

Appendix G.6

VISUAL REPORT





PHEFUMULA EMOYENI ONE

VISUAL IMPACT ASSESSMENT FOR THE PROPOSED PHEFUMULA EMOYENI ONE WIND ENERGY FACILITY

IMPACT ASSESSMENT REPORT





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IMPACT ASSESSMENT REPORT

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 41105236

OUR REF. NO. 41105236-REP-00002

DATE: AUGUST 2024



PHEFUMULA EMOYENI ONE

VISUAL IMPACT ASSESSMENT FOR THE PROPOSED PHEFUMULA EMOYENI ONE WIND ENERGY FACILITY

IMPACT ASSESSMENT REPORT

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QUALITY CONTROL

| Issue/revision | First issue | Revision 1 |
|----------------|--------------------|---|
| Date | October 2023 | February 2024 |
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| Project number | 41105236 | |
| Report number | 41105236-REP-00002 | |
| | | |

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APPENDICES

APPENDIX A

SPECIALIST'S CV

APPENDIX B

VISUAL AND FLICKER SITE SENSITIVITY VERIFICATION REPORT

APPENDIX C

DOCUMENT LIMITATIONS



ABBREVIATIONS

| Abbreviations | |
|---------------|---------------------------------|
| BESS | Battery energy storage system |
| DEM | Digital elevation model |
| EA | Environmental Authorisation |
| EIA | Environmental Impact Assessment |
| ha | Hectares |
| LTV | Level of theoretical visibility |
| O&M | Operations and maintenance |
| PEO | Phefumula Emoyeni One |
| SP | Significance points |
| VAC | Visual absorption capacity |
| VIA | Visual Impact Assessment |
| WEF | Wind Energy Facility |
| WSP | WSP Group Africa (Pty) Ltd |



DETAILS OF THE SPECIALIST

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DECLARATION OF INDEPENDENCE BY SPECIALIST

I, Johan Bothma declare that I –

- Act as the independent specialist for the undertaking of a specialist report for the proposed Phefumula Emoyeni One Wind Energy Facility Project;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
- Do not have nor will have a vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- Undertake to disclose, to the competent authority, any information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan, or document.



1 INTRODUCTION

WSP Group Africa (Pty) Ltd (WSP) was appointed by Phefumula Emoyeni One (Pty) Ltd (PEO), to conduct a Visual Impact Assessment (VIA), for the proposed PEO wind energy facility (WEF) near the town of Ermelo, in the Mpumalanga Province of South Africa.

This VIA forms part of the environmental permitting process required for the proposed PEO WEF development, and this report presents:

- A visual baseline description of the project site and surrounding landscape
- A determination of the visual resource value of the proposed project site and surrounding study area and associated sensitivity verification
- Identification of potential visual receptors
- An impact assessment for proposed project activities
- Recommended mitigation measures, where applicable

Note that this VIA is for the PEO WEF only, and that the associated grid connection and transmission infrastructure is the subject of a separate permitting process and VIA.

1.1 LOCATION OF THE PROJECT SITE

The proposed PEO WEF is located approximately 16 km north of Ermelo in the Msukaligwa Local Municipality and Gert Sibande District Municipality, near the town of Ermelo, in the Mpumalanga Province of South Africa. Currently, a total of 95 portions of the farms Israel 207 IS; Bosmanskrans 217 IS; Vaalbank 233 IS; Kuilfontein 234 IS; Bosmanshoek 235 IS; Witbank 236 IS; Nooitgedacht 237 IS; Orpenskraal 238 IS; Geliksdraai 240 IS; Elim 247 IS; Kranspoort 248 IS; Tweefontein 249 IS; Voorzorg 250 IS; Nooitgedacht 251 IS; Spion Kop 252 IS; Uitzicht 266 IS; Davelfontein 267 IS; Middelpaat 271 IS; Driehoek 273 IS; Spitskop 276 IS and Kranspoort 827 IS are being considered for the proposed development, however the portions affected will be determined by the final development layout.

1.2 PROJECT DESCRIPTION

The PEO WEF will furthermore be developed within a project area of approximately 33 660 hectares (ha), however the extent of the cumulative disturbance footprint of the project will only be a fraction of the development area and will be determined once the final layout has been established (Figure 1-2).

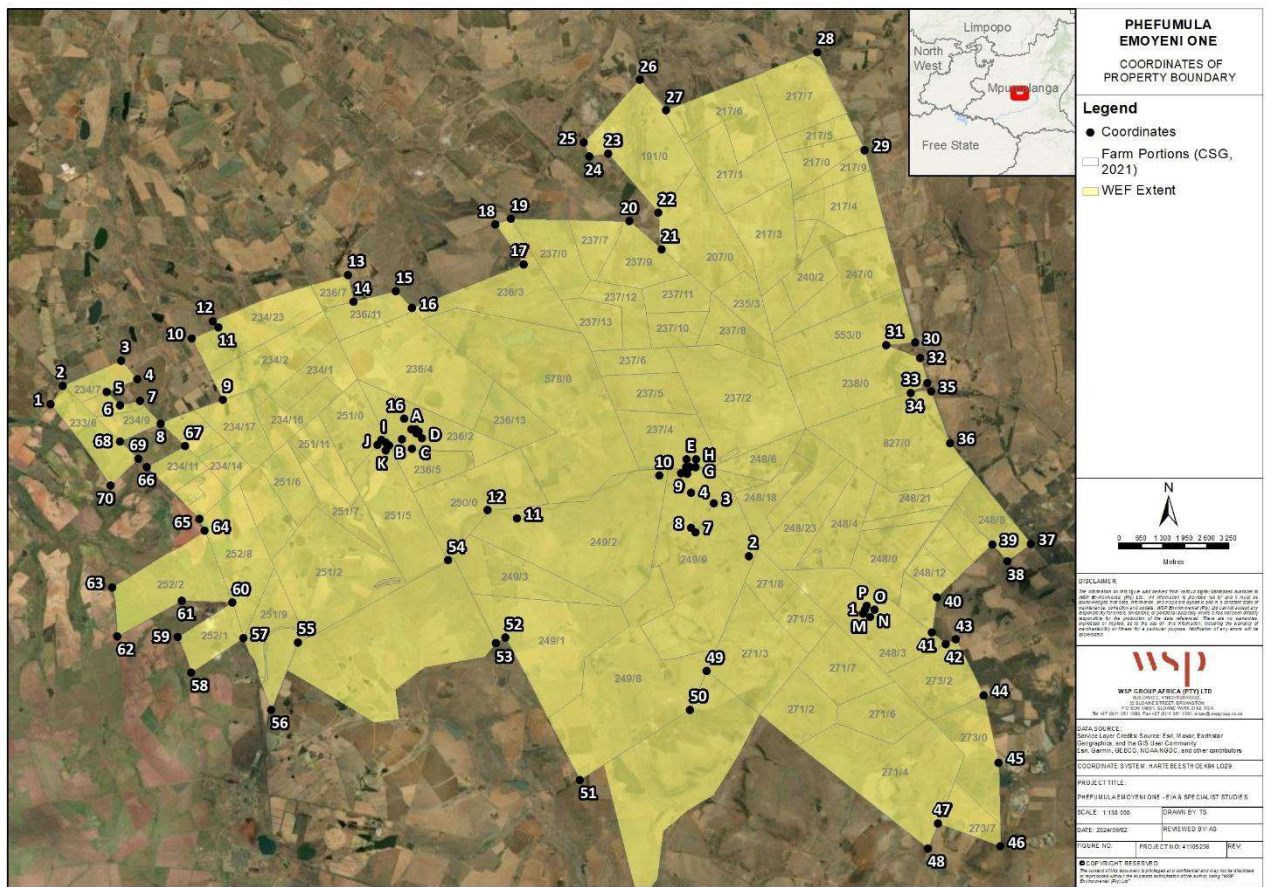


Figure 1-2 – Farm portions map of the proposed PEO WEF development area

The project will entail the development of various components that are expected to result in a potential visual impact, either as temporary impacts during the construction/decommissioning phases, and/or long-term impacts during the operational phase (Table 1-1):

Table 1-1 – Visible project components that are expected to cause a visual impact

| Detail | Information |
|------------------------------------|---|
| Turbines | <ul style="list-style-type: none"> ■ Up to 88 turbines, with an approximate hub height of up to 200 m, and rotor diameter of up to 200 m ■ Hardstand area of approximately 75 m x 120 m ■ Foundation diameter of up to 40 m per turbine – excavation up to 6 m deep, constructed of reinforced concrete to support the mounting ring. Once tower established, footprint of foundation is covered with soil ■ One or more blades may be painted as part of the mitigation to reduce avifaunal collision risk |
| Substation and internal powerlines | <ul style="list-style-type: none"> ■ 33 kV cabling to connect the wind turbines to the onsite collector substations, to be laid underground where practical ■ 3 x 33 kV/132 kV onsite collector substation (IPP Portion), each being up to 5 ha ■ Cabling between turbines, to be laid underground where practical |

| Detail | Information |
|------------------------------------|---|
| Construction camp and laydown area | <ul style="list-style-type: none"> ■ Construction compounds including site office (approximately 300 m x 300 m in total but split into 3 ha each of 150 m x 200 m): <ul style="list-style-type: none"> — 3 x batching plant of up to 4 ha to 7 ha — 3 x construction compound / laydown area, including site office of 3 ha each (150 m x 200 m each) ■ Laydown and crane hardstand areas (approximately 75 m x 120 m) |
| Internal roads | <ul style="list-style-type: none"> • 12-13 m wide roads with 12 m radius turning circles, gravel surface |
| O&M building | <ul style="list-style-type: none"> • 3 x O&M office of approximately 1.5 ha each adjacent to each collector substation |
| Batching plant | <ul style="list-style-type: none"> • Up to 3 x batching plants of up to 4 ha to 7 ha |
| BESS | <ul style="list-style-type: none"> ■ Battery energy storage system (BESS) (200 MW/800 MWh). The type of system has not been confirmed at this stage, however final selection is expected to have a negligible impact from a visual perspective ■ Export capacity of up to 200 MW ■ Total storage capacity 800 MWh ■ Storage capacity of up to 6-8 hours ■ The BESS will be housed in containers covering a total approximate footprint of up to 5 ha <ul style="list-style-type: none"> • Battery types to be considered include solid state batteries as the preferred (lithium ion) and redox flow batteries as the alternative (vanadium redox) |

A revised preliminary project layout map has been developed, based on the land cover characteristics and combined environmentally sensitive areas identified from the various specialist studies, and is illustrated in Figure 1-3 below. Note that this layout also incorporates the outcomes of the VIA baseline assessment described in Section 4. Further refinement of the layout may still be possible, whereby the locations of individual turbines, access roads, and/or associated infrastructure could be adjusted based on technical and practical considerations, but these limited variations are not expected to have a material impact on the outcomes of this VIA.

1.3 DELINEATION OF THE VISUAL STUDY AREA

A visual impact will be caused by all visible infrastructural components developed as part of the project, as well as all areas where the physical appearance of the landscape will be altered by earthworks and construction activities. The areas from which these proposed landscape alterations are expected to be visible are therefore defined as the study area.

