THE BASIC ASSESSMENT FOR THE PROPOSED KOMAS WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR KLEINSEE IN THE NORTHERN CAPE PROVINCE.

APPENDIX C.5

Visual (including Flicker) Assessment

VISUAL (INCLUDING FLICKER) IMPACT ASSESSMENT:

Basic Assessment for the proposed development of the Komas Wind Energy Facility and associated infrastructure near Kleinsee in the Northern Cape Province

Report prepared for:

CSIR – Environmental Management Services

P O Box 320

Stellenbosch, 7599

South Africa

Report prepared by:

SiVEST SA (Pty) Ltd

12 Autumn Road

Rivonia, Johannesburg, 2128

South Africa

24 March 2021

EXECUTIVE SUMMARY

SiVEST SA (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct a Visual Impact assessment (VIA, including flicker) for the proposed construction and operation of the Komas Wind Energy Facility (WEF) and associated infrastructure on Portion 1 of the Farm Zonnekwa No. 326, Portion 2 of the Farm Zonnekwa No. 328, Portion 3 of the Farm Zonnekwa No. 328, Portion 4 of the Farm Zonnekwa No. 328 and Portion 4 of the Farm Kap Vley No. 315, near Kleinsee in the Northern Cape Province.

Although the study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure, it is not typically valued or utilised for its tourism significance. The study area has however seen very limited transformation or disturbance and is considered largely natural. As such the proposed Komas WEF development is expected to alter the visual character of the area and contrast significantly with the typical land use and / or pattern and form of human elements present.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low to moderate visual sensitivity**. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas, leisure-based tourism activities or sensitive receptor locations were identified and there are no recognised tourism or scenic routes in the study area. In addition, there is limited human habitation resulting in relatively few potentially sensitive receptors in the area.

The VIA identified thirteen potentially sensitive receptors in the study area, all of which are farmsteads. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed Komas WEF development will likely alter natural vistas experienced from these dwellings. The VIA determined that the proposed development will have a high level of impact on three (3) of these receptors. Most of these four receptors are farmsteads located in relatively close proximity to the proposed Komas WEF development area and this factor, in conjunction with the relatively flat terrain in the area and the lack of screening vegetation, gives rise to a high impact rating. None of these receptors are tourism-related facilities however, and as such they are not considered to be Sensitive Receptors. In addition, it should be noted that three of these receptors, namely R12, R14 and R15, are located on the application site for the proposed Kap Vley WEF and as such it is possible that residents at these locations may not perceive the proposed Komas WEF in a negative light.

Seven (7) of the remaining receptor locations would be subjected to moderate levels of visual impact as a result of the proposed development and the remaining three (3) receptors would only experience negligible levels of visual impact.

The significance of the overall impact rating revealed that the proposed Komas WEF is expected to have a **negative low visual impact rating during construction** and a **negative moderate visual impact rating during operation**, with relatively few mitigation measures available.

Several renewable energy developments are being proposed within a 50 km radius of the proposed Komas WEF application site. These renewable energy developments have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other, could significantly alter the sense of place and visual character in the broader region. It was however determined, that only five of these would have any significant impact on the landscape within the study area, these being; the proposed Gromis WEF which is

subject to another BA process which is currently being undertaken in parallel to this BA process, the proposed Kleinzee WEF and the proposed Kap Vley, Namas and Zonnequa WEFs which have received Environmental Authoristations (EAs) on 25 October 2018, 18 February 2019 and 25 February 2019 respectively. All of these projects are in close proximity to one another and to the proposed Komas WEF development area and it is anticipated that this concentration of facilities will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as having negative impacts of moderate significance during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists.

It should be noted that the study area is located within the Renewable Energy Development Zone 8 (REDZ 8) known as Springbok, and thus the relevant authorities support the concentration of renewable energy developments in this area. In addition, it is possible that the three WEFs in close proximity to each other could be seen as one large WEF rather than three separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

A comparative assessment of alternatives (Option 1 and Option 2) for the proposed battery and on-site substation complex was undertaken in order to determine which of the alternatives would be preferred from a visual perspective. No fatal flaws were identified for either of the battery and substation complex site alternatives and Option 1 was identified as the preferred Option, while Option 2 was found to be favourable.

From a visual perspective therefore, the project is deemed acceptable and an EA should be granted. SiVEST is of the opinion that the potential impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

LIST OF ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
CAA	Civil Aviation Authority
DBAR	Draft Basic Assessment Report
DEFF	Department of Environment, Forestry and Fisheries
DEM	Digital Elevation Model
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EO	Environmental Officer
GIS	Geographic Information System
I&APs	Interested and Affected Parties
kV	Kilo Volt
MC	Main Contractor
MW	Megawatt
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NGI	National Geospatial Information
OHL	Overhead Line
O&M	Operation and Maintenance
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
SANBI	South African National Biodiversity Institute
VAZ	Visual Assessment Zone
VIA	Visual Impact Assessment
WEF	Wind Energy Facility

GLOSSARY

Definitions	
Anthropogenic Feature	An unnatural feature as a result of human activity.
Aspect	Direction in which a hill or mountain slope faces.
Cultural Landscape	A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992).
Sense of Place	The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.
Scenic Route	A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.
Sensitive Visual Receptors	An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities.
Study Area / Visual Assessment Zone	The study area / visual assessment zone is assumed to encompass a zone of 10km from the outer boundary of the proposed wind energy facility (WEF) application site.
View Point	A point in the landscape from where a particular project or feature can be viewed.
Viewshed	The geographical area which is visible from a particular location.
Visual Character	The physical elements and forms and land use related characteristics that make up a landscape and elicit a specific visual quality or nature. Visual character can be defined based on the level of change or transformation from a completely natural setting.
Visual Contrast	The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would conform with the land use, settlement density, forms and patterns of elements that define the structure of the surrounding landscape.
Visual Envelope	A geographic area, usually defined by topography, within which a particular project or other feature would generally be visible.
Visual Exposure	The relative visibility of a project or feature in the landscape.
Visual Impact	The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.
Visual Receptors	An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically include commercial activities and motorists travelling along routes that are not regarded as scenic.
Visual Sensitivity	The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	**Addressed in the Specialist Report**
1. (1) 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;	Appendix A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix B
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, Pg 10
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.1, Pg 16
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 1.6 Pg 35
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.1 Pg 12
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.1, Pg 12
(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;	Section 1.6, Pg 40
(g) an identification of any areas to be avoided, including buffers;	Section 1.6, Pg 40
(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;	Appendix D
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.1, Pg 14
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	
(k) any mitigation measures for inclusion in the EMPr;	Section 1.6 Pg 48 Section 1.7 Pg 52 Section 1.8 Pg 65
(l) any conditions for inclusion in the environmental authorisation;	Section 1.8 Pg 65
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 1.8 Pg 65
(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;	Section 1.10 Pg 70
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 1.1, Pg 12
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(q) any other information requested by the competent authority.	N/A
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.	Part A of the Assessment Protocols published in Government Notice No.

	320 in Government Gazette No. 43110 on 20 March 2020 is applicable (i.e. Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed). See Appendix E.

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VISUAL IMPACT ASSESSMENT

1.1. INTRODUCTION AND METHODOLOGY

This report serves as the Visual (including Flicker) Impact Assessment that was prepared as part of the Basic Assessment BA for the proposed development of the Komas Wind Energy Facility (WEF) and associated infrastructure near Kleinsee in the Northern Cape Province.

1.1.1. Scope and Objectives

Genesis ENERTRAG Komas (Pty) Ltd (hereafter referred to as "Komas") is proposing to develop the Komas WEF and associated infrastructure near Kleinsee in the Northern Cape Province.

The proposed development site is located within the Renewable Energy Development Zone 8 (REDZ 8 known as Springbok, published in terms of Section 24(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) in Government Notice (GN) R. 114 of 16 February 2018. Considering this, a Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), is required for the authorisation of this large-scale WEF. As part of this BA process, a Visual Impact Assessment (VIA) is required in order to inform the Basic Assessment Report (BAR) and Application for Environmental Authorisation (EA) under NEMA.

The aim of the VIA is to identify potential visual issues associated with the development of the proposed WEF, as well as to determine the potential extent of visual impacts. This involves characterising the visual environment of the area and identifying areas of potential visual sensitivity that may be subject to visual impacts. This visual assessment focuses on the potential sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed development.

1.1.2. Details of Specialist

This specialist assessment was undertaken by Kerry Schwartz of SiVEST, a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST. Kerry's GIS skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also undertaken many VIAs in recent years and the relevant VIA project experience is listed in the table below. A Curriculum Vitae is included in Appendix A and a signed specialist statement of independence is included in Appendix B of this specialist assessment.

Table 1: Relevant Project Experience

Environmental Practitioner	SiVEST (Pty) Ltd – Kerry Schwartz
Contact Details	kerrys@sivest.co.za
Qualifications	BA (Geography), University of Leeds 1982
Membership of Professional Societies	South African Geomatics Council – GTc GISc 1187
Expertise to carry out the Visual Impact Assessment.	**Visual Impact Assessments:** ▪ VIA (BA) for the proposed Oya Solar Photovoltaic (PV) Facility, near Matjiesfontein in the Western Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. ▪ VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. ▪ VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province. ▪ VIA (EIA) for the proposed Paulputs WEF near Pofadder in the Northern Cape Province. ▪ VIA (EIA) for the proposed development of the Rondekop WEF near Sutherland in the Northern Cape Province. ▪ VIA (BA) for the proposed development of the Tooverberg WEF near Touws Rivier in the Western Cape Province. ▪ VIA (BA) for the proposed development of the Kudusberg WEF near Sutherland, Northern and Western Cape Provinces. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the San Kraal Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Ithemba Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province ▪ Visual Impact Assessments for 5 Solar Power Plants in the Northern Cape ▪ Visual Impact Assessments for 2 Wind Farms in the Northern Cape ▪ Visual Impact Assessment for Mookodi Integration Project (132kV distribution lines) ▪ Landscape Character Assessment for Mogale City Environmental Management Framework

1.1.3. Terms of Reference

The Terms of Reference for this VIA include the following:

