PROPOSED POORTJIES WIND ENERGY FACILITY, NORTHERN CAPE PROVINCE

AMENDMENT: COMPARATIVE VIEWSHED ANALYSIS AND VISUAL ASSESSMENT

Produced for:

Mainstream Renewable Power South Africa (Pty) Ltd

On behalf of:

Savannah Environmental (Pty) Ltd
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Lourens du Plessis (t/a LOGIS), a specialist in visual assessments and Geographical Information Systems (GIS), undertook the comparative viewshed analysis and visual assessment for the proposed amendment. He also undertook the original Visual Impact Assessment for the Proposed Poortjies Wind Energy Facility (submission date December 2014).

Lourens has been involved in the application of 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 is 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.

Savannah Environmental (Pty) Ltd appointed Lourens du Plessis as an independent specialist consultant to undertake the visual assessment for the proposed amendment to the Poortjies Wind Energy Facility. He will not benefit from the outcome of the project decision-making.

1. INTRODUCTION

Mainstream Renewable Power South Africa (Pty) Ltd wishes to amend the specifications of their wind turbine generators (WTG) for the proposed Poortjies Wind Energy Facility (WEF) located south of Pofadder in the Northern Cape Province.

The intended amendment includes:

- The increase of the rotor diameter from up to 140m (authorised in 2015 and re-issued in 2021) to up to 200m
- Increase the hub-height from up to 140m (authorised in 2015 and re-issued in 2021) to up to 200m
- Inclusion of the blade tip-height of up to 300m
- A reduction in the authorised number of turbines from the currently authorised 50 turbines, to reflect as up to 24

The primary relevance of this amendment from a visual impact perspective is the proposed increase in WTG dimensions from a total maximum vertical dimension (height) of approximately **210m** to **300m** above ground level. This translates to a total **90m** increase in blade tip height per WTG, potentially increasing the visual exposure and subsequently the potential visual impact.

The proposed amendment will reduce the number of wind turbines by 26, a positive when considering the overall frequency of visual exposure of the WEF.

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 amendment;
- Whether the increase in dimensions would significantly aggravate the potential visual impact on identified receptors (identified during the EIA phase undertaken for the project);
- If additional impact mitigation measures are relevant; and
- To suggest amendments or additions to the Environmental Management Programme (EMPr) (if applicable).

3. METHODOLOGY

This visual assessment includes a comparative viewshed analysis in order to determine the visual exposure (visibility) of the original (authorised) turbine dimensions compared to the potential (additional) exposure of the increased (proposed) turbine dimensions. The viewshed analysis focuses on a radius of 20km from the proposed amended turbine layout (development footprint) and potential visual receptors located within this zone. The original VIA report determined that receptors, where visible, within this zone may experience ***high*** to ***moderate*** visual impacts of the proposed infrastructure.

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

4. RESULTS OF THE COMPARATIVE VIEWSHED ANALYSIS

A viewshed analysis was undertaken from each of the authorised wind turbine positions (50 in total) at an offset of 210m (maximum blade tip height) above ground level. The result of this analysis represents the potential total visual exposure of the original and authorised turbine dimensions (indicated in green on **Map 1**). The viewshed analysis was repeated at an offset of 300m to indicate the increase in visual exposure (shown in red) of the increased turbine dimensions (24 in total) proposed as part of the amendment. The results of the viewshed analyses are displayed on **Map 1** below.

From the analysis it is clear that the approximately **30%** increase in turbine dimensions, would have a relatively small influence on the overall visual exposure of the wind farm, due to the already tall turbine structures previously authorised and the predominantly flat topography of the surrounding landscape. The surface area (within the study area) of the original turbine exposure is **1,264km²**, compared to the **1,467km²** of the increased dimensions of the wind turbine exposure. This is an increase of **203km²**, or alternatively, an increase of **16%** in the potential visual exposure.

There are no additional sensitive visual receptors located within the area of increased visual exposure that will be affected by the amended turbine dimensions and layout.

Potential sensitive visual receptors within an approximately 20km radius (identified during the EIA phase) include:

< 5km

- Neelsvlei
- A section of the secondary road traversing south-west of the facility