- For the purposes of this VIA, the term ‘project site’ or ‘site’ refers to the proposed overall PEO WEF footprint, or section thereof as indicated by the specific context (Figure 1-4)
- The term “study area” refers to the area that will potentially be visually affected by the project and represents the 10 km radius buffer around the total project site. Visual receptors occurring within the study area are also indicated, and further considered during the impact assessment process (refer to Section 7)

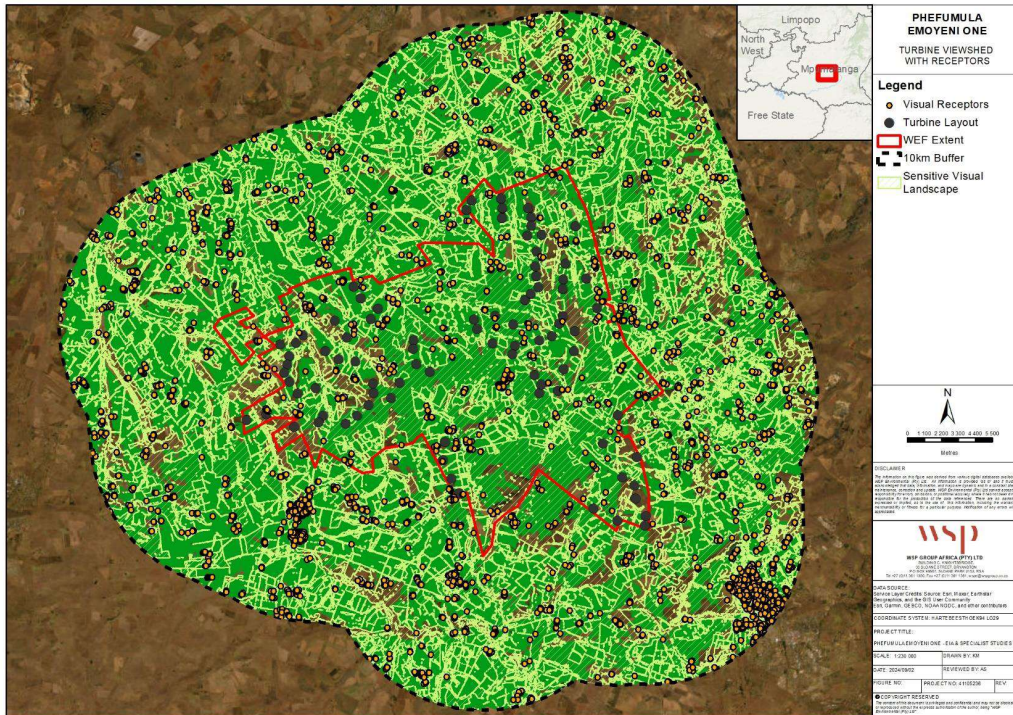


Figure 1-4 - 10 km study area and visual receptors

2 STUDY METHODOLOGY

2.1 VIA METHODOLOGY

The VIA specialist study was conducted using the following methodology:

- Reviewing the preliminary findings of the flicker and landscape site environmental sensitivity as per the project *Screening Report for an Environmental Authorization as Required by the 2014 EIA Regulations*, dated 04/09/2023
- Describing the landscape character or visual baseline based on:
 - A review of available aerial imagery and topographical maps, focusing on the both natural- and human-made elements
 - A site visit conducted on 05 October 2023
- Determining the visual resource value of the landscape based on:
 - The topographical character of the study area and potential occurrence of landform features of interest
 - The presence of water bodies within the study area
 - The general nature and level of disturbance of existing vegetation cover within the study area
 - The nature and level of anthropogenic disturbances and transformation
- Determining the sensitivity of the study area regarding visual resource using the national web-based environmental impact assessment screening tool
- Determining the visual absorption capacity of the receiving visual landscape
- Determining the receptor sensitivity to the proposed project
- Conducting Screening Assessment for construction, operation and decommissioning phases based on the project description
- Identifying preliminary visual mitigation measures for the impacts identified during the screening assessment
- Determining the magnitude of potential impacts within the existing visual context by considering the proposed project in terms of:
 - Visibility
 - Visual intrusion
 - Visual exposure
- Assessing the impact significance by relating the magnitude of the visual impact to:
 - Impact extent
 - Impact reversibility
 - Impact duration
 - Probability of occurrence
- Based on the outcomes of the impact assessment, refining mitigation measures to reduce the potential negative visual impacts of the project, where feasible

2.2 LEGISLATIVE REQUIREMENTS AND INDUSTRY PRACTICE

For the purposes of conducting the VIA, guidance has been taken from the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP) *Guideline for Involving Visual and Aesthetic Specialists in the EIA Process* (Oberholzer, 2005). Although not legislated for the rest of the country, these are the only VIA guidelines that have been issued in South Africa and provide an appropriate content and assessment framework. Additional guidance has also been taken from other reference works in the field of visual assessment, listed in Section 13.

Further, in accordance with the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes, which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e. “the Protocols”), and Appendix 6 of the EIA Regulations. The protocols used are the “*Site Sensitivity Verification Requirements where a specialist Assessment is required but no Specific Assessment Protocol has been Prescribed*”, which are referenced to the report content as indicated in Table 2-1:

Table 2-1 - Appendix 6 of the EIA Regulations specialist study checklist

| Report content requirement | Reference |
|---|--|
| A specialist report prepared in terms of these Regulations must contain— | |
| (a) details of— (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae; | Refer to details of the specialist section after the table of contents |
| (b) a declaration that the specialist is independent in a form as may be specified by the competent authority; | Refer to declaration of independence by specialist after the table of contents |
| (c) an indication of the scope of, and the purpose for which, the report was prepared; (cA) an indication of the quality and age of base data used for the specialist report; (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Refer to Sections 1 and 2 Refer to Section 2 Refer to Section 4.2 for a description of existing impacts on site, cumulative impacts are assessed in Section 11 |
| (d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment; | Refer to Section 2 for information regarding the date and season, and Sections 3 and 4.7 for relevance of seasonal influences on assessment outcome |
| (e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used; | Refer to section 2.1 for methodology, as well as 9.2.1 of specialised process (viewshed analysis) and Section 9.2.2 (artist renderings) |

| Report content requirement | Reference |
|---|--|
| (f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives; | Refer to Section 5 |
| (g) an identification of any areas to be avoided, including buffers; | Refer to Section 5.3 |
| (h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers; | The development layout is presented in Figure 1-3, and superimposed on visual sensitivities map. From a visual impact assessment, the visual resource determination was done for the site as a whole (Section 5) |
| (i) a description of any assumptions made and any uncertainties or gaps in knowledge; | Refer to Section 3 |
| (j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities; | Initial findings regarding visual resource value, receptor sensitivity, identified impacts and mitigation are presented as elsewhere indicated in this table, and summarised in Section 12 |
| (k) any mitigation measures for inclusion in the EMP;: | Refer to Section 10 for recommended mitigation measures |
| (l) any conditions for inclusion in the environmental authorisation; | Refer to Section 10 for recommended mitigation measures |
| (m) any monitoring requirements for inclusion in the EMP; or environmental authorisation; | Refer to Section 10 for recommended mitigation measures |
| (n) a reasoned opinion— (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMP, and where applicable, the closure plan; | None noted. Refer to Section 10 for the proposed visual mitigation strategy and measures, and Section 12 for the conclusion |
| (o) a description of any consultation process that was undertaken during the course of preparing the specialist report; | No consultation was conducted; however, the study was conducted using widely acknowledged principles of visual assessment as noted in Section 9.2 |

| Report content requirement | Reference |
|--|-------------------|
| (p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and | None received yet |
| (q) any other information requested by the competent authority | None received yet |
| (2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply. | Not applicable |

3 ASSUMPTIONS AND LIMITATIONS

The following qualification is relevant to the field of VIA and the findings of this study:

- The final locations of individual project components, specifically the locations of individual wind turbines, O&M building, substation, BESS, access roads, and temporary batching plants may not have been finalised yet, and the findings of this VIA are based on the most recent available layout and project development description. Further refinement of the layout may still be possible, whereby the locations of individual project components could be further adjusted based on technical and practical considerations. However, these limited variations are not expected to have a material impact on the outcomes or recommendations of this VIA.
- Similarly, the selection of specific technologies, including that of the BESS and other components, has not been finalised in all instances. However, in most cases the specific choice of technology is not expected to materially influence the findings of the impact assessment, as the height and location of individual turbines are expected to be the most determining factor during the visual impact assessment.
- Artificial landforms and structures, such as berms, stockpiles, buildings, and even tall vegetation will all impact the level of visibility of individual project components. However, given the limited development within the study area the influence of these elements during the viewshed analysis to be conducted during the impact assessment phase is expected to be limited.
- Determining the value, quality and significance of a visual resource or the significance of the visual impact that any activity may have on it, in absolute terms, is not achievable. The value of a visual resource is partly determined by the viewer and is influenced by that person's socio-economic, cultural, and individual background, and is even subject to fluctuating and intangible factors, such as emotional mood and appreciation of "sense of place".
- This situation is compounded by the fact that the conditions under which the visual resource is viewed can change dramatically due to natural phenomena, such as weather conditions and seasonal change. Visual impact cannot therefore be measured simply and reliably, as is for instance the case with water, noise, or air pollution.
- It is therefore not possible to conduct a visual assessment without relying to some extent on the expert opinion of a qualified consultant, which is inherently subjective. The subjective opinion of the visual consultant is however unlikely to materially influence the findings and recommendations of this study, as a wide body of scientific knowledge exists in the industry of VIA, on which findings are based.
- The graphic representation of the wind turbines superimposed into photos of the existing landscape is conceptual in nature only and is meant to illustrate the visual appearance of the

project development, rather than convey technical or engineering aspects of the project. The locations of individual turbines within the landscape are approximate only, based on the preliminary layout, and may be further adjusted based on the final project layout. The appearance of the turbines may differ from what is depicted based on specific turbine technology and other factors.

4 BASELINE VISUAL ENVIRONMENT

4.1 FINDINGS OF ENVIRONMENTAL AUTHORISATION SCREENING REPORT

The *Screening Report for an Environmental Authorization as Required by the 2014 EIA Regulations*, dated 04/09/2023 for the proposed project indicated various locations within the site that are of very high sensitivity towards shadow flicker (Figure 4-1), and being of high to very high landscape (visual) environmental sensitivity (Figure 4-2). The areas of high sensitivity towards shadow flicker are expected to be representative of individual farmsteads and other buildings within the site boundary and surrounding areas, whereas the areas of higher visual landscape sensitivity appear to correlate with drainage lines and associated wetlands/vegetation cover, as well as ridges and other topographical features. These aspects are further evaluated and reported on in Sections 4.2 to Section 7.



Figure 4-1 - Map of relative flicker theme sensitivity

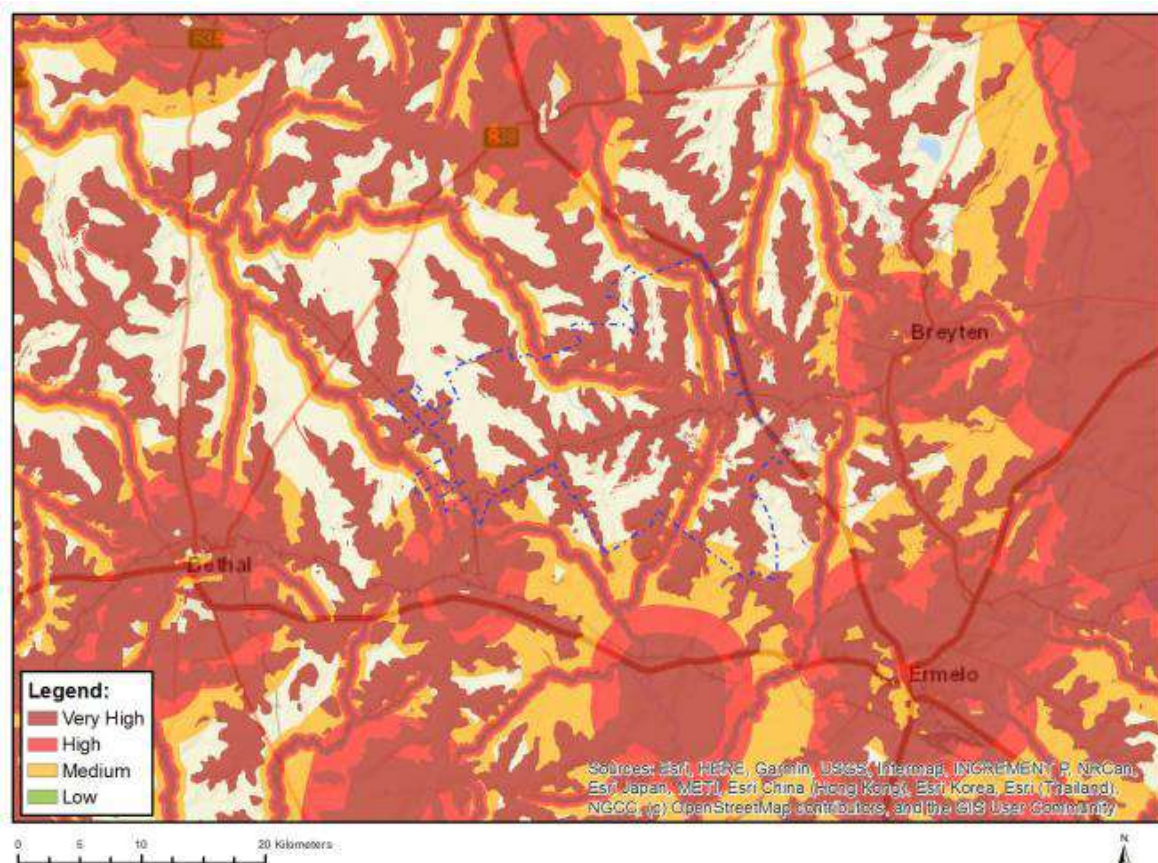


Figure 4-2 - Map of relative landscape (wind) theme sensitivity

4.2 GENERAL LANDSCAPE CHARACTERISTICS

The visual baseline presented in this section is predicated on site observations made during the dedicated site visit conducted on 05 October 2023, as well as Google Earth imagery. To determine the visual resource value of the study area, the following factors were considered:

- General topography, including prominent or appealing landforms, and their spatial orientation relative to the project site
- Nature of existing vegetation cover with respect to overall appearance, density and height, and level of disturbance
- Location, physical extent, and appearance of water bodies, and
- Nature and level of anthropogenic transformation or disturbance and the perceived level of compatibility of existing land uses

This section provides a brief overview of the visual baseline environment and context in which the proposed project will take place.