- Adhere to the requirements of specialist studies in terms of Appendix 6 of the NEMA EIA Regulations (2014}, as amended.
- Adhere to Part A of the Assessment Protocols published in GN 320 on 20 March 2020 (i.e. Site sensitivity verification requirements);
- A key task for the specialists is to review the existing sensitivity mapping from the SEA for the project area and provide an updated sensitivity map for the Komas WEF project site;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge;
- Provide a description of the relevant legal context and requirements;
- Identify and assess the potential direct and indirect impacts of the proposed Komas WEF project and its associated l infrastructure on the visual resources during the construction, operational and decommissioning phases. Provide an assessment of the irreversibility of impacts, and the irreplaceability of lost resources. Please complete the assessment tables as provided by the CSIR;
- Use the Impact Assessment Methodology as provided by the CSIR;
- Identify and assess cumulative impacts from other Wind and Solar PV projects within a 50 km radius from the Komas WEFs that have already received Environmental Authorisation (EA), are preferred bidders and/or have submitted an application to Department of Environment, Forestry and Fisheries (DEFF) at the start of this BA process.
- In addition, the cumulative impact assessment for all identified and assessed impacts must be refined to indicate the following:
    - Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
    - The cumulative impacts significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.
- Assess the project alternatives and identify the preferred alternative with motivation for this selection.
- Assess the no-go alternative very explicitly in the impact assessment section. Please note that the DEFF considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads and internal cables is allowed in the 'no-go' areas. Should your definition of the 'no-go' area differ from the DEFF definition; this must be clearly indicated in your assessment. You are also requested to indicate the 'no-go' area's buffer.
- Incorporate and address issues and concerns raised during the BA process where they are relevant to the specialist's area of expertise.
- Propose mitigation measures to address possible negative effects and to enhance positive impacts to increase the benefits derived from the project.
- Provide recommended mitigation measures, management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts to be included in the Environmental Management Programme (EMPr);
- Provide a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts and a reasoned opinion as to whether the proposed projects should be authorised. Identify any aspects which are conditional to the findings of the assessment which are to be included as conditions of the EA, should the project be approved.

1.1.4. Approach and Methodology

This VIA is based on a combination of desktop-level assessment supported by field-based observation.

- Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by National Geospatial Information (NGI), the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop means were later verified during the site visit.

- Identification of sensitive and potentially sensitive receptor locations

Visual receptor locations and routes that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were assessed in order to determine the impact of the proposed development on each of the identified receptor locations.

- Fieldwork and photographic review

A four (4) day site visit was undertaken between the 10th and the 13th of February 2020 (mid-summer). The aim of the site visit was to:

  - verify the landscape characteristics identified via desktop means;
  - conduct a photographic survey of the proposed study area;
  - verify the sensitivity of visual receptor locations identified via desktop means;
  - eliminate receptor locations that are unlikely to be influenced by the proposed development;
  - identify any additional visually sensitive receptor locations within the study area; and
  - assist with the impact rating assessment from visually sensitive receptor locations.

- Impact Assessment

A rating matrix (Appendix C) was used to objectively evaluate the significance of the potential visual impacts associated with the proposed Komas WEF development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) in an attempt to minimise the potential visual impact of the proposed Komas WEF development. The rating matrix is based on several different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration, extent and consequence in order to assign a level of significance to the potential visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed development on each visual receptor location (both sensitive and potentially sensitive), as identified. This matrix is based on three parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

- Photomontages

An indicative range of locations (referred to as “view points”) was selected for modelling purposes and photomontages were produced from these viewpoints. The preliminary wind turbine layout for the proposed Komas WEF, as provided by Komas, was modelled in 3D at the correct scale and then superimposed onto landscape photographs taken during the site visit. Although the turbine layout has subsequently changed, the resulting photomontages still demonstrate the likely visibility of the proposed turbines from various locations within the visual assessment zone and also illustrate how views from each selected view point could potentially be transformed by the proposed Komas WEF development if the wind turbines are erected on the site as proposed.

- Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) during the public participation process for the BA will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, the report will be updated to include relevant information as and when it becomes available.

1.1.5. Assumptions and Limitations

The following assumptions and limitations apply:

- This visual study has been undertaken based on the project description provided by the client and the CSIR at the inception of the project.

- Wind turbines are very large structures and could impact on visual receptors that are located relatively far away, particularly in areas where the terrain is very flat. Given the nature of the receiving environment and the height of the proposed wind turbines, the study area or visual assessment zone is assumed to encompass a zone of 10 km from the proposed WEF – i.e. an area of 10 km from the boundary of the WEF development area. This 10 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the WEF may still be visible beyond 10 km, the degree of visual impact would diminish considerably and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.

- Despite the fact that the study area encompasses a zone of 10 km from the boundary of the application site, the distance from the nearest proposed turbine position was used when determining the zones of visual impact for the identified visual receptor locations (both sensitive and potentially sensitive). As such, even though a receptor location may be located within a negligible visual impact zone, it was still taken into consideration for the purposes of this study.

- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. These receptor locations were then verified and assessed during a site visit undertaken in February 2020. Due to access constraints and the extent of the study area however, it was not possible to visit or verify every potentially sensitive visual receptor location and as such, a number of broad assumptions have been made in terms of the sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perception of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings that are likely to be adversely affected by the visual intrusion of the proposed development. Thus the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that a visual impact will be experienced.

- Due to access limitations during the site visit, the impact rating assessment of the proposed development on some of the potentially sensitive visual receptor locations was undertaken via desktop means. Although the exact status of these receptors could not be established during the field investigation, it was assumed that most of these were farmsteads and as such they were still regarded as being potentially sensitive to the visual impacts associated with the proposed wind farm and were assessed as part of the VIA.

- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the WEF development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen as merely a representation of the likely visual impact at a receptor location.

- The assessment of receptor-based impacts has been based on the turbine layout provided by Komas. The turbine sizes, numbers and/or locations may thus change, which may require a re-assessment of the visual impacts on identified receptor locations

- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area derived from the National Geo-Spatial Information (NGI)'s 25m Digital Elevation Model (DEM) is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the DEM used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.

- In addition, the viewshed analysis does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst case scenario.

- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft BAR will however be incorporated into further drafts of this report, if relevant.

- The visual study was originally based on the preliminary design and layout information for the proposed Komas WEF development made available by Komas Wind. In the interim, Komas Wind have revised the proposed layout, based on the environmental sensitivities and no-go areas identified by the specialists on the project team, and this report has been updated to reflect the changes.

- At the time of undertaking the visual study no detailed information was available for the design and layout of services and infrastructure associated with the proposed Komas WEF development. The assessment is therefore based on the potential visual impacts associated with Komas WEF infrastructure.

- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting that will be required for the proposed Komas WEF and therefore the potential impact of lighting at night has not been assessed at a detailed level. However, lighting requirements are relatively similar for all WEFs and as such, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.

- This study includes an assessment of the potential cumulative impacts of multiple renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.

- Photomontages have not been compiled for all sensitive and potentially sensitive receptor locations. Instead, a range of locations was selected for modelling purposes to provide an indication of the possible impacts from different locations within the study area. It should be noted that these photomontages are specific to the location, and that even sites in close proximity to one another may be affected in different ways by the proposed WEF development. The visual models represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated. At the time of this study the proposed project was still in the planning phase and as such the turbine layouts, as provided by the client, may still be refined in terms of micro-siting. Although infrastructure associated with the facility has not been included in the models, this is not considered to be a major limitation as the visual impact of associated infrastructure would be minor when considering the infrastructure next to the wind turbine.

- It should be noted that the fieldwork was undertaken in early February 2020, during mid-summer. However, the study area is typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the potential visual impact of the proposed Komas WEF development

- The overall weather conditions in the study area have certain visual implications and are expected to affect the visual impact of the proposed Komas WEF development to some degree. Clear weather conditions tend to prevail throughout the year in the study area. In these clear conditions, the wind turbines would present a greater contrast with the surrounding environment than they would on a cloudy overcast day. The weather conditions during the time of the study were therefore taken into consideration when undertaking this VIA.

1.1.6. Source of Information

The main sources of information which were utilized for the VIA included:

- Project description for the proposed Komas WEF and associated infrastructure provided by Komas;
- Elevation data from 25m DEM from the NGI;
- 1:50 000 topographical maps of South Africa from the NGI;
- Land cover and land use data extracted from the 2018 South African National Land-Cover Dataset provided by GEOTERRAIMAGE;
- Vegetation classification data extracted from SANBI's VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2020;
- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 4 2019);
- The findings of the Wind and Solar SEA (CSIR, 2015) and;
- The National web-based Environmental Screening Tool DEFF.

1.2. DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE VISUAL IMPACT ASSESSMENT

In this section, aspects of the proposed Komas WEF project that are relevant to the VIA and the typical visual impacts resulting from the project are discussed. It is important to note that in recent years many WEFs have been constructed in South Africa. The development and associated environmental assessment of WEFs in South Africa is however still relatively new, and thus it is valuable to draw on international experience. This section of the report therefore draws on

international literature and web material (of which there is significant material available) to describe the generic impacts associated with WEFs.

The revised project description for the proposed Komas WEF and the associated infrastructure include the following components:

- Up to 50 wind turbine generators (WTGs) with a maximum capacity of up to 300 MW.
- Turbines with a hub height of up to 200 m and a rotor diameter of up to 200 m.
- Hardstand areas of approximately 1500 m^2 per turbine.
- Medium voltage cabling connecting the turbines will be laid underground.
- A Lithium-ion Battery Energy Storage System (BESS) comprising of several utility scale battery modules within shipped containers or an applicable housing structure on a concrete foundation.
- Internal roads with a width of up to 10m providing access to each turbine, the BESS, on-site substation (SS) and laydown area. The roads will accommodate cable trenches and stormwater channels (as required) and will include turning circle/bypass areas of up to 20m at some sections during the construction phase. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
- A temporary construction laydown/staging area of approximately 4.5 hectares (ha) which will also accommodate the operation and maintenance (O&M) buildings.
- A 33/132kV on-site SS to feed electricity generated by the proposed Komas WEF into the national grid.

The BESS and 33/132kV on-site SS will be located within a 4ha battery and substation complex to allow for micro-siting of the BESS components and to accommodate internal roads (as required), a temporary construction laydown area and a firebreak around the BESS footprint. Two site options have been identified for assessment as part of the BA process.

