Appendix G.12

VISUAL IMPACT ASSESSMENT

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KROMHOF WIND ENERGY FACILITY

VISUAL IMPACT ASSESSMENT FOR THE PROPOSED KROMHOF FACILITY

IMPACT ASSESSMENT REPORT

41106427_REP_00003
JUNE 2025

CONFIDENTIAL

KROMHOF WIND ENERGY FACILITY

VISUAL IMPACT ASSESSMENT FOR THE PROPOSED KROMHOF FACILITY

IMPACT ASSESSMENT REPORT

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PROJECT NO. 41106427

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DATE: JUNE 2025

KROMHOF WIND ENERGY FACILITY

VISUAL IMPACT ASSESSMENT FOR THE PROPOSED KROMHOF FACILITY

IMPACT ASSESSMENT REPORT

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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
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 Verkykerskop Wind Energy Facility Markgraaff 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) has been appointed to undertake an Environmental Impact Assessment (EIA) to meet the requirements under the National Environmental Management Act (Act 107 of 1998) (NEMA), for the various applications associated with the proposed Verkykerskop Wind Energy Facility (WEF) Cluster located in the Free State Province. The appointment includes conducting a Visual Impact Assessment (VIA) for the proposed Kromhof WEF, 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
- Preliminary identification of:
  - potential visual receptors
  - screening of visual impacts for proposed project activities during the various project phases
  - recommended mitigation measures
- Proposed methodology for impact assessment

Note that this VIA is for the Kromhof WEF Project only, and that the associated 132 kV grid connection and transmission infrastructure are the subject of separate permitting process and therefore also the subjects of a separate VIA.

1.1 LOCATION OF THE PROJECT SITE

The proposed Kromhof WEF Project, as part of the Verkykerskop WEF Cluster, is located in the Thabo Mofutsanyane District Municipality and Phumelela Local Municipality, near the town of Harrismith, in the Free State Province of South Africa (**Figure 1-1**).

The details of the property associated with the proposed Kromhof Project, including the 21-digit Surveyor General (SG) codes for the cadastral land parcels are outlined in Table 1-1.

Table 1-1 – Farm Portions affected by the proposed Kromhof Project

Project	Farm Name	SG 21 code
Kromhof WEF	Remaining Extent of Farm Leiden No. 2	F01500000000000200000
	Remaining Extent of Farm Myn-Burg No. 3	F01500000000000300000
	Remaining Extent of Farm Naauw Kloof No. 4	F01500000000000400000
	Remaining Extent of Farm Krom Hof No. 530	F01500000000053000000
	Remaining Extent of Farm Puntje No. 1240	F01500000000124000000
	Remaining Extent of Farm Aanfield No. 253	F01500000000025300000
	Portion 1 of Farm Aanfield No. 253	F01500000000025300001

Project	Farm Name	SG 21 code
	Remaining Extent of Farm Ox Hoek No. 98	F01500000000009800000
	Portion 1 of Farm Ox Hoek No. 98	F01500000000009800001
	Portion 2 of Farm Ox Hoek No. 98	F01500000000009800002
	Portion 3 of Farm Ox Hoek No. 98	F01500000000009800003
	Remaining Extent of Farm Markgraaff's Rest No. 478	F01500000000047800000

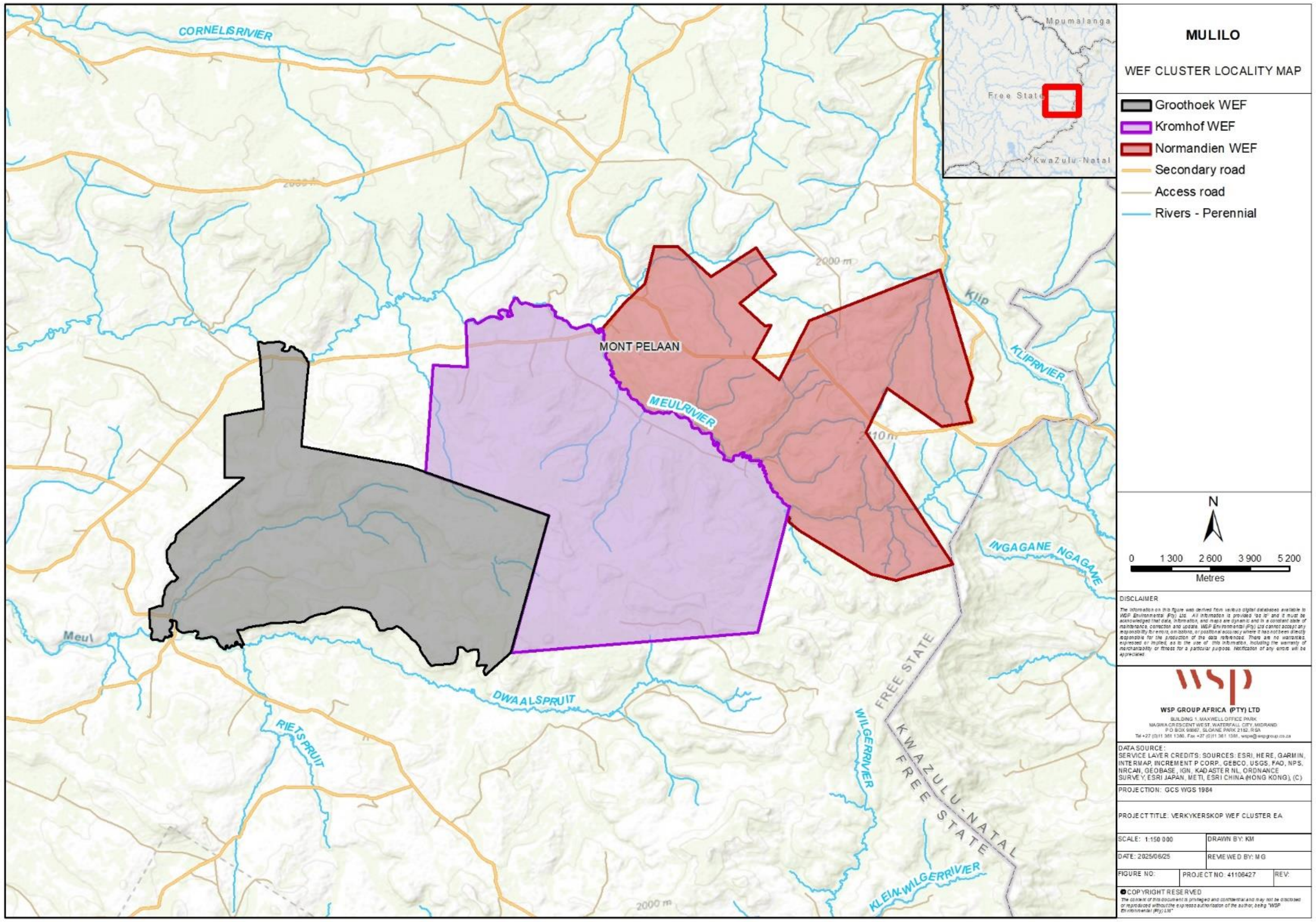

Figure 1-1 - Locality map of Kromhof Project as part of the Verkykerskop WEF Cluster

1.2 PROJECT DESCRIPTION

The proposed Kromhof WEF Project (Figure 1-2) will entail the development of up to 37 wind turbines within a total project area of approximately 7 296 ha, with a combined generation capacity of up to 300 MW. The project will furthermore entail the following development aspects, that are expected to impact the visual landscape:

- Turbines (Figure 1-3) with a hub height of 140 m (which may increase to 150 m) and rotor diameter of up to 200 m
- Hard standing areas of up to 0.8 ha per turbine
- Turbine foundations:
  - temporary excavation up to 4 m deep, constructed of reinforced concrete to support the mounting ring
  - once the tower is established, the foundation footprint is covered with soil
- Substation - 1 x 33 kV/132 kV onsite collector substation (IPP Portion), each being up to 2 ha
- Powerlines – 33 kV cabling to connect the wind turbines to the onsite collector substations, to be laid underground where practical
- Construction camp, site office and laydown area including:
  - Concrete batching plant of up to 1 ha
  - Site office of 4 ha
  - laydown area of 8 ha
- Internal roads of up to 8 m in width
- O&M office of up to 1 ha
- Battery energy storage system (BESS) (200 MW/800 MWh).
  - Pre-assembled solid-state batteries
  - export capacity of up to 800 MWh
  - total storage capacity 200 MW
  - storage capacity of up to 6-8 hours
  - The BESS will be housed in containers covering a total approximate footprint of up to 7 ha

The project will also include a main transmission substation, grid connection, and main grid lines and associated towers, however as mentioned these components will be the subject of a separate EA process.