The study area is in the Mpumalanga Highveld. The region has historically been dominated by farming and other agricultural uses, with vast areas under cultivation and livestock grazing. More recently, several opencast surface mining operations have been established directly east of the study area. Ermelo and the much smaller Breyten are located southeast and east of the study area respectively, while Bethal and the smaller Hendrina are located further west and north respectively.

These urban centra, and especially their associated townships, are characterised by ongoing expansion.

The study area visual baseline is further described in the following subsections and illustrated by various maps and photos, the latter as per the photo location map (

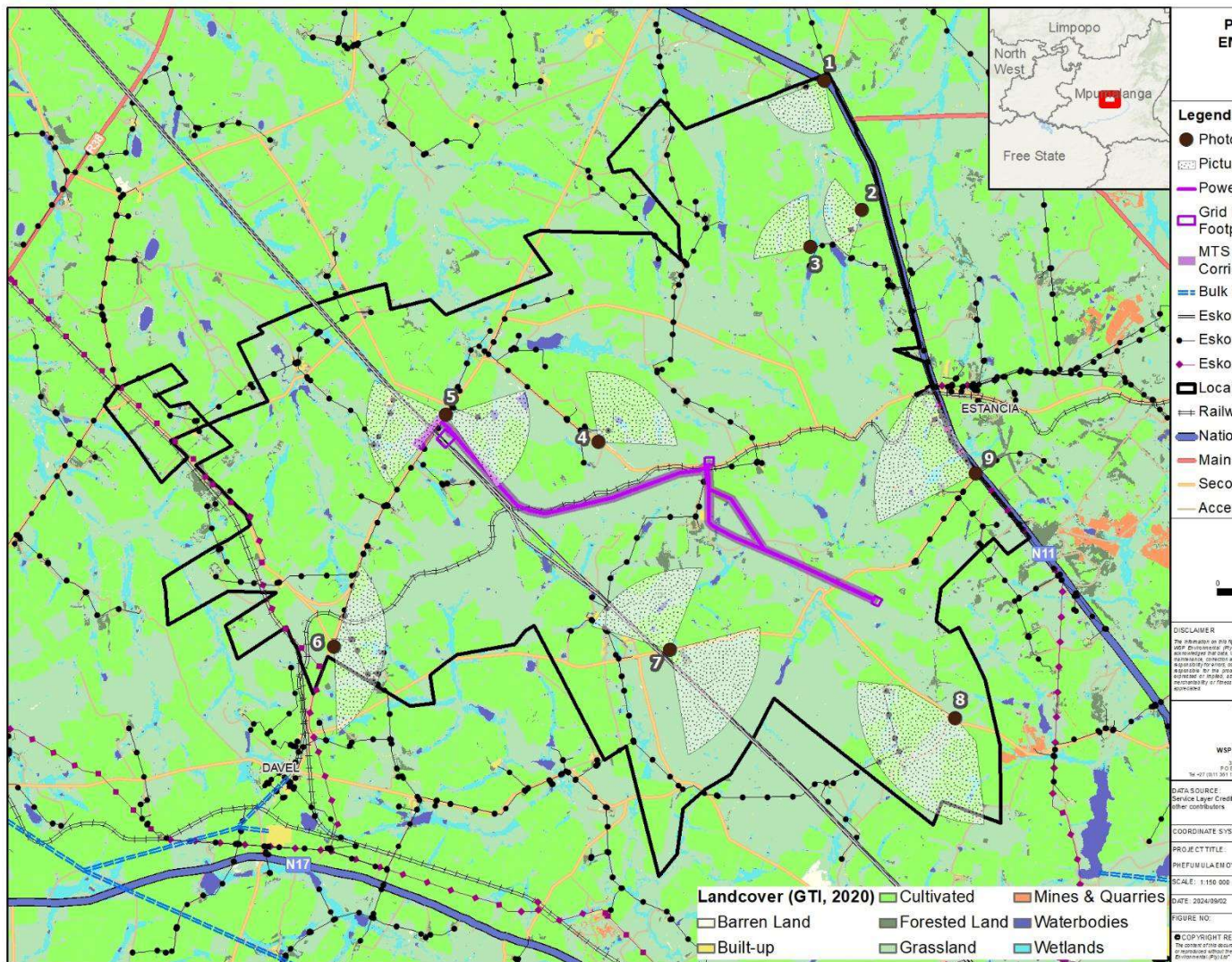


Figure 4-17).

4.3 TOPOGRAPHY

The natural topography is characterised mainly by rolling plains and low hills in most areas, which is locally interspersed by small ridges and flattish plateaus (Figure 4-3). The study area is roughly bisected by a non-prominent east-west watershed. Lower-lying areas are associated with the numerous small drainage lines and larger streams, that drain the study area from the main central watershed to the northwest and the south respectively, which also represents the general fall in elevation.

Most of the small rises formed by these watersheds are not prominent or steep, and therefore do not form specific visual landmarks or characteristic features, however a few of the larger landforms

are landmarks in shorter-range views (Figure 4-4). Nevertheless, the natural topography of the site itself and much of the immediate surroundings remain largely untransformed and contribute to the rural appeal of the setting.



Figure 4-3 - Rolling plains and low hills are locally interspersed by small ridges and flattish plateaus (photo position 4)



Figure 4-4 – Example of a small hill forming a landmark in a short-range view (photo position 7, looking east)

4.4 HYDROLOGY (DRAINAGE FEATURES)

Many smaller, partially perennial drainage lines as well as a few larger, permanent streams traverse the study area and become more visually prominent towards the northern and southern edges of the study area. An extensive network of wetlands is also associated with these runoff drainage features and comprise mainly seep and channelled valley-bottom wetlands, which become floodplain wetlands outside and to the west and northwest of the project site (Figure 4-5). However, from a visual perspective these are often indistinct from the surrounding areas and differentiated by a subtle change in vegetation, rather than by visible water. In addition, a few small pans also dot the study area, with various larger pans located outside and to the northwest and southwest of the project site.

Many earth-embankment dams of varying sizes are located throughout the project site, and several larger dams with engineered dam walls also occur in downstream sections of drainage lines within the project site. These large bodies of standing water often form prominent features in the landscape, especially in short- and medium-range views (Figure 4-6) and also tend to attract water fowl and other bird species (Figure 4-7) and are sometimes edged by more diverse vegetation cover.

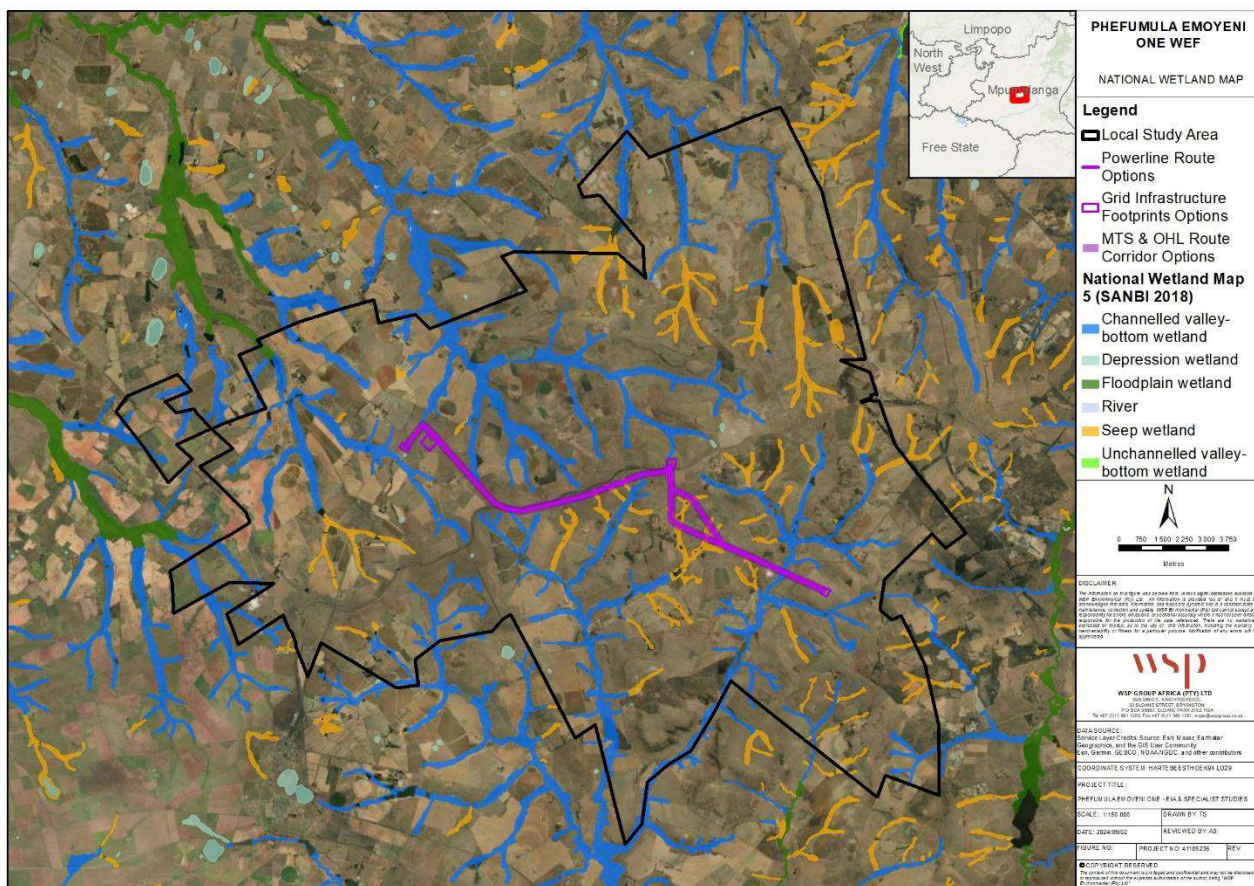


Figure 4-5 - Surface drainage lines and hydrological features map at the PEO WEF



Figure 4-6 - Larger bodies of standing water often form prominent features in the landscape (photo position 3)



Figure 4-7 – Bodies of standing water attract several waterfowl and other bird species (photo position 6)

4.5 VEGETATION CHARACTERISTICS

The original vegetation cover across large parts of the site and surrounding study area have been converted to planted cropland (Figure 4-8) or are used for grazing (Figure 4-9). However, the vegetation along most waterways, low-lying areas, and many ridges is still largely untransformed, and characterised predominantly by indigenous species interspersed by isolated clumps of wattle, eucalyptus, and other invasive species. The area is typical of the central Highveld, and from a distance forms a visual patchwork of textures and colours (Figure 4-10). The predominant grassland cover is also characterised by a marked change in appearance from summer to winter, as grasses change from green to brown (refer to Section 4.7). Taller trees such as planted oaks and clumps of eucalyptus and pines form prominent features when displayed against the horizon (**Figure 4-11**).



Figure 4-8 - Large parts of the study area have been converted to planted cropland (photo position 8)



Figure 4-9 – A significant percentage of the study area is also used for livestock grazing (photo position 7, looking northwest)



Figure 4-10 – From a distance the vegetation cover forms a visual patchwork of textures and colours (photo position 6)



Figure 4-11 – Tall planted trees such as oaks, eucalyptus and pines form prominent features when displayed against the horizon (photo position 2)

4.6 LAND COVER AND LAND USES

The land cover of the site and surrounding area is shown on Figure 4-12. Large parts of the overall project site are essentially undeveloped or used for extensive agricultural practices, with farmsteads, smallholdings, numerous dams, and several gravel roads being the most prominent infrastructure. The site is also bounded by the N11 highway to the east (Figure 4-13), and several high-mast power lines (Figure 4-14) and radio towers (Figure 4-15) also occur within the site, although the latter are not prominent in medium-range views. Other large roads in the study area include the N17 highway to the south and R38 west and north of the site.

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Figure 4-14 - High-mast power lines traverse parts of the project site (photo position 5, looking east)



Figure 4-15 – Several tall telecommunication towers are also located within the site, although these are not prominent in medium-range views (photo position 5, looking west)– pictured here is the project meteorological measurement mast (red arrow)

4.7 SEASONAL AND ATMOSPHERIC CONDITIONS

A further aspect of the visual baseline that needs to be considered is that of weather-related/atmospheric conditions and seasonal variations. Prevailing atmospheric conditions can greatly influence how a landscape is perceived by viewers, as well as the range over which views are possible.