The proposed grid infrastructure including an Eskom Switching SS, 132 kV gridline and collector SS will be assessed as part of a separate BA process.

Detailed below is a list of the key components of the proposed development that have visual implications. Although the associated on-site infrastructure has been included here, the visual impact of associated infrastructure is generally far less significant than the visual impact associated with wind turbines. The infrastructure would however, magnify the visual prominence of the proposed development if located on ridge tops or flat sites in natural settings where there is limited tall wooded vegetation present to conceal the impact.

1.2.1. Turbines

Wind turbines proposed for the Komas WEF will have a hub height of up to 200 m, a rotor diameter of up to 200 m and a blade length of up to 100 m (Figure 1), resulting in a maximum height at the blade tip of 300m. The height of the turbines and their location on relatively flat terrain would result in the development typically being visible over a large area.

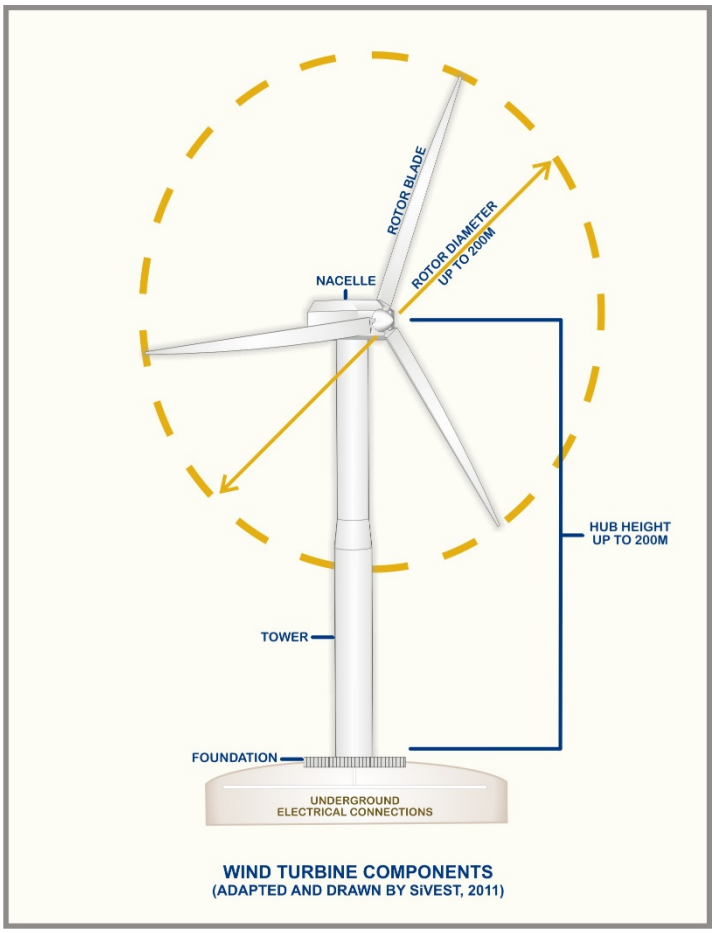

Figure 1: Typical components of a wind turbine

Internationally, studies have demonstrated that there is a direct correlation between the number of turbines and the degree of objection to a WEF, with less opposition being encountered when fewer turbines are proposed (Devine-Wright, 2005). Certain objectors to wind energy developments also mention the “sky space” occupied by the rotors of a turbine. As well as height, "sky space" is an important issue. “Sky space” refers to the area in which the rotors would rotate.

The visual prominence of the development would be exacerbated within natural settings, in areas of flat terrain or if located on a ridge top. Even dense stands of wooded vegetation are likely to offer only partial visual screening, as the wind turbines are of such a height that they will rise above even mature large trees.

- **Shadow Flicker**

Shadow flicker is an effect which is caused when shadows repeatedly pass over the same point. Shadow flicker can be caused by wind turbines when the sun passes behind the hub of a wind turbine and casts a shadow that continually passes over the same point as the rotor blades of the wind turbine rotate (http://www.ecotricity.co.uk).

The effect of shadow flicker is only likely to be experienced by people situated directly within the shadow cast by the rotor blades of the wind turbine. As such, shadow flicker is only expected to have an impact on people residing in houses located within close proximity of a wind turbine (less than 500 m) and at a specific orientation, particularly in areas where there is little screening present. Shadow flicker may also be experienced by and impact on motorists if a wind turbine is located in close proximity to an existing road. The impact of shadow flicker can be effectively mitigated by choosing the correct site and layout for the wind turbines, taking the orientation of the turbines

relative to the nearby houses and the latitude of the site into consideration. Tall structures and trees will also obstruct shadows and prevent the effect of shadow flicker from impacting on surrounding residents (http://www.ecotricity.co.uk).

- **Motion-Based Visual Intrusion**

An important component of the visual impacts associated with wind turbines is the movement of the rotor blades. Labelled as motion-based visual intrusion, this refers to the inclination of the viewer to focus on discordant, moving features when scanning the landscape. Evidence from surveys of public attitudes towards WEFs suggest that the viewing of moving rotor blades is not necessarily perceived negatively (Bishop and Miller, 2006). The authors of the study suggest two (2) possible reasons for this; firstly, when the turbines are moving they are seen as being 'at work', 'doing good' and producing energy. Conversely, when they are stationary they are regarded as a visual intrusion that has no evident purpose. More interestingly, the second theory that explains this perception is related to the intrinsic value of wind in certain areas and how turbines may be an expression or extension of an otherwise 'invisible' presence.

Famous winds across the world include the Mistral of the Camargue in France, the Föhn in the Alps, or the Bise in the Lavaux region of Switzerland. The wind, in these cases, is an intrinsic component of the landscape being expressed in the shape of trees or drifts of sands, but being otherwise invisible. The authors of the study argue that wind turbines in these environments give expression, when moving, to this quintessential landscape element. In a South African context, this phenomenon may well be experienced if wind farms are developed in areas where typical winds, like berg winds, or the south-easter in the Cape are an intrinsic part of the environment. In this way, it may even be possible that wind farms will, through time, form part of the cultural landscape of an area, and become a representation of the opportunities presented by the natural environment.

1.2.2. BESS and On-site Substation

As stated above, the BESS and on-site SS will be located within a battery and substation complex on the Komas WEF site.

Substations are generally large, highly visible structures which are more industrial in character than the other components of a WEF. In addition, BESS facilities, at a maximum height of 6m, could potentially be highly visible from receptors in the surrounding area. In the context of a largely natural landscape, the new BESS and on-site substation will be perceived to be highly incongruous. However, the BESS and substation complex would likely be perceived as a part of the proposed Komas WEF development and as such, the would be dwarfed by the large number of turbines that would be visible. The proposed BESS and on-site substation are therefore not expected to be associated with any significant visual impacts, or even a measurable cumulative impact.

At this stage, two (2) battery and substation complex site alternatives (i.e. Option 1 and Option 2) have been identified for assessment during the BA process.

1.2.3. Overhead Power Lines / Underground Cabling

Wind turbines will be connected to the proposed on-site substation using medium voltage (33 kV) underground cabling.

Excavations associated with the power lines may become prominent if they create a linear feature that contrasts with the surrounding vegetation.

Figure 2 below shows the process typically associated with the generation of electricity from WEFs.

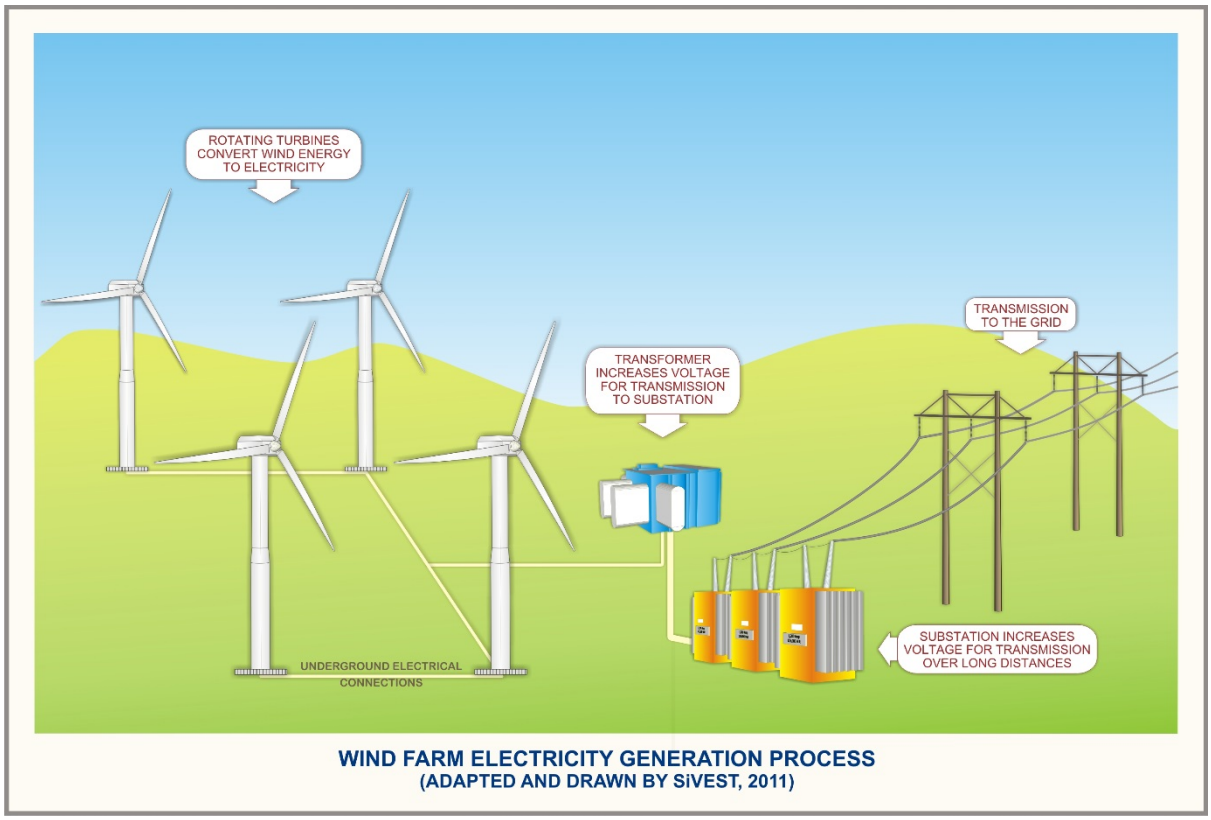

Figure 2: Conceptual wind farm electricity generation process showing electrical connections

1.2.4. Access Roads

Access roads may become visually prominent if they create linear features which contrast with the surrounding landscape. The level of contrast would increase where the roads require the cutting of 'terraces' into steep-sided slopes or across contours.