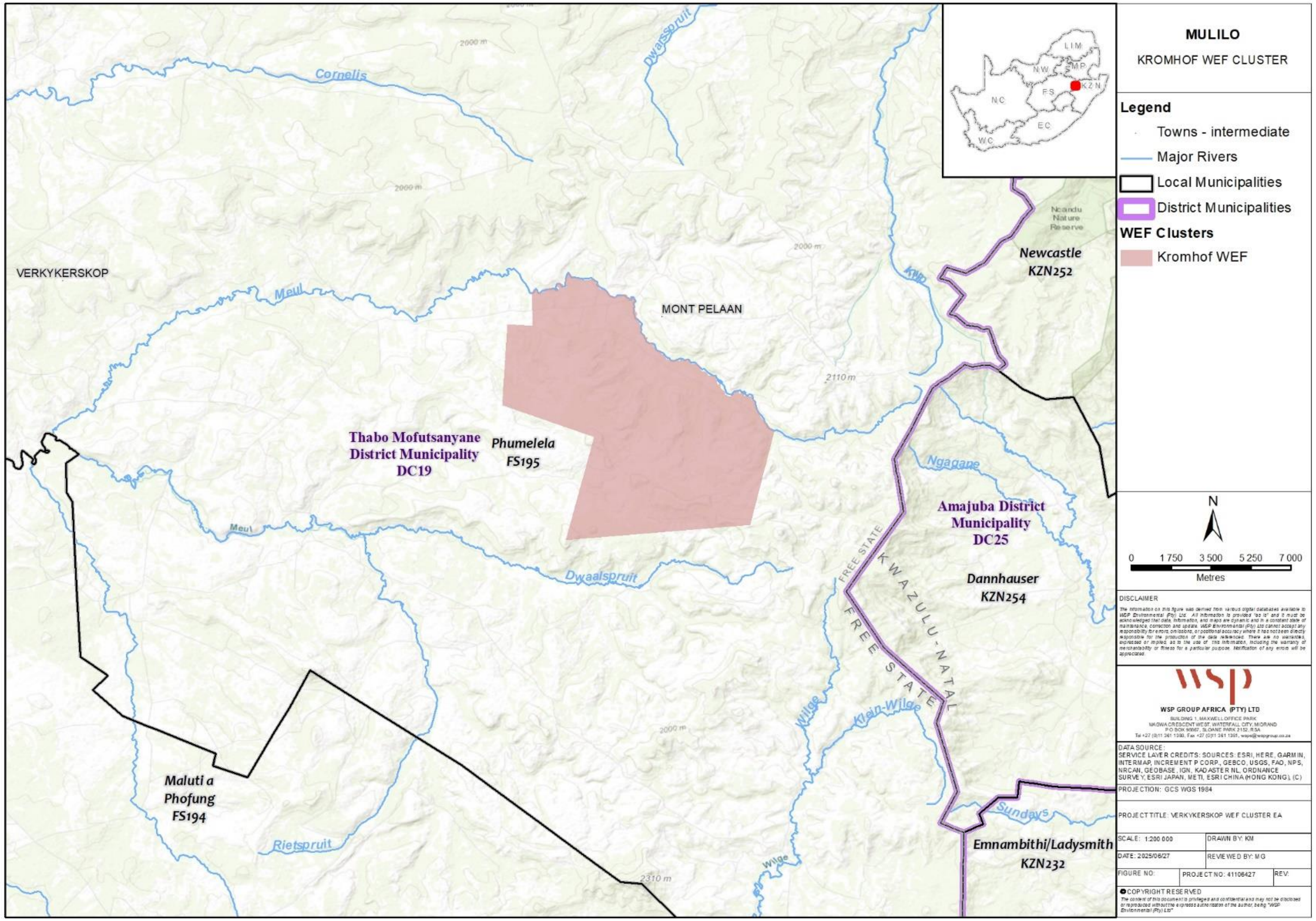

Figure 1-2 – Location map of the proposed Kromhof Project development area

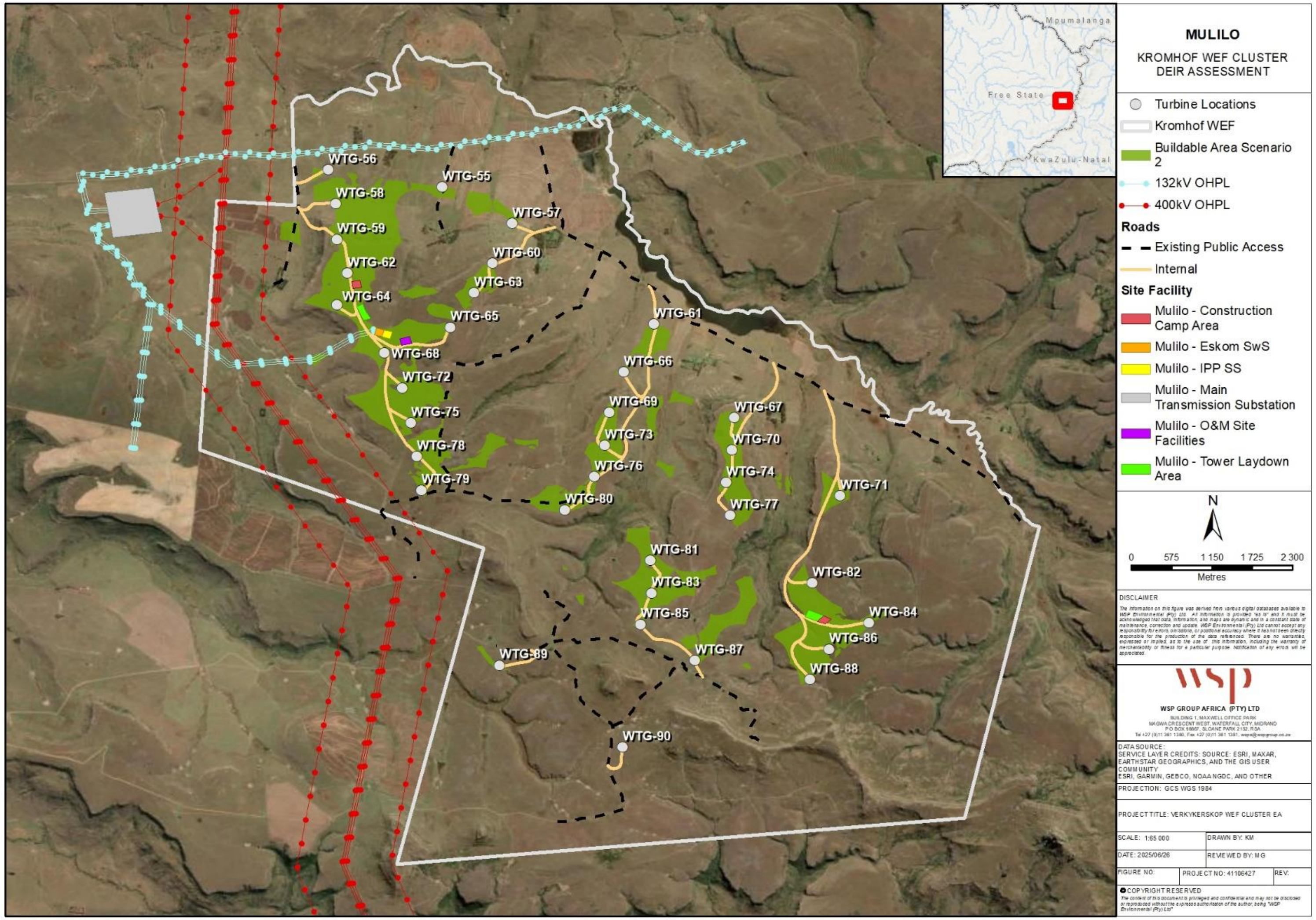

Figure 1-3 - Layout map of the Kromhof WEF

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. The visual impact identification is presented in Section 9.1 and further evaluated during the detailed impact assessment section of this report.

1.3 DELINEATION OF THE VISUAL STUDY AREA

The study area for the VIA comprises the spatial extent of the project footprint and related activities, as well as an associated buffer area.

A visual impact will be caused by all visible infrastructural components 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.

The study area was defined as a 10 km radius around the physical footprint of the proposed Kromhof WEF Project footprint.