The study area is located in a summer rainfall region, and while winters are cold and mostly dry, mist is common particularly during winter, greatly reducing visibility when it is present. Airborne pollution in the region can be high, often resulting in hazy atmospheric conditions. Fires can also significantly impact visual conditions, causing vast and highly visible smoke columns which greatly reduce the visibility in short-range views.

In addition, seasonal changes greatly change the appearance of most landscapes, with the Highveld region typically alternating from vast expanses of various hues of green during the rainy season, to more subdued browns and tans during the winter (Figure 4-16). Croplands also change in appearance, from bare earth at the start of the spring planting season to visually uniform fields of corn during summer, which gradually brown and yellow during autumn before harvesting, following which the fields are again characterised by exposed earth and bare stalks (Figure 4-8).



Figure 4-16 – The predominant vegetation cover is characterised by a marked change in appearance from summer to winter, as grasses change from greens to browns and tans (photo position 1)

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5 VISUAL RESOURCE VALUE OF THE STUDY AREA

5.1 VISUAL RESOURCE VALUE CRITERIA

Visual resource value refers to the visual quality of elements of an environment, as well as the way in which combinations of elements in an environment appeal to our senses. Studies in perceptual psychology have shown an affinity for landscapes with a higher visual complexity, rather than homogeneous ones (Young, 2004). Furthermore, based on research of human visual preference (Crawford, 1994), landscape quality increases when:

- Prominent topographical features and rugged horizon lines exist
- Water bodies such as streams or dams are present
- Untransformed indigenous vegetation cover dominates, and
- Limited presence of human activity, or land uses that are not visually intrusive or dominant prevail

Further to these factors, Table 5-1 indicates criteria used for visual resource assessment. The assessment combines visual quality attributes (views, sense of place and aesthetic appeal) with landscape character and gives the landscape a very high, high, moderate, or low visual resource value.

Table 5-1 - Visual resource value criteria

| Visual Resource Value (sensitivity) | Criteria |
|-------------------------------------|--|
| Very high (4) | <ul style="list-style-type: none"> ■ Pristine or near-pristine natural landscape with no or very limited human intervention visible ■ Natural landscapes characterised by highly scenic or attractive features that are unique to the area or region ■ Areas that exhibit a strong positive character with valued features that combine to elicit a distinct experience of visual unity, richness, and harmony ■ Cultural heritage sites, architectural features, or built-up sites comprised completely or mostly consisting of elements of high historical or social value, and that are unique or otherwise characterised by high visual appeal ■ These landscapes are likely of particular importance to conserve, and are particularly sensitive to change |
| High (3) | <ul style="list-style-type: none"> ■ Predominantly natural landscapes that nevertheless have some human interventions visible ■ Natural landscapes characterised by scenic or attractive natural features, characteristic of the region in which it is located ■ Areas comprised of visual elements that mostly combine to create a sense of visual unity, richness, and harmony, with minor or isolated incongruent aspects of features ■ Cultural heritage sites, architectural features, or built-up sites largely characterised by features of high historical or social value, and that mostly have high visual appeal ■ These are landscapes may contain specific features or elements of conservation importance, and which may be sensitive to change |

| Visual Resource Value (sensitivity) | Criteria |
|-------------------------------------|--|
| Moderate (2) | <ul style="list-style-type: none"> Partially transformed or disturbed landscape in which human interventions are visible but do not dominate views Natural landscapes but with noticeable presence of incongruous elements or degradation of some features Areas that exhibit some positive visual appeal but that are not unique and are found elsewhere, or that include some disharmonious elements resulting in a more mixed character Cultural heritage sites, architectural features, or built-up sites characterised by individual elements that have some socio-cultural or historic interest but not considered visually unique These landscapes are less important to conserve but may still include certain areas or features worthy of conservation, and have some capacity to absorb visual change |
| Low (1) | <ul style="list-style-type: none"> Extensively transformed or disturbed landscape Human intervention is of visually intrusive nature and dominates available views Scenic appeal of landscape greatly compromised, and visual cohesion of individual elements is mostly non-existent Built-up sites in which unappealing elements have visual prominence, or that consist of widely disparate or incongruous land uses and activities Areas generally negative in character with few, if any, valued features. Scope for positive enhancement frequently occurs |

5.2 VISUAL RESOURCE VALUE EVALUATION

A summary of the visual resource value of the study area *vis-à-vis* the tabulated factors is discussed below:

- The natural topography of the site and study area is representative of that of the region, and is largely devoid of distinctive landmarks, although larger rises and low ridges do provide some visual variation and create focal points in short range views. The site natural topography is also essentially untransformed, in comparison to areas directly to the east which have notably been transformed by surface coal mining. The site topographical visual resource value is therefore rated as high (3).
- Similarly, the hydrological aspect of the site is undistinctive and visually like that of much of the larger area, although large sections of wetland are still largely intact. The many dams of different sizes do create points of interest and attract birdlife which adds diversity and a dynamic aspect to the site, and the hydrological aspects of the site are therefore rated as being of high (3) visual resource value.
- Given the fact that only a fraction of the once expansive original Highveld grasslands remains, and the further threat posed by mining, agriculture, informal settlement, and associated degradation, the visual resource value of the remaining untransformed sections of the site's vegetation cover is rated as high (3). Similarly, individual clumps and lanes of planted pine and oak trees create points of interest and contribute to the rural character and charm of the area, and also have a high visual resource value.
- The visual resource value of the mostly agricultural land uses and associated land cover of the site, within the context of the larger study area, is considered high (3).



The visual resource value assessment of the site within the context of the study area, in terms of the above criteria scores, is summarised in Table 5-2:

Table 5-2 - Visual resource value determination

| Visual baseline attribute | Topography | Water bodies | Vegetation | Land uses |
|-----------------------------|------------|--------------|------------|-----------|
| Visual resource value score | 3 | 3 | 3 | 3 |
| Total | | | | 12 (high) |

Where:

- 4 – 6 = low
- 7 – 9 = moderate
- 10 – 13 = high
- 14-16 = very high

Based on the above score ranges, the overall visual resource value and sensitivity of most of the site, within the context of the surrounding study area, is rated as high (12).

5.3 VISUALLY SENSITIVE AREAS

Based on the above assessment, in principle and from a visual perspective the following areas should be avoided to the greatest extent possible when situating any of the project infrastructure, which includes the individual wind turbines, internal transmission lines, BESS, as well as temporary features such the concrete batching plant, construction camps, and laydown areas:

- Along the tops of ridges and outcrops, as this would fundamentally change their visual character
- Within delineated wetlands, as the loss of natural vegetation cover would detract from the visual resource value of the area.
- Within 500 m (or other distance specified by the avifauna specialist) of natural pans or the larger dams, as the presence of the turbines in close proximity to these features would detrimentally impact the sense of place surrounding these, and likely also deter birdlife from accessing these features.

Furthermore, where possible and within the constraints of safety and practical constraints, preference should be given to locating the project infrastructure in the vicinity of existing infrastructure, including near roads, powerlines, or within or along the edges of cropland.

6 VISUAL ABSORPTION CAPACITY

6.1 VISUAL ABSORPTION CAPACITY CRITERIA

Visual absorption capacity (VAC) can be defined as an “estimation of the capacity of the landscape to absorb development without creating a significant change in visual character or producing a reduction in scenic quality” (Oberholzer, 2008). The ability of a landscape to absorb development or additional human intervention is primarily determined by the nature and occurrence of vegetation cover, topographical character, and human structures.

A further major factor is the degree of visual contrast between the proposed new project and the existing elements in the landscape. If, for example, a visually prominent industrial development already exists in an area, the capacity of that section of landscape to visually “absorb” additional industrial structures is higher than that of a similar section of landscape that is still in its natural state. VAC is therefore primarily a function of the existing land use and cover, in combination with the topographical ruggedness of the study area and immediate surroundings.

Based on the very limited degree of landscape transformation of the site within the study area, the gently rolling topography, and overall lack of distinctive features, vertical elements or landmarks, the VAC of the site is rated as low (Figure 6-1).



Figure 6-1 - The entire site is characterised by low overall degree of visual absorption capacity

6.2 VISUAL ABSORPTION CAPACITY WEIGHTING FACTOR

To account for the fact that visual impacts are expected to be more intrusive in landscapes with a lower VAC than in those with a higher VAC (regardless of the visual quality of the landscape), a weighting factor is incorporated into the impact magnitude determination, as indicated in Table 6-1. A higher weighting factor is applied to areas with a low VAC to account for the increased visual impact.

Table 6-1 - VAC weighting factor table

| Visual resource value of receiving landscape | Low VAC | Medium VAC | High VAC |
|--|----------------|----------------|----------------|
| High/very high resource value | High (1.2) | High (1.2) | Moderate (1.0) |
| Medium resource value | High (1.2) | Moderate (1.0) | Low (0.8) |
| Low visual resource value | Moderate (1.0) | Low (0.8) | Low (0.8) |

The visual resource value of the study area has been determined to be high (refer to section 5), while the VAC of the study area has been rated as low (see above). Hence, a high (1.2) weighting factor in terms of VAC is applied during the impact assessment.

7 VISUAL RECEPTORS

7.1 RECEPTOR GROUPS

Visual impact is primarily concerned with human interest. Potential viewers, or visual receptors, thus constitute people that might see and be affected by the proposed development. Receptor sensitivity refers to the degree to which an activity is expected to impact receptors, and depends on:

- the various groups of people (visual receptor groups) that occur within the project study area
- how many people will see and be impacted by the project
- how frequently they are expected to be exposed to the project
- their perceptions regarding the aesthetics of the existing visual context

Visual receptors of the proposed project can be broadly categorised into two main groups, namely:

- people who live or work in the area, and who will be continuously or frequently exposed to the project components (resident receptors)
- people who travel through the area and are only temporarily exposed to the project components (transient receptors)

Receptors in the study area potentially include the following groups:

- residents of the various farmsteads and smallholdings on or within viewing distance of the site, and workers at these establishments (resident receptors)
- people working at the various mines that occur east of the site, and other agricultural and commercial establishments surrounding the site (resident receptors)
- residents of and visitors to the towns and associated settlements potentially within sight of the site (resident and transient receptors)
- other travellers along the various national and regional roads, and other asphalt and gravel roads surrounding the site (transient receptors)

The degree to which these receptors will be impacted by the project will be dependent on the level of visibility of the project components within the project study area, which will be further assessed during the impact assessment phase.

7.2 RECEPTOR SENSITIVITY

The visual receptor sensitivity and incidence can be classified as high, moderate, or low, as indicated in Table 7-1.

Table 7-1 - Visual receptor sensitivity criteria

| Number of people that will see the project (incidence factor) | |
|---|--|
| Large | Towns and cities, along major national roads (e.g. thousands of people) |
| Moderate | Villages, typically less than 1 000 people |
| Small | Less than 100 people (e.g. a few households) |
| Receptor perceived landscape value (sensitivity factor) | |
| High | People attach a high value to aesthetics, such as in or around a game reserve or conservation area, and the project is perceived to impact significantly on this value of the landscape. |
| Moderate | People attach a moderate value to aesthetics, such as smaller towns, where natural character is still plentiful and in close range of residency. |
| Low | People attach a low value to aesthetics, when compared to employment opportunities, for instance. Environments have already been transformed, such as cities and towns. |

The following ratings have been applied to the identified visual receptor groups:

- Resident receptors: Resident receptors comprise at least a moderate to possibly large number of people (incidence factor) living and/or working in the study area. We advance that considering the low existing levels of development associated with the rural setting, a notable contingent of this receptor group will probably attach a high value (vulnerability factor) to the visual appearance of the project site.
- Transient receptors: People travelling through the study area will include residents, itinerant workers, regional tourists, and people on route to towns in the area, or destinations elsewhere. Given the proximity of numerous towns and the fact that the site is bordered by the N11 it is likely that many people (incidence factor) see the site on a frequent basis. It can be assumed that different people within this receptor group will have widely divergent views on the value of the site and surroundings as a visual resource, which will largely be determined by their relation to the area. To account for this degree of variability, it is assumed that this group on a whole will on average attach at least a moderate degree of value to the proposed project site (vulnerability factor).

Based on the above, a comparatively large number of people (incidence factor) are expected to be visually affected by the project, and that the perceived landscape value (vulnerability factor) is expected to vary from moderate to high, depending on the relationship of the individual receptor with the area.

7.3 RECEPTOR SENSITIVITY WEIGHTING FACTOR

To determine the magnitude of a visual impact, a weighting factor that accounts for receptor sensitivity is determined (Table 7-2), based on the number of people that are likely to be exposed to a visual impact (incidence factor) and their expected perception of the value of the visual landscape and project impact (vulnerability factor).