Considering that the proposed access roads will be mostly located on flat terrain, it is likely that visual impacts associated with the construction of these access roads will be reduced. If however these roads are not maintained correctly during the construction phase, vehicles travelling along the gravel access roads could expose surrounding farmsteads / homesteads to dust plumes.

1.2.5. Construction Laydown Areas

From a visual perspective, laydown areas could result in visual impacts if they are placed in prominent positions such as on ridge tops. In these locations, buildings may break the natural skyline, drawing the attention of the viewer.

The visual impact of infrastructure associated with a WEF is generally not regarded as a significant factor when compared to the visual impact associated with wind turbines. The infrastructure would however increase the visual "clutter" of the WEF and magnify the visual prominence of the development if located on ridge tops or flat sites in natural settings where there is limited tall wooded vegetation to conceal the impact.

1.3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

1.3.1. Site Location

The proposed Komas WEF is located approximately 18 km south-west of Komaggas and 26 km south-east of Kleinsee in the Nama Khoi Local Municipality in the Northern Cape Province. (Refer to ***Map 1*** in ***Appendix D***).

As shown in ***Map 2*** in ***Appendix D***, the WEF development area is approximately **2724.76** ha in extent and is located on portions of five (5) farms with a combined area of approximately **5070** ha. The relevant farm portions are as follows:

- Portion 1 of the Farm Zonnekwa No 326;
- Portion 2 of the Farm Zonnekwa No 328;
- Portion 3 of the Farm Zonnekwa No 328;
- Portion 4 of the Farm Zonnekwa No 328; and
- Portion 4 of the Farm Kap Vley No 315.

1.3.2. Topography

The study area for the proposed Komas WEF project is located on relatively flat to gently undulating terrain situated between the Komaggas Mountains in the east and the Atlantic Coastline in the west. The most prominent physical feature in the predominantly flat landscape of the study area is a low mountain range to the east and south of the Komas WEF development area. This range is characterised by relatively steep slopes and is visible across much of the study area (**Figure 3** and **Figure 4**).

Figure 3: View east-south-east across the proposed Komas WEF development area showing a typical view of the low range of mountains / hills which dominate the eastern sector of the study area.

Figure 4: View south-west from the secondary main road, (some 5 kms north of the proposed Komas WEF development area) showing the topography typical of much of the study area.

The topography and slope of the study area are illustrated in ***Map 3*** and ***Map 4*** in ***Appendix D***.

Visual Implications

Areas of flat relief, including the flat plains and the higher-lying ridges, are characterised by wide ranging vistas, although the vistas eastwards will be somewhat constrained by the Komaggas Mountains (**Figure 5**). Bearing in mind that wind turbines are very large structures (potentially up to 300m in height including the rotor blades), these could be visible from an extensive area around the site. Although the low mountain range immediately east of the site would limit views of the WEF from some areas in the eastern-most sector of the study area (**Figure 6**), across the remainder of the study area there would be very little topographic shielding to lessen the visual impact of the wind turbines from any locally-occurring receptor locations.

Figure 5: View south-east towards the Komaggas Mountains from the secondary road that traverses the northern sector of the study area showing limited vistas eastwards

Figure 6: View south-west from the secondary road that traverses the eastern sector of the study area (approximately 9 kms from the proposed Komas WEF Development Area) showing topographical screening provided by the low mountain range.

GIS technology was used to undertake a preliminary visibility analysis for the proposed turbine positions as per the revised (50 turbine) layout. A worst-case scenario was assumed when undertaking the analysis, in which the proposed turbine positions were considered with a maximum (tip) height of 300 m. Other infrastructure associated with the proposed Komas WEF was not factored into the visibility analysis as the visual impact of the associated infrastructure is generally not regarded as a significant factor when compared to the visual impact associated with wind turbines. The resulting viewshed indicates the geographical area from where turbines would be visible, i.e. the zone of visual influence. This analysis is based entirely on topography (relative elevation and aspect) which is an important factor that should be considered when determining the area of visual influence for a WEF development. The viewshed analysis does not consider any existing vegetation cover or built infrastructure which may screen views of the proposed development. This is again to assess the worst-case scenario.

In addition, detailed topographic data was not available for the broader study area and as such the visibility analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

The results of this analysis are shown in ***Map 5*** in ***Appendix D***. From this it is evident that the wind turbines would be highly visible from large parts of the study area.

1.3.3. Vegetation

According to Mucina and Rutherford (2006), much of the study area is covered by the Namaqualand Strandveld vegetation type which tends to occur on the flat to slightly undulating terrain of the coastal peneplain (**Figure 7**). Vegetation is low, species-rich shrubland dominated by erect and creeping succulent shrubs.

Figure 7: Typical vegetation cover prevalent in the proposed Komas WEF study area

The south-eastern sector of the study area is covered by the Namaqualand Sand Fynbos vegetation type which is typically associated with more undulating terrain. Vegetation is characterised by scattered tall shrubs (up to 1.5m high) with Restionaceae in between and although the canopy can be dense, vegetation is easily overgrazed to a sparse cover.

Other vegetation types in the broader study area include the tall shrubland associated with the Namaqualand Inland Duneveld vegetation type (**Figure 8**) as well as Namaqualand Klip Koppe Shrubland and Namaqualand Heuweltjie Strandveld. In addition, some exotic tree species and other typical garden vegetation has been established around farmsteads (**Figure 9**).

In general, however, much of the study area is characterised by natural low shrubland with transformation limited to a few isolated areas where pastoral activities such as livestock rearing is taking place.

Figure 8: Tall shrubs in the eastern sector of the proposed Komas study area

Figure 9: Example of the typical tall trees which have been established around farmsteads within the proposed Komas study area

Vegetation classification in the study area is shown in ***Map 6*** in ***Appendix D***.

Visual Implications

Vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening. In some instances however, tall exotic trees planted around farmhouses may restrict views from receptor locations.

1.3.4. Land Use

According to the South African National Land Cover dataset (GeoTerra Image 2018), much of the visual assessment area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland *(**Map 7** in **Appendix D)***

Agricultural activity in the area is severely restricted by the arid nature of the local climate and livestock rearing (sheep and cattle) is the dominant activity (**Figure 10**). There are no areas of cultivation present within the assessment zone and as such, the natural vegetation has been retained across much of the study area.

Figure 10: Evidence of livestock rearing taking place within the proposed Komas WEF study area

The nature of the climate and the corresponding land use has resulted in low densities of livestock and relatively large farm properties across the area. Thus the area has a very low density of rural settlement, with relatively few farmsteads scattered across the area (**Figure 11**). Built form in much of the proposed Komas WEF study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills (**Figure 12**).

Figure 11: Typical view of an isolated farmstead in the distance

Figure 12: Example of farm infrastructure found within the proposed Komas WEF study area

Other human influence is visible in the area in the form of the two secondary roads which traverse the study area. One road runs in an east to west direction, across the northern sector of the study providing a local link between Komaggas and Kleinsee. The other road affects a small section of the eastern sector of the study area, running in a north-south direction. Both of these are gravel roads which are predominantly used by local farmers to access the nearby towns of Komaggas and Kleinsee. Existing 66 kV power lines directly adjacent to the Komaggas-Kleinsee

link road form significant man-made features in an otherwise undeveloped landscape (**Figure 13**).

Figure 13: View of 66 kV power lines along the Komaggas-Kleinsee link road

The closest built-up areas are the small towns of Komaggas to the east and Kleinsee to the west. Both of these are situated well outside the visual assessment zone for the proposed Komas WEF and are thus not expected to have an impact on the visual character of the study area.

Visual Implications

As stated above, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. In addition, there are no towns or settlements in the visual assessment zone and thus, there are very low levels of human transformation and visual degradation across the major portion of the study area.

Significant elements of human transformation are however present in the northern and eastern sectors of the proposed Komas WEF study area, these being the gravel secondary roads and the existing 66 kV power lines. These elements are considered to have degraded the visual character to some degree.

Thus the proposed Komas WEF development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area, although elements of human transformation in parts of the study area will reduce the level of contrast to a degree.

1.3.5. Visual Character

The above physical and land use-related characteristics of the study area contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at

the opposite end of the scale to a largely natural undisturbed landscape. Visual character is also influenced by the presence of built infrastructure such as buildings, roads and other objects such as telephone or electrical infrastructure.

As mentioned above, much of the study area is characterised by natural landscapes with some rural / pastoral elements and low densities of human settlement. Livestock grazing is the dominant land use, with no areas of cultivation in evidence. Grazing activities have not transformed the natural landscape to any significant degree and as such, a large portion of the study area has retained its natural character and is dominated by largely natural, scenic views.

As there are no towns or built-up areas in the visual assessment zone influencing the overall visual character, there are very low levels of human transformation and visual degradation across much of the study area. Prominent anthropogenic elements in the study area however include 66kV power lines and the two gravel secondary roads in the study area. Other, less prominent elements present in the area include telephone poles, windmills, gravel farm access roads and farm boundary fences. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed WEF would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to be a typical Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide-open, uninhabited spaces sparsely punctuated by widely scattered farmsteads and small towns. Over the last couple of decades, an increasing number of tourism routes have been established within the Karoo, and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway or a stop on a longer journey from the northern parts of South Africa to the Western and Eastern Cape coasts. Examples of this may be found in the “Getaway Guide to Karoo, Namaqualand and Kalahari” (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can also be considered a valuable ‘cultural landscape’ in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002). In 1992 the World Heritage Committee[1] adopted the following definition for cultural landscapes:

Cultural landscapes represent the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.

Cultural Landscapes can fall into three categories (according to the World Heritage Committee's Operational Guidelines):

Cultural Landscapes can fall into three categories (according to the Committee's Operational Guidelines):

- "a landscape designed and created intentionally by man";
- an "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape"; and

[1]UNESCO, 2005. Operational Guidelines for the Implementation of the World Heritage Convention. UNESCO World Heritage Centre. Paris

- an "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element".