- For the purposes of this VIA, the term ‘project site’ or ‘site’ refers to proposed Kromhof WEF Project footprint

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 (shown in Figure 1-4). Visual receptors occurring within the study area are also indicated, and further considered during the impact assessment process (refer to Section 7)

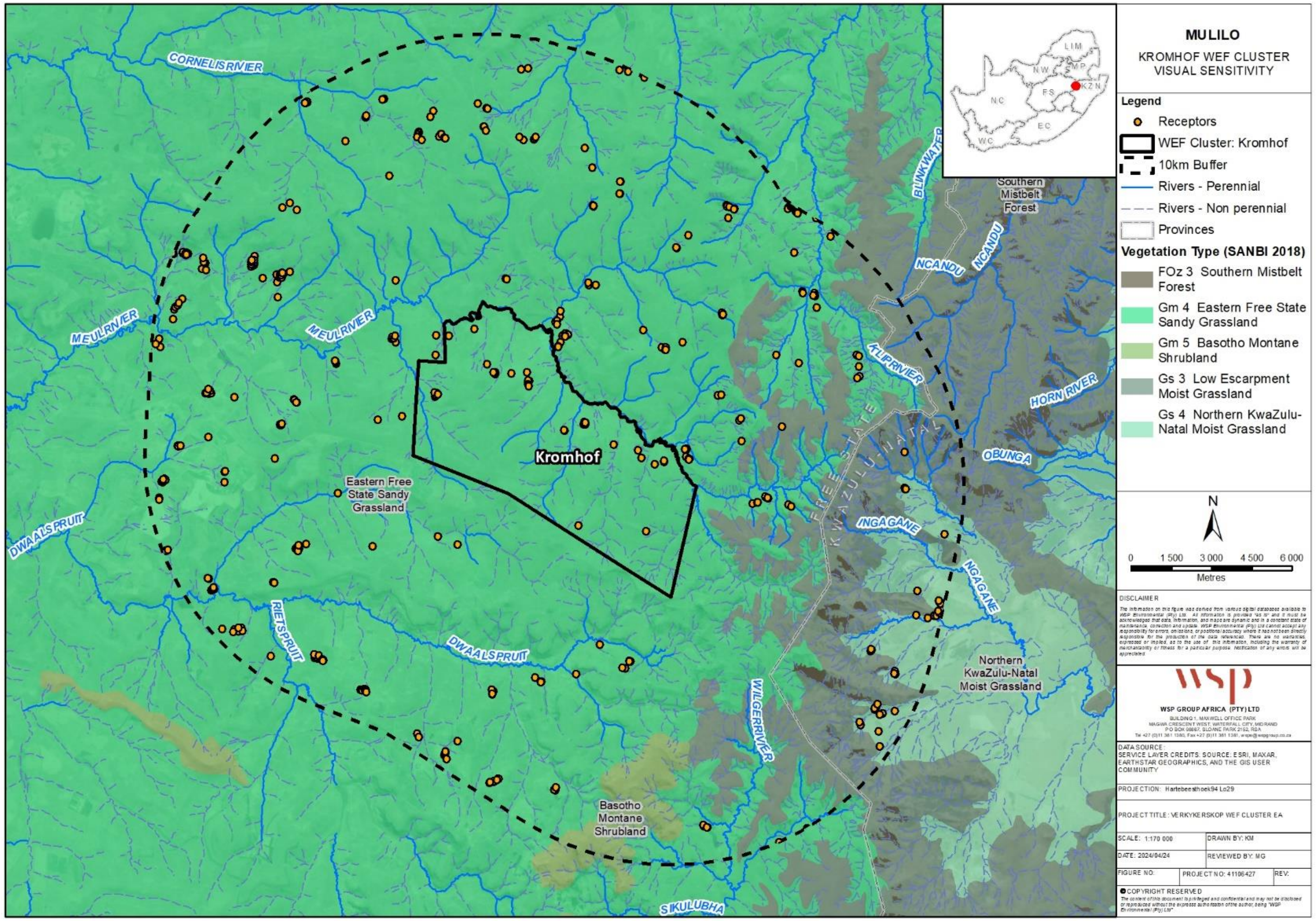

Figure 1-4 - The study area (10 km buffer around the Project site) and visual receptors for the Kromhof Project visual impact assessment

2 STUDY METHODOLOGY

2.1 VIA METHODOLOGY

The VIA specialist study is being conducted using the following methodology:

2.1.1 SCOPING PHASE:

- 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 15 March 2024 and further fieldwork conducted by other specialists
- 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 (refer to Section 5.1)
- 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
- Performing a preliminary cumulative impact assessment for the project in terms of the existing project study area

2.1.2 IMPACT ASSESSMENT PLAN OF STUDY:

- Evaluating different project alternatives in terms of their anticipated visual impact, as relevant
- 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:
  - Duration
  - Severity
  - Geographical extent
- Revising the preliminary cumulative impact assessment

- Based on the outcomes of the impact assessment, refining mitigation measures to reduce the potential negative visual impacts of the project, were 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). These are the only VIA guidelines that have been issued in South Africa. Additional guidance has also been taken from other reference works in the field of visual assessment, list in Section 12.

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 4.1 for a description of existing impacts on site, cumulative impacts are assessed in Section 9.7
(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 4.6 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 Section 9.2.1 for specialised process of viewshed analysis to follow during impact assessment
(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 and 6. Alternatives are described in Section 8

Report content requirement	Reference
(g) an identification of any areas to be avoided, including buffers;	Refer to Sections 5.1 and 5.4
(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 superimposed over the existing vegetation cover (Figure 1-3) and study area indicating visual receptors (Figure 1-4), as well as outcome of the viewshed analysis indicating affected receptors (Figure 9-2)
(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;	Findings regarding visual resource value, receptor sensitivity, identified impacts and mitigation are presented as elsewhere indicated in this table, and further evaluated during impact assessment in Section 9
(k) any mitigation measures for inclusion in the EMPr;	Refer to Section 9.7 for recommended mitigation measures
(l) any conditions for inclusion in the environmental authorisation;	Visual mitigation measures to be implemented as indicated in Section 10
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	None noted
(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 EMPr, and where applicable, the closure plan;	Refer to Section 10 for the proposed visual mitigation strategy and preliminary measures and Section 11 for the reasoned opinion statements
(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
(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 layout of individual project components, specifically the locations of individual wind turbines, O&M building, substation, BESS, and temporary batching plants may not be finalised yet, and the findings of this VIA are based on the available development description. Recommendations regarding the location of specific project infrastructure, including proposed mitigation measures as included in this report, may therefore need to be revised based on the final project infrastructure layout and/or designs
- Similarly, selection of specific technology 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 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

4 BASELINE VISUAL ENVIRONMENT

The visual baseline presented in this section is predicated on site observations, 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 respects 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.

4.1 GENERAL LANDSCAPE CHARACTERISTICS

The project site in the Free State Province is roughly 35 km southwest of Newcastle and 45 km northeast of Harrismith, almost adjacent to the border of KwaZulu-Natal, within the Grassland Biome. The region is largely rural and undeveloped in character, and land uses are primarily crop production, livestock farming and other agricultural uses, with vast areas still characterised by primary grassland and associated vegetation communities. Settlements most settlements in the region are small, with Newcastle, Harrismith and Ladysmith being the only notable exceptions.

The study area visual baseline is further described in the following subsections and illustrated by various maps and photos.

4.2 TOPOGRAPHY

The natural topography of much of the vicinity is characterised by expansive rolling plateaus, contrasted by distinct escarpments and low cliff faces and ridges, various wide and narrower valleys that have been carved by a comprehensive network of watercourses, and several isolated and more prominent outcrops form distinct visual landmarks.

The topography of the Kromhof WEF Project site (Figure 4-1) is visually characterised by the higher-lying plateau and protruding spurs in the southern and central parts of the site, respectively, from which several roughly north-draining tributaries flow into a lower-lying valley that make up the northern part of the site.

Additionally, one of the highest koppies in the area (with an elevation of approximately 2 080 m) is located along the southern site boundary. This feature is around 180 m to 200 m higher than the surrounding plateaus and forms the most prominent landmark within the site boundary area.

By contrast, the Kromhof WEF site elevation is at its lowest along the northernmost site boundary, which is formed by a tributary of the Wilge River, at around 1 740 m. The valley floors are between 80 m and 150 m lower than the surrounding plateaus, which are edged by steep and rocky cliffs.

Figure 4-1 – The site topography is characterised by expansive rolling plateaus, low cliff faces, outcrops, and valleys

4.3 HYDROLOGY (DRAINAGE FEATURES)

The Kromhof WEF is located within the Upper Wilge River Catchment Area, with the regional topography having been sculpted by a complex network of watercourses and generally draining towards the west and north.