Table 7-2 - Receptor sensitivity criteria weighting factor

| Receptor perceived landscape value (vulnerability factor) | Number of people that will see the project (incidence factor) | | |
|---|---|----------------|----------------|
| | Large | Moderate | Small |
| High | High (1.2) | High (1.2) | Moderate (1.0) |
| Moderate | High (1.2) | Moderate (1.0) | Low (0.8) |
| Low | Moderate (1.0) | Low (0.8) | Low (0.8) |

Based on the receptor sensitivity assessment and the above criteria, a high weighting factor (1.2) in terms of this aspect was applied during the impact magnitude determination.

8 PROJECT ALTERNATIVES

The proposed layout for the PEO WEF has been informed by and refined in response to site sensitivity inputs from the various specialists, for assessment in the EIA Phase. However, in principle, from a visual perspective the preferred layout for the PEO WEF would be one where the turbines are (to the extent possible) clustered in the vicinity of existing linear infrastructure, including power lines and roads, and other vertical elements such as radio masts and telecommunication towers, as well as near cropland, noting that irrigation pivot points will be avoided. Locating individual turbines within delineated wetland areas or within proximity of any of the larger water bodies or on top of prominent ridges could in principle result in a greater degree of visual intrusion. However, given the mostly rolling topography and open, long-range vistas that exist across the site from most vantage points, the specific locations of individual turbines will likely be of lesser consequence, than the number of turbines that will be erected.

The alternative of utilising ready-mix concrete trucks instead of the temporary cement batching plant would be favoured, as the batching plant would for the duration of its presence negatively impact the visual character of the area in which it is located. Furthermore, it is reasonable to assume that the appearance of the area in which the plant is located would be permanently altered to some degree despite the implementation of rehabilitation measures.

From a visual perspective, the “no-go” alternative, i.e. whereby the PEO WEF will not be developed, would in principle be favoured, as this would mean that none of the visually detrimental elements would be introduced into the landscape and thereby retaining the existing visual resource value of the project site. However, the significance of the site as a visual asset needs to be weighed against other socio-economic considerations, such as the current and future energy requirements of the



nation, to determine whether the proposed project should be supported. Furthermore, several other similar projects are also planned and, in some instances, already approved for development in the region, which means that the visual character of the area will be changing significantly in the near future. This aspect is further assessed in Section 11.

9 IMPACT ASSESSMENT

9.1 IMPACT IDENTIFICATION

The following potential visual impacts that may occur during the construction, operational and decommissioning/closure phases of the project were identified. The expected visual impacts of the construction and decommissioning phases are assessed together, as they will largely be the same, albeit with the latter essentially occurring in reverse:

9.1.1 CONSTRUCTION AND DECOMMISSIONING PHASE IMPACTS

- Presence of visually intrusive construction/decommissioning related activities and equipment in the landscape.
- Airborne dust due to construction/decommissioning activities and resultant dust settling onto surrounding landscape.

9.1.2 OPERATIONAL PHASE IMPACTS

- Reduction in visual resource value due to the presence of visually intrusive wind turbines and other project infrastructure in the landscape. Figure 9-1 provides an indication of the appearance of typical wind turbines in a hilly rural landscape setting.
- Shadow flicker nuisance from spinning turbine blades.
- Flicker nuisance from spinning blades if one or more are painted to mitigate avifaunal impacts.
- Light pollution at night due to safety lighting on top of turbines, and security lighting.



Figure 9-1 - Example of a typical wind farm in a rural setting (Wikipedia, 2023)

9.2 IMPACT MAGNITUDE CRITERIA

The magnitude of a visual impact was determined in the impact assessment phase by considering the visual resource value and VAC of the landscape in which the project will take place, and the receptors potentially affected by it, together with the level of visibility of the project components, their degree of visual intrusion and the potential visual exposure of receptors to the project, as further elaborated on below:

9.2.1 THEORETICAL VISIBILITY

The level of theoretical visibility (LTV) is defined as the sections of the study area from which the proposed project infrastructure may be visible and will be performed during impact assessment. This was determined to inform the impact assessment phase by conducting a viewshed analysis and using Esri ArcGIS for Desktop software, 3D Analyst Extension (Geographic Information System software with three-dimensional topographical modelling capabilities).

The basis of a viewshed analysis is a Digital Elevation Model (DEM). The DEM for this viewshed analysis was derived from contour sets for the site, as well as national 5 m contour lines. A 10 km study area surrounding the site was used for the analysis. The viewshed was developed for the proposed turbines assuming a “worst-case” scenario height of 300 m, which accounts for the up to 200 m tower height, and up to 100 m blade length. The viewshed analysis was cumulatively generated from all turbines, as per the locations indicated by the current version of the project layout.

Artificial landforms and structures, such as berms, stockpiles, buildings, and indeed tall vegetation (particularly alien tree windrows and plantations) are not reflected in the DEM. However, given the largely uniform, low vegetation height and the limited development within study area and the great



height of the turbines, the influence of these factors on the results of the viewshed analysis are negligible. The results of the wind turbines viewshed analysis are presented by Figure 9-2.

The LTV based on the results of the viewshed analysis were then rated according to Table 9-1.

Table 9-1 - Level of visibility rating

| Level of theoretical visibility of project element | Visibility rating |
|---|-------------------|
| Less than a quarter of the total project study area | Low (1) |
| Between a quarter and half of the study area | Moderate (2) |
| More than half of the study area | High (3) |

9.2.1.1 Construction, Operational and Decommissioning Phase Impacts

Based on the outcome of the viewshed analysis, which indicates that one or more turbines will be visible from the entire project study area, the LTV of all construction, operational, and decommissioning phase impacts is rated as high (3). The only exception in this regard is the degree to which shadow flicker from the spinning turbines will be visible. This phenomenon will only impact a fraction of the project site and immediate surroundings, and it is expected will only potentially impact a very small number of receptors for a very short combined period of time over the span of a year, and visibility of this impact is therefore rated as low (refer to Section 9.2.2.3 for more detail in this regard.)

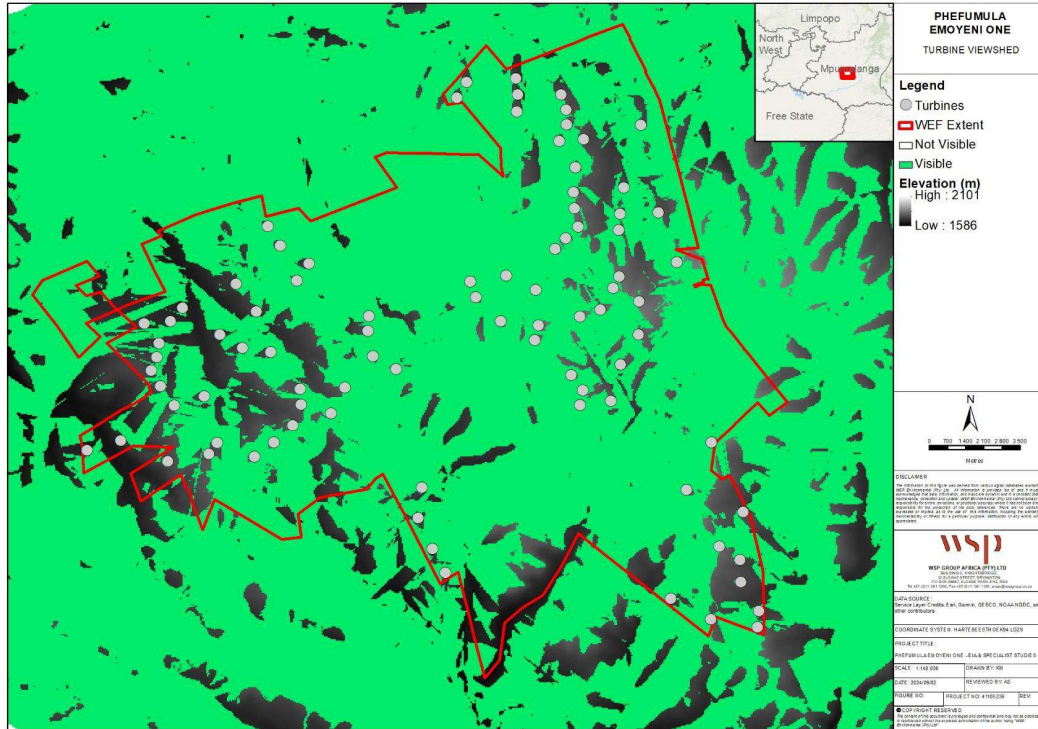


Figure 9-2 - Viewshed analysis of PEO WEF turbines

9.2.2 VISUAL INTRUSION

Visual intrusion deals with how well the project components fit into the ecological and cultural aesthetic of the landscape as a whole. An object will have a greater negative impact on scenes considered to have a high visual quality than on scenes of low quality because the most scenic areas have the "most to lose". The visual impact of a proposed landscape alteration also decreases as the complexity of the context within which it takes place, increases. If the existing visual context of the site is relatively simple and uniform any alterations or the addition of human-made elements tend to be very noticeable, whereas the same alterations in a visually complex and varied context do not attract as much attention. Especially as distance increases, the object becomes less of a focal point because there is more visual distraction, and the observer's attention is diverted by the complexity of the scene (Hull and Bishop, 1998). The expected level of visual intrusion of each of the project components is further evaluated based on these factors below.

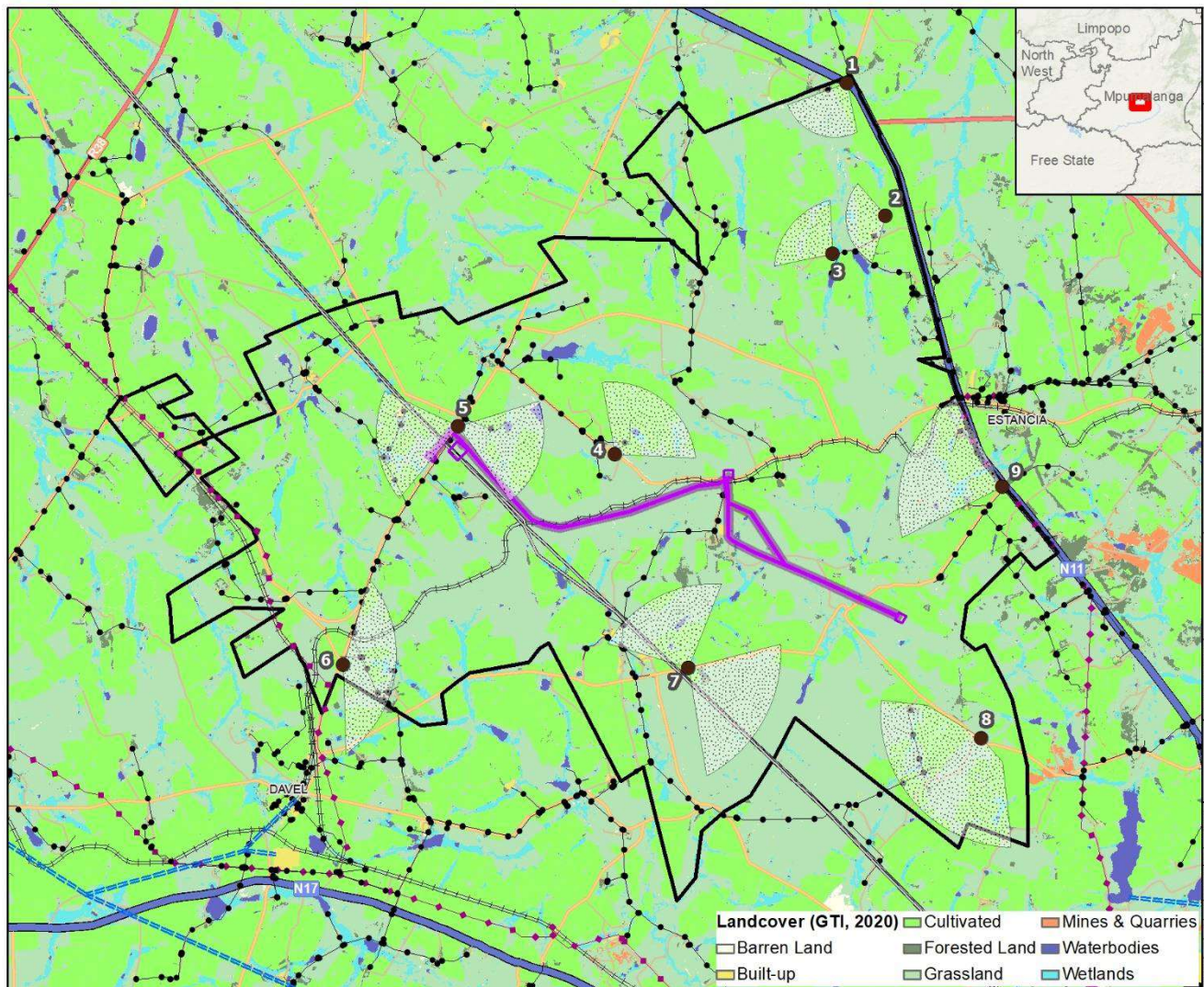
9.2.2.1 Construction and Decommissioning Phase Impacts

- Presence of visually intrusive construction/decommissioning related activities and equipment in the landscape – The construction site will contain various machinery, laydown areas with materials and equipment, movement of vehicles, and the increasing presence of the wind turbines and other infrastructure under construction will be characterised by a profusion of shapes, colours, and textures and a high level of activity. This will contrast dramatically with the rural setting which is visually largely homogenous and of a low VAC. The level of visual intrusion of this aspect of the construction and decommissioning phases is therefore rated as high (3).
- Airborne dust due to construction/decommissioning activities and resultant dust settling onto surrounding landscape – dust clouds can be particularly visible and intrusive impacts associated with construction activities, due to their vertical height and contrast with the surrounding sky. However, the proposed project will not involve extensive earthworks or result in large-scale denuded areas, and conversely therefore also not result in excessive dust fallout on surrounding areas. The level of visual intrusion from dust related impacts during construction and decommissioning is therefore expected to be low (1).