The typical Karoo landscape consisting of wide open plains, and isolated relief, interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is also a representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Kleinsee and Komaggas, engulfed by an otherwise rural environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context.

In terms of the types of cultural landscape listed above, the Karoo cultural landscape would fall into the second category, that of an organically evolved, “continuing” landscape.

In light of this, the study area, as visible to the viewer, represents a typical Karoo cultural landscape. This is important in the context of potential visual impacts associated with the development of a WEF as introducing this type of development could be considered to be a degrading factor in the context of the natural Karoo character of the study area. However, considering the fact that a number of WEFs have been developed or are likely to be developed across the Karoo, it is conceivable that WEFs may in the future become an integral part of the typical Karoo cultural landscape. In addition, the study area is located within the Renewable Energy Development Zone 8 (REDZ 8 - known as Springbok), and thus the relevant authorities support the concentration of renewable energy developments and associated transformation in this area.

In this instance visual impacts on the cultural landscape would be reduced by the fact that the area is relatively remote and there are very few tourism or nature-based facilities in the study area. In addition, the nearest recognised or potential tourism routes (R355 and the Namaqua Coastal route) are some distance away.

1.3.6. Sensitive Visual Receptor Locations

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the ‘sense of place’. The degree of visual impact experienced will however vary from one receptor to another, depending on the viewer’s perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;
- the presence of sites / routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and

- feedback from I&APs, as raised during the public participation process conducted as part of the BA study.

As the visibility of the WEF development would diminish exponentially over distance, receptors that are closer to the WEF would experience greater adverse visual impact than those located further away. Zones of visual impact were therefore delineated based on distance bands measured from the nearest proposed turbine placement. Based on the height and scale of the project, the distance intervals chosen for these zones of visual impact are as follows:

- 0 – 2 km (high impact zone)
- 2 – 6 km (moderate impact zone)
- 6 km – 10 km (low impact zone)

The degree of visual impact experienced will vary from one receptor location to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

- Value placed by the viewer on the natural scenic characteristics of the area;
- The viewer's sentiments toward the proposed structures. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape); and
- Degree to which the viewer will accept a change in the typical Karoo character of the surrounding area.

Preliminary desktop assessment of the study area found no tourism or nature-based facilities within the study area. The nearest nature-based facility is the Namaqua National Park to the south-east of the study area, some 16 kms from nearest turbine placement on the Komas WEF development site. It has been noted that although the WEF is outside the Viewshed Protection Area as defined in the Namaqua National Park Management Plan, the proposed development is partially within the National Park Buffer and the proposed Park Expansion Footprint. It is not possible to assess the visual impacts of the proposed Komas WEF on the proposed expansion area without more detailed information regarding the proposed use zones within this area. Considering the fact however that the approved Kap Vley WEF project is partially located within this expansion area, the construction of this WEF will introduce a more industrial character into the area, thus altering the inherent sense of place within the expansion area and reducing the significance of visual impacts resulting from the proposed Komas WEF.

The desktop assessment did however identify thirteen (13) potentially sensitive visual receptor locations within 10 kms of the boundary of the Komas WEF development area. Only ten (10) of these receptors are however located within 10 km of a turbine placement. It is believed that most, if not all of these receptors are existing farmsteads. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed development will likely alter natural vistas experienced from these dwellings, however the residents' sentiments toward the proposed development are unknown. The potentially sensitive visual receptor locations in relation to the zones of visual impact are indicated in ***Map 8*** *in* ***Appendix D.*** None of the identified receptor locations were considered to be sensitive receptors.

In many cases, roads, along which people travel, are regarded as sensitive receptor locations. There are no main or arterial roads in close proximity to the proposed development and the main thoroughfare in the study area is the secondary road which traverses the northern sector of the study area in an east to west direction. Another secondary road affects a small section of the eastern sector of the study area, running in a north-south direction. Both of these are gravel roads are used mainly by local farmers to access the nearby towns of Komaggas and Kleinsee. As such these routes are not valued or utilised for their scenic or tourism potential and are not considered to be visually sensitive.

Other thoroughfares in the study area are gravel access roads which are primarily used by local residents. They are therefore not regarded as visually sensitive as they are not valued or utilised for their scenic or tourism potential.

Visual receptor locations are examined in more detail in **Section 1.6.1** and **Section 1.6.3**.

1.3.7. Existing and Proposed Renewable Energy Developments

Although it is important to assess the visual impacts of the proposed WEF itself, it is equally important to assess the cumulative visual impact that could materialise if other renewable energy facilities (both wind and solar facilities) and associated infrastructure projects are developed in the broader area. Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. The number of renewable energy facilities within the surrounding area and their potential for large scale visual impacts could significantly alter the sense of place and visual character in the study area, as well as exacerbate the visual impacts on surrounding visual receptors.

Renewable energy facilities have the potential to cause large-scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. Although the associated power lines and substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.

Ten (10) renewable energy projects were identified within a 50 km radius of the proposed Komas WEF (***Map 9*** in ***Appendix D***). These projects, as listed in **Table 2** below, were identified using the DEA's Renewable Energy EIA Application Database for SA in conjunction with information provided by the CSIR and Komas. It is assumed that all of these renewable energy developments include grid connection infrastructure, although few details of this infrastructure were available at the time of writing this report.

These renewable energy projects include nine (9) wind energy projects and one (1) solar energy Photovoltaic (PV) project. Although solar PV developments are expected to have different impacts when compared to WEFs, all renewable energy developments are relevant as they contribute to the alteration of the visual character of the area.

The concentration of renewable energy facilities within the surrounding area could significantly alter the visual character in the broader region, as well as exacerbate the visual impacts on surrounding visual receptors, once constructed. The mitigation measures from the Visual Assessment studies for the other WEF developments in close proximity to the proposed Komas WEF have been considered in this assessment (where available).

Five of the proposed renewable energy facilities identified within 50 km of proposed Komas WEF are situated outside of the 10 km visual assessment zone. These include the Nigramoep PV Solar Energy facility, the two Blue Wind WEF projects north of Kleinzee, Koingnaas WEF and Springbok WEF, the nearest of which is 23 km from the proposed Komas WEF development area. Thus although these renewable energy facilities are expected to impact on the visual character of the broader area, given the distance from the study area, it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape or the visual receptors *within* the Komas WEF visual assessment zone.

Five of the proposed WEFs are however located within 10 km of the proposed Komas WEF, these being the proposed Gromis WEF, Kap Vley WEF, Kleinzee WEF, Namas WEF and Zonnequa WEF. Kap Vley WEF is in fact directly adjacent to the proposed Komas WEF development area, while the proposed Gromis WEF is less than 3 km away. The proposed

Gromis WEF is the subject of a separate BA process which is currently being undertaken in parallel to this BA process for the proposed Komas WEF. The proposed Kap Vley, Namas and Zonnequa WEFs are all in fact directly adjacent to the proposed Komas WEF development area, while the proposed Gromis WEF is less than 3 km away. The proposed Kap Vley WEF received EA from the then Department of Environmental Affairs on 25 October 2018, while both Namas WEF and Zonnequa WEF received EAs in February 2019.

Given the relatively flat terrain in the area and the lack of screening vegetation, it is likely that the turbines proposed for these WEFs will be visible to most of the visual receptors in the assessment area for the Komas WEF. As such, it is expected that the visual receptors located within the study area would experience exacerbated visual impacts should these developments ultimately be constructed in addition to the proposed Komas WEF.

The cumulative impacts anticipated as a result of the construction and operation of the proposed Komas WEF in combination with the other proposed renewable energy developments include:

- visual impacts on users of arterial and secondary roads;
- the visual impacts on residents of farmsteads / homesteads and settlements;
- the visual impacts of shadow flicker on sensitive and potentially sensitive visual receptors;
- the visual impacts of lighting at night on sensitive and potentially sensitive visual receptors;
- the visual impacts of construction and operation on sensitive and potentially sensitive visual receptors; and
- the visual impacts on the visual quality of the landscape and sense of place.

In addition to the other renewable energy developments in the surrounding area, the proposed Komas WEF development and its associated infrastructure could exert a greater visual impact within the surrounding area by further altering the visual character, thereby exposing a greater number of visual receptor locations to visual impacts.

The operation of the proposed Komas WEF development in addition to the other nearby renewable energy developments may also be perceived as unwelcome visual intrusions, particularly in more natural undisturbed settings.

Large construction vehicles and equipment during the construction phases will contribute further to the alteration of the natural character of the study area and will also expose a greater number of visual receptors to visual impacts associated with the construction phases, if the construction phases for all of these projects coincide.

The construction activities may thus also be perceived as further unwelcome visual intrusions, particularly in more natural undisturbed settings. Vehicles and trucks travelling to and from the proposed development sites on gravel access roads are expected to generate increased dust emissions in the greater area. The increased traffic on these roads and the dust plumes could create a greater visual impact within the greater area and may evoke more negative sentiments from surrounding receptors.

Surface disturbance during construction would also result in a greater amount of bare soil being exposed which could result in a greater visual contrast with the surrounding environment. In addition, temporary stockpiling of soil during construction may alter the landscape further. Wind blowing over these disturbed areas could result in an increased amount of dust which would have a visual impact. Impacts will however be reduced with the implementation of mitigation measures during the construction and operation phases in order to control dust emissions.

Security and operational lighting at the proposed renewable energy developments and their associated infrastructure could also result in a greater amount of light pollution and glare within the surrounding area, which could be a significant annoyance to surrounding residents.

Thus, from a visual perspective, the concentration of renewable energy facilities as proposed will inevitably change the visual character of the area and alter the inherent sense of place, introducing an increasingly industrial character into a largely natural area, and thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures put forward by the visual specialists in their respective studies.