One of the upper tributaries of the Wilge River forms the northern boundary of the Kromhof WEF Project site, while the associated broad and relatively wide valley makes up approximately a third of the norther part of the site. The stream itself is larger than those found in the surrounding areas, and the incised stream channel that meanders and curls through the deep valley also has several prominent horseshoe lakes associated with it.

Most hydrological features within the site boundaries tend to be partly obscured by rises in the elevation when viewed from some distance away, and over greater distances are often first identified by surrounding trees and denser vegetation, and the frequently eroded channel sides, rather than visible or standing water. During the rainy season, the larger watercourses and surrounding floodplains can become inundated which together with the few dams form larger visible bodies of open water (Figure 4-3). The smaller watercourses are less visible but provide visual variation and interest (Figure 4-4). By contrast, during the dry season some of the smaller watercourses are not particularly prominent, when open water is often limited to the broader, wider sections of the larger watercourses, and the few dams (Figure 4-6).

Figure 4-2 - During the rainy season, the larger floodplains and few dams form larger visible bodies of open water (Zinn, 2025)

Figure 4-3 - The smaller watercourses are less visible but provide visual variation and interest

Figure 4-4 - During the dry season open water is often limited to the broader, wider sections of the larger watercourses and dams

4.4 VEGETATION CHARACTERISTICS

Large parts of the greater region and Kromhof WEF Project site itself are still characterised by original primary grassland vegetation communities, which is visually punctuated by expansive stretches of often dense shrubland occurring along the steeper slopes and rocky areas, as well as bordering the smaller drainage channels in the narrower valleys. Isolated clumps of indigenous willow (*Salix mucronata*) and exotic willow (*Salix babylonica*) also form local focal points and add interest in short-range views. Markedly, there are almost no areas of typical alien tree species invasion (i.e. eucalyptus, wattle, or poplar) anywhere within the site boundary, with the only isolated exotic trees being those planted within the few farmsteads and other small building clusters scattered throughout the site.

There are limited areas of cropped farmland within the site, occurring mostly within the flatter valley area. The remainder of the site is covered by grassland, which from a distance blend into a mosaic patchwork of textures and different greens, browns, tans, and reds. The vegetation cover is also characterised by a marked change in appearance from summer to winter, as grasses change from green to brown and crop areas are planted and subsequently harvested (refer to Section 4.6). The predominant vegetation communities are illustrated by Figure 4-5.

Figure 4-5 - The site is mainly characterised by A) Wetland, B) Rocky Grassland, and C) Open Grassland (The Biodiversity Company, 2025)

4.5 LAND COVER AND LAND USES

The visual context of the project site is distinctly rural and is primarily untransformed and natural in character, and areas of development and active human use are limited. Importantly, none of the few manmade structures protrude above the very characteristic horizon and are therefore not visually dominant and blend into the surrounding landscape.

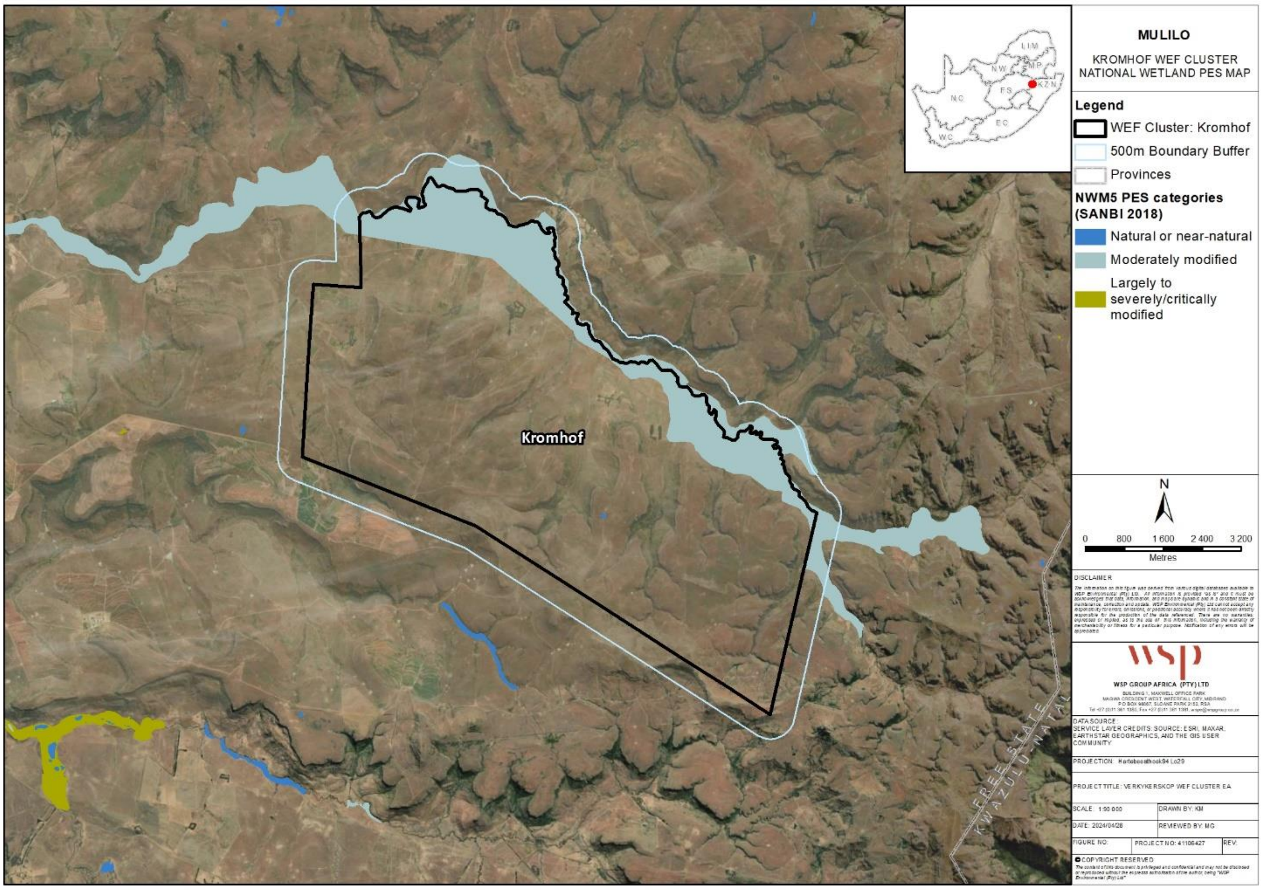

Figure 4-6 - Aerial photograph of the site and immediate surroundings, illustrating key visual character aspects

4.6 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, 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 is limited, but high humidity or smoke from fires often result in hazy atmospheric conditions. Fires can also significantly impact visual conditions, causing vast and highly visible smoke columns which greatly reduce visibility in short-range views.

In addition, seasonal changes greatly change the appearance of most landscapes, with the 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 4-7). 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 4-7 – 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

5 VISUAL RESOURCE VALUE OF THE STUDY AREA

5.1 ENVIRONMENTAL IMPACT ASSESSMENT SCREENING

The DFFE preliminary environmental impact assessment screening indicates that large parts of the Kromhof WEF study area are of very high or high visual resource value, and that the areas of least concern are located along the lower-lying valley (**Figure 5-1**). This information informed the visual resource value evaluation performed, following the observations made during site visit (Section 5.3).