5 – 10km

- Millerton
- Luttingshoop
- Oubip
- Poortjie 1 & 2

10 – 20km

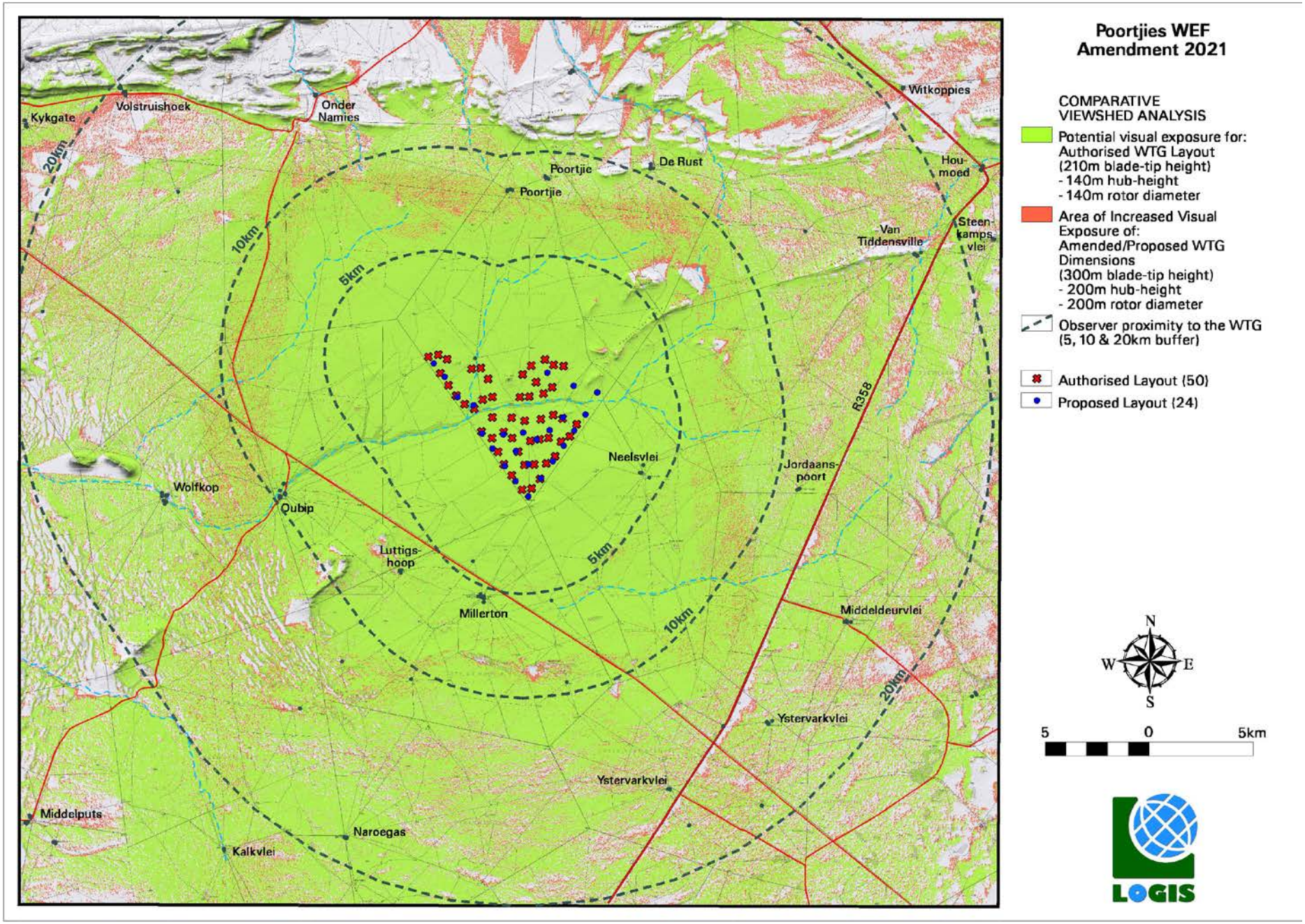
- Naroegas
- Wolfkop
- De Rust
- Van Tiddensville
- Jordaanspoort
- Middeldeurvlei
- Ystervarkvlei 1 & 2
- A section of the R358 arterial road traversing south-east of the facility

Note:

Where homesteads are derelict or deserted, the visual impact will be non-existent, until such time that they are inhabited again.

In spite of the increase in the turbine dimensions 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. This signifies a negligible change to the potential visual impact with the implementation of the amended turbine dimensions.

It is worth noting that the Poortjies WEF is located immediately south of the approved Koranna and Khai Ma WEFs, potentially contributing to the cumulative visual impact of wind turbine structures within the landscape. It is however still preferable to consolidate and concentrate wind energy facilities within this zone rather than to spread it further afield. The location of the WEFs is also generally remote and there are a limited number of potential sensitive visual receptors within the region. The cumulative visual impact is therefore deemed to be of an acceptable level.



Map 1: Comparative Viewshed Analysis – Poortjies Wind Energy Facility.

5. COMPARATIVE VISUAL ASSESSMENT STATEMENT

In consideration of the proposed amendments, there is no (zero) change to the significance rating compared with the original EIA visual impact assessment report. Furthermore, no additional mitigation measures are considered necessary for the purposes of the amended scenario and the mitigation measures provided in the original EIA therefore remain suitable and applicable.

6. CONCLUSION / RECOMMENDATIONS

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

The proposed increase in turbine 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 amendment). This statement relates specifically to the assessment of the visual impact within a 5km radius of the wind turbine structures (potentially ***high*** significance), but also generally apply to potentially ***moderate*** to ***low*** visual impacts at distances of up to 20km from the structures.

From a visual perspective, the proposed changes to the turbine dimensions will therefore require no (zero) changes to the significance ratings of the impacts identified within the original Visual Impact Assessment report that was used to inform the approved EIA. In addition to this, no new mitigation measures are required.

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

7. REFERENCES / DATA SOURCES

Council for Scientific and Industrial Research (CSIR), 2015. *The Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa.*

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