It should be noted however that the study area is located within the REDZ 8 known as Springbok, and thus the relevant authorities support the concentration of renewable energy developments in this area. In addition, it is possible that the proposed WEFs (i.e. the proposed Komas, Gromis, Kap Vley, Namas and Zonnequa WEFs) in close proximity to each other could be seen as one large WEF rather than five separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

Table 2: Renewable energy developments proposed within a 50km radius of the Komas WEF application site

DEA Reference Number	PROJECT TITLE	APPLICANT	EAP	TECHNOLOGY	MEGAWATT	STATUS
12/12/20/2331/1	Project Blue Wind Energy Facility Near Kleinsee within the Nama Khoi Local Municipality(LM), Northern Cape Province	Diamond Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
12/12/20/2331/3	Project Blue Wind Energy Facility (Phase 2 and 3) near Kleinsee within the Nama Khoi LM, Northern Cape Province	WWK Development (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	74 MW	Approved
12/12/20/2212	Proposed 300 MW Kleinzee WEF in the Northern Cape Province	Eskom Holdings SOC Limited	Savannah Environmental Consultants (Pty) Ltd	Wind	300 MW	Approved
14/12/16/3/3/2/1046	The 300 MW Kap Vley WEF and its associated infrastructure near Kleinsee, Nama Khoi LM, Northern Cape Province	Kap Vley Wind Farm (Pty) Ltd	Council for Scientific and Industrial Research	Wind	300 MW	Approved
12/12/20/2154	Proposed Construction of the 7.2 MW Koingnaas Wind Energy Facility within The De Beers Mining Area on the Farm Koingnaas 745 Near Koingnaas, Northern Cape Province	Just PalmTree Power Pty Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	7.2 MW	Approved
14/12/16/3/3/1/1971	Proposed Namas Wind Farm near Kleinsee, Namakwaland Magisterial District, Northern Cape	Genesis Namas Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
14/12/16/3/3/1/1970	Proposed Zonnequa Wind Farm near Kleinsee, Namakwaland Magisterial District, Northern Cape	Genesis Zonnequa Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
12/12/20/1721	The proposed Springbok Wind Energy facility near Springbok, Northern Cape Province	Mulilo Springbok Wind Power (Pty) Ltd	Holland & Associates Environmental Consultants	Wind	55.5 MW	Approved

DEA Reference Number	PROJECT TITLE	APPLICANT	EAP	TECHNOLOGY	MEGAWATT	STATUS
14/12/16/3/3/1/416	Nigramoep PV Solar Energy Facility on a site near Nababeep, Northern Cape	To review	To review	Solar PV	20 MW	In process
14/12/16/3/3/1/557	The Kokerboom Photovoltaic Solar Power Facility On A Site South Of Springbok Within The Nama Khoi Local Municipality, Northern Cape Province	Brax Energy (Pty) Ltd	EScience Associates (Pty) Ltd	Solar PV	10 MW	Approved
TBA	The proposed Gromis WEF and associated infrastructure near Kleinsee in the Northern Cape Province	Genesis ENERTRAG Gromis Wind (Pty) Ltd	Council for Scientific and Industrial Research	Wind	200 MW	In process

1.4. APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

Key legal requirements pertaining to the proposed Komas WEF development are as follow:

In terms of Section 24(3) NEMA in GN R. 114 of 16 February 2018, the proposed Komas WEF development site is located within the REDZ 8 known as Springbok. In light of this, a BA Process as contemplated in terms of regulation 19 and 20 of the EIA Regulations 2014 (as amended), is required for the authorisation of this large scale WEF. As part of this BA process, the need for a VIA (including flicker) to be undertaken has been identified in order to assess the potential visual impact of the proposed Komas WEF.

There is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however in addition to NEMA the following legislation has relevance to the protection of scenic resources:

- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003); and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999).

Based on the above Acts protected /conservation areas and sites /routes with cultural or symbolic value have been taken into consideration when identifying sensitive and potentially sensitive receptor locations and rating the sensitivity of the study area.

1.5. IDENTIFICATION OF KEY ISSUES

1.5.1. Key Issues Identified

The potential visual issues / impacts identified during the BA process for the proposed Komas WEF development include:

- Potential visual intrusion resulting from vehicles and equipment during construction and decommissioning phases;
- Potential impacts of increased dust emissions from construction / decommissioning activities and related traffic during construction and decommissioning phases;
- Potential visual scarring of the landscape as a result of site clearance and earthworks during construction;
- Potential alteration of the visual character of the area during operation;
- Potential visual intrusion resulting from wind turbines located on ridge lines and higher plateaus during operation;
- Potential visual clutter in the landscape resulting from the BESS, on-site substation, laydown areas, O&M structures and connecting a 132 kV power line, which is the subject of a separate BA process;
- Potential alteration of the night time visual environment as a result operational and security lighting as well as navigational lighting on top of the wind turbines during operation;
- Potential visual intrusion of any remaining infrastructure on the site during decommissioning; and
- Combined visual impacts (i.e. cumulative visual impacts) from several renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area.

No comments or feedback pertaining to the visual environment have been received from the public participation process to date. The DBAR will be released for public comment. Accordingly, any issues raised of a visual nature during the public participation process will be incorporated into this report.

1.5.2. Identification of Potential Impacts

Potential visual issues / impacts resulting from the proposed Komas WEF and associated infrastructure are outlined below.

1.5.3. Construction Phase

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction laydown areas and material stockpiles;
- Potential impacts of increased dust emissions from construction activities and related traffic;
- Potential visual scarring of the landscape as a result of site clearance and earthworks; and
- Potential visual pollution resulting from littering on the construction site.

1.5.4. Operational Phase

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area;
- Potential visual clutter caused by the BESS, substation and other associated infrastructure on-site;
- Potential visual effect on surrounding farmsteads; and
- Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.

1.5.5. Decommissioning Phase

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
- Potential impacts of increased dust emissions from decommissioning activities and related traffic; and
- Potential visual intrusion of any remaining infrastructure on the site.

1.5.6. Cumulative Impacts

- Combined visual impacts from several renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area; and
- Combined visual impacts from several renewable energy facilities in the broader area could potentially exacerbate visual impacts on visual receptors.

1.5.7. No Go Alternative

- The no-go alternative is considered in the assessment of impacts chapter.

1.6. ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

1.6.1. Results of the Field Study

As previously stated, the field investigation and photographic review was conducted between the 10th and the 13th of February 2020. A summary of the findings of this investigation is provided below.

Terrain

The field investigation confirmed that the terrain across much of the study area is relatively flat and as such, a WEF would be prominent on the skyline if placed on the ridges of the mountain range. These mountains are however relatively low and thus only visually significant at a local scale.

Visual Character

The broader area surrounding the proposed Komas WEF development area is largely natural with some rural / pastoral elements. Accordingly, there are very low levels of human transformation and visual degradation across the major portion of the study area.

Visibility

The field investigation also confirmed that wide vistas are experienced across much of the study and that a WEF would be highly visible to most of the farmsteads located within the visual assessment area. Many of these farmsteads are however some distance from the WEF development area and this factor would reduce the degree of visibility.

The viewshed of the proposed WEF extends across most of the study area and is only slightly restricted by the low mountain range to the east and south of the WEF development area.

Scenic Resources / Sensitive Visual Receptors

The field study confirmed that there are few scenic resources in the study area and no tourism or nature-based facilities. The settlement density in the study area is very low and farmsteads are widely scattered across the study area. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed development will likely alter natural vistas experienced from these dwellings, however the residents' sentiments toward the proposed development are unknown.

The desktop assessment identified thirteen (13) potentially sensitive locations, but due to access restrictions it was not possible to confirm the presence of farmsteads at all of these locations. For the purposes of this report however, it has been assumed that these locations are potentially sensitive receptor locations.

Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

The field study confirmed that much of the study area is characterised by flat terrain, low shrubland vegetation and very little transformation. As a result, the visual absorption capacity in the study area is rated as low.

1.6.2. Environmental Sensitivity Map

Visual Sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e. topography, landform and land cover), the spatial distribution of potential receptor locations, and the likely value judgements of these receptor locations towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the area, SiVEST has developed a matrix based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix (***Table 3***), the visual sensitivity of the area is broken up into a number of categories, as described below:

- **High** - The introduction of a new development such as a WEF would be likely to be perceived negatively by receptor locations in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptor locations.
- **Moderate** - Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.
- **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 3: Environmental factors used to define visual sensitivity of the study area

FACTORS	DESCRIPTION	RATING									
		LOW							*HIGH*		
		1	2	3	4	5	6	7	8	9	10
Pristine / natural / scenic character of the environment	Study area is largely natural with some areas of scenic value and some pastoral elements.										
Presence of sensitive visual receptors	No sensitive receptors have been identified in the study area, but some potentially sensitive receptors were identified.										
Aesthetic sense of place / visual character	Visual character is typical of Karoo Cultural landscape.										
Irreplaceability / uniqueness / scarcity value	Although there are some areas of scenic value within the study area, these are not rated as highly unique.										
Cultural or symbolic meaning	Much of the area is typical of a Karoo Cultural landscape.										
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.										
Sites of special interest present in the study area	No sites of special interest were identified in the study area.										
Economic dependency on scenic quality	No tourism/leisure based facilities were identified in the area										
International / regional / local status of the environment	Study area is typical of Karoo landscapes										
**Scenic quality under threat / at risk of change	Introduction of a WEF will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned will introduce an increasingly industrial character, giving rise to significant cumulative impacts										

**Any rating above ‘5’ will trigger the need to undertake an assessment of cumulative visual impacts.

Low				Moderate					High
10	20	30	40	50	60	70	80	90	100

Based on the above factors, the total score for the study area is 41, which according to the scale above, would result in the area being rated as having a low visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts, and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas, leisure-based tourism activities or sensitive receptor locations were identified in the study area and relatively few potentially sensitive receptors were found to be present.

In the initial stages of the BA process, all project specialists were requested to conduct a screening assessment to inform the site layout for the proposed WEF. The aim of this exercise was to indicate any areas which should be precluded from the proposed development footprint. From a visual perspective, these would be areas where the establishment of wind turbines would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

A preliminary visibility analysis, based on a worst case scenario structure height of 300m (tip height), showed that turbines placed on the site would be visible from all identified potentially sensitive receptors and as such, no areas on the site were significantly more sensitive than the remainder of the site. It should be noted however that the visual prominence of a tall structure such as a wind turbine would be exacerbated if located on a ridge top or high lying plateau. As such, the screening assessment recommended that any ridges within the WEF development area should be precluded from the WEF development footprint.