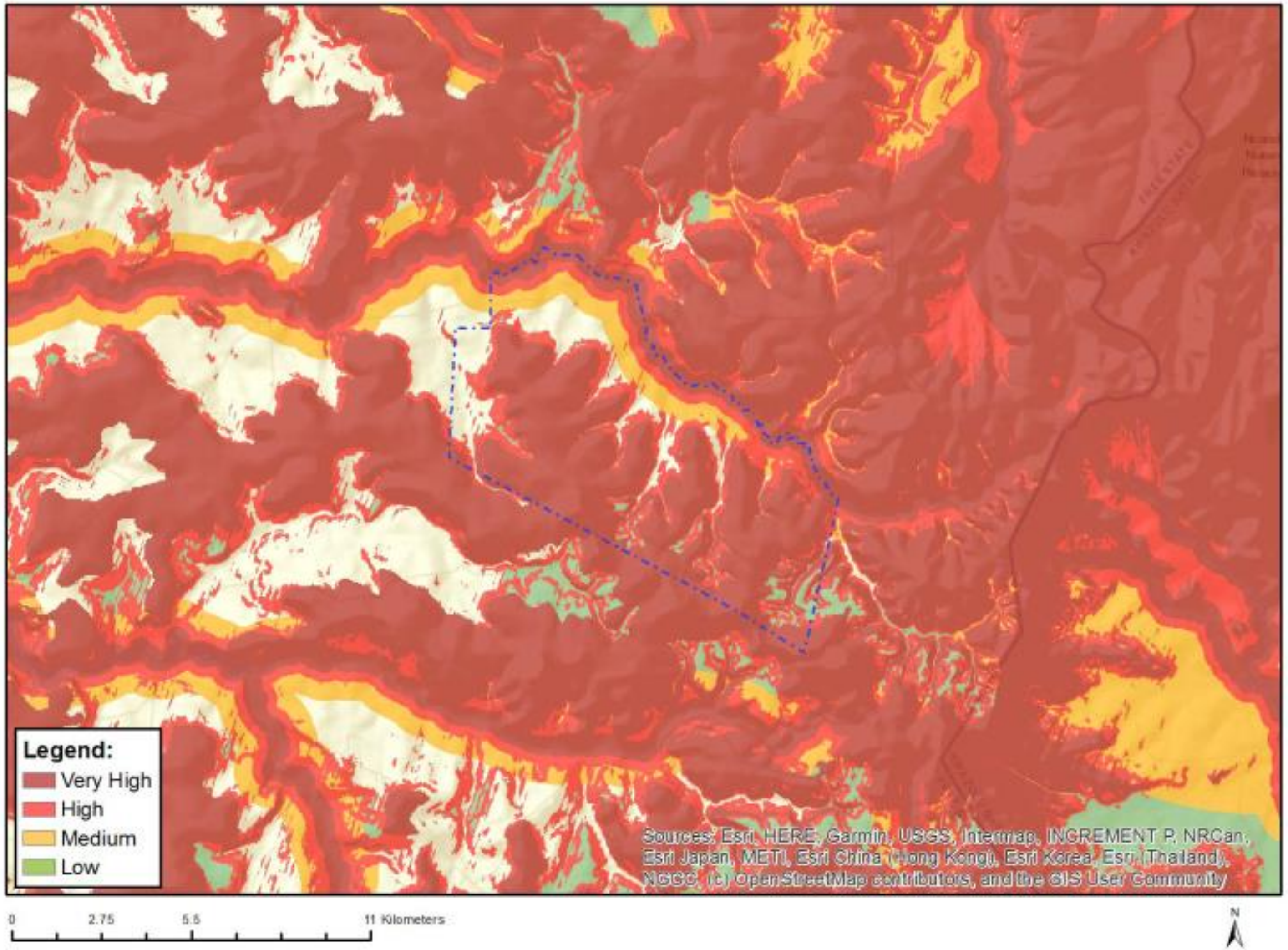

Figure 5-1 - DFFE environmental assessment screening tool - landscape wind theme (21/02/2024)

5.2 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.

A review of the national web-based environmental impact assessment screening tool indicates that the site is not considered sensitive regarding the visual resource. Nonetheless, it recommends that a visual impact assessment be conducted as part of the environmental assessment process.

Table 5-1 - Visual resource value criteria

Visual Resource Value (sensitivity)	Criteria
Very high (4)	▪ 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)	▪ 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
Moderate (2)	▪ 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

Visual Resource Value (sensitivity)	Criteria
	▪ 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)	▪ 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

5.3 VISUAL RESOURCE VALUE EVALUATION

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

- The natural topography of the study area in general and site itself is distinct and central to the visual character of the region, with many features of visual interest. The Kromhof site topography is prominent given the elevation differences between the highest outcrops, plateaus and the lower-lying valleys, although arguably less dramatic than that of the adjacent areas, and the visual resource value of this attribute is therefore rated as high (3)
- The hydrological features, specifically the small dams, only form focal elements of interest in short- to medium-range views, but the winding and sometimes incised watercourse forms a distinct visual pathway and characterised by a high level of detail and interest. The large horseshoe dams are also unique within the study area, and this aspect of the landscape is therefore considered to be of high (3) visual resource value
- Given that nationally only a fraction of the once expansive original Highveld grasslands remain, and the further threat posed by mining, agriculture, urban expansion, and associated degradation, the visual resource value of the essentially untransformed nature of the site's vegetation cover is rated as very high (4)
- The largely natural state of the site and limited agricultural land uses, within the context of the larger study area, results in this attribute being of a very high visual resource value (4)

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	4	4
Total				**14 (very 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 very high.

5.4 VISUALLY SENSITIVE AREAS

Based on the above assessment, from a visual perspective the following areas would ideally 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 highest tops of ridges and outcrops or along the escarpment edges, as this would fundamentally change the visual character of these features. However, these locations are also likely the most ideal from a wind speed and exposure perspective, and hence a balance between the number and locations of individual turbines and the requirement to preserve the visual characteristics of the area is needed
- Within delineated wetlands and immediately adjacent to watercourses and dams, as the loss of natural vegetation cover would detract from the visual resource value of the area
- Furthermore, where possible and within the constraints of safety and practical limitations, preference should be given to locating the project infrastructure in the vicinity of existing infrastructure, including near roads, powerlines, or along the edges of cropland areas

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 characteristic topography and visually unbroken horizon skyline, and overall lack of vertical manmade elements, the VAC of the site is rated as low.

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 very 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 living or working at or visiting the isolated tourist destinations that occur around the site (resident and transient 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 and is further assessed in the impact assessment section of this report (Section 9).

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 a relatively small 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, most people in 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 (albeit small) towns and the fact that the site borders KwaZulu Natal and man y popular tourist destinations further to the east, it is likely that at least a moderate number of people (incidence factor) could 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 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 moderate 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

Potential layout alternatives and variations for the Kromhof WEF Project were assessed during the Scoping Phase whereby areas of environmental sensitivity were avoided as far as possible, to derive the layout presented in Figure 1-3, for assessment in the EIA Phase. In principle, from a visual perspective the preferred layout would be one where the turbines are (to the extent possible) clustered rather than spread out and located in the vicinity of farmland and existing linear infrastructure, including power lines and roads. Also, turbine locations near the edges of ridges, delineated wetland areas, or the larger water bodies would ideally be avoided. However, the more exposed locations are also likely the most ideal from a wind speed and exposure perspective, and hence a balance between the number and locations of individual turbines and the requirement to preserve the visual characteristics of the area is needed.

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 Kromhof Project will not be developed, would mean that none of the project elements that may be deemed visually detrimental would be introduced into the landscape and thereby retaining the existing visual character and associated resource value of the project site. It is noted that the project area has very low existing levels of development, a distinct and definable rural character, and high visual resource value of the ridges and low cliffs that characterise the site. It is also unlikely that significant visual mitigation could be implemented should the project proceed, given the great height of the turbines and the nature of the project technology.

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 were 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 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 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 was determined by conducting a viewshed analysis and using Esri ArcGIS for Desktop software, with 3D Analysist 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 if available, 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 250 m, which accounts for the 140 m tower height (which may be increased to 150 m), and 100 m individual blade length. The viewshed analysis was collectively generated from each of the individual turbines, using the individual locations established in the most recent 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 largely uniform, low vegetation height and the limited development and 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 LTV of the Normandien WEF project is represented by Figure 9-2:

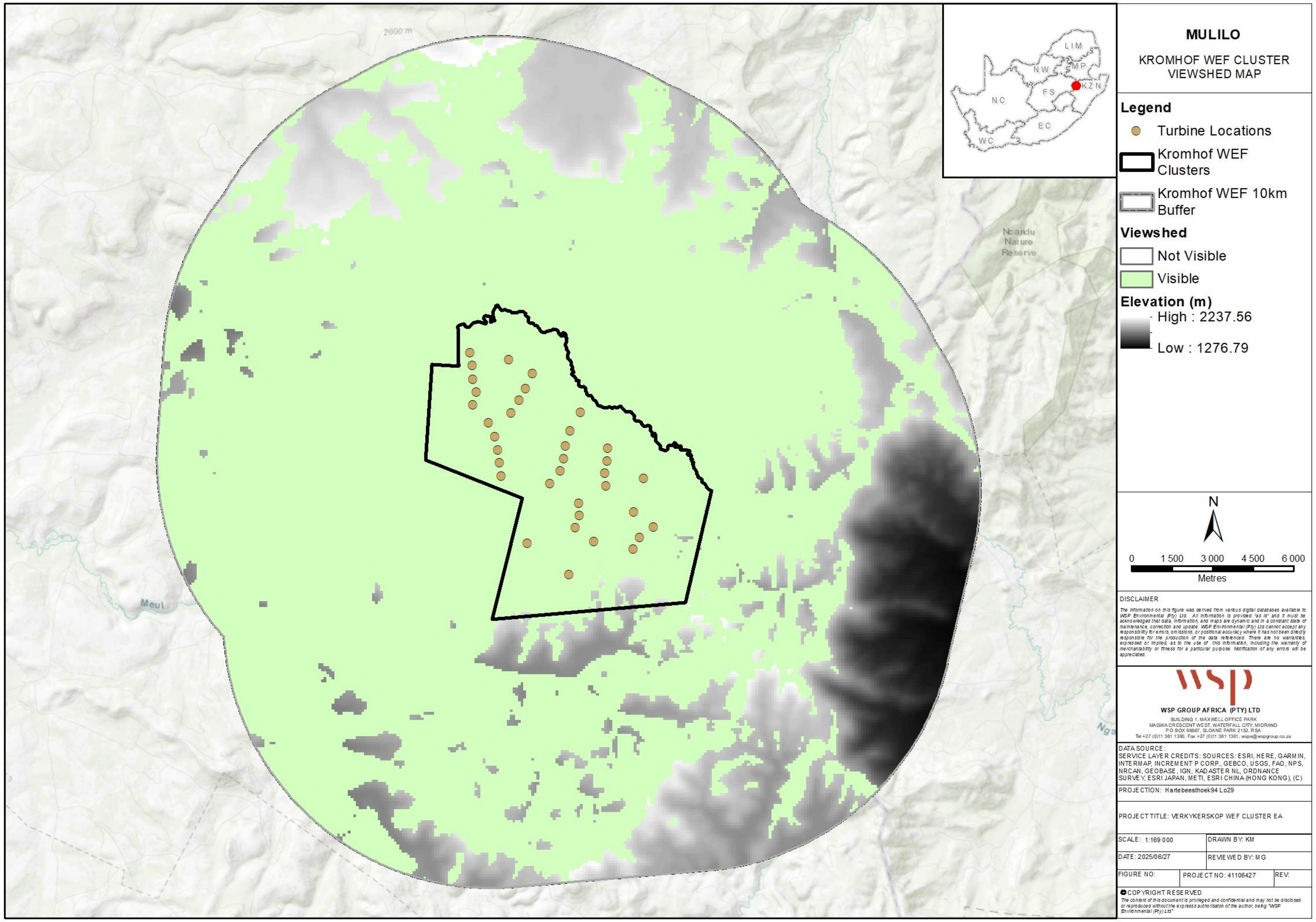

Figure 9-2 - Viewshed analysis of the Kromhof WEF Project

The LTV based on the results of the viewshed analysis will then be 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)

Based on the outcome of the viewshed analysis, which indicates that one or more turbines will the 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).

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 (Figure 9-3), 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). 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).

Figure 9-3 - Artist's impression of two of the Kromhof WEF turbines, indicating the level of visibility and visual contrast in the existing landscape even over considerable distance

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 two of the proposed turbines will be located within 500 m from any dwellings or other existing built structures, with two turbines also located within 800 m of any dwellings or other built structures (Figure 9-4).

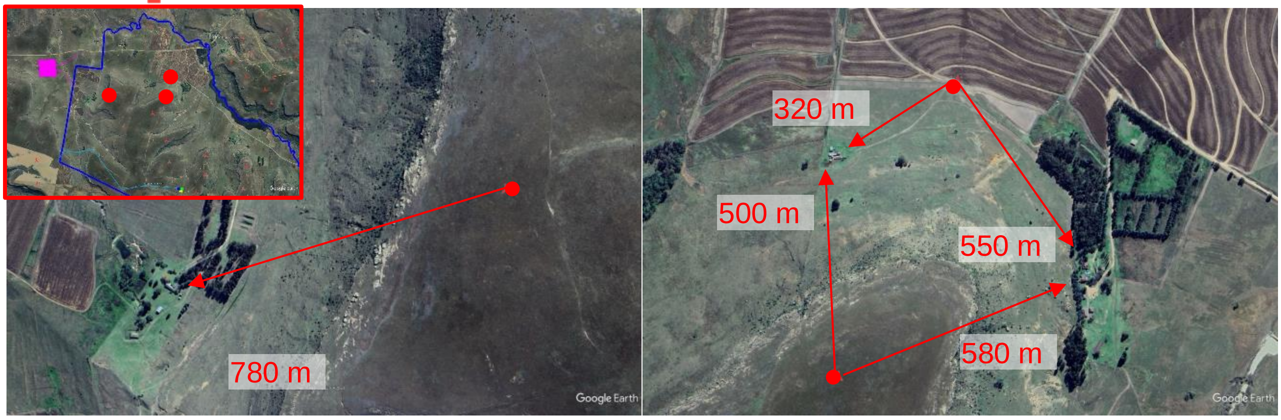

Figure 9-4 - Turbines that are located within 500 m, and 1 000 m, respectively, of dwellings and other built structures (image source: Google Earth, 2025, not to scale)

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.

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

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 9-5. 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). The level of visual exposure of the turbines and other infrastructure was evaluated within this context in the impact assessment (Section 9.6).

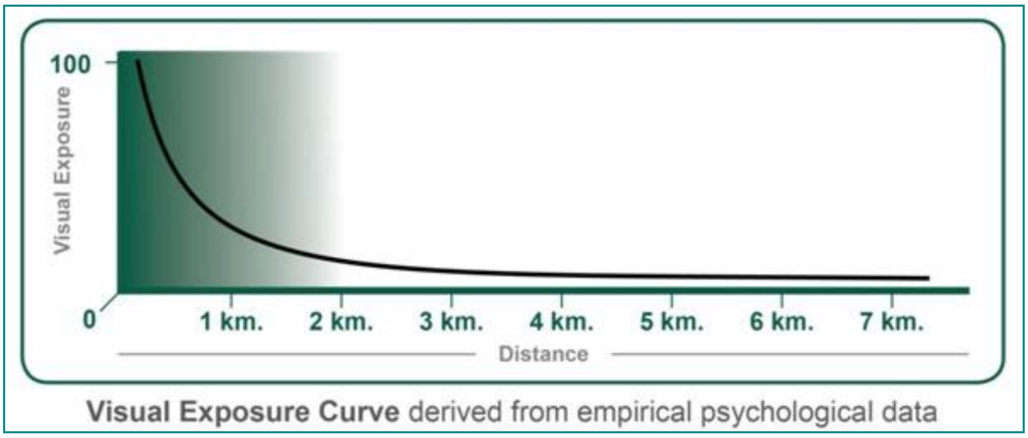

Figure 9-5 - Visual exposure graph

The level of visual exposure of both resident and transient receptors towards the turbines and other infrastructure is expected to be limited to views greater than 500 m and 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:

Magnitude = [(*Visual quality of the site x VAC factor*) *x* (*Visibility* + *Visual Intrusion* + *Visual Exposure*)] *x Receptor sensitivity factor*.

Thus: [(*1 x Factor 1.0*) *x* (*1 + 1 + 1*)] *x 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	4	1.2	3	3	2	1.2	46.08	Very high (5)
Airborne dust due to construction/decommissioning activities and resultant dust settling onto surrounding landscape	4	1.2	3	1	2	1.2	34.56	Very high (5)
Operational phase impacts								
Reduction in visual resource value due presence of visually intrusive turbines and other infrastructure in the landscape	4	1.2	3	3	2	1.2	46.08	Very high (5)
Shadow flicker nuisance from spinning turbine blades	4	1.2	1	1	2	1.2	23.04	Medium (3)
Flicker nuisance from spinning blades if one or more are painted to mitigate avifaunal impacts	4	1.2	3	2	2	1.2	40.32	Very high (5)
Light pollution at night due to security lighting	4	1.2	3	2	2	1.2	40.32	Very high (5)
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, 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 will consider 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
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

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
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 IMPACT ASSESSMENT DETERMINATION

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 9.7.

- 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	5	3	3	1	4	**48**	**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	3	2	3	4	2	**24**	**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	5	3	5	4	3	**51**	**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	5	3	3	4	5	**75**	**N4**	4	3	3	4	4	**56**	**N3**
				Significance	**N4 - High**							**N3 - Moderate**						

9.7 CUMULATIVE IMPACT ASSESSMENT

Cumulative impacts refer to the successive, incremental, and/or combined effects of a project, activity, or action when considered alongside other existing, planned, or reasonably foreseeable developments. The assessment and management of cumulative impacts focus on those impacts that are scientifically significant or of concern to affected communities. While this assessment primarily addresses South African regulatory requirements, elements of internationally recognized standards, such as the IFC Performance Standards, provide valuable context for identifying and mitigating cumulative impacts. These standards will guide alignment during later stages of the project lifecycle.

