuses on a radius of 5km from the proposed turbine layout and potential visual receptors located within this zone. The original VIA report determined that receptors, where visible, within this zone may experience a **high** visual impact of the proposed infrastructure.

Potential sensitive visual receptors include observers residing at homesteads (farm residences) within the study area, and observers travelling along the secondary roads traversing near or over the proposed development site.

### 4. RESULTS

A visibility analysis was undertaken from each of the wind turbine positions (31 in total) at an offset of 186m (maximum blade tip height) above ground level. The result of this analysis represents the potential total visual exposure of the original turbine dimensions (indicated in green). The viewshed analysis was repeated at an offset of 205m to indicate the visual exposure of the increased turbine dimensions (shown in red). The results of the visibility analyses are displayed on **Map 1** below.

It is clear that the approximately 9% increase in turbine dimensions, would have a relatively small influence on the overall visual exposure, due to the already tall turbine structures. The surface area (within the study area) of the original turbine exposure is 320km<sup>2</sup>, compared to the 325km<sup>2</sup> of the increased dimensions turbine exposure. This is an increase of 5km<sup>2</sup>, or alternatively, a 1.5% increase in potential visual exposure.

There are no additional sensitive visual receptors located within the area of increased visual exposure. Potential sensitive visual receptors (identified during the IEA phase) include:

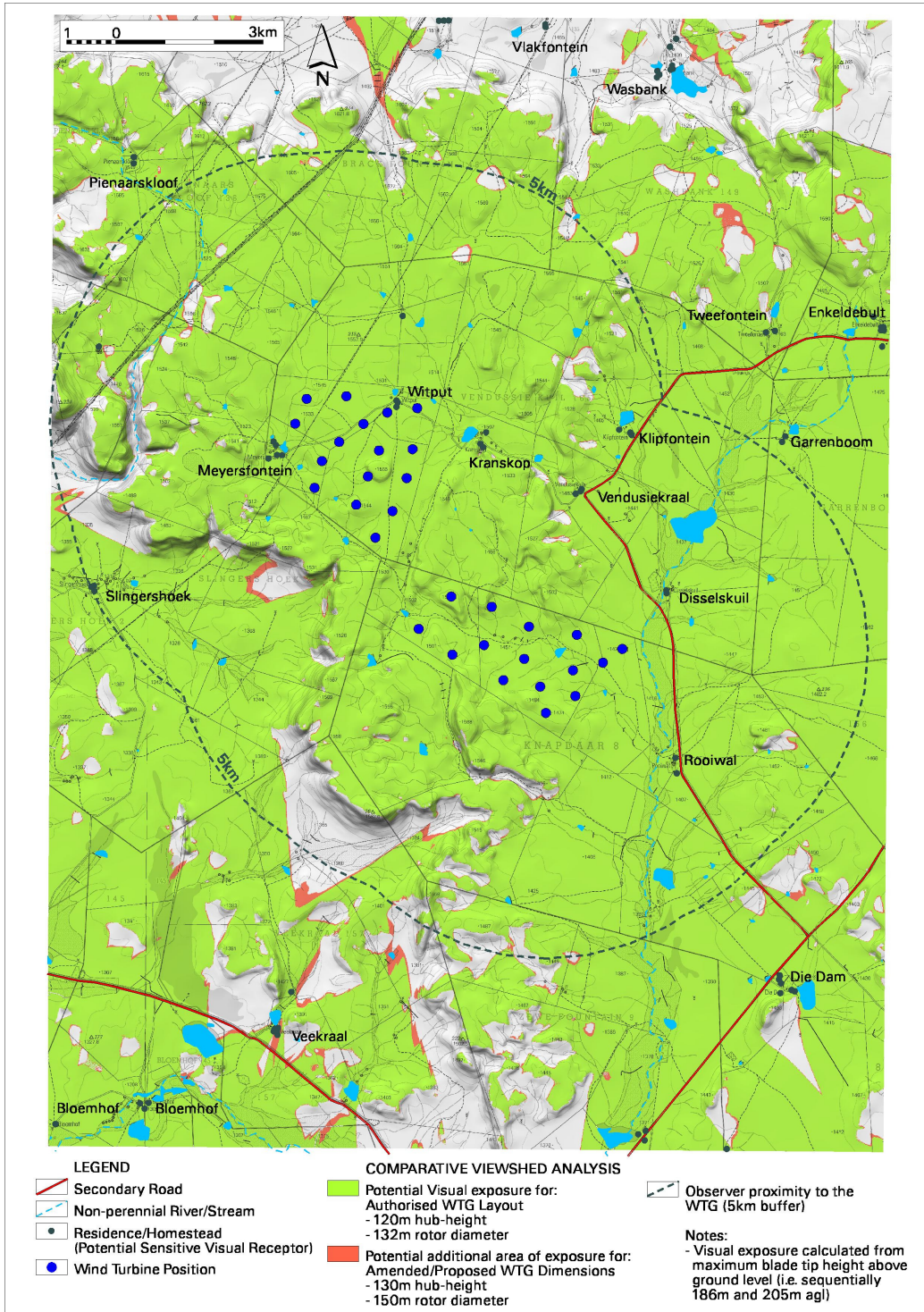
- Klipfontein
- Disselskuil
- Vendusiekraal
- Rooiwal
- Slingershoek
- Pienaarskloof
- Tweefontein
- Garrenboom
- Groenpan
- Die Dam

*Note: The location of these homesteads (excluding Klipfontein and Disselskuil) on properties earmarked for future or potential WEF developments reduces the probability of this impact occurring. Others, e.g. Vendusiekraal and Kranskop,*

*are believed to be derelict or uninhabited. In the event that the homesteads are deserted, the visual impact will be non-existent, until such time as it is inhabited again.*

The increased area of visual exposure does not include a significant portion of additional exposure to major roads within the study area.

It is expected that the wind turbine structures, both the original dimensions and the proposed increased dimensions would be equally visible and noticeable from both the roads and homesteads identified above.



**Map 1:** Comparative Viewshed Analysis - Castle Wind Energy Facility.

## 5. CONCLUSION/RECOMMENDATIONS

The proposed increase in the dimensions of the wind turbine structures is **not expected to significantly alter** the influence of the WEF on *areas of higher viewer incidence* (observers traveling along major secondary roads within the region) or *potential sensitive visual receptors* (residents of homesteads in close proximity to the WEF).

The proposed increase in dimensions is consequently **not expected to significantly influence** the anticipated visual impact, as stated in the original VIA report (i.e. the visual impact is expected to occur regardless of the increase in turbine dimensions).

There are no additional impact mitigation measures or alterations to the EMPR suggested for the proposed increased turbine dimensions, as the general appearance and functional design is not expected to change.

It is suggested that the proposed amendment to the turbine dimensions be supported, subject to the conditions and recommendations as stipulated in the original Environmental Authorisation, and according to the Environmental Management Plan and suggested mitigation measures, as provided in the original Visual Impact Assessment report.