Another concern identified in the Visual Screening assessment is the direct impact of the turbines on any farmsteads or receptors located on the WEF application sites. Accordingly, it was recommended that a 500 m exclusion zone be placed around any farmstead located on, or within 500 m of the WEF development area. The exclusion of turbines from this zone would reduce the direct impact of the turbines on the occupants of the farmsteads, especially those impacts related to shadow flicker.

In assessing visual sensitivity, the Landscape Theme of the National Environmental Screening Tool was used to determine the relative landscape sensitivity for WEF development. This tool identifies areas of Very High and High sensitivity in respect of WEF development on the Komas site. The identification of areas of “Very High” landscape sensitivity in this instance is largely based on natural features such as mountain tops, high ridges and steep slopes.

The Screening Tool is however a very high level, desktop study and as such the results of the study must be viewed against factors affecting visual impact, such as:

- the presence of visual receptors;
- the distance of those receptors from the proposed development; and
- the likely visibility of the development from the receptor locations.

In addition, the recommendation in the Landscape Section of the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (CSIR, 2015) is that, where areas of very high or high sensitivity have been identified, further assessment would be required before development can take place.

Hence the “High” and “Very High” Sensitivity ratings ascribed by the Screening Tool do not preclude development but rather should be viewed as zones where the number of turbines should be limited where possible.

Visually sensitive areas in respect of the proposed Komas WEF development are shown in ***Map 10*** in ***Appendix D***. For the most part, these areas of visual sensitivity have been taken into account in the revised turbine layout as shown in Map 10, and only two turbines are located on a demarcated ridge.

It should be noted that this sensitivity rating applies to turbine development only. The visual impacts resulting from the associated infrastructure are considered to have far less significance when viewed in the context of multiple wind turbines and as such the associated infrastructure has been excluded from the sensitivity analysis.

1.6.3. Receptor Impact Rating

In order to assess the impact of the proposed development on the identified potentially sensitive receptor locations, a matrix that takes into account a number of factors has been developed, and is applied to each receptor location.

The matrix is based on the factors listed below:

- Distance of a receptor location from the proposed development (zones of visual impact);
- Presence of screening factors (topography, vegetation etc.); and
- Visual contrast of the development with the landscape pattern and form.

These factors are considered to be the most important factors when assessing the visual impact of a proposed development on a potentially sensitive receptor location in this context. It should be noted that this rating matrix is a relatively simplified way of assigning a likely representative visual impact, which allows several factors to be considered. Experiencing of visual impacts is however a complex and qualitative phenomenon and is thus difficult to quantify accurately. The matrix should therefore be seen as a representation of the likely visual impact at a visual receptor location. Part of its limitation lies in the quantitative assessment of what is largely a qualitative or subjective impact.

As described above, distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 2 km of the proposed WEF development. Beyond 10 km, the visual impact of a WEF diminishes considerably, as the development would appear to merge with the elements on the horizon.

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings and topographic features. For example, a grove of trees or a series of low hills located between a receptor location and an object could completely shield the object from the receptor. As such, where views of the proposed development are completely screened, the receptor has been assigned an overriding negligible impact rating, as the development would not impose any impact on the receptor.

The visual contrast of a development refers to the degree to which the proposed WEF development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on visual receptors within a specific context. A development that is incongruent with the surrounding area could have a significant visual impact on visual receptors as it may change the visual character of the landscape.

As previously stated, however, the study area is located within the REDZ 8, and as such the concentration of renewable energy developments is supported in this area. This could result in an incremental change in the visual character of the area and in the typical land use patterns over time towards a less rural environment within which a WEF would be less incongruous.

The matrix returns a score, which in turn determines the visual impact rating assigned to each receptor location described in ***Table 4*** below.

Table 4: Ratings scores

Rating	Overall Score
High Visual Impact	8-9
Medium Visual Impact	5-7
Low Visual Impact	3-4
Negligible Visual Impact	(overriding factor)

An explanation of the matrix is provided in ***Table 5*** below.

Table 5: Visual assessment matrix used to rate the impact of the proposed development on sensitive and potentially sensitive receptors

	VISUAL IMPACT RATING			
VISUAL FACTOR	**HIGH**	**MEDIUM**	**LOW**	**<u>OVERRIDING FACTOR</u>: NEGLIGIBLE**
Distance of receptor away from proposed development	0 ≤= 2km **Score 3**	2km - 6km **Score 2**	6km - 10km **Score 1**	> 10km
Presence of screening factors	No / almost no screening factors – development highly visible **Score 3**	Screening factors partially obscure the development **Score 2**	Screening factors obscure most of the development **Score 1**	Screening factors completely block any views towards the development, i.e. the development is not within the viewshed
Visual Contrast	**High contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 3**	**Moderate contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 2**	**Corresponds** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 1**	

Table 6 below presents a summary of the overall visual impact of the proposed development on each of the potentially sensitive visual receptor locations identified within the study area. As previously mentioned, due to access limitations, the identified potentially sensitive visual receptor locations were not fully investigated from a visual perspective during the time of the field investigation. Notwithstanding this limitation, these receptor locations are still regarded as being potentially sensitive to the visual impacts associated with the proposed development and were assessed as part of the VIA by desktop means where required.

The Expansion Footprint for the Namaqua National Park has not been included in the receptor impact rating exercise. As previously mentioned, it is not possible to assess the impacts of the proposed Komas WEF on the proposed expansion area based on the information currently available.

It should be noted that this exercise has been updated in line with the revised turbine layout provided by Komas in July 2020.

Table 6: Summary - Potentially Sensitive Visual Receptor Rating

Receptor Location	Distance to Nearest Turbine	Screening	Contrast	OVERALL IMPACT RATING
R02 – Farmstead	Medium (2)	Medium (2)	High (3)	**MEDIUM (7)**
R03 – Farmstead	High (3)	Medium (2)	High (3)	**HIGH (8)**
R04 – Farmstead	Medium (2)	Medium (2)	High (2)	**MEDIUM (6)**
R05 – Farmstead	Low (1)	High (3)	Medium (2)	**MEDIUM (6)**
R06 – Farmstead	>10KM FROM NEAREST TURBINE			**NEGLIGIBLE**
R10 – Farmstead	Low (1)	Medium (2)	Medium (2)	**MEDIUM (5)**
R12 – Farmstead	Low (1)	High (3)	High (3)	**MEDIUM (7)**
R14 – Farmstead	High (3)	High (3)	High (3)	**HIGH (9)**
R15 – Farmstead	Medium (2)	High (3)	High (3)	**HIGH (8)**
R16 – Farmstead	>10KM FROM NEAREST TURBINE			**NEGLIGIBLE**
R18 – Farmstead	Low (1)	Medium (2)	High (3)	**MEDIUM (6)**
R20 – Farmstead	>10KM FROM NEAREST TURBINE			**NEGLIGIBLE**
R21 – Farmstead	Low (1)	Medium (2)	High (3)	**MEDIUM (6)**

The table above shows that three (3) of the potentially sensitive receptors would experience high levels of visual impact as a result of the proposed Komas WEF development. Most of these receptors are farmsteads located in relatively close proximity to the WEF development area and this factor, in conjunction with the relatively flat terrain in the area and the lack of screening vegetation, gives rise to a high impact rating. None of these receptors are tourism-related facilities however, and as such they are not considered to be Sensitive Receptors. Thus the high impact rating assigned will not affect the overall impact ratings determined in Section **1.6.6**. In addition, it should be noted that two of these receptors, namely **R14 and R15**, are located on the application site for the proposed Kap Vley WEF and a fourth, R03 is located on the application site for the proposed Zonnequa WEF and as such it is possible that residents at these locations may not perceive the proposed Komas WEF in a negative light.

Seven (7) of the remaining receptor locations would be subjected to medium levels of visual impact as a result of the proposed development. The remaining three (3) receptors are located more than 10km from the nearest turbine placement and as such levels of visual impact experienced from this location would be negligible.

1.6.4. Photomontages

Photomontages (visual simulations) have been compiled in order to provide an indication of how the proposed Komas WEF development would appear from various viewpoints within the visual assessment area. An indicative range of locations (referred to as "viewpoints") were selected for modelling purposes (***Map 11*** in ***Appendix B***) and photomontages were produced from these viewpoints. The preliminary wind turbine layout for the proposed Komas WEF as provided by Komas was modelled in 3D, at the correct scale, and then superimposed onto landscape photographs taken during the site visit. Although the turbine layout for the proposed Komas WEF has been revised, the resulting photomontages are still considered relevant as they illustrate how views from each selected viewpoint will be transformed by the proposed WEF development if the wind turbines are erected on the site as proposed.

The following assumptions and limitations are of relevance for the photomontages:

- A range of locations was selected for modelling purposes to provide an indication of how views will be transformed from different locations within the study area. It should be noted that the photomontages are specific to each location, and that even sites in close proximity to one another may be affected in different ways by the proposed WEF development.
- The photomontages represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated.
- At the time the VIA was undertaken the proposed project was still in the planning stages and as such the turbine layout, as provided by the client, may change. In addition, new infrastructure associated with the WEF has not been included in the models.
- These photomontages have been provided merely as indicative illustrations and should not be seen as an accurate representation of the proposed Komas WEF turbine layout.

View Point 1 (-29.853852S; 17.249608E): View east-north-east towards the proposed Komas WEF development area from Portion 4 of the Farm Zonnekwa No 328 (receptor No R02), approximately 2.3 km from the nearest proposed turbine position

Figure 14: View east-north-east from View Point 1- Pre-Construction

Figure 15: View east-north-east from View Point 1 - Post-Construction

As indicated in **Figure 15** above, the proposed wind turbines will be highly visible from this location due to the relatively close proximity of the turbines (i.e. within 3 km), the flat terrain and the lack of screening vegetation. The wind turbines would contrast highly with the dominant natural landscape elements as there are few tall linear elements in view from this location.

View Point 2 (-29.761935S; 17.289925E): View south towards the proposed Komas WEF development area from the secondary road which traverses the northern sector of the study area, approximately 5.2 km from the nearest proposed turbine position.

Figure 16: View south from View Point 2- Pre-Construction

Figure 17: View south from View Point 2- Post-Construction

As indicated in **Figure 17** above, the wind turbines will be visible from this location. Apart from some slight undulation, the terrain is mostly flat and the low scrubland vegetation does not provide any significant screening. Although the wind turbines would contrast highly with the dominant natural landscape elements, potential visual impacts would be reduced by the distance from the proposed Komas WEF development area (5.2km).