Cumulative impacts are evaluated within the project's area of influence, which includes:

- Areas directly impacted by the project
- Surrounding regions influenced by other existing and planned projects
- Broader geographic and temporal scales where unplanned but predictable impacts may emerge

While compliance with IFC Performance Standards is not a requirement under South African EIA regulations, their guidance on addressing cumulative impacts is acknowledged. This includes analyzing the interaction of project impacts with other human activities and natural drivers affecting Valued Environmental and Social Components (VECs). During financial close and subsequent phases, the project will incorporate additional measures to align with international standards where necessary.

This cumulative impact assessment provides a foundation for understanding the broader environmental and social context of the Kromhof WEF. It evaluates the additive effects of the project in conjunction with other renewable energy developments within the region, with the goal of proposing actionable measures to mitigate cumulative impacts where feasible. These measures will be detailed in the Environmental and Social Management Plans (ESMPs) and broader Environmental and Social Management System (ESMS) as the project progresses.

Cumulative impacts with existing and planned facilities may occur during construction and operation of the Kromhof 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, a number of projects within the surrounding area which have submitted applications for environmental authorisation (some of which have been approved) have been considered. The projects considered are from the latest REEA database from the DFFE (2024 Quarter 4). It is important to note that the existence of an approved EA does not directly equate to actual development of the project.

The proposed Verkykerskop WEF Cluster is not located within one of the promulgated Renewable Energy Development Zones (REDZ). The projects located within a 50 km radius of the site that should be considered in the cumulative impact assessment is included in Table 9-6, and illustrated in Figure 9-6. Projects within 100 km radius are not being evaluated as part of this VIA, as developments beyond this distance fall well outside of the range of cumulative visibility.

Table 9-6 - Projects within 50 km of the Verkykerskop WEF Cluster

Project name	Applicant	Status	Reference number	Distance away (km)
Newcastle Gas Engine Power Plant (NGEPP), Newcastle, Kwazulu-Natal Province.	Newcastle Energy (Pty) Ltd	Refused	14/12/16/3/3/2/2074	36
Proposed Upgrade of Karbochem boilers and electricity project in Newcastle	Distributed Energy Generation (Pty) Ltd	In process	14/12/16/3/3/1/1164	37
Proposed Upgrade of Karbochem boilers and electricity project in Newcastle - Amendment	Distributed Energy Generation (Pty) Ltd	Approved	14/12/16/3/3/1/1164/AM1	37
Proposed Newcastle solar energy facility near Newcastle, KwaZulu-Natal Province	Building Energy (Pty) Ltd	Refused	14/12/16/3/3/1/1225	38
Proposed Newcastle WEF 2 and associated grid infrastructure near Newcastle, KwaZulu-Natal Province	Mulilo Newcastle Wind Power 2 (Pty) Ltd	Refused	14-12-16-3-3-2-2213	34
Proposed Mulilo Newcastle WEF and associated grid infrastructure near Newcastle, KwaZulu-Natal Province	Mulilo Newcastle Wind Power (Pty) Ltd	Approved	14-12-16-3-3-2-2457	40
Proposed Mulilo Newcastle WEF 2 and associated grid infrastructure near Newcastle, KwaZulu-Natal Province	Mulilo Newcastle Wind Power 2 (Pty) Ltd	Approved	14-12-16-3-3-2-2458	43

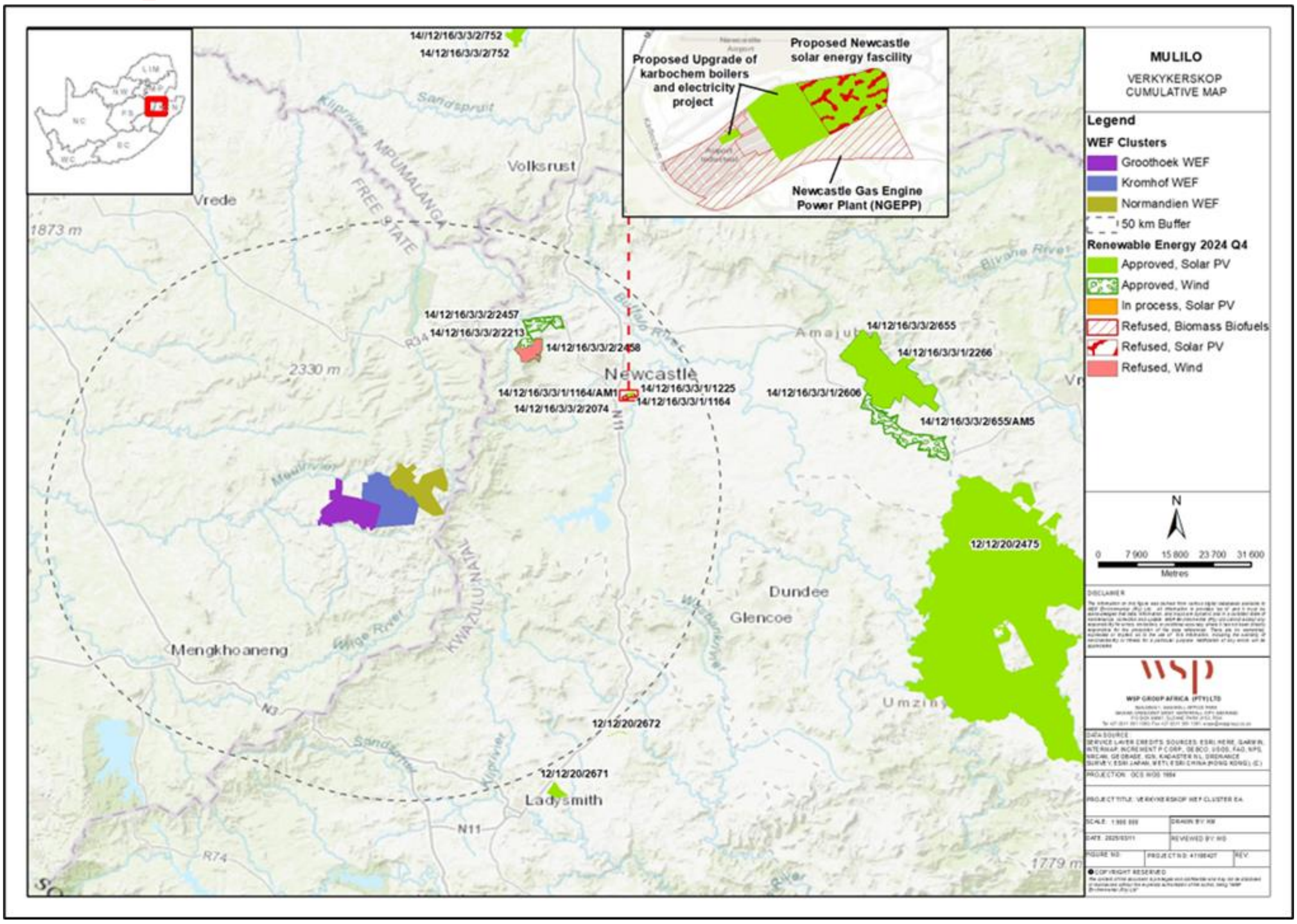

Figure 9-6 - Projects within 50 km of the Verkykerskop WEF Cluster

The region is predominantly a rural and agricultural landscape, although Newcastle, Harrismith and several other small towns occur within the cumulative impact assessment study area. Currently, the cumulative impact assessment study area is essentially devoid of projects similar in appearance to the proposed Verkykerskop WEF cluster and the Kromhof project. However, the combined Verkykerskop WEF cluster which also include the Normandien and Groothoek WEF projects if developed will result in a cumulative visual impact, due to the increased visibility footprint of the combined projects (Figure 10-2). Two further wind turbine and one electric boiler project approved within this area are also expected to cause similar impacts to that of the Kromhof WEF project.