9.2.2.2 Operational Phase Impacts

- Reduction in visual resource value due to the presence of visually intrusive wind turbines, and other project infrastructure in the landscape – once operational, the facility will consist of a vast field of very tall wind turbines that would form the most visually prominent elements in the landscape. The geometric shapes and light colour of the individual towers and blades will contrast with the largely undeveloped surrounding rural context. The level of visual intrusion of the turbine towers and other infrastructure during operations is therefore expected to be high (3). Figure 9-3 to Figure 9-6 depict an artist's illustrations of what typical wind turbines like those of the proposed PEO WEF project could look like in the existing landscape, when viewed from

various vantage locations (refer to



- Figure 4-17). Note that these illustrations were generated during the project Scoping Phase based on an earlier version of the project layout. However, the illustrations are meant to depict the general appearance of the wind turbines within the existing visual landscape, to qualitatively assess the expected degree of visual intrusion. Given the rolling topography and high level of visibility throughout the study area, it is not expected that varying the locations of individual turbines within this context would significantly change the overall degree of visual intrusion that will be caused by their inclusion in the landscape.
- Flicker of the shadows cast by the spinning turbines impacting on resident receptors. This impact is further assessed in Section 9.2.2.3 below and based on the outcome is rated as being of low (1) visual intrusion.
- Flicker disturbance caused by the spinning of one of the blades of each turbine potentially being painted to reduce avifauna impacts. The visual intrusiveness of this aspect (if the blade/s were to be painted) is expected to be somewhat more prominent than that of shadow flicker, as the painted blades would be visible from most vantage points and will occur in a fixed location, whereas shadow flicker is “transient” to a given location. For this reason, visual disturbance from painted blades is rated as being moderate (2).

- Light pollution at night due to security lighting – the impact of night-time illumination can be particularly egregious, specifically in areas with low existing levels of existing point-source (direct and to a lesser extent ambient (indirect, reflected) light levels. The intensity of the impact of light at night is a further function of the brightness, direction, elevation, occurrence (flickering vs. constant) and colour of the light. The proposed project is in a low-development area, with relatively limited existing direct light sources, and ambient light expected mainly from the southeast from the town of Ermelo. While the overall level of lighting is expected to be low when compared to more intensive industrial developments and urban areas and will largely be limited to aviation safety lights and perimeter security, the great height of the turbines mean that the safety lights will be highly visible. For this reason, the visual intrusion of night-time light is expected to be moderate (2).

9.2.2.3 Shadow flicker

Currently no shadow-flicker specific legislation or formal policy guidance exists for South Africa. However, guidance presented by the Best Practice Guidance to Northern Ireland Planning Policy Statement 18 ‘Renewable Energy’ (Environment, 2009) state that:

“Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as ‘shadow flicker’. It only occurs inside buildings where the flicker appears through a narrow window opening. A single window in a single building is likely to be affected for a few minutes at certain times of the day during short periods of the year. The likelihood of this occurring and the duration of such an effect depends upon:

- *the direction of the residence relative to the turbine(s);*
- *the distance from the turbine(s);*
- *the turbine hub-height and rotor diameter;*
- *the time of year;*
- *the proportion of day-light hours in which the turbines operate;*
- *the frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon); and*
- *the prevailing wind direction.”*

“Problems caused by shadow flicker are rare. At distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the site. Where shadow flicker could be a problem, developers should provide calculations to quantify the effect and where appropriate take measures to prevent or ameliorate the potential effect, such as by turning off a particular turbine at certain times.

Careful site selection, design and planning, and good use of relevant software, can help avoid the possibility of shadow flicker in the first instance. It is recommended that shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day”.

“Only properties within 130 degrees either side of [south], relative to the turbines can be affected at these latitudes in the UK – turbines do not cast long shadows on their [northern] side.”

An assessment of the current project layout indicates that only one of the proposed turbines (# 88) will be located within 500 m of any existing built structures, with a cluster of farm buildings situated



approximately 350 m to the southwest of the proposed location of this turbine. Another small cluster of farm buildings are also located approximately 530 m south of a second turbine (# 12).

Given the very small number of farmsteads and other buildings within the site boundary, only a few other turbines will be in relatively proximity to any buildings, i.e.:

- Turbine # 68 – farmstead buildings located approx. 980 m to the south
- Turbine # 81 - farmstead buildings located approx. 1 000 m to the west
- Turbine # 74 - farmstead buildings located approx. 1 050 m to the south-southwest
- Turbine # 80 - farmstead buildings located approx. 1 150 m to east-southeast

It must be noted that not all structures mentioned above are necessarily permanently occupied buildings and, in some instances, constitute sheds, storage or other similar buildings. In most instances, the buildings are also at least partially surrounded by tree screens or clusters, which already shade these structures for a considerable portion of the day and/or would also partially obstruct the turbines from direct line of sight, and the shadow of the turbine.

Given the above factors, the expected level of visual intrusion (or nuisance) that will be caused by shadow flicker is expected to be low (1).



Figure 9-3 - Artist's impression of turbines as seen from photo position 1 along the N11



Figure 9-4 - Artist's impression of turbines as seen from photo position 2



Figure 9-5 - Artist's impression of turbines as seen from photo position 4



Figure 9-6 - Artist's impression of turbines as seen from photo position 7 (looking east)

9.2.3 VISUAL EXPOSURE

The visual impact of a development diminishes at an exponential rate as the distance between the observer and the object increases – refer to Figure 9-7. Relative humidity and fog in the area directly influence the effect. Increased humidity causes the air to appear greyer, diminishing detail. Thus, the impact at 1 000 m would be 25% of the impact as viewed from 500 m. At 2 000 m it would be 10% of the impact at 500 m. The inverse relationship of distance and visual impact is well recognised in visual analysis literature (Hull and Bishop, 1998) and was used as important criteria for this study.

Thus, visual exposure is an expression of how close receptors are expected to get to the proposed interventions on a regular basis. For the purposes of this assessment, close range views (equating to a high level of visual exposure) are views over a distance of 500 m or less, medium-range views (equating to a moderate/medium level of visual exposure) are views of 500 m to 2 km, and long-range views are over distances greater than 2 km (low levels of visual exposure).

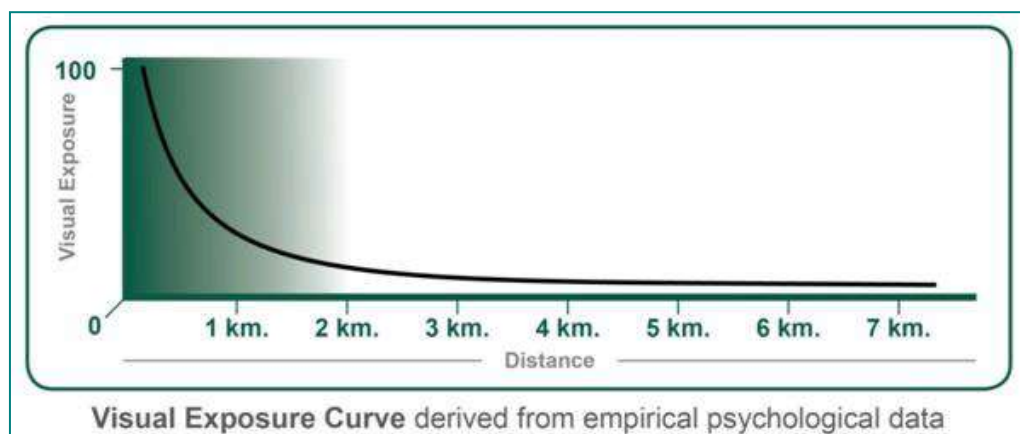


Figure 9-7 - Visual exposure graph

The level of visual exposure of the turbines and other infrastructure was evaluated within this context for the respective project phases.

9.2.3.1 Construction, Operational and Decommissioning Phase Impacts

- All identified impacts: the distance between individual wind turbines and individual receptors and the resultant degree of visual exposure will vary considerably, as a function of relative location of each within the study area. However, at their closest several wind turbines will be located between 500 m and 2 km of both the N11 highway and various public gravel roads and isolated resident receptors, and the level visual exposure is therefore rated as moderate (2).

9.3 IMPACT MAGNITUDE METHODOLOGY

The expected impact magnitude of the proposed project was rated, based on the above assessment of the visual resource value of the site, as well as level of visibility, visual intrusion, visual exposure and receptor sensitivity as visual impact criteria. The process is summarised below:

$$\text{Magnitude} = [(\text{Visual quality of the site} \times \text{VAC factor}) \times (\text{Visibility} + \text{Visual Intrusion} + \text{Visual Exposure})] \times \text{Receptor sensitivity factor}.$$



Thus: $[(1 \times \text{Factor } 1.0) \times (1 + 1 + 1)] \times \text{Factor } 1 = 3.$

From the above equation the maximum magnitude point (MP) score is 51.8 points. The possible range of MP scores is then categorised in terms of magnitude rating as indicated in Table 9-2.

Table 9-2 - Impact magnitude points score range and magnitude rating

| MP score | Magnitude rating |
|-------------|--|
| >34.5 | Very High: Permanent cessation of processes |
| 26 - 34.5 | High: Processes temporarily cease |
| 17.5 – 25.9 | Medium: Processes continue but in a modified way |
| 9 – 17.4 | Low: Slight impact on processes |
| <8.9 | Very low: No impact on processes |

9.4 IMPACT MAGNITUDE DETERMINATION

Based on the visual resource, VAC, receptor sensitivity and impact assessment criteria assessed in the preceding sections, the magnitude of the various impacts identified was determined for each phase of the project. Consequently, the impact magnitude determination for the construction and operational phases and for the closure phase is presented in Table 9-3.



Table 9-3 - Determination of impact magnitude

| Visual impact | Study area visual resource value | VAC weighting factor | Level of visibility | Visual intrusion | Visual exposure | Receptor sensitivity factor | Total impact magnitude points | Impact magnitude rating |
|--|--|-------------------------|---------------------|------------------|-----------------|--------------------------------|-------------------------------------|----------------------------|
| Construction and decommissioning phases impacts | | | | | | | | |
| Presence of visually intrusive construction/decommissioning related activities and equipment in the landscape | 3 | 1.2 | 3 | 3 | 2 | 1.2 | 34.56 | Very high (5) |
| Airborne dust due to construction/decommissioning activities and resultant dust settling onto surrounding landscape | 3 | 1.2 | 3 | 1 | 2 | 1.2 | 25.92 | Medium (3) |
| Operational phase impacts | | | | | | | | |
| Reduction in visual resource value due presence of visually intrusive infrastructure in the landscape | 3 | 1.2 | 3 | 3 | 2 | 1.2 | 34.56 | Very high (5) |
| Shadow flicker nuisance from spinning turbine blades | 3 | 1.2 | 1 | 1 | 2 | 1.2 | 17.28 | Low (2) |
| Flicker nuisance from spinning blades if one or more are painted to mitigate avifaunal impacts | 3 | 1.2 | 3 | 2 | 2 | 1.2 | 30.24 | High (4) |
| Light pollution at night due to security lighting | 3 | 1.2 | 3 | 2 | 2 | 1.2 | 30.24 | High (4) |
| Where for: visual resource value very high=4, high=3; moderate=2; low=1; visibility, visual intrusion, and visual exposure: high=3; moderate=2; low=1; VAC and receptor sensitivity: high = factor 1.2; moderate = factor 1; low = factor 0.8 | | | | | | | | |

9.5 IMPACT ASSESSMENT RATING METHODOLOGY

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts. Where possible, mitigation also seeks to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation, as relevant/feasible.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects were reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers the following impacts:

- direct - impacts that arise directly from activities that form an integral part of the Project
- indirect - impacts that arise indirectly from activities not explicitly forming part of the Project
- secondary - induced impacts caused by a change in the Project environment
- cumulative - impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria presented in Table 9-4. The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria presented in below:

Table 9-4 - Impact assessment criteria and scoring system

| CRITERIA | SCORE 1 | SCORE 2 | SCORE 3 | SCORE 4 | SCORE 5 |
|--|---|---------------------------------|--|-----------------------------------|---|
| Impact Magnitude (M) The degree of alteration of the affected environmental receptor | Very low: No impact on processes | Low: Slight impact on processes | Medium: Processes continue but in a modified way | High: Processes temporarily cease | Very High: Permanent cessation of processes |
| Impact Extent (E) The geographical extent of the impact on a given environmental receptor | Site: Site only | Local: Inside activity area | Regional: Outside activity area | National: National scope or level | International: Across borders or boundaries |
| Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change | Reversible: Recovery without rehabilitation | - | Recoverable: Recovery with rehabilitation | - | Irreversible: Not possible despite action |

| CRITERIA | SCORE 1 | SCORE 2 | SCORE 3 | SCORE 4 | SCORE 5 |
|--|---|-----------------------|-------------------------|-------------------------|-----------------------|
| Impact Duration (D) The length of permanence of the impact on the environmental receptor | Immediate: On impact | Short term: 0-5 years | Medium term: 5-15 years | Long term: Project life | Permanent: Indefinite |
| Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation | Improbable | Low Probability | Probable | Highly Probability | Definite |
| Significance (S) is determined by combining the above criteria in the following formula: | $[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$ | | | | |
| IMPACT SIGNIFICANCE RATING | | | | | |
| Total Score | 4 to 15 | 16 to 30 | 31 to 60 | 61 to 80 | 81 to 100 |
| Environmental Significance Rating (Negative (-)) | Very low | Low | Moderate | High | Very High |
| Environmental Significance Rating (Positive (+)) | Very low | Low | Moderate | High | Very High |

9.6 DETERMINATION OF IMPACT SIGNIFICANCE

An impact assessment of the screening level visual impacts identified has been conducted as summarised in Table 9-5. The impact significance without mitigation measures is re-assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified, noting that the feasibility of visual impact mitigation is limited. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during project implementation to verify that actual impacts are the same as those predicted in this report. Recommended mitigation measures are discussed in section 10.

- Magnitude: The individual impact magnitude scores and ratings are reflected in Table 9-3
- Extent: All visual impacts associated with all phases of the project are expected to be of regional scale (3), as the impact will extend beyond the site boundaries to the immediate surroundings, but will not extend or otherwise be significant on a larger (i.e. municipal, provincial) scale. The only exception here is shadow flicker, which will only be experienced at a highly localised scale (2)
- Reversibility:
 - Transient impacts such as airborne dust are considered reversible (1), as the visual impact ceases once the caused has ended
 - Construction-related impacts are recoverable (3), as most of the impacts associated with this phase will cease once construction has ended and will transform into operational phase



impacts once the infrastructure has been fully erected. The visual impacts of the construction phase can also be reduced through appropriate management and mitigation, albeit to a limited extent

- The operational phase visual impacts are largely irreversible (5), as they will continue to persist and remain unchanged for the entire duration of the operation phase, and limited to no mitigation (depending on the impact) is likely to be feasible. The exceptions here are in the cases of Shadow flicker nuisance from spinning blades, and light pollution at night due to turbine safety and project site security lighting, where a measure of operational and siting, and design mitigation respectively, may be possible (3)
- Duration:
 - Most construction and decommissioning phase impacts, the duration was assumed to be short-term (2), as a function of how long the construction and decommissioning phases respective are expected to last
 - However, the visual impact of airborne dust is immediate (1) as the impact ceases as soon as the dust plume has dissipated, and dust settled
 - Operational-phase impacts will be a function of the lifespan of the project, and have therefore been rated as long-term (4)
- Probability:
 - All direct visual impacts caused by the presence of the project infrastructure in the landscape, including the presence of construction machinery and activities, have been rated as definitely occurring (5), as these impacts are a given if the project is implemented
 - Indirect/associated impacts, such as airborne dust during construction/decommissioning, and glare during operations, are rated as having a high probability (4), as they can be reasonably expected to occur, but are not guaranteed. Further, shadow flicker nuisance from spinning blades is considered unlikely to occur or will at most be of very short duration and is therefore rated as having a low (2) probability, whereas flicker nuisance from painted spinning blades will only potentially occur when individual turbines are turning and is therefore rated as having moderate (3) probability

Table 9-5 – Impact assessment

| Impact number | Aspect | Description | Character | Ease of Mitigation | Pre-Mitigation | | | | | | | Post-Mitigation | | | | | | |
|----------------------------------|--|--|-----------|--------------------|----------------|----|----|-----|----|----|--------|-----------------|----|----|-----|----|----|--------|
| | | | | | (M+ | E+ | R+ | D)x | P= | S | Rating | (M+ | E+ | R+ | D)x | P= | S | Rating |
| CONSTRUCTION AND DECOMMISSIONING | | | | | | | | | | | | | | | | | | |
| Impact 1: | Airborne dust | Airborne dust due to construction/decommissioning activities and resultant dust settling onto surrounding landscape | Negative | moderate | 3 | 3 | 3 | 1 | 4 | 40 | N3 | 3 | 3 | 3 | 1 | 2 | 20 | N2 |
| Significance | | | | | N3 - Moderate | | | | | | | N2 - Low | | | | | | |
| Impact 2: | Construction activities | Presence of visually intrusive construction/decommissioning related activities and equipment in the landscape | Negative | low | 5 | 3 | 3 | 2 | 5 | 65 | N4 | 5 | 3 | 3 | 2 | 4 | 52 | N3 |
| Significance | | | | | N4 - High | | | | | | | N3 - Moderate | | | | | | |
| OPERATIONS | | | | | | | | | | | | | | | | | | |
| Impact 3: | Presence of turbines, other infrastructure | Reduction in visual resource value due to presence of visually intrusive wind turbines and other project infrastructure in the landscape | Negative | none | 5 | 3 | 5 | 4 | 5 | 85 | N5 | 5 | 3 | 5 | 4 | 5 | 85 | N5 |
| Significance | | | | | N5 - Very High | | | | | | | N5 - Very High | | | | | | |
| Impact 4: | Shadow flicker | Shadow flicker nuisance from spinning blades | Negative | moderate | 2 | 2 | 3 | 4 | 2 | 22 | N2 | 2 | 2 | 3 | 4 | 1 | 11 | N1 |
| Significance | | | | | N2 - Low | | | | | | | N1 - Very Low | | | | | | |
| Impact 5: | Blade flicker | Flicker nuisance from painted spinning blades | Negative | none | 4 | 3 | 5 | 4 | 3 | 48 | N3 | 4 | 3 | 5 | 4 | 3 | 48 | N3 |
| Significance | | | | | N3 - Moderate | | | | | | | N3 - Moderate | | | | | | |
| Impact 6: | Light pollution | Light pollution at night due to turbine safety and project site security lighting | Negative | low | 4 | 3 | 3 | 4 | 5 | 70 | N4 | 4 | 3 | 3 | 4 | 4 | 56 | N3 |
| Significance | | | | | N4 - High | | | | | | | N3 - Moderate | | | | | | |

10 RECOMMENDED MITIGATION MEASURES

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in Figure 10-1.

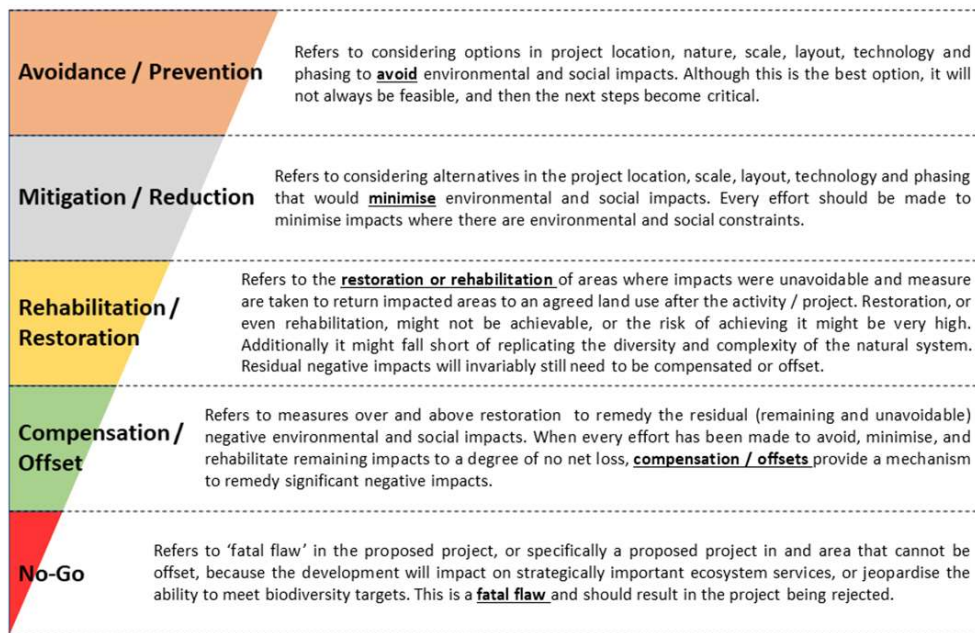


Figure 10-1 - Risk mitigation hierarchy

Where avoidance is not possible, visual mitigation for operational facilities can be approached in two ways, and usually a combination of the two methodologies is most effective. The first option is to implement measures that attempt to reduce the visibility of the sources of a visual impact. Thus, an attempt is made to "hide" the source of the visual impact from view, by placing visually appealing elements between the viewer and the source of the visual impact. The second option aims to minimise the degree or severity of the visual impact itself, and usually involves altering the source of the impact in such a way that it is smaller in physical extent and/or less intrusive in appearance.

In the case of the PEO WEF, visual mitigation options are very limited due to several factors, i.e.:

- The vast horizontal scale of the project infrastructure



- The requirement for unobstructed access to wind flow, and space constraint posed by the large blade diameter
- Technology and operational requirements and constraints

The proposed visual mitigation measures for the construction and decommissioning, and operational phases respectively, are presented in Table 10-1.

Table 10-1 - Recommended preliminary mitigation measures for visual impacts

| Component | Mitigation measures |
|--|---|
| Construction and decommissioning phases | |
| Airborne dust due to construction/decommissioning activities and resultant dust settling onto surrounding landscape | Dust control: <ul style="list-style-type: none"> ■ Water down construction roads and large bare areas as frequently as is required to minimise airborne dust ■ Enforce a 40 km/h speed limit on site for all vehicles ■ Monitor dust fallout if any complaints are received, using appropriate dust monitoring programme |
| Presence of visually intrusive construction/decommissioning related activities and equipment in the landscape | Site management: <ul style="list-style-type: none"> ■ Ensure all construction areas are appropriately maintained and kept in tidy order ■ Reduce the number and size of material laydown and waste storage areas to the extent feasible, and barricade these from view with shade netting/similar if needed ■ Remove accumulated waste material and unused equipment from site as frequently as is feasible ■ Repair unsightly and ecologically detrimental erosion damage to steep or bare slopes as soon as possible and re-vegetate these areas using a suitable mix of indigenous grass species |
| Operational phase | |
| Reduction in visual resource value due to presence of visually intrusive wind turbines and other project infrastructure in the landscape | <ul style="list-style-type: none"> ■ Employ micro-siting and orientation of turbines and other infrastructure to group with existing infrastructure and already disturbed areas |
| Shadow flicker from spinning blades | <ul style="list-style-type: none"> ■ Employ micro-siting and orientation adjustment of individual towers to ensure glare and flicker impacts to resident receptors (on-site and adjacent landowners) or transient receptors (roads bordering the site) are reduced ■ In the event that nuisance from shadow flicker is experienced by specific receptors, adjust operating times of individual turbines to not be active during timeslots that shadows are cast over affected buildings/locations |
| Light pollution at night due to turbine safety and project site security lighting | <ul style="list-style-type: none"> ■ Utilise security lighting that is movement activated rather than permanently switched on, to prevent unnecessary constant illumination ■ Plan the lighting requirements of the facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination ■ Reduce the height and angle of illumination from which lights are fixed as much possible while still maintaining the required levels of illumination |

| Component | Mitigation measures |
|-----------|--|
| | <ul style="list-style-type: none"> Identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow security surveillance Avoid up-lighting of structures by rather directing lighting downwards and focussed on the area to be illuminated Fit all security lighting with 'blinkers' or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Light fixtures of this description are commonly available for a variety of uses and should be used to the greatest extent possible |

11 CUMULATIVE IMPACT ASSESSMENT

A cumulative impact assessment is the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible (IFC GPH).

Sadler (1996) defines cumulative impacts as the “the net result of environmental impact from a number of projects and activities”. Further, cumulative in relation to an activity, means the “past, current, and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities” (2014 EIA Regulations, GNR 982).

Cumulative impacts with existing and planned facilities may occur during construction and operation of the proposed PEO WEF. While one project may not have a significant negative impact on sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts.

Therefore, several renewable energy developments within the surrounding area which have submitted applications for environmental authorisation (some of which have been approved and others now operational) have been considered. It is important to note that the existence of an approved EA does not directly equate to actual development of the project.

The existing surrounding projects of varying approval status are presented in Figure 11-1. The proposed PEO WEF is not located within one of the promulgated Renewable Energy Development Zones (REDZ).

The following renewable energy projects are located within a 55 km radius of the site, and have been considered in the cumulative impact assessment:

- The Halfgewonnen solar photovoltaic (PV) facilities on portions 7, 8, 9 and 16 of the farm Halfgewonnen 190 IS (DFFE Ref: 14/12/16/3/3/2/2068) located 19 km northeast of the site;
- The authorised Forzando North Coal Mine Solar PV Facility, 9.5 MW, (DFFE Ref: 14/12/16/3/3/1/452) is located 13 km northwest of the site;



- Eskom Arnot PV Facility at the Arnot Power Station on Remainder of Portion 24 of Reitkuil 491 JS near Middleburg in Mpumalanga (DFFE Ref: 14/12/16/3/3/2/760) is located 35 km north of the site;
- Proposed establishment of the Haverfontein wind energy facility near Carolina, Mpumalanga Province (DFFE Ref: 12/12/20/2018/AM2) is located 42 km Northwest of the site;
- Camden I Wind Energy Facility (WEF) (up to 200 MW) (subject to a Scoping and Environmental Impact Reporting (S&EIR) process) (DFFE Ref: 14/12/16/3/3/2/2137) located approximately 28 km southeast of the site;
- Camden I WEF Grid Connection (up to 132 kV) (DFFE Ref: 14/12/16/3/3/1/2769) located approximately 28 km southeast of the site;
- Camden Grid Connection and Collector substation (up to 400 kV) (DFFE Ref: 14/12/16/3/3/2/2134) located approximately 28 km southeast of the site;
- Camden I Solar (up to 100 MW) (DFFE Ref: 14/12/16/3/3/2/2136) located approximately 28 km southeast of the site;
- Camden I Solar Grid Connection (up to 132 kV) (DFFE Ref: 14/12/16/3/3/1/2768) located approximately 28 km southeast of the site;
- Camden II Wind Energy Facility (up to 200 MW) (DFFE Ref: 14/12/16/3/3/2/2135) located approximately 35 km southeast of the site;
- Camden II Wind Energy Facility up to 132 kV Grid Connection located approximately 35 km southeast of the site;
- Hendrina North WEF (up to 200 MW) (DFFE Ref: 14/12/16/3/3/2/2130) located approximately 16 km northwest of the site;
- Hendrina North Grid Infrastructure (up to 275 kV) (DFFE Ref: 14/12/16/3/3/2/2128) located approximately 16 km northwest of the site;
- Hendrina South WEF (up to 200 MW) (DFFE Ref: 14/12/16/3/3/2/2131) located approximately 16 km northwest of the site;
- Hendrina South Grid Infrastructure (up to 275 kV) (DFFE Ref: 14/12/16/3/3/2/2129) located approximately 16 km northwest of the site;
- Ummbila Emoyeni WEF (up to 900 MW) (DFFE Ref: 14/12/16/3/3/2/2160) located approximately 10 km southwest of the site;
- Ummbila Emoyeni Grid Connection (up to 400 kV) (DFFE Ref: 14/12/16/3/3/2/2162) located approximately 10 km southwest of the site; and
- Ummbila Emoyeni Solar Facility (up to 150 MW) (DFFE Ref: 14/12/16/3/3/2/2161) located approximately 17 km southwest of the site.

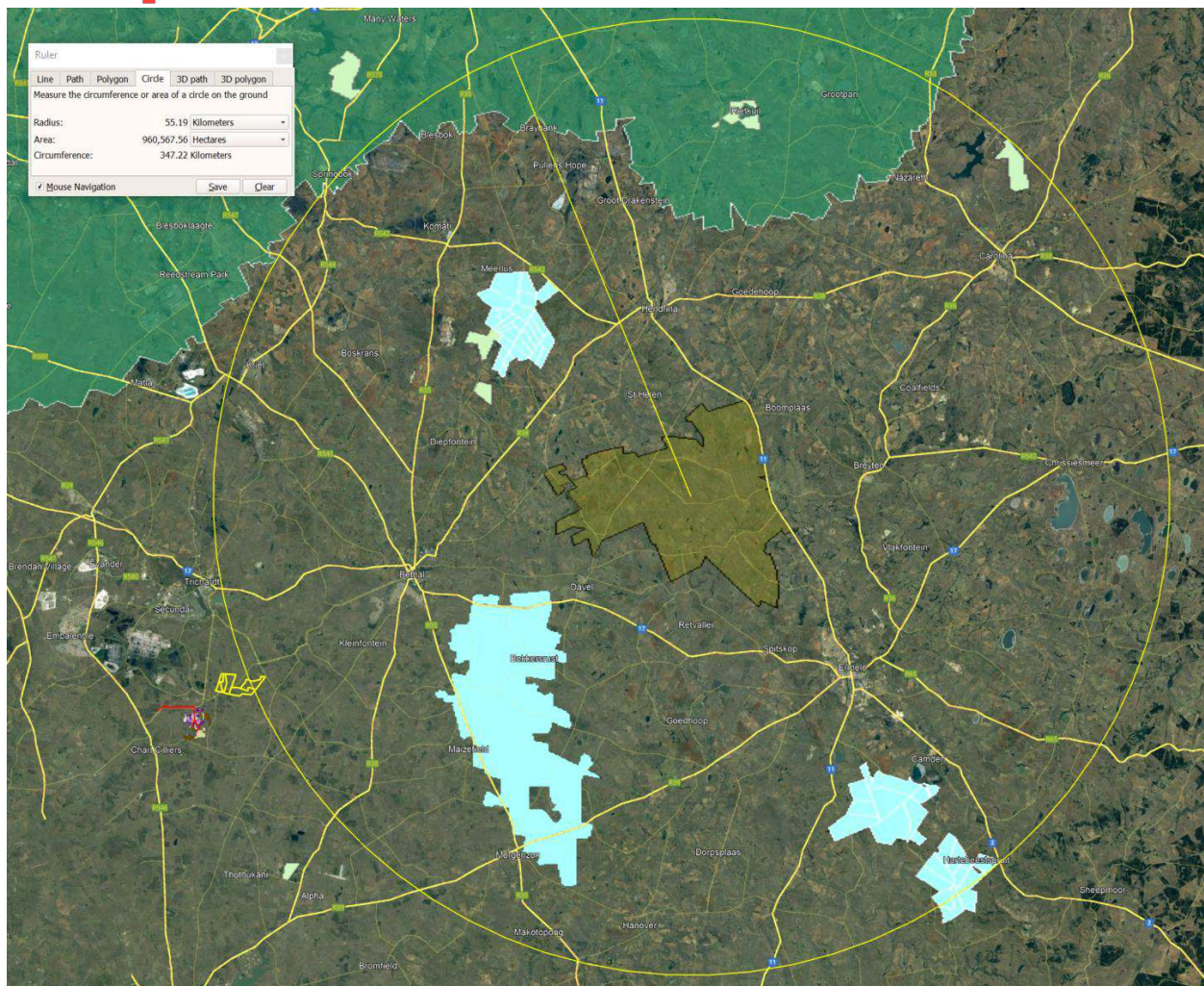


Figure 11-1 - Renewable Energy Projects within 55 km of the Phefumula Emoyeni One WEF

The region is predominantly an agricultural landscape, although several small to moderately sized towns occur within the cumulative impact assessment study area, which is also bordered by Secunda and lies just outside of the Sasol industrial complex to the west. Several small mines, various rural businesses and lodges, and farmsteads also occur in this study area.

The visual impact associated with the proposed PEO WEF project will therefore be the introduction of an additional expanse of visually intrusive renewable energy generation infrastructure into the visual landscape, thereby transforming a notable additional section of the mostly rural, agricultural study area towards energy generation. The cumulative effect together with that of the various other proposed renewable projects if developed, will be the further degradation and fragmentation of the existing rural character of the study area, which may act as catalyst for further similar development in the vicinity. The cumulative visual impact of the project is assessed below:

- **Magnitude:** Numerous other future projects of a similar nature may take place in the region, several of which could be within visible distance of the PEO WEF project. Only a relatively small percentage of the overall project footprint area will physically be transformed as part of the project, which in turn will encompass roughly 3.5% of the total 55 km radius cumulative impact assessment study area. However, from a visual perspective the development will be visible from



within a much larger percentage of the cumulative impact assessment study area, and the project viewshed may also partially overlap with that of other proposed WEFs. For these reasons, the magnitude of the cumulative visual impact of the project is estimated to be moderate (3)

- **Extent:** The cumulative visual impact will be of regional scale (3), as the impact will extend beyond the site boundaries to the regional surroundings, but is not expected to be significant on a larger (i.e. provincial) scale
- **Reversibility:** The visual impacts associated with the project once constructed will persist and remain unchanged for the entire duration of the operation phase, as will be the case with other projects of a similar nature if approved, and in most instances limited to no mitigation (depending on the impact) is likely to be feasible, and therefore deemed irreversible (5)
- **Duration:** As this is an operational-phase impact that will be present for the lifespan of the project, the duration has been rated as long-term (4)
- **Probability:** Given the proximity of several of the proposed other developments, the probability of a cumulative visual impact caused by the presence of the project infrastructure in the landscape has been rated as highly likely occurring (4)

Table 11-1 – Cumulative visual impacts

| Phase | Potential cumulative visual impacts | Visual significance | | | | | |
|-------------------|--|---------------------|---|---|---|---|---------------|
| | | M | E | R | D | P | S |
| Operational phase | Further degradation and fragmentation of the existing rural character of the study area through the introduction of an additional expanse of visually intrusive infrastructure into the landscape. | 3 | 3 | 5 | 4 | 4 | 60 (moderate) |

Based on the above assessment, the cumulative visual impact of the project is expected to be moderate.

12 CONCLUSIONS

The PEO WEF project site is located in a largely rural, agricultural setting, with large areas of farmland interspersed by several towns, roads and other linear infrastructure, and localised areas of mining development. Several larger towns are also located further away from the site, within the outer edges of the 10 km study area and beyond. As such, the potential visual receptor base to the proposed development is large and diverse.

Furthermore, the visual resource value of the site within the context of the surrounding study area is generally considered to be high, owing mainly to the low prevailing levels of development, topographical character, and presence of various water bodies, and therefore also has a low ability to absorb visual change.

The proposed project will have negative impacts on the visual environment, mainly due to the introduction of very tall, visible, and visually intrusive elements into the landscape, in the form of the



turbines, as well as other associated support infrastructure. The significance of these impacts is expected to be moderate to high in the context of the existing visual setting, and limited visual mitigation is generally feasible and mainly relevant to the construction and decommissioning phases, as proposed in section 10.

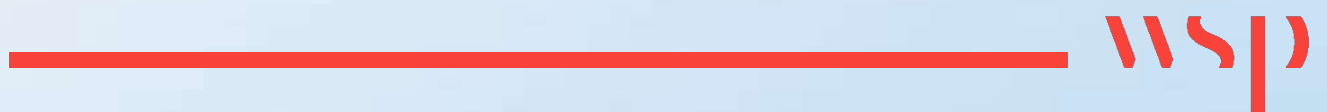
Several applications for similar projects have also already been lodged and in some instances approved in the area. A cumulative visual impact is therefore expected to occur if the project proceeds, and further similar development does take place in the greater region. However, although the project will result in a permanent negative visual impact for the lifespan of the WEF, the study area is not considered highly unique in terms of visual character. This impact also needs to be considered within the context of the country's worsening energy generation and supply outlook, and accordingly can be supported from a visual perspective.

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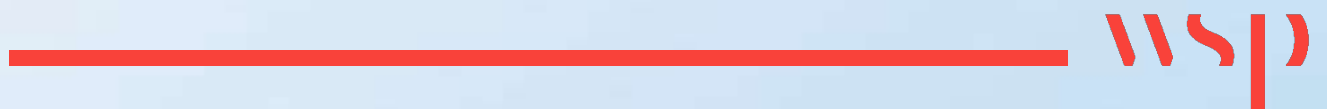
Appendix A

SPECIALIST'S CV



Appendix B

VISUAL AND FLICKER SITE SENSITIVITY VERIFICATION REPORT



Appendix C

DOCUMENT LIMITATIONS