View Point 3 (-29.842927S; 17.178665E): View east-south-east towards the proposed Komas WEF development area from the Remainder of the Farm Rooivlei No 327 (Receptor No R10), approximately 8.4 km from the nearest proposed turbine position.

Figure 18: View east-south-east from View Point 3- Pre-Construction

Figure 19: View east-south-east from View Point 3- Post-Construction

As indicated in **Figure 19** above, the rotor blades of the wind turbines will be visible from this location. Apart from some slight undulation, the terrain is mostly flat and the low scrubland vegetation does not provide any significant screening of views from this location. Although the wind turbines would contrast highly with the dominant natural landscape elements, potential visual impacts would be reduced by the distance from the proposed Komas WEF development area (8.3 km).

1.6.5. Night-time Impacts

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. The night scene in areas where there are numerous light sources will be visually degraded by the existing light pollution and therefore additional light sources are unlikely to have a significant impact on the nightscape. In contrast, introducing light sources into a relatively dark night sky will impact on the visual quality of the area at night.

Much of the study area is characterised by natural areas with rural / pastoral elements and low densities of human settlement and as a result, relatively few light sources are present in the area surrounding the proposed development site. The closest built-up area is the town of Komaggas which is situated approximately 18 km to the north-east of the proposed application site. In addition, Kleinsee is located approximately 26 km west of the WEF development area. These built-up areas are thus situated too far away to have significant impacts on the night scene. At night, the study area is therefore largely characterised by a picturesque dark starry sky and the visual character of the night environment is considered to be 'unpolluted' and pristine. The most prominent light sources within the study area at night include isolated lighting from scattered farmsteads and transient light from the passing cars travelling along the gravel access roads.

Given the scale of the proposed Komas WEF, the operational and security lighting required for the project is likely to intrude on the nightscape and create glare, which will contrast with the extremely dark backdrop of the surrounding area. In addition, the red hazard lights placed on top of the

turbines may be particularly noticeable as their colour will differ from the few lights typically found within the environment and the flashing will draw attention to them.

1.6.6. Overall Visual Impact Rating

1.6.7. Potential Impact 1 (Construction Phase)

Nature of the impact

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction laydown areas and material stockpiles;
- Potential impacts of increased dust emissions from construction activities and related traffic;
- Potential visual pollution resulting from littering on the construction site; and
- Potential visual scarring of the landscape as a result of site clearance and earthworks.

Significance of impact without mitigation measures

The significance of visual impacts without mitigation measures during construction are rated as **Moderate**.

Proposed mitigation measures

- Carefully plan to minimise the construction period and avoid construction delays.
- Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Vegetation clearing should take place in a phased manner.
- Make use of existing gravel access roads where possible.
- Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.
- Ensure that dust suppression techniques are implemented:
    - on all access roads;
    - in all areas where vegetation clearing has taken place; and
    - on all soil stockpiles.
- Maintain a neat construction site by removing litter, rubble and waste materials regularly.

Significance of impact with mitigation measures

Mitigation measures will result in a reduction of visual impacts during construction from Moderate to Low.

1.6.8. Potential Impact 2 (Operational Phase)

Nature of the impact

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area;
- Potential visual clutter caused by the BESS, substation and other associated infrastructure on-site.
- Potential visual effect on surrounding farmsteads; and
- Potential alteration of the night-time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.

Significance of impact without mitigation measures

The significance of visual impacts without mitigation measures during operation are rated as **moderate**.

Proposed mitigation measures

Design Phase:

- In areas of 'Very High' and 'High Sensitivity', the number of turbines should be limited, where possible.
- No turbines should be placed within 500 m of the dwellings or farmsteads which are situated within the proposed Komas WEF development area.
- Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity.
- Turbine colours should adhere to the Civil Aviation Authority (CAA) requirements.

Operational Phase:

- If possible, turbines should be painted plain white, as this is a less industrial colour. Bright colours and logos on the turbines should be kept to a minimum.
- Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011).
- If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can give the impression of unity which will lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011).
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Where practically possible, the O&M buildings should not be illuminated at night.
- Cables should be buried underground where feasible.
- The operation and maintenance buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible.
- Unless there are water shortages, dust suppression techniques must be implemented on all access roads.

Significance of impact with mitigation measures

Mitigation measures will result in a minor reduction of visual impacts during operation, but the impact rating will remain **Moderate**.

1.6.9. Potential Impact 3 (Decommissioning Phase)

Nature of the impact

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; and
- Potential impacts of increased dust emissions from decommissioning activities and related traffic.

Significance of the impact

The significance of visual impacts without mitigation measures during decommissioning is however rated as **Moderate.**

Proposed mitigation measures

- Carefully plan to reduce the decommissioning period.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Maintain a neat decommissioning site by removing rubble and waste materials regularly.
- Make use of existing gravel access roads where possible.
- Dust suppression techniques must be implemented on all gravel access roads.

Significance of impact with mitigation measures

Mitigation measures will result in some reduction of visual impacts during decommissioning and the impact rating will be reduced to **Low**.

1.6.10. Cumulative Impacts

Nature of the impact

- Combined visual impacts from several renewable energy facilities in the broader area during the construction and operation phases could potentially alter the sense of place and visual character of the area; and
- Combined visual impacts from several renewable energy facilities in the broader area during construction and operations phases could potentially exacerbate visual impacts on visual receptors.

Significance of impact without mitigation measures

The significance of the cumulative visual impacts without mitigation measures during construction and operation are rated as **Moderate,** although this would depend on the final development layouts for each of the relevant WEFs.

Proposed mitigation measures

- Carefully plan to minimise the construction period and avoid construction delays.
- Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Vegetation clearing should take place in a phased manner.
- Access roads must be kept as narrow as possible and existing gravel access roads must be used where possible.
- Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.
- Ensure that dust suppression techniques are implemented:
    - on all access roads;
    - in all areas where vegetation clearing has taken place; and
    - on all soil stockpiles.
- Maintain a neat construction site by removing litter, rubble and waste materials regularly.
- Formulation and adherence to an EMPr, monitored by an Environmental Control Officer (ECO).
- In areas of 'Very High' and 'High Sensitivity', the number of turbines should be limited, where possible.
- Steep slopes (>1:5 gradient) should be avoided.
- No turbines should be placed within 500 m of the dwellings or farmsteads which are situated within the proposed development area (i.e. 500m exclusion buffers – see Section 1.6.2).

- Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity.
- Turbine colours should adhere to CAA requirements.
- If possible, turbines should be painted plain white, as this is a less industrial colour. Bright colours and logos on the turbines should be kept to a minimum.
- Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011).
- If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can give the impression of unity which will lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011).
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Where practically possible, the O&M buildings should not be illuminated at night.
- Cables should be buried underground where feasible.
- The O&M buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible.
- Unless there are water shortages, dust suppression techniques must be implemented on all access roads.

Significance of impact with mitigation measures

Mitigation measures will not result in a reduction of cumulative visual impacts during construction and operation. **Moderate** cumulative visual impacts are still expected during the construction and operational phases.

1.6.11. No Go Impacts

Nature of the impact

The 'No Go' alternative is essentially the option of not developing a WEF in this area. The area would thus retain its visual character and sense of place and there would be no visual impacts.

Significance of impact without mitigation measures

Not applicable.

Significance of impact with mitigation measures

Not applicable*.*

1.7. IMPACT ASSESSMENT SUMMARY

The BA process requires that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. The CSIR has developed an impact assessment rating matrix for this purpose. The assessment of impacts and recommendation of mitigation measures as discussed above are collated in ***Table 7*** - ***Table 10*** below.

Please refer to ***Appendix C*** for an explanation of the impact assessment rating methodology.

Table 7: Impact assessment summary table for the Construction Phase

Impact pathway	Nature of potential impact/risk	Status [2]	Extent [3]	Duration [4]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated ?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
VISUAL															
CONSTRUCTION PHASE															
Direct Impacts															
Construction Activities	Visual intrusion, landscape scarring and dust emissions	Negative	Local	Short-Term	Substantial	Very likely	High	Low	Moderate	No	Yes	▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Position laydown areas and related storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of	Low	4	Medium

[2] Status: Positive (+) ; Negative (-)
[3] Site; Local (<10 km); Regional (<100); National; International
[4] Very short-term (instantaneous); Short-term (<1yr); Medium-term (1-10 years); Long-term (project duration); Permanent (beyond project decommissioning)

Impact pathway	Nature of potential impact/risk	Status [2]	Extent [3]	Duration [4]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated ?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												vehicles and trucks travelling to and from the proposed sites, where possible. ▪ Ensure that dust suppression techniques are implemented: o on all access roads; o in all areas where vegetation clearing has taken place; o on all soil stockpiles. ▪ Maintain a neat construction site.			

Table 8: Impact assessment summary table for the Operational Phase

Impact pathway	Nature of potential impact/risk	Status	Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
VISUAL															
OPERATIONAL PHASE															
Direct Impacts															
Operational Activities	Alteration of visual character, visual intrusion, visual clutter, dust emissions and light pollution and glare	Negative	Local	Long Term	Substantial	Very likely	High	Low	Moderate	No	Yes	*Design Phase:* ▪ In areas of 'Very High' and 'High Sensitivity', the number of turbines should be limited, where possible. ▪ No turbines should be placed within 500m of dwellings or farmsteads which are situated within the WEF development area. ▪ Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. ▪ Turbine colours should adhere to CAA requirements. *Operational Phase:* ▪ If possible, turbines should be painted plain white, as this is a less	Moderate	3	Medium

Impact pathway	Nature of potential impact/risk	Status	Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												industrial colour. Bright colours and logos on the turbines should be kept to a minimum. ▪ Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). ▪ If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can give the impression of unity which will lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011) ▪ Light fittings for security at night should reflect			

Impact pathway	Nature of potential impact/risk	Status	Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												the light toward the ground and prevent light spill. ▪ Where practically possible, the operation and maintenance buildings should not be illuminated at night. ▪ Cables should be buried underground where feasible. ▪ The operation and maintenance buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. ▪ Unless there are water shortages, dust suppression techniques must be implemented on all access roads.			