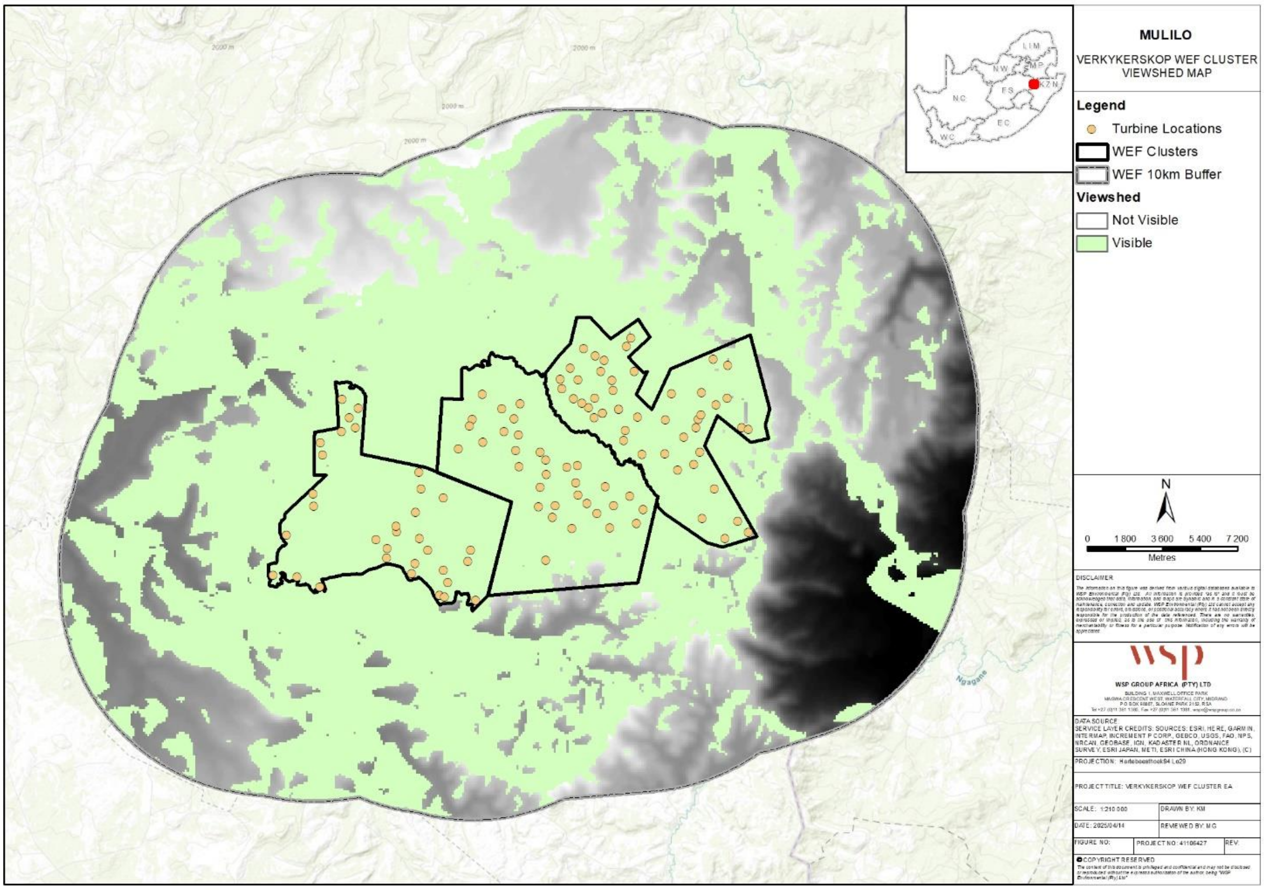

Figure 9-7 - Cumulative LTV of the combined Verkykerskop WEF cluster

The visual impact associated with the proposed Kromhof WEF project will entail the introduction of highly visible 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 partially alter 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: Currently a limited number of future projects of a similar nature may take place in the region, and it is highly unlikely that these will be within visible distance of the Kromhof 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 a small percentage of the 55 km radius cumulative impact assessment study area, although from a visual perspective the development will be visible from within a larger percentage of the cumulative impact assessment study area. For these reasons, the magnitude of the cumulative visual impact of the project is currently estimated to be low (2)
- 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 relative distance of the other proposed renewable developments from the Kromhof WEF site, the probability of a cumulative visual impact caused by the presence of the project infrastructure in the landscape has been rated as probable of occurring (3)

Table 9-7 – Cumulative visual impacts

Phase	Potential cumulative visual impacts	Visual significance					
		M	E	R	D	P	S
Operational phase	Alteration of the existing rural character of the study area through the introduction of an expanse and visually prominent infrastructure into the landscape	2	3	5	4	3	42 (moderate)

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

10 PRELIMINARY RECOMMENDED MITIGATION MEASURES

The impact significance without mitigation measures were 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. 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.

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.

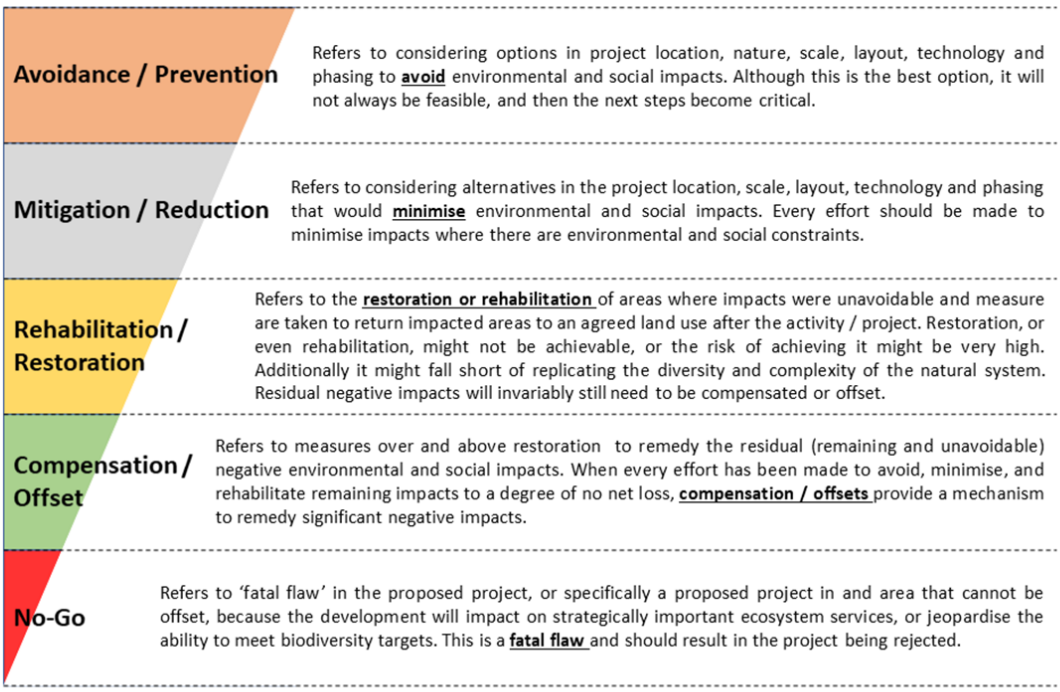

Figure 10-1 - Risk mitigation hierarchy

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 Kromhof WEF Project, visual mitigation options are largely limited to the construction and decommissioning phases 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 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: ▪ 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: ▪ 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	▪ Employ micro-siting and orientation of turbines and other infrastructure to group with existing infrastructure and already disturbed areas
Glare due to sunlight reflection from smooth surface, and flicker from painted blades	▪ 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

Component	Mitigation measures
Light pollution at night due to turbine safety and project site security lighting	▪ 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 ▪ 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 CONCLUSIONS

The Kromhof WEF project site is located in a rural setting, with limited areas of low-impact agricultural activity. The study area is sparsely populated with only farmsteads, isolated tourist attractions and small settlements occurring here, and the larger towns located further away from the site. As such, the potential visual receptor base to the proposed development is somewhat limited but diverse. Furthermore, the visual resource value of the site within the context of the surrounding study area is very high, owing mainly to the low prevailing levels of development, highly characteristic topography, and largely intact Highveld grassland cover, and furthermore also has a low ability to absorb visual change.

The proposed project will introduce numerous very tall and highly visible turbines and other associated infrastructure into the landscape. The presence of these elements will influence the prevailing rural character of the study area and may be deemed visually detrimental within the context of the existing visual setting, depending on the predisposition of individual receptors. Limited visual mitigation is likely to feasible and mainly relevant to the construction and decommissioning phases, as proposed in Section 10. The significance of the identified visual impacts was assessed and were determined to range from high to very high, with the most detrimental visual impacts associated with the presence of the turbines during the operational phase.

However, the visual impacts of the project, which are largely social in nature, should be weighed against other social and economic considerations to determine whether the project should be supported. Based on the fact that the project study area is located in a larger area with similar rural characteristics, and the ongoing and urgent need to secure additional power generation capacity for the country, it is recommended that, from a visual perspective, the project be supported, provided that the required visual mitigation measures be implemented